

GIAHS proposal  
**Traditional Tea Agrosystem  
in Hadong**

July, 2016



# Content

## **SUMMARY INFORMATION/ 03**

### **1. Description of the Agricultural Heritage system / 04**

<b>Global(or national) importance of Hadong traditional tea agrosystem</b> .....	04
1.1 Food and livelihood security .....	06
1.2 Biodiversity and ecosystem function .....	09
1.3 Knowledge systems and adapted technologies .....	15
1.4 Culture, social organizations and customs .....	21
1.5 Remarkable landscapes and land management features .....	24

### **2. Other social and cultural characteristics pertinent to the management of the agricultural system / 27**

2.1 The oldest tea tree of Hadong and the first tea field .....	27
2.2 Living manners preserved through the tea agriculture .....	28
2.3 Traditional tea cups and tea utensils .....	29

### **3. Historic relevance / 30**

3.1 The historical introduction of Hadong traditional tea .....	30
3.2 Historical records related to Hadong tea .....	31
3.3 Hadong traditional tea and the Buddhist culture .....	32

### **4. Contemporary relevance / 33**

4.1 Value of tea agriculture as a future resource .....	33
4.2 Use of tea fields as a tourism cultural resource .....	33

### **5. Threats and challenges / 34**

5.1 The expansion of market through the FTA .....	34
5.2 Threats to tea field conservation due to decrease of labor population .....	35
5.3 The Destruction of the wild tea fields by developing tourist destinations .....	36
5.4 Natural farming, keeping clean natural environment .....	47

### **6. Practical considerations / 48**

6.1 Effort to be designated as Global Important Agricultural Heritage .....	38
6.2 Promoting projects for conservation and utilization of agricultural heritage .....	39
6.3 Strengthening of residents abilities with tea producers at the center .....	40

### **7. Dynamic Conservation Plan for GIAHS selected site / 41**

7.1 Establishing plans for conservation, management of Hadong traditional tea agriculture .....	41
7.2 Action plans to conserve and utilize the traditional tea agrosystem .....	42

## **SUGGESTED ANNEXES /48**

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

**SUMMARY INFORMATION**

<p>Name/Title of the Agricultural Heritage System:  <b>Traditional Tea Agrosystem in Hadong</b></p>	
<p>Requesting Agency/Organization  <b>Office of Hadong County</b></p>	
<p>Cooperating Organizations</p> <p>(1) Ministry of Agriculture, Food and Rural Affairs(MAFRA)  (2) Office of Gyeongsangnam-do Province  (3) Institute of Hadong Green Tea  (4) Conservation Council for Hadong Traditional Tea Agrosystem  (5) Hadong Tea Producers Council  (6) Korea Rural Heritage Association  (7) Agricultural Heritage Research Center of MyeongsoIMC Inc.  (8) Institute of Biodiversity and Ecosystem Services, Dongguk University</p>	
<p>Country/location/Site</p> <p>- Latitude 35°11'18"N, Longitude 127°37'31"E (Office of Hwage-myun standard)  - Located at the northwestern end of Hadong-gun, Gyeongsangnam-do, Korea, Hwage-myeon is a steep mountainous region of which 91% of the total area is forests composed of tea trees and forest flora. The traditional tea fields are mainly distributed along the slopes at the valleys of Hwageacheon Stream adjacent to Seomjin River and around the temples such as Chilbul Temple and Ssanggye Temple.</p>	
<p>Accessibility of the site</p> <ul style="list-style-type: none"> <li>- To reach from outside of South Korea, one can come into the country via Incheon International Airport(ICN) or fly to Sachun Airport from Seoul Gimpo Airport(GMP) which takes 55minutes and approach to the Hwage-myun by car (1hour)</li> <li>- To take bus, one can take the bus from Seoul South Terminal and get off at Hwage City Bus Terminal</li> <li>- To use the train, one can take KTX from Seoul Station, get off at Suncheon Station or Guryegu Station, and take the cross-country bus or a car from the station to Hwage-myeon</li> </ul>	
<p>Approximate Surface Area: 5.98km<sup>2</sup> / 134.35km<sup>2</sup> (Area cultivation traditional tea / Area of Hwage-myeon)</p>	
<p>Agro-Ecological Zone/s: Traditional tea area</p>	
<p>Topographic features: A hilly and mountainous area surrounded by Mt. Jiri</p>	
<p>Climate Type: Oceanic climate, Rainy region</p>	
<p>Approximate Population: 3,424 people / 1,658 households (801 households farming Hadong tea)</p>	
<p>Main Source of Livelihoods: Agriculture, Fisheries, Tourism service</p>	

## 1. Description of the Agricultural Heritage System

### Global(or national) importance of Hadong traditional tea agrosystem

The Hadong traditional tea agriculture is a traditional agricultural system and culture of symbiosis-the product of Hwage-myun residents' 1,200 years of adaptation to the barren environment of the mountainous terrain of Jiri Mountain nature. The residents, aware of the significance of the natural environment, preserved characteristic agricultural technology and culture unique to the region without spoiling the traditional agricultural environment passed down from their ancestors. As such, Hadong's tea agriculture was developed in symbiosis with the residents in their everyday lives, recognized for its value as Korea's Important Agricultural Heritage Systems(KIAHS) in 2015.

### Conservation and utilization of Hadong traditional tea agrosystem through the integrated management system

The traditional tea agriculture of Hadong is valuable not only as a natural agricultural system that preserves biodiversity and constructs ecological cycle but also a traditional agricultural system in terms of social and cultural aspects such as conservation and succession of the variety of tea culture. Hence, Hadong-gun is selected as a special management zone of tea agriculture and provides capacity enhancement training and technological support to train the local experts of tea production. Moreover, Hadong Traditional Tea Agriculture Conservation



Photo 1. Conservation of traditional tea field

and Utilization Plan was established in 2015 for systematic preservation and transmission of traditional tea leaves and tea culture, and the Hadong-gun, local experts, and the Hadong Tea Producers Council are working together to promote various small-scale preservation and publicity activities. In 2007, Hadong-gun founded the Institute of Hadong Green Tea, which is the first and only tea laboratory in Korea at this point, and is underway with researches in various fields to manage and support the tea farming regions scientifically. As such, Hadong tea agricultural region is a place of agricultural heritage with the history of over a thousand years in which the physical agricultural environment and culture are conserved as the local community promote participation and understanding.

### Traditional tea agriculture of Hadong with its historical significance as Korea's first tea field

A significant place in the thousand years of Korean tea culture history, Hadong had its first tea planted in the order of the king in 828 AD near Ssanggye Temple near Jiri Mountain. A temple village, Hwagae had its tea agriculture managed by monks and later on, it was passed on to the secular world with slash-and-burn farmers settling and villages forming in the following centuries. The first tea field in the entrance of the temple and the Oldest Tea Tree of Korea in *Dosimgol* show that Hadong is an agricultural heritage region representing Korea's tea history.



Photo 2. Preservation of agricultural activities in the first tea field

### The transmission of preservation of sociocultural value in the traditional tea agriculture of Hadong

The tea producers of Hadong adhere to the traditional tea roasting method using the iron kettle, and the method and tea culture are transmitted among the local producers. Hadong plays a leading role in the tea culture of Korea, evidenced by the fact that 3 of 6 tea maestros of Korea are from Hadong.

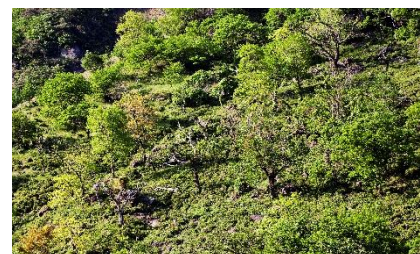
Moreover, various literature, folk songs, and everyday customs related to tea are passed down to this very day. Traditional tea is consumed in Hadong not only as a beverage but also as folk medicine, and it is also dutifully prepared and served on the ancestral rites. In addition, various aspects of tea culture formed as byproducts of preserving tea agriculture for a long period of time are closely connected to the lives of the locals and are passed on as parts of the agricultural knowledge system unique to Hadong.



**Photo 3.** Transmission of the traditional agricultural methods

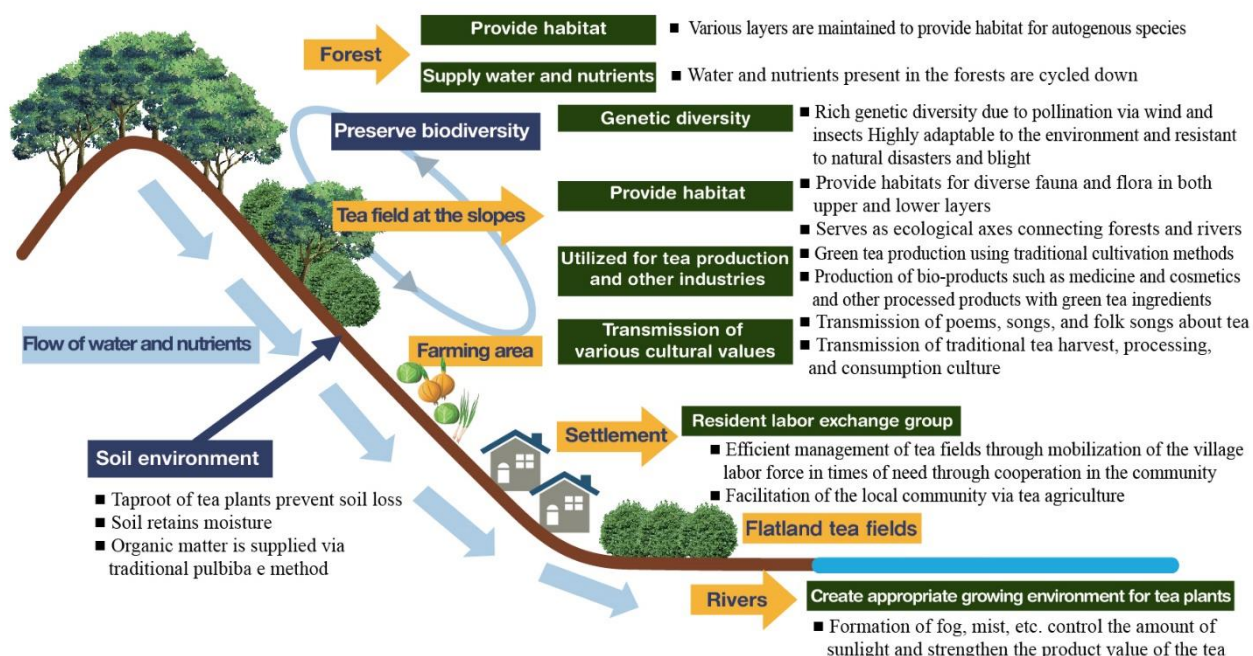
### Hadong's natural agricultural method of producing traditional tea in symbiosis with the nature

With the agricultural methods in harmony with the blessed natural environment, traditional tea agriculture of Hadong is managed by the natural agricultural method especially minimizing the artificial intervention by maintaining the natural distribution characteristics of tea plants in the slopes, rock cracks in the foot of the mountain, forest boundaries, etc. The traditional tea production with the least management, in which fallen leaves and wild grass are used as environment-friendly compost—which is called pulbibaie in Korean—and each tea leaf is handpicked, is continued uniquely to this very day. Tea fields managed by such natural methods provide beautiful agricultural scenery and ecological environment in which various flora and fauna can inhabit, promoting biodiversity.



**Photo 4.** Tea plants cultivated among different fauna

In terms of ecosystems, traditional tea fields between the forests and the rivers serve as ecological axes that connect the habitats of the flora and fauna and species accommodation and provision at the same time. Moreover, different types of habitats such as the forests, tea fields at the slopes, rocky tea fields, settlements and other farming areas, rivers, etc. are preserved via natural agricultural methods and affect the growth of tea plants. The tea plants of Hadong display different habitat characteristics and differs from other tea-producing regions in that the surrounding environment-soil, altitude, surrounding flora, etc.-affect the flavor of the tea.



**Figure 1.** Preservation of ecological cycle in Hadong's traditional tea agrosystem

## 1.1 Food and livelihood security

### (1) The start of tea agriculture for sustenance

Surrounded by Jiri Mountain, Hadong-gun, Hwagae-myeon is a representative tea production area of Korea that started tea production 1,200 years ago. Although the actual tea production began after the Silla Dynasty, the records of tea plants and tea exist before the said period. Traditional tea produced in Hwagae-myeon had been offered to the central government until the end of Joseon Dynasty, and the product was its decrease during times of national strife such as war. However, the traditional tea production method and culture is passed down to this very day due to the natural environment appropriate for the tea growth and the regional characteristics of prevalent Buddhist culture and proximity to temples.

As the greatest production site of the domestic hand-roasted tea, Hwagae-myeon, unlike other tea-producing regions, has its tea fields in the sloped valleys of Hwagae Stream. Surrounded by Jiri Mountain, Hwagae-myeon has 91% of its total area composed of steep mountainous regions with Seomjin River at its south and Hwagae Stream flowing through it from north to south, flood frequent during the monsoon season and stable agricultural activities difficult. Due to the lack of fields to cultivate due to steep mountainous regions, formation of food grains fields for rice and barley was difficult. Therefore, the people of Hwagae had to rely on tea agriculture instead of rice paddies to make their living. The people obtained food supply and goods through cultivating indigenous tea trees growing around Hwagae Stream and between rocks in hilly areas around the temples. Before the facilitation of the tea industry market in the 1960's, culture of cooperative agriculture among the local farm households developed from the early periods since few farm households actually owned the tea fields.

During the 1960's and 1970's, the traditional tea agriculture of Hwagae-myeon was mostly carried out through the six farming households that owned tea fields. Because the tea agriculture was carried out among the select few farming households, villagers nearby were mobilized to manage the tea field when concentrative labor was required in times such as harvest. Even in the same region, the traditional tea fields of Sinheung Village and Moam Village were located in steep, rocky areas and therefore required a lot of manpower. While the annual amount of fresh tea leaf production amounted to two tons, the number of farming households possessing traditional tea processing craftsmanship was not enough to handle the amount of tea leaves, making most of the fresh tea leaves sold at a low price. Harvested fresh leaves were usually bartered with the rice and vegetables from nearby villages such as Akyang or fish and shellfish caught by the fishers of the Namhae region of Hadong or were sold to the monks of the local temples such as Chilbul or Ssanggye Temples possessing tea processing craftsmanship.

Traditional tea fields owned by the temples such as Ssanggye Temple were jointly managed by the nearby villagers and monks from the old days, and the monks taught farmers skills to manage tea fields and process tea to support and facilitate the tea field management. As the domestic tea consumption increased in the 1980's, tea production in Hwagae spread to the secular households as well. The number of tea-producing households—which was 6 in 1960's—increased to 140 in 1989, and the tea processing skills



Photo 5. Traditional tea field of Moam Village



Photo 6. Tea harvesting in the first tea field of Ssanggye temple



Photo 7. Hadong traditional tea sold in the 1980's

taught by the monks were spread to the farming households, expanding the tea production and sales. Such expansion in tea production is continued to this day, and the tea-producing households carry out the whole process—from harvesting to processing—manually although it is a difficult task. Households without tea-processing skills keeps alive the traditional tea agriculture by selling fresh tea leaves harvested in their neighbors,

## (2) Development of tea agriculture in Hadong and profit gains

Residents of Hwagae cultivated tea fields and produced tea in the very traditional ways without altering the agricultural environment preserved from their ancestors' generations. Unlike the tea farmers of other regions in Korea, Hwagae tea farmers are full-time, devoted professionals of tea agriculture. In 2015, 801 households out of 951 (84.2%) work in tea farming, which takes up 40.9% of all tea farming households in Hadong. Hwagae-myeon produces approximately 1,700kg of tea per year, which is 87% of all tea production in Hadong. The quantity is quite little compared to other tea farming regions that adopted machinery in agriculture, but since Hadong tea is harvested and roasted through the human hands, the amount of tea produced per farming household is naturally lower. The tea producers of Hwagae are a large amount of small-scale farming households, and tea products are sold and distributed independently as well.

In Hwagae tea agriculture, revenue is generated mostly through sales of freshly-picked tea leaves and high-quality tea leaves harvested throughout different seasons and processed afterwards. In the past, the locals harvested the tea leaves in four different periods mid-April to late May—mid-April, late April to early May, early May to mid-May, and mid-May to late May. However, the production nowadays is mainly focused on the high-quality hand-roasted tea from the harvest periods of mid-April and late April to early May, due to the difficulty in harvesting tea leaves growing in the rocky slopes of Hadong. As the demand for fermented tea consumed traditionally as folk medicine is on the rise, tea farmers in Hadong are increasing the production of fermented tea and using the more younger tea leaves harvested in mid-April rather than later period.



Photo 8. Flatland tea fields formed around Hwagaecheon River

In the Hadong region, the modernization and industrialization of tea agriculture were established after the mass operation of the tea fields after the modern period. First, the hand-roasted tea production mainly dependent on the existing tea fields on the slopes are increasingly moving to the flatland tea fields near Hwagae Stream, and the mechanization of agriculture is underway as well. In the flatland tea fields, tea leaves for teabags rather than hand-roasted tea leaves are mainly produced, and it takes up 92% (1,734 tons) of the total tea production in Hwagae. Second, the tea agriculture in Hwagae



Photo 9. The first domestic tea product brand introduced in Hwagae region(1962)

used to be managed via service exchange and cooperation between farming household from harvesting to processing, but the division of labor was adopted with the introduction of tea production companies and processing facilities in the region. There was a separation between the households that harvest fresh tea leaves and tea production companies that purchase the leaves and process them before packaging and selling them as products. The number of tea production companies in Hadong increased from 22 in 1990's to 174 today, and 93 of them are located in Hwagae-myeon.

**Table 1.** Cultivation and production status of Hadong tea

Grouping	Cultivation				Production (ton)			Income (1billion)
	Farming households	Lots of land	Area(ha)	Mixed crops(ha)	Total	Traditional tea	Teabag material	
Hadong-gun	1,956.0	6,509.0	1,041.9	80.5	1,973.9	292.0	1,681.9	152.4
Hwagae-myeon	801.0	3,837.0	597.8	13.5	1,734.0	125.0	1,609.0	103.8
(Ratio (%))	(40.9)	(58.9)	(57.3)	(16.7)	(87.8)	(42.8)	(95.6)	(68.0)

※ Source: Hadong-gun Office internal resource (2015)

Along the flow of time, there were changes in the form of tea agriculture management, but the residents of Hwagae are cultivating the tea fields and producing hand-picked and hand-roasted tea in order to preserve the value of traditional tea fields on the slope formed in harmony with the natural environment of Jiri Mountain. The mechanized tea field management of flatland tea fields in some parts of the region are only to support the revenues of the farming households and are not to provide the tea leaves for the traditional hand-roasted tea and fermented tea.

Due to the conclusion of FTA with China and the development of the coffee industry, tea agriculture of Hadong is going through tough times as well. In order to make it through the hardships, the locals are partaking not only in the increase of traditional tea production but also in the publicity events and festivals to facilitate the growth of tea agriculture.

### (3) Agricultural products in Hwagae-myeon alongside tea leaves

Traditional tea fields of Hadong are scattered along the rocky slopes of Hwagae Stream unlike the terraced fields of China, Japan, and Boseong region of Korea, and it makes deciduous plants such as persimmon, chestnut, and bamboo grow along with the tea trees. Therefore, agricultural produce other than tea, such as maple sap, chestnut, bracken, fatsia, shiitake mushroom, Japanese apricots, are produced as specialties in Hwagae as well. The Asian maple tree, or *gorosoe* in Korean, grown 600-900m above sea level especially famous for the maple sap. As Seomjin River flows along the southern side of Hwagae, fish and shellfish such as sweetfish and marsh clams are caught and considered to be well-established food ingredients in the region. Agricultural produce of Hwagae are sold in direct transactions at the Hwagae Market or the local food market in Hadong. Recently, Hadong-gun selected the agricultural heritage region as a chemical-free zone to enhance the quality of agricultural products.



**Photo 10.** Agricultural products sold in Hwagae Market

**Table 2.** Production status of agricultural specialties in Hwagae-myeon, Hadong-gun (Total number of farming households: 951)

Groups	Tea	Maple sap	Chestnut	Bracken	Fatsia	Japanese Apricot	Rice
Cultivation area(ha)	598	2,621	425	155	20	52	12
Amount produced(ton)	1,734	817	850	59	34	613	56



**Photo 11.** Hadong tea



**Photo 12.** Maple sap



**Photo 13.** Chestnut





Photo 14. Bracken



Photo 15. Fatsia



Photo 16. Japanese apricot

## 1.2 Biodiversity and ecosystem function

### (1) Characteristics of climatic factors and distribution of Hadong Traditional Tea Agriculture

#### Climatic factors of Hadong's tea growth

With excellent climatic conditions to grow tea, Hwagae-myeon produces 20% of the total domestic tea production amount of Korea. As it is a mountainous region, there are more tea fields located 220m above sea level on slopes of 10-40° facing south in silty loam of pH 4.6 acidity and low clay composition. Moreover, Jiri Mountain and its steep mountain pass block the cold wind in winter and the warm wind from Seomjin River and the South Sea blow in, resulting in little frost and early budding of tea leaves. The daily temperature range is quite large at 15.4°C and the abundant water of Seomjin River and Hwagaecheon Stream provide a long period of foggy days. The wet fog formed along the Hwagae Stream flowing from north to south cools the heat of the earth and keep the soil moist, providing the optimal conditions to grow tea. Moreover, bamboo and other plants growing along with tea trees control the sunlight exposure and contribute to the production of high-quality tea.

Recognizing such climatic conditions, the residents of Hwagae cultivate and manage tea through natural agricultural methods that do not harm the natural ecosystem. As the result, the tea fields around Hwagae Stream and the foot of the mountain exist in harmony with the surrounding natural environment, maintaining excellent biodiversity.

Table 3. Appropriate environmental condition for growing tea plants

Climate and environment	Temperature			Precipitation Annual average	Soil	
	Annual average	Lowest	Highest		Acidity	Moisture
Appropriate environment to grow tea plants	13.0~16.0°C	-5.0~6.0°C ↑	34.0°C ↓	1,300mm ↑	ph4.5~5.5	90% ↑
Growth environment of tea plants in Hwagae-myeon	14.3°C	-4.4°C	32.7°C	1,711mm	ph4.8	90% ↑

#### Characteristics of Hadong tea plant distribution

Most Hadong traditional tea fields are distributed along the mountain slopes at 100-400m of altitude along the Hwagae Stream. They are especially concentrated in the 300-400m altitude, and there are some tea fields located at altitude of 800m. Most of Hwagae-myeon is composed of mountain slopes at 60° angle, which take up 82.7% of total area. The rest are composed of forest slopes (11.4%), alluvial fans and valleys (3.3%), hills and hillocks (0.8). The upper stream of Hwagae Stream, which gets higher from Buchun-ri close to Seomjin River to Deokeun-ri, Beomwang-ri, and Daeseong-ri, is higher in altitude, and many tea fields are located in areas with 30° angle or steeper near the forest area, which are managed with monorails.



Photo 17. Traditional tea field spread across the slope

Moreover, the topsoil in Hwagae-myeon are composed of 80.1% sandy loam and 19.7% of loam. The tea fields are mainly located in the sandy loam area, which provide decent drainage.

**Table 4.** Terrain distribution in Hwagae-myeon

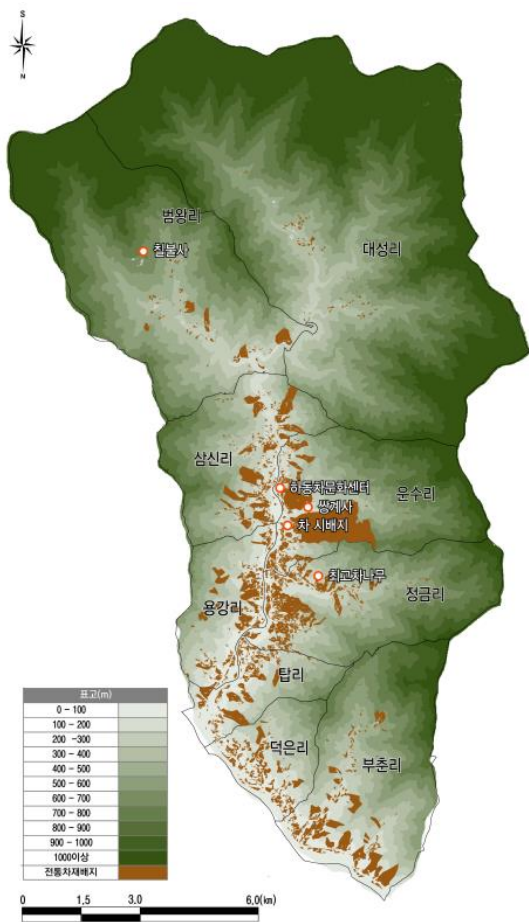
Groups	Area (m <sup>2</sup> )	Ratio (%)
Mountainous regions	110,678,587	82.7
Forest slopes	15,279,116	11.4
Alluvial fan/Valleys	4,477,775	3.3
Hills/Hillocks	1,126,630	0.8
Flat inland area	433,862	0.3
Riverside	7,410	0.0
Others	1,855,194	1.4

※ Source: Research on the Collection, Preservation, and Trait Evaluation of Forest Bioresources, Institute of Hadong Green Tea (2016)

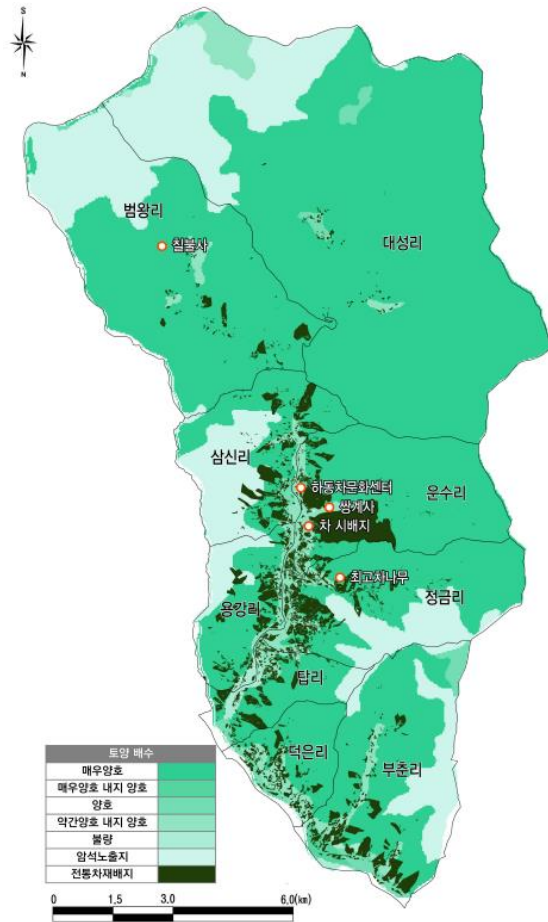
**Table 5.** Topsoil of Hwagae-myeon

Group	Area (m <sup>2</sup> )	Ratio (%)
Sandy loam	105,714,825	80.1
Loam	25,951,572	19.7
Fine sandy loam	336,983	0.3

※ Source: op. cit. Institute of Hadong Green Tea (2016)



**Figure 2.** Traditional tea fields in Hadong based on the topsoil



**Figure 3.** Traditional tea fields in Hadong based on the soil drainage

## (2) Characteristics and genetic diversity of Hadong tea plant species

### Characteristics of Hadong tea plant species

Tea plants are evergreen trees belonging to the Theaceae family, which includes the Assam species in India, large leaf species and small leaf species of China, and the Yabukita species of Japan recently researched and developed from the Chinese species. Most tea plants in Hadong originate from the indigenous tea plants near the temples such as Ssanggye Temple and Chilbul Temple and are close to the small leaf species of China but more localized through adaptation throughout the long period of time.

In comparison to the Japanese Yabukita species—which mainly has horizontal roots—introduced to Korea after the Japanese Occupation, the Hadong tea plants have taproots, allowing them to take root as three times as deep. It allows them to grow better in natural habitats such as rock cracks, gravelly fields, etc. of the barren slopes. Moreover, they are more resistant to the natural disasters such as cold, draught, frost, etc. and blight and absorb nutrients better due to deeper roots. The tea leaves are also thicker in shape and stronger in flavor and aroma compared to their Japanese and Chinese counterparts, making them more fit for the traditional hand-roasting method passed down in Hadong. As such, the genetics of Hadong tea plants allow them to grow well even in their natural habitat untouched by human hands, and the locals understood such characteristics and used them to continue with the environment-friendly agriculture.



Photo 18. Hadong tea plant



Photo 19. Hadong tea plant root (taproot)



Photo 20. Root of Japanese *Yabukita* (horizontal root)

### Genetic diversity of Hadong tea plant species

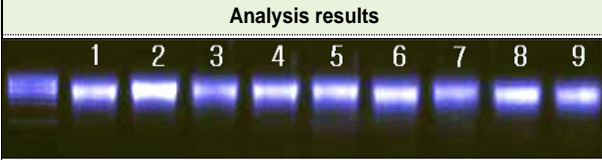
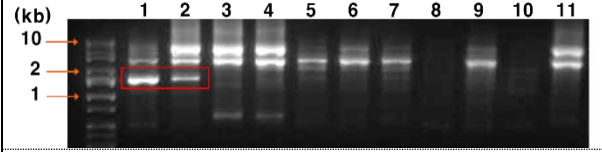
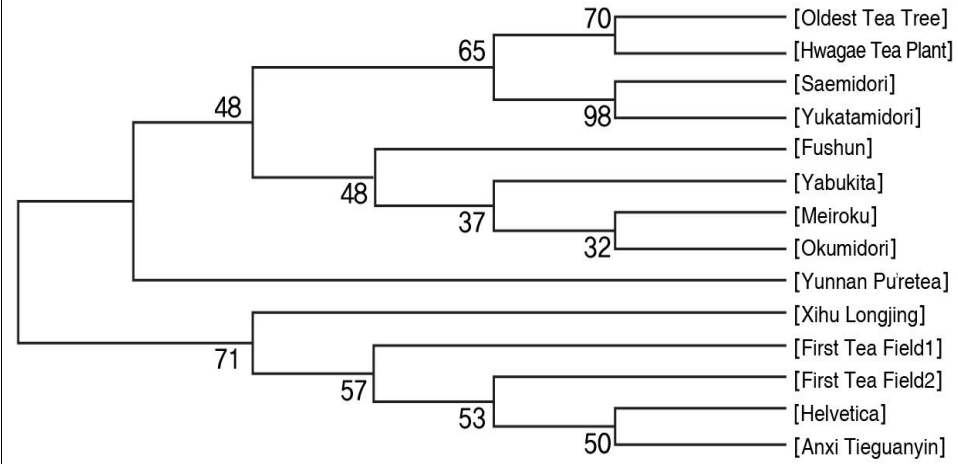
Hwagae-myeon is the first area of tea agriculture in Korea as the tea seed was brought from the Tang Dynasty China and planted there during the Silla Dynasty. The area surrounded by the Jiri Mountain also helped the traditional tea maintain existence by preventing the genetic influx from other regions.

Through genetic analysis, Institut of Hadong Green Tea verified that the Hadong tea plants are of different species compared to their Chinese and Japanese counterparts. The samples were collected from the Oldest Tea Tree, two plants from the first tea field, two plants from the Hwagae tea plants, seven species of Japanese tea plants, and three species of Chinese tea plants, and the DNA were successfully separated, making it possible to pick out the characteristic DNA marker—Primer A19—from the Oldest Tea Tree and the Hadong tea plants. Moreover, the Hadong tea plants were also divided into Chinese and Japanese groups, with the Oldest Tea Tree in the Japanese group and the plants from the first tea field in the Chinese group. Therefore, it is decided that the Hadong tea, Chinese tea, and Japanese tea plants all

originate from the same ancestor and Hadong tea plant came to have the diverse and unique genetic characteristics due to isolation and cultivation in Hwagae area for a prolonged period of time.

Hence, Hadong tea plants are pollinated through insects and wind, making genetic mutation easier to appear. During the mutation, inferior genes disappear naturally, and the superior genes prevail after the adaptation to the environment. After such process is repeated over time, the superior species fully adapted to the local environment emerges and different tea plants appear in different parts of the same region. According to the local, it is not possible to harvest the tea leaves all at once even in the same field since there are different species present even though the outward difference is very difficult to discern.

**Table 6.** Genetic analysis results of tea plants in Hadong, China, and Japan

Groups	Analysis results	Legend
Genomic DNA separated from the live leaf		1: Oldest Tea Tree 2: First Tea Field 1 3: First Tea Field 2 4: Yabugita 5: Fushun 6: Okumidori 7: Saemidori 8: Xihu Longjing 9: Anxi Tieguanyin
DNA marker of Hadong tea picked out : Primer A19		1: Oldest Tea Tree 2: First Tea Field 1 3: Xihu Longjing 4: Anxi Tieguanyin 5: Yabugita 6: Fushun 7: Meiroku 8: Saemidori 9: Xihu Longjing 10: Yukatamidori 11: Asanoka
Tree of molecular phylogeny based on the base sequence		

### (3) Biodiversity in the Traditional Tea Fields

#### The flora of Hadong traditional tea fields







In the warm and wet southern part of the Jiri Mountain National Park, Asian hornbeam colonies are located, and on the outer valley area are colonies of loose-flower hornbeam and queritron. In the Neodeol areas, there are Manchurian ash trees and dogwoods forming colonies, and in the relatively dry areas below 900m above the sea level are colonies of oriental oaks. In the exposed and dry area of mountaintop and ridges are pine trees, and at 1,400m above sea level are Korean firsn forming colonies, and as the altitude gets higher and the wind becomes stronger, arboreal trees twisted into deformed trees can be seenmutating the exterior of vigorous tree species, creating deformed trees. On the top of the mountain, colonies of shrubbery such as furred wild chive, royal azalea, Erman’s birch and betula are distributed.

There are 19 orders, 59 families, 150 genera, 187 species, 27 varieties, and 1 breed of tracheophytes found in the lower stream and estuary of of Seomjin River. Among these are four types of Pteridophyta including the long-tail spleenwort and two types of gymnosperms in the pine tree family, namely the pine tree and the Japanese black pine. Among angiosperms are 137 types of dicotyledonous plants and 42 of monocotyledonous ones.

**Table 7.** the Flora status of Hadong traditional tea fields

Classification		Order	Family	Genus	Species	varieties	breeds	Total
Total		19	59	150	187	27	1	215
club moss		1	1	1	2	-	-	2
scouring rush		1	1	2	2	-	-	2
gymnosperm	cone	1	2	3	4	-	-	4
angiosperm	monocotyledon	5	8	34	42	7	1	50
	dicotyledon	11	47	110	137	20	-	157

		
<b>Photo 21.</b> <i>Fir clubmoss</i>	<b>Photo 22.</b> <i>Small Makino fern</i>	<b>Photo 23.</b> <i>Evergreen spleenwort</i>
		
<b>Photo 24.</b> <i>Shiny autumn fern</i>	<b>Photo 25.</b> <i>Naejang twinsorus fern</i>	<b>Photo 26.</b> <i>Petiolate tongue fern</i>

### The fauna of Hadong traditional tea fields

Mammals found in Hadong are raccoons from the family Canidae, wildcats and cats from the family Felidae, weasels, martens, badgers, and otters from the family Mustelidae, Asiatic black bear in the order Carnivora, elk, roe, and deer from the family Capreolus, boars from family Suidae, moles from the mole family, rabbit, Eurasian Red Squirrel and squirrels from the order Insectivora. Around the Hwagae-myeon Daeseonggol, the biggest number of mammal species found in the Beomwang-ri-Tokkibong area and the traces of wildcats' and martens' habitation can be found in Daeseonggol and Beomwang-ri-Tokkibong area.

The nine resident birds continuously found in the area are great tit, black-capped chickadee, *Hypsipetes amaurotis*, *Paradoxornis webbiana*, pale ouzel, brown dipper, sparrow, gray wagtail and *Emberiza elegans*. There are various species found in the lower class of Seomjin River. It includes three second-class endangered species such as Chinese merganser, Korean buzzard and Eastern curlew and ten specific species such as *Butastur indicus*, cuckoo, swift, house swift, common Indian kingfisher, black-capped kingfisher, bluebird, gray-headed woodpecker, *Zitting Cisticola* and nightingale. For the birds observable in the certain time of year, there are ones observable during the migration season, the breeding season, and the hibernation season, with the most seen during the hibernation season.

The water system of Seomjin River is composed of Masan Stream in Masan-myeon, Gurye-gun, Yeongok Stream of Toji-myeon, Gurye-gun, and Hwagae Stream of Hwagae-yeon, Hadong-gun. Except for the large streams closest to the main stream of Seomjin River, the streams pass through big rocks and pebbles. Among the fish in the water, the dominant species is *Majusculus* and the subdominant species is in the order of dace, minnow and slipmouth. Among

the freshwater species, there are seven of migratory species of eel, dace, sweetfish, salmon, gray mullet, sea perch and fresh water trident goby. Most fish are in the family Cyprinidae of the order Cypriniformes. There are twenty Korean indigenous species including the oily bitterling and Korean bitterling, a legally protected species. There are no fish species designated as a foreign species that may disturb the local ecosystem.

Amphibians found inside the tea fields are two orders, five families, five genuses and eight species including salamander, red-bellied frog, toad, green frog, Korean frog, North mountain frog, ranid and bullfrog. There are two orders, five families, seven genera, and nine species of reptile including fresh water tortoise, lizard, Amur grass lizard, cat snake, rat snake, Asian tiger snake, red banded snake, red-tongue pit-viper and Korean mamushi. Fresh water tortoise, a second-degree endangered species by the Ministry of Environment, can also be found.

**Table 8.** the Fauna status of Hadong traditional tea fields

		
<p><b>Photo 27.</b> Raccoon dog</p>	<p><b>Photo 28.</b> Otter</p>	<p><b>Photo 29.</b> Leopard Cat</p>
		
<p><b>Photo 30.</b> Oily Bitterling</p>	<p><b>Photo 31.</b> Reeve's turtle</p>	<p><b>Photo 32.</b> bluebird</p>

#### (4) The ecological cycle system of Hadong traditional tea agrosystem

Traditional tea fields of Hadong include the variety of genes, species, and habitats to house biodiversity. First of all, it was found that the tea species in Hadong shared the common ancestor with the tea species in Japan and China, according to the genealogical analysis to understand its genetic characteristics. Moreover, Hadong tea plants are highly adaptable to the environment due to 1,000 and more years of habitation in the region while reproducing via insects and wind giving each tea field genetic diversity.

The diversity in species and habitats is affected by the diverse habitat types of tea fields such as forests, slopes, rocky terrain, village sites and farms, rivers, etc. Such diverse habitat types plays the roles as habitats for the fauna and flora in their appropriate environment, promoting much biodiversity. Forests and rivers provide the space in which diverse species of animals and plants indigenous to the Jiri Mountain area can dwell, playing the role of species supply. The slopes, rocky terrains, and flatland tea fields play the role of ecological axes that connect the forests and rivers and also the supplying ground of species. As tea plants are arbors, the tea fields are arboreal area facilitating the introduction of plants in other habitats and providing the habitats for birds, small mammals, insects, etc. mainly living in arbors. Moreover, rocky tea fields provide microclimate and habitats for reptiles, insects, etc. In the surrounding dwelling areas and other farming fields and paddies, other indigenous plants and animals inhabit the settlement environment, displaying different characteristics from other habitats. Such spaces provide weeds and garden plant

species mainly appearing in fields and paddies and play the role of species supply and habitats in a different significance. Therefore, the tea fields and surrounding habitats interact with each other, promoting biodiversity.

Traditional tea fields of Hadong formed such ecological cycle system based on the biodiversity and traditional cultivation methods. The water and nourishment from the forests pass through the slopes, rocky terrains, regular farms, settlements, and flatland tea fields and finally reach the river, and the rivers provide the moisture for fog and rain to supply water to forests and other areas, forming a cycle. Moreover, tea plants have taproots, preventing soil loss in the mountainous regions of Hwagae-myeon in Hadong and holding moisture in the steep slopes. In addition, traditional *pulbibae* methods are used to provide organic nourishment in the tea fields. Traditional tea fields in Hadong have formed the appropriate ecological cycle from the forests to the rivers.

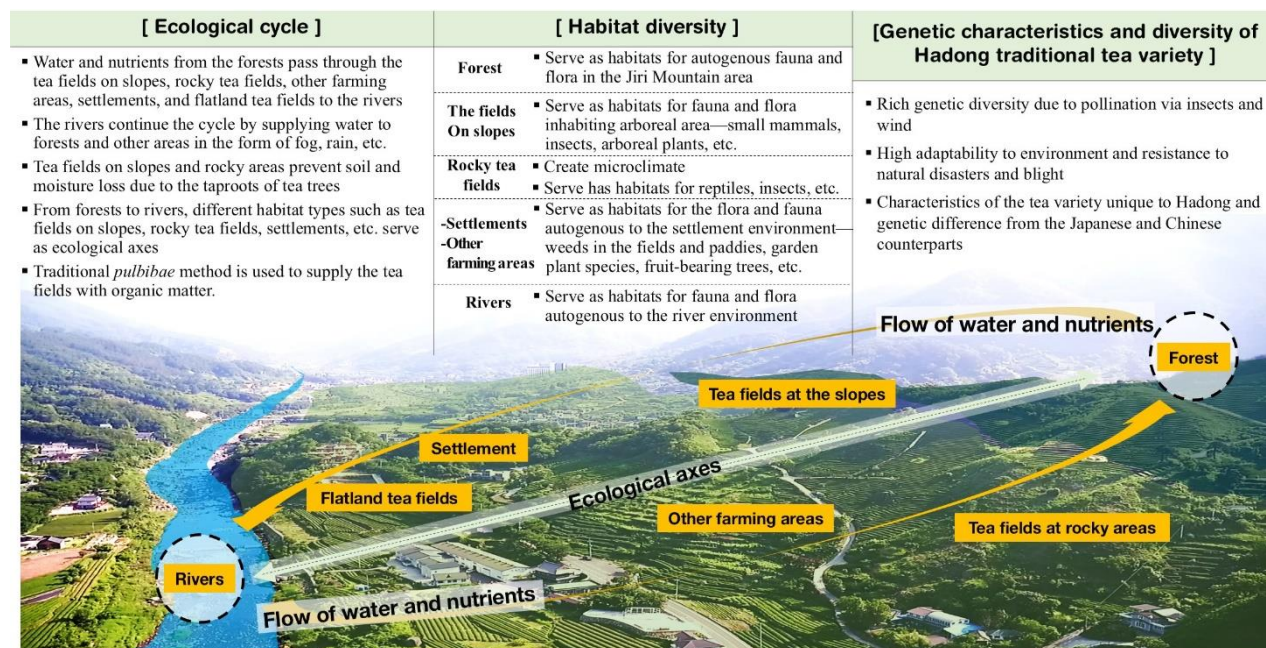


Figure 4. The biodiversity and ecological cycle of Hadong traditional tea fields

### 1.3 Knowledge systems and adapted technologies

#### (1) Management and Tea Harvest of Hadong Traditional Tea Fields

Traditional tea fields formed on hilly slopes of mountains

Hadong tea fields exist in two forms. One form is the hilly tea field located on the slopes of Jiri Mountain, and the other is the flatland tea field near villages. Most Hadong tea fields are of the former and have been adapted to the natural environs a long time ago. The latter are the fields cultivated from the former paddies and fields for other agricultural produce with seeds reaped from the existing tea fields.

Located on slopes, the traditional tea fields of Hadong is scattered across the area 200m above sea level in forms of small tea tree colonies, which is the way they have been in the past as well. Moreover, the traditional tea fields of Hadong are cultivated without altering the existing natural environment such as rocks and trees.



Photo 33. Agricultural activities in a hilly tea field

## Hadong Tradition Tea Agriculture, cultivated and managed through natural methods

As Hwagaemyeon had the favorable natural conditions such as climate and soil for growing tea trees, the locals did not need to put in much effort into managing tea fields. Widely used methods of tea field management are *gaengsin*, fertilizer, weed control, soil management, winter preparation, etc. However, agriculture of the Hadong tea fields involve minimizing artificial field management methods, only using *gaengsin* and weed control.

*Gaengsin* is a procedure of organizing the top of tea trees vertically or in the shapes of ovals or arrows. This procedure is considered important because it plays crucial roles in the quality and quantity of harvest. Weed control was traditionally done by *pulbibae* method, which is picking the weed by hand or putting manure under the tea field after cutting the grass around it. The by-products of branches from *gaengsin* were spread on the tea fields. The by-products of branches are known to prevent acidification, moisture evaporation and loss of organic matter.

Today, after organic fertilizer was distributed, *pulbibae*, manure, fertilizers are all used. The traditional method of picking the weed by hand and *pulbibae* are carried out in slopy tea fields and areas around them.

### Classification of tea quality in accordance with harvest period

The first tea is normally harvested around Grain Rain (around April 20) in Hadong area. The name of tea leaf is different according to the period Hadong tea leaf is harvested. Tea leaf collected before Grain Rain is called *Woojun*, those during the Grain Rain and Beginning of Summer (May 5) are *Sejak* and *Joongjak* for those collected in July and *Daejak* for August. Also, *Woojun* and *Sejak* are classified as *Chutmoolcha*, *Joongjak* as *Doomoolcha* and *Daejak* as *Semoolcha*.

Recently, due to climate change, the harvest season of *Woojun* in some areas is becoming earlier to late March. The later the time of leaves are collected, the quality degrades due to the abundant sunlight that creates components with of bitter taste. Even during the harvest season, picking tea leaves on cloudy or rainy days was prohibited. Collecting around noon on a sunny day was also not allowed. The reason was that the tannin components that cause the bitter taste is active. Therefore, daybreak or before noon when sunlight was not abundant was the time to collect tea leaves of high quality.

The tea harvesting methods of Hadong traditional tea agriculture is picking each budding leaf by hand. The young buds are only to be picked at their top part. When picking, bamboo baskets were traditionally used, but aprons made from soft fabric are used nowadays along with the facilitation of the green tea industry, This method hinders the acidification and is effective in obtaining a large amount of tea leaves and was thus naturally spread widely.



Photo 34. Tea field fertilization, *pulbibae*



Photo 35. Tea harvesting in the 1980's



Photo 36. Picking of tea tree and buds



## Difference in tea aroma due to field environment

Traditional tea fields in Hadong form in colonies that are in harmony with the diverse natural flora and environmental conditions of the slopes of the gorges of Hwagae Stream. The main researches on the relations between the conditions of altitude and soil series of tea fields and the aroma of the tea leaves are currently underway.

According to the research so far, Hadong tea leaves grown in higher altitude give off richer aroma, and other plants in the same colony as the tea plants affect the aroma as well. The hypothesis was derived from the research results showing that tea leaves harvested from fields forming colonies with chestnut trees give off the savory aroma akin to roasted chestnuts. Based on such results, more in-depth researches on the climate, soil, and flora of the tea fields will be carried out.

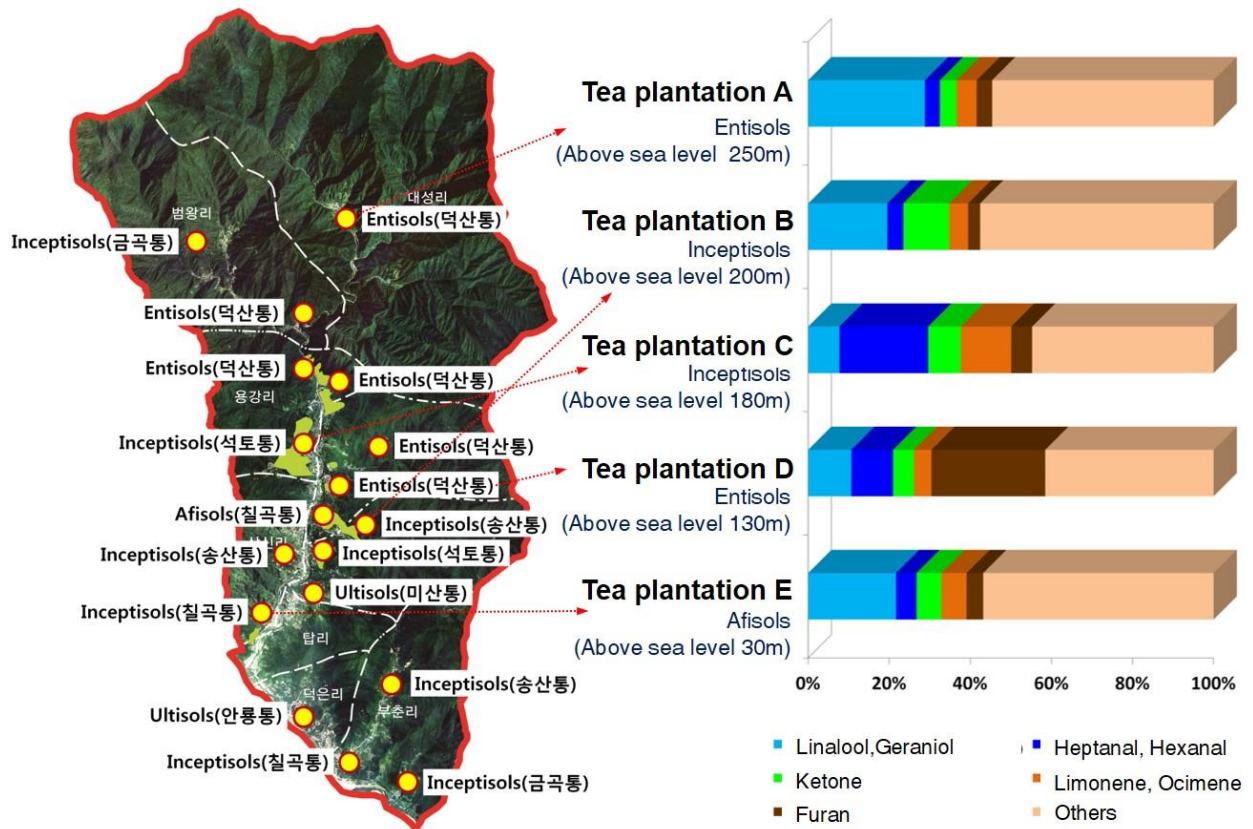


Figure 5. Research results on the relations between the altitude and soil series and the aroma of tea

## (2) Hadong traditional hand roasted tea manufacture method

Traditional manufacture method of only Hadong that people do everything by hand

The hand roasted tea is a traditional tea made by roasting tea leaves in iron pots with a nice smell and taste. The manufacture method of hand roast can be said to be the traditional tea manufacture method in that it is the same manufacturing method recorded in the Dongsasong of the Choewi Sunsa. This procedure has been representatively passed down by Hong Sosool, a Uson dang master.

The Hadong traditional hand roast tea manufacture first removes the unnecessary parts from the tea leaves collected and select the ones that are of high quality. The tea leaves are slightly rubbed to distribute the moisture fairly. The selected tea leaves are put into a hot iron pot of 250°C~350°C and are roasted suitably so that they do not burn nor uncook. The roasted tea leaves are quickly drawn from the pot and cooled on straw mat. This process is one of the most important process in deciding the quality of the tea. After they are cooled, they are rubbed by hand on the straw mat like washing clothes. The procedures of roasting and rubbing are repeated several times controlling the temperature. After the rubbing procedure, the tea leaves are brushed to divide into singles and dried on a wicker tray for ventilation. The dried tea leaves are roasted for the last time for two to three hours at a lower temperature of 80°C. This procedure is the most important for the flavor and smell of the tea. After these procedures, the tea with the moisture level of 5~6% and with a great flavor that can be stored for a long period of time is made. After the final roasting, among the leaves and stems that have not been selected, some are selected again and packaged. To summarize, selection → roasting in iron pot → cooling → rubbing → drying → final roasting(adding flavor) → selection and packaging.

The traditional handmade roasted tea manufacture takes seven to eight hours starting at night to daybreak. Likewise, the Hadong traditional tea is a wild handmade tea that requires sincerity of the people in every procedure from the very first to last.



Figure 6. Handmade roasted manufacture process of Hadong traditional tea agriculture

### (3) Hadong jaeksal tea processing and tasting method

#### Jaeksal, traditional folk tea found only in Hadong area

Tea of the Hadong region was tributed to the king until the late period of the Chosun Dynasty and the only ones able to drink tea of high value such as Woonun were noblemen and monks. Normal people made fermented tea from leftover tea leaves or rough leaves harvest in July and October and used them as healthy beverages or medicine. The people called them Jaeksal or Jaeksal tea. Nobody knows for sure who, when or how transmitted Jaeksal but it is the traditional folk tea that was used instead of other beverage and medicine of this region. In Hadong, Jaeksal is considered to be the biggest part of tea even to the children and know to drink it when they catch a cold or have a headache.



Photo 37. Hadong Jaeksal

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Photo 38. Traditional Jaeksal stored under the eaves

For ages, fertilized tea, Jaeksal tea was prevalent among the people of Hwage and was made by firing tea leaves in a caldron or a boiling pot instead of soaking them. Jaeksal has a bright brown color and a unique flavor and taste. It was normally drank by itself or was made to a soup with other ingredients instead of medicine. This tradition still exists in the form of Gobbul tea.

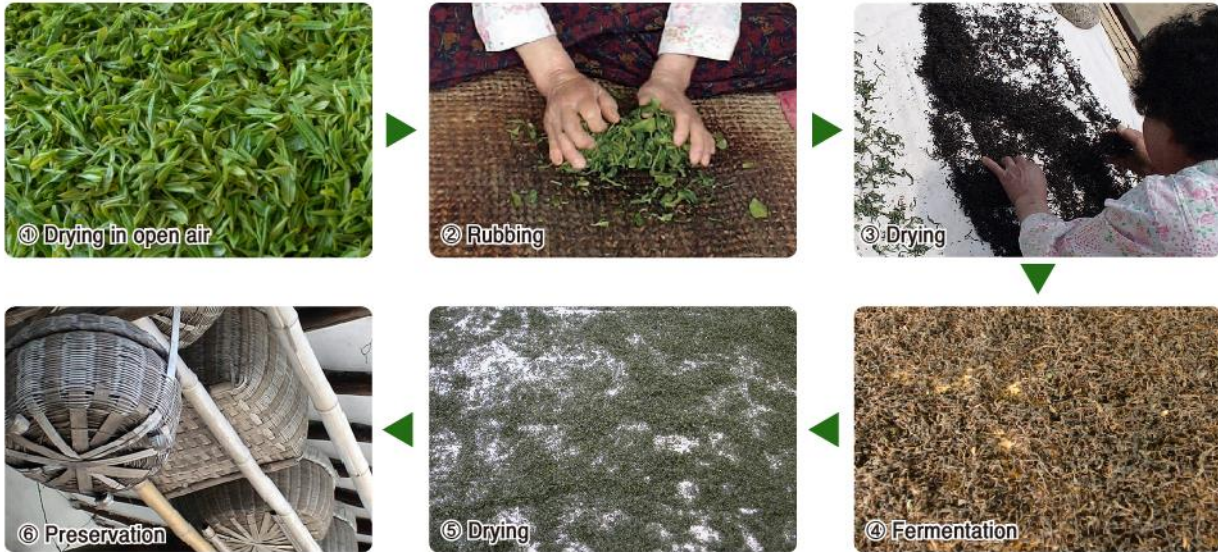


Photo 39. Gobbul tea products

A black tea-type fermented tea passed down from generation to generation among the locals of Hadong tea agriculture zone, jaeksal tea was registered in the Ark of Taste of Slow Food International in 2016 as a cultural heritage of food in recognition for its history and traditional value as the local tea along with the hand-roasted tea.

Table 9. Processing method of Hadong Jaeksal

Process	Direction
① Drying in open air	Dry the harvested leaves in the shade until they wilt. Stir them while they are left for a day or two, and the leaves will decrease in volume.
② Rubbing	Rub the leaves on the straw mat but not until they crumble.
③ Drying	Dry the leaves in the shade. Repeated rubbing and drying will make the leaves shrivel.
④ Fermentation	Leave the tea leaves for an hour or overnight.
⑤ Drying	Dry the leaves near the fireplace or in the shade until they're parched.
⑥ Preservation	Put the leaves in the hanji-the Korean traditional paper-envelopes or straw baskets and store them in the ceiling corner of shelves.



#### (4) Efforts to pass on the knowledge system of Hadong traditional tea

##### Traditional culture transmission of regional tea people

Because the Hwage traditional tea field exists between rocks of the mountain foot, cultivating is an arduous task. Therefore, the fields differentiates themselves through limited handmade green tea processing of high quality and teaches and hands down the continuous traditional tea processing technique.

The tea people of Hadong have basic knowledge of tea manufacture as they pick up at a young age from their parents. They also succeed the manufacture method that has been passed down from the monks of Hwagye Ssangye temples. They also hand down the traditional culture through the research of traditional handmade manufacture method and continuous experience based on the what is recorded in <Dasuh> of Choeui Sunsa

Jotae Yeonga, the founder of roasted tea, tea manufacturer of 50 years of experience(Hong Sosool), master of traditional handmade green tea(Park Soogeun), master of iron roasting green tea traditional food (Kim Donggeun) are the frontiers of regional tea culture and succeed the traditional culture. The tea member who owns the oldest tree (Oh Seeyoung) is the 7th generation to carry out the family business. To research the variety of wild tea, she manages wild areas where people cannot reach and at the same time observes and researches the competition and changes of scrub such as nearby bamboo trees.



Photo 40. Park Su-geun, Tea master



Photo 41. Kim Dong-gon, Tea master



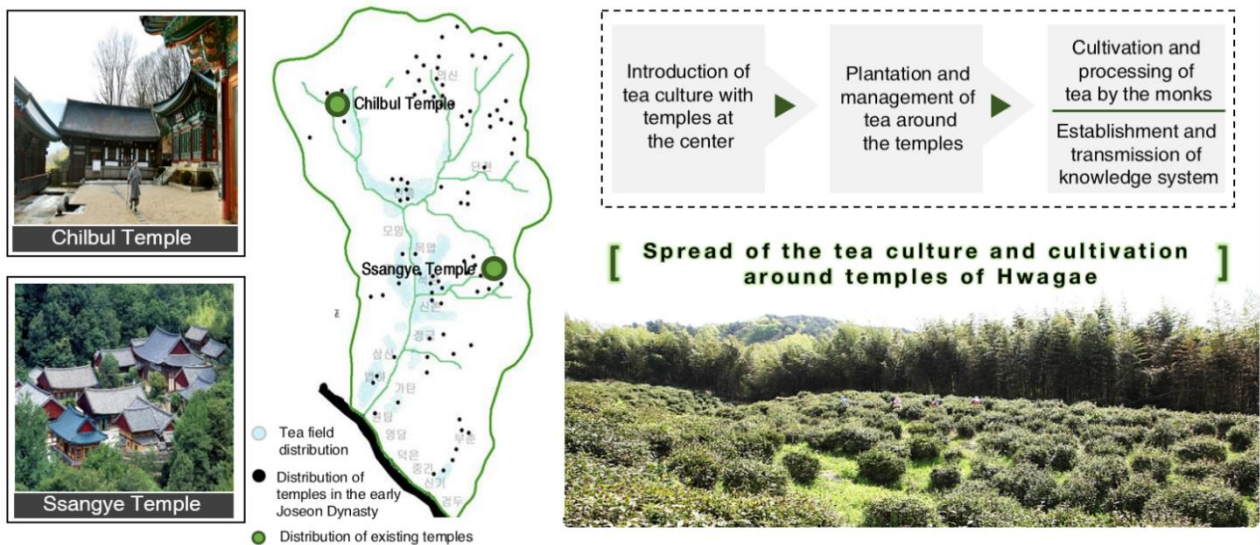
Photo 42. Hong So-sul, Tea master

## 1.4 Culture, social organizations and customs

### (1) Formation of Hadong tea culture due to historical and geographical causes

Among Buddhist monks, tea was considered a beverage for cultivating the mind and a sacred offering to Buddha. Before the tea industry bloomed, monks in the temple and locals shared and transmitted the system of knowledge for cultivating and managing tea fields and processing tea. According to geographical literature in the Joseon Dynasty regarding the presence of Buddhist temples in tea-producing regions, most of the regions with well-established tea fields have temples with long histories or temple sites.

Hwagae is a temple village with numerous temples and monks, and the Buddhist culture flourished so much in the region that people referred to it as “Jiri Mountain Buddhism” and the autogenous tea fields prospered as well. In the early Joseon Dynasty, the tea fields of Hwagae spread along the distribution of Buddhist temples, and now that only Ssanggye Temple—the first tea field of Korea—and Chilbul Temple remain, the autogenous tea fields are located vastly around them. Before the modern era, tea fields of Hwagaemyeon were managed and run by the temples, which cooperated with the locals to cultivate and manage the tea while transmitting agricultural methods to them as well. The knowledge system of traditional tea cultivation and processing methods was established and transmitted to the locals by the monks, and it remains until this day. The head monk of Ssanggye Temple in the late 19th century was even named Chunmyeong—meaning “spring tea leaf”—showing the monks’ love for tea. The prosperous Buddhist culture in Hwagae also played a crucial role in continuation of the tradition of the tea fields and the hand-roasted tea, its unique specialty.



### (2) Pluralistic management through townspeople cooperative community, ‘labor exchange group’

Because the Hwagae area has environmental advantages for the growth of autogenous tea tree, the locals harvested the tea leaves in their natural state without much management of the tea fields. However, it was difficult to use tools as most tea fields were scattered across the steep slopes of the valleys of Hwagaecheon Stream. Since the days of the past, a great amount of manpower was required for gathering a large amount of tea in the harvest season. The period of 30-40 days around Grain Rain was when the biggest number of workers were mobilized in the year. The busiest period was from late April to early May. The said period provides the most amount of tea leaves

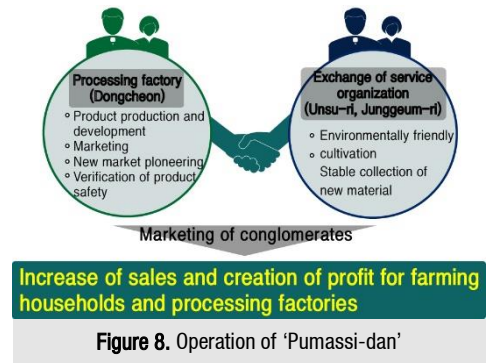


**Photo 43.** The harvest of the mid-April tea through Pumassi(labor exchange)

to harvest, and the leaves grow evenly in that period, being the most valuable as products for sale. Therefore, the labor and time is most concentrated the late April and early May.

In the case of flatland tea fields created in the modern days, mechanical leaf harvester are used to modernize the harvesting process, but the tea fields in the slopes still require manual picking of leaves for the traditional tea production, one by one at the time. Residents of Hwagae formed labor exchange groups—or pumasidan in Korean—among the members of the local community to cooperated during the harvesting period and mobilize necessary manpower. The labor exchange groups are usually composed of 50-70 people from 3-4 adjacent villages. In Before the tea production expanded in the 1980’s, the locals who did not own the tea field helped the owners of tea fields harvest in exchange for the their share of harvest during May, when the leaf buds grew again, to secure their share of yearly tea.

Today, the labor exchange group developed into a joint production and management system for the tea industry from the older cooperative group sharing experience on the hardships of labor and abundance of harvest in the course of preserving and maintaining the traditional tea agriculture Nowadays, 6 processing companies run 10 labor exchange groups in 20 villages. Usually, each labor exchange group takes charge of all parts of the process from harvesting to tea processing. Hence, the farming households harvest tea leaves and sell all of them to the processing companies, and the companies process the fresh tea leaves from the households into traditional tea and sell them at the tea market, with both supporting each other to maintain the local tea agriculture environment.



**Table 10.** Operation status of Hwagae-myeon 'Pumassi-dan'

Processing company	Service Exchange Organization	Name of Village
<b>[6 Processing companies]</b>	<b>[10 Pumassi-dan]</b>	<b>[20 Villages]</b>
Hanbat Tea Co., Ltd.	Boochoon	Gumdoo, Singo, Boochoon
	Dukeun	Joonggi, Sangduk, Youngdang
Hwagae Tea Co., Ltd.	Topli	Wontop, Bumha, Gatan
	Junggeum	Junggeum, Sinchon
Dongchun Tea Co., Ltd.	Samsin	Samsin
	Moam	Moam
Ssanggye Tea Co., Ltd.	Yonggang	Yonggang
	Woonsoo	Sukmoon, Mokam
Jotae Yeonga	Sinhong	Sinhong, Euisin, Danchun
Hwagae Agriculture Cooperatives	Bumwang	Bumwang

※ Source: Hadong-gun (2015)

### (3) Tea culture within the everyday lives of the Hadong people

#### *Jaeksal* used as folk medicine

A type of fermented tea, *jaeksal* is a traditional drink in Hadong. As the residents of Hadong valued tea as health beverages and folk medicine, there are naturally many different ways to brew tea. Even nowadays, villagers of Hwagae brew *jaeksal* along with other ingredients such as Korean medicinal stuff, wild fruits, flower, ginger, Chinese quince, Asian pear, bamboo baldes, etc.



Photo 44. Brewing of *Jaeksal*

When at the verge of catching cold, the residents brewed 3 or 4 slices of ginger or dried pear with the *jaeksal* tea before resting, and people leaving their hometown were given the tea for medicines during the winter. *Jaeksal* works wonders against the skin boils as well, as solution of *jaeksal* tea brewed with trifoliolate orange fruit and a pinch of salt could cure skin ailments when used for washing one's body. Chewing the tea is good against motion sickness, drinking *jaeksal* tea in the scorching summer instead of cold water quenches the thirst better and prevents stomachache. Naturally, the locals used the tea as folk medicine of various ends.

#### Hadong-gun, the capital of tea poem and song culture

Hadong, referred to as the home of tea, is the capital of tea culture with various folk songs, poems and songs of our ancestors and people of today. In Hwagae region, there are poems and songs about tea from the the Shilla Dynasty to this very day.

There are poems of ancient writers and monks enjoying tea and songs. These include the Great Buddhist Master *Seosan*'s poem written in a small temple he built called the *Naeunjuk* Hermitage while enjoying tea and Great Buddhist Master *Buhyu*'s poem written to express his joy of planting tea into the forest in Chilbul Temple as he practiced his Buddhism. Folk of *Jaeksul* tea used as medicine and Hadong tea tributed to the king are also handed down orally.

Table 11. Folk and poems related to tea of Hwagye-myeon

<p style="text-align: center;"><b>Hwagaedong Poem</b> Gwoon Choi Chiwon</p> <p>The Hwagaedong of the Western country Full of stars in a gourd bottle A fairy shoves a jade pillow Suddenly a thousand year has passed</p>	<p style="text-align: center;"><b>Naeunjeok Hermitage of Duryu Mountain</b> Seosan Daesa Hyujeong</p> <p>Five or six monks built a cottage beside my hermitage They set to work together to the morning bell and go to sleep together to the evening drum Draw water and moonlight from the stream and brew tea together in an azure mist What is it that you do everyday, prayer recital or Zen meditation</p>
<p style="text-align: center;"><b>Tea Harvest Song (a folk song)</b> Unknown</p> <p>Pick the choyup give it to a merchant Pick a joongyup give it to parents Pick a malyup give it to husband Make herb medicine from old leaves Put it ina bag and give it to my child when his stomach aches He gets better having herb medicine and grows well</p>	<p style="text-align: center;"><b>A Folk Song of Tea</b> Unknown</p> <p>The sun rises through the thin mist of the Shinheong Valley Wake up, women The young jaksal tea leaves wake up from the mists before the Grain Rain Jaksal leaves grown in the thunderstorm rain Harvest them in your skirt width and head to the Hwagae market</p>

Tea Poem	Tea Poem
<p style="text-align: center;">Beomhae, a Zen master</p> <p style="text-align: center;">Borim tea is offered to the governor Authentic Hwagae tea is offered to the king The local tea of Hampyeong and Muan is valuable in the south And the tea of Gangjin and Haenam is famous in the northern part of the capital</p>	<p style="text-align: center;">Chusa Kim Junghee</p> <p style="text-align: center;">When spring comes in Ssangye, the destiny of tea is formed In the acha of the tea water, dasun covers Gluttony cannot stop at an old age that they want more laver dried in the fragrant sunlight</p>

### 1.5 Remarkable landscapes and land management features

#### The history of land utilization in the traditional tea fields of Hadong

With the prevalent formation of temples in the Jiri Mountain area in the early Joseon Dynasty, tea agriculture in Hwagae maintained the tea plant colonies by harvesting the leaves of autogenous tea plants without artificial cultivation. Afterwards, many natural villages and farming areas were formed along the Jiri Mountain valleys starting from the village around the temple, and tea culture and tea cultivation method spread across the town, forming the tea fields of Hwagae. In the following centuries, the tea agriculture of Hwagae continued to fluctuate between proliferation and decline along with the tea cultivation and tea culture of the Joseon Dynasty, bringing about changes in the use of land in Hwagae-myeon tea agriculture. After the last years of Joseon Dynasty and the Japanese Occupation period, tea fields of Hwagae area in Hadong came to take the form of traditional tea field colony distribution today in the 1960's in harmony with the forests and valleys of Jiri Mountain. In the 2000's and onwards, the tea agriculture spread as the high added value agriculture and even the flatland is used for tea fields as well.

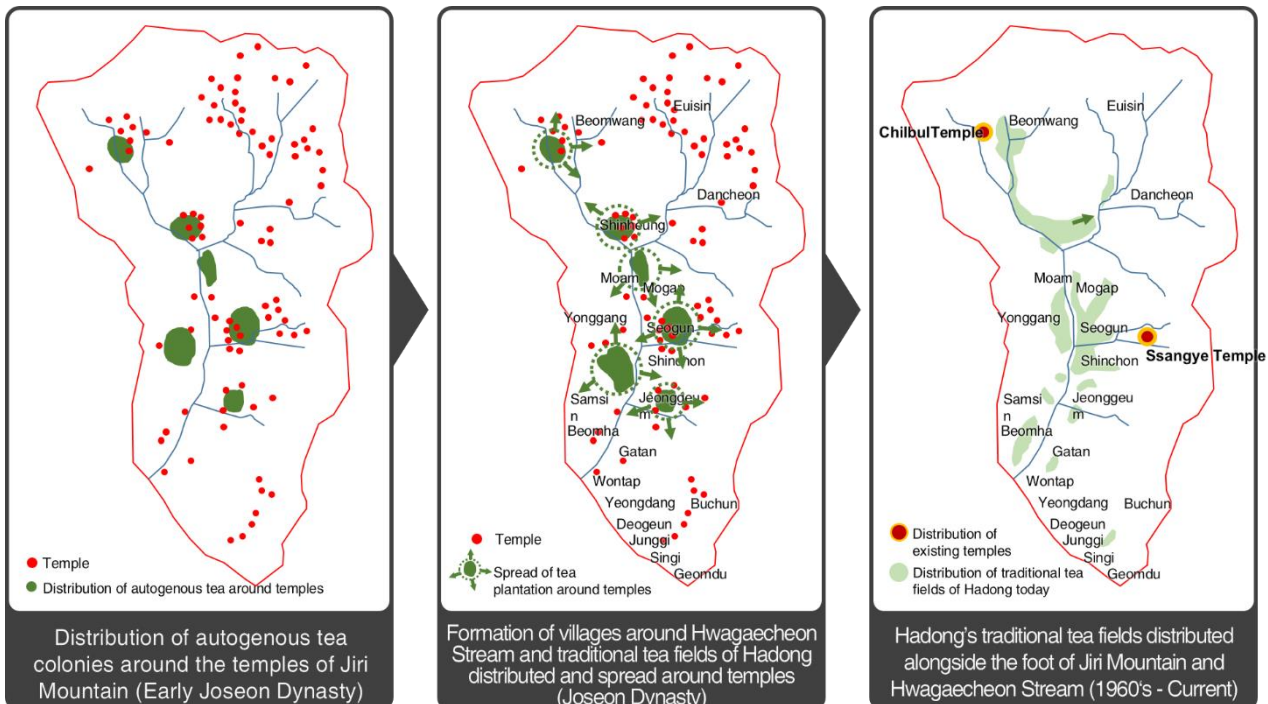


Figure 9. Changes in the land usage of the Hadong traditional tea fields (From the locals' testimonies)



## Landscape formation through symbiotic use of land in the traditional tea fields

The tea fields of Hwagae-myeon show the characteristics of environment-friendly land use, in which the existing terrains and natural environment such as steep slopes and the foot of the mountain is used for agriculture without any artificial modification. Therefore, it forms the unique scenery in which the tea field is located in harmony with the surrounding forests with the fauna at the slopes—arbors, shrubs, and mosses—and rocks. Such environment-friendly land use of Hadong traditional tea agrosystem holds significance in terms of preserving the ecosystem and symbiosis of the mountainous regions as well as forming the natural landscape in which the tea fields, mountain and forest terrains, and fauna are in harmony. It is a characteristic look to the Hadong tea field that sets it aside from other terraced tea fields in Korea.

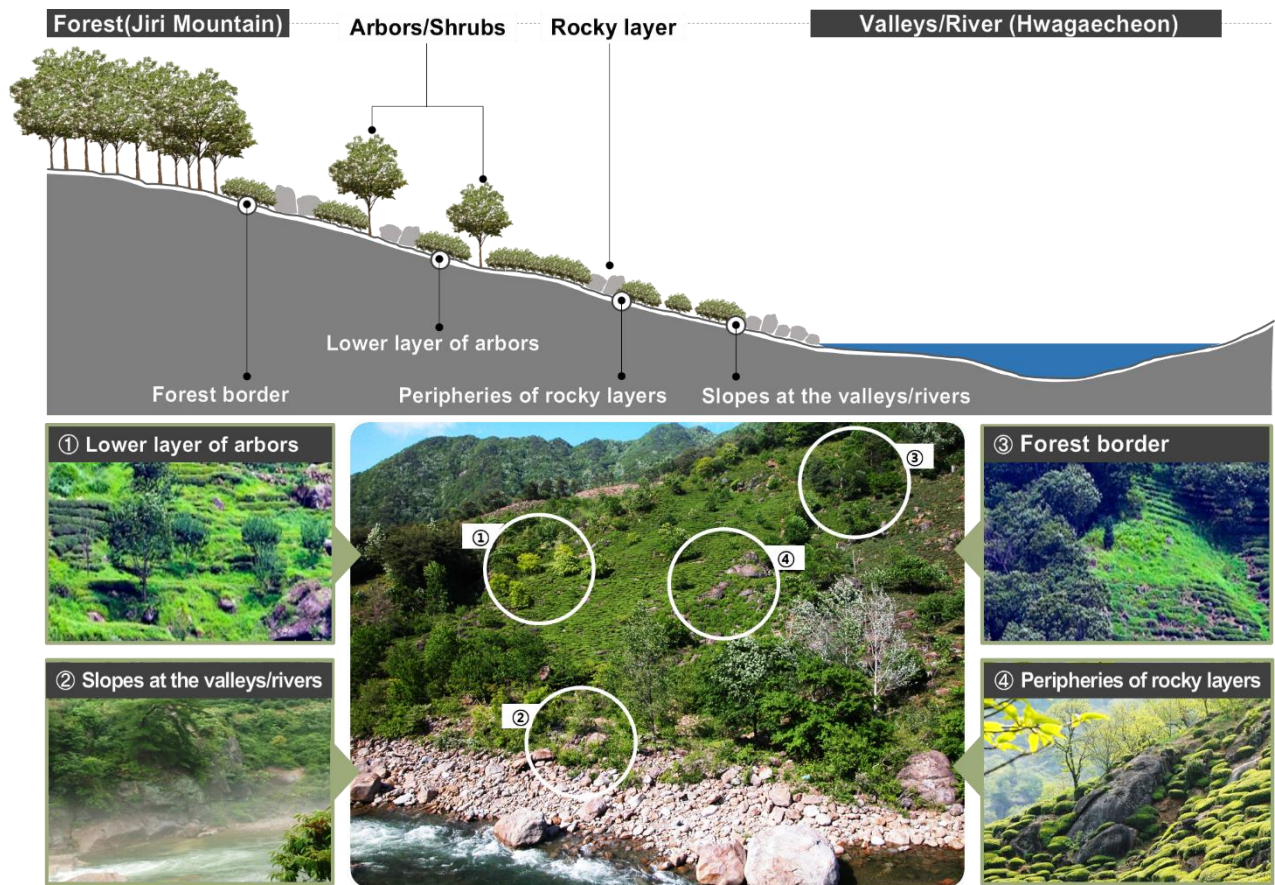










Figure 10. Unique land usage and landscape formation in Hadong traditional tea fields

## Eight

### Beautiful Sites preserving the beautiful landscape of the traditional tea fields

Because the tea fields of Hadong-gun is formed without changing any of the mountain area, it maintains the wild beauty and tough appearance of nature. Decorating the tea field displays affection and from early spring when picking starts, the scent of flower spreads. Among the tea areas of Hadong, ‘Eight Beautiful Sites’ was selected to contribute to the spread of tea culture. The ‘Eight Beautiful Sites’ are mostly owned by individuals or specific temples and are six from the Hwagae Stream surroundings, one from Buchun-li and one from Akyang-myeon. In these wild tea fields, one can smell and taste the scent and flavor of tea.

**Table 12.** Beautiful tea fields in Hadong

Classification	Characteristic	Picture	Classification	Characteristic	Picture
First Tea Field	The field on which Kim Daeryeom planted the first tea seeds in 828 AD (Year 3 of King Heungdeok of Silla) at the order of the king		Dosim Tea Field	The location of the Oldest Tea Tree (Thousand-Year Tea Tree) in Korea	
myeongwon Tea Field	It has a visitor's deck, and Seiam Hermitage, Chilbul Temple, and Jiri Mountain Historical Hall are nearby		Ssanggye traditional Tea Field	Maintains the traditional form of Hadong's traditional autogenous tea field, in which tea trees grow between the rock cracks	
Korea Dawon	Introduced as a beautiful tea field of Hadong in different media		Tea Area	Integrated tea experience space run by Hanbat Tea Field located in the Tea Space	
Samwoo Tea Field	Part of the Samsin Information Village (green tea experience village) open as an experience tea field to visitors		Maeahm Tea Field	The only one of the Eight Beautiful Tea Fields located in Akyang providing the chance to enjoy the scenery of flatland tea field	

### The cultural scenery of Hadong traditional tea agriculture

The important characteristics of Hadong traditional tea agriculture lies not only in the scenery and the various elements of physical view but also the cultural scenery arising from the agricultural activities throughout the different seasons. In Spring, the sight of local farmers picking tea in the field like a green carpet on the mountain is a agricultural and cultural scene to behold. The sound of leaves snapping—akin to the sound of raindrops—while being harvested brings about different emotions in people looking at the scenery of the tea field. The sights of picking tea leaves can be seen everywhere in Hwagaemyeon from Spring to early Summer. Moreover, the look of people musing over thoughts after drying the harvested tea leaves, roasting them, and fermenting them in the ochre room is a cultural scene unique to Hwagaemyeon.



Photo 45. Scenery of tea agriculture-related culture in Hwagae-myeon

## 2. Other social and cultural characteristics pertinent to the management of the agricultural system

### 2.1 The oldest tea tree of Hadong and the first tea field

Hadong-gun Hwagye-myun, the first tea field of the Korean peninsula

Although there is no definite record of when South Korea had the first tea field, records of Kim Daeryup going to Tang in the 3rd year of King Heungduk of Shilla (828) to bring the species of tea tree and planting them around the Jiri Mountain for the king's order is passed down. Afterwards in July of 2008, the Korean Record Institute and Tea Academy researched all



Photo 46. Monument of certification on the first tea field

the wild tea plants in the country and certified Hwagye as the first tea field of the Korean peninsula and made a monument of certification. It is also designated as the 61st memorial of Gyeongsangnam-do Province.

**The living evidence of South Korea’s history of tea, the oldest tea tree**

The age of a tea tree can be said to be the living evidence of the region’s oldest tea culture history. Also, by seeing the ecology of oldest tea tree and its surrounding environment, research on the preservation and vitalizations can be done pluralistically that interest of the oldest tea tree is immense among tea people.

According to the most recent research, the oldest tea tree is the one growing in the tea field owned by the Dosim Tea Field of Hadong-gun Hwagye-myun Junggeum-li Dosim Village (Representative Oh Siyoung). According to the research of the Korean

Tea Academy and Korean Tea Culture Research Association, the height is 4.15m and the width of the branches is 3m and the circumference is 48cm and is estimated to be 500 to 1000 years old.



**Photo 47.** The Oldest Tea Tree in the Dosim Tea Field

**2.2 Living manners preserved through the tea agriculture**

**Pungda Ancestral Rite**

To wish for a successful harvest, ancestral rites are conducted around Gokwoo, which is when the tea cultivation start. The Pungda ancestral rite takes place every April based on the tea fields and is held in the order of Gil play, stepping on Jisin, Sungodain Hundare and Dadamhwe of Tea People Organizations. The festival is carried on even to this day.



**Photo 49.** Pungdaje-a village ritual to pray for a good harvest

**The wish ancestral rite of Chilbul Temple**

For ages in Hwagye, the people cultivating tea held wish ancestral rite every March and October to wish for a successful harvest of green tea that were tributed. Today, it is passed on as the thousand year tradition of Chilbul Temple as the ‘Ahjabang Open Gobulsuncha Grand Buddhist Ceremony.’ It has been passed down to preserve and pass down as an individual Buddhist Ceremony withholding the tea and religion, livelihood in harmony. It wishes for the mercy of Buddha to spread through tea for the health and peace of the people and the target of wishes is spread from green tea fields to all living creatures.





**Photo 50.** Ahjabang Open Gobulsuncha Grand Buddhist Ceremony of Chilbul Temple

**Marriage custom**




The living manners of wild tea culture can also be found in the marriage custom of the people. When the daughters got married, the mothers of Hadong put tea seeds into the pockets and sent them. It was meant to maintain virginity as the roots of a tea tree grows in a one line. Also, tea trees are called fruit reunion tree or mother and son tree. This because the tree represents the affection between the parents and the children. Likewise, the tea tree has roots not only as methods of survival but as a culture that affects the living culture of the local people.

### 2.3 Traditional tea cup and tea utensil

In the home of the thousand year tea Hadong, there is a strong bond between tea and tea utensil. Tea utensil encompasses everything used in tea and can be used in various ways based on how the tea is boiled depending on personal preferences and tastes. Choeui Sunsa, who gave a drink to the king wrote in <Dasinjun> that when one makes tea, he should be neat and plain. The neatness and plainness can be found in the traditional tea cup and utensil of Hadong.

Tea utensils used to process traditional tea of Hadong			
<b>Kettle</b>	Made from iron and used to roast tea leaves.		
<b>Flipper and scoop</b>	Used to scoop out the roasted tea leaves from the kettle		
<b>Broom</b>	Used to sweep out the picked-out tea leaves and other debris around the kettle		
<b>Straw mat</b>	Used to rub the tea leaves. The finer, the better		
<b>Winnowing basket and fine mesh screen</b>	Used to winnow out the powder, which is an essential part of making good tea		

Traditional tea utensils used for Buddhist tea offering ceremony in Hadong			
			
Tea jar for a large amount of tea	Various teapots	Cooling bowl	Screening net
			
Earthen tea cup and saucer used for tea offering ceremony	Brass tea bowl and small teapot	Grayish-blue powder celadon tea bowl	Teaspoon for tea leaves

### 3. Historic relevance

#### 3.1 The historical introduction of Hadong traditional tea

The Hadong tea field that holds historical significance as the first tea field

In South Korea, there are several theories regarding the origin of tea. The theories are that it was autogenous from the beginning, introduced by King Kim Suro, or introduced by Kim Daeryeom. Among these, the most feasible is that it was introduced by Kim Daeryeom. The story of Kim Daeryeom of Kyundangsa Kyundangsa : Envoy sent to Tang from the three countries of the Korean peninsula, especially, Shilla.

In the 3rd year of King Heunduk (828) coming back with the species of Chuntae Mountain tree and planting tea seeds in the Hadong region (around Jiri Mountain) as a part of the king's order is based on the historical records. Because the area around Jiri Mountain was before the formation of village, it is assumed that tea species were planted around temples for the management of tea fields.

Hadong became a tea-producing region representing the country after it was first planted by the king's order during the Shilla Dynasty and through the Korea and Joseon Dynasty. The tea produced in Hadong was continuously offered to the to the king in the central government until the late Joseon Dynasty. It was also consumed by many monks and writers, evident from the numerous poems and writings about tea. It is told that they drank the Hadong tea as they shared their poems.



Photo 51. Vol. King Heungdeok of *Samguk Sagi*



Photo 52. Tea Initial Plantation Memorial

Table 13. *Samguk Sagi*, Silla bongi vol. 10, Year 3 of King Heungdeok

<p>In the December of the third year of King Heungdeok's reign(828 AD),  an envoy was sent to the Tang Dynasty China to offer tributes.  Emperor Wenzong of Tang received the envoy in the Royal Hall and held a banquet,  granting the envoys with royal gifts according to their ranks.  Kim Dae-ryeom, the envoy to Tang, came back with tea seeds, which the king ordered to plant near Jiri Mountain.  Tea was present in our country since the day of Queen Seondeok, the 27th monarch or Silla,  but this is when it truly became prevalent.</p>
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The re-spread of tea agriculture through the reformation efforts of the 1980's at a regional level

From the late Joseon Dynasty to the Donghak Movement, the Hwadong Hwagae area became a strategic point due to its geographical features. This is one of the biggest reason behind the loss of tea field. From the Japanese Colonization Era, villages formed along the Jiri Mountain area that forest and tea fields were cultivated as farmland. The tea industry declined along with the development of areas such as Hwagaejang.

Later on, Hadong tea fields were so damaged it was close to impossible to spot a tea tree and most tea farming households were also gone. However, even during the Japanese Occupation period when native tea cultivation was threatened, Hadong tried to maintain its traditional tea species. From the 1960's to 1970's, only seven tea farming households remained in Hwagae and it was like cultivating tea growing in local mountains. Back then, technicians of tea processing were lacking in number, and there were no processing facilities, so the tea agriculture was barely maintained. Reformation was completed through pulbibae of damaged tea fields. From the 1980's, the tea agriculture spread to the entire Hwagae-myeon by the townspeople planting the tea species in fields. The tea agriculture vitalized through regional education and distribution of tea production. From this point, the tea fields of today formed. Along

with this, the tea farming households that were only six in the 1960's increased to 140 in 1980, 618 in 1990 and recently to 801.

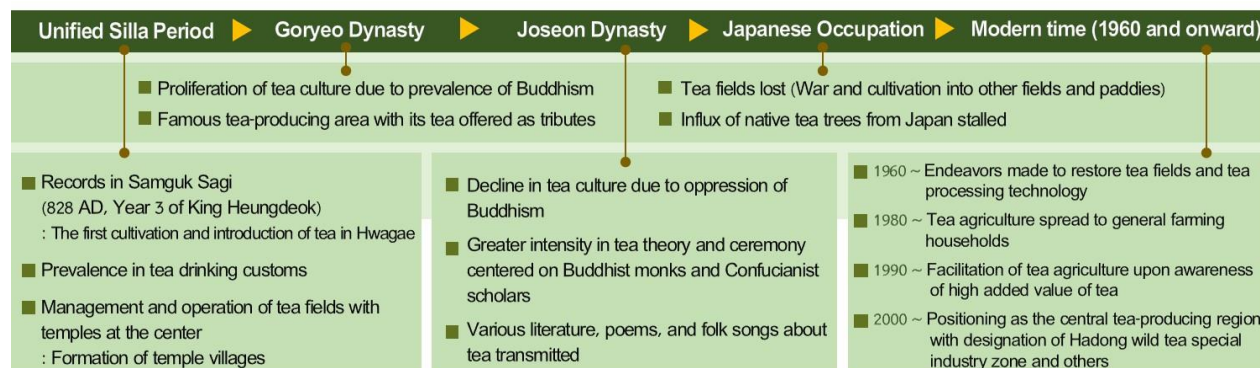


Figure 12. Timely characteristics of Hadong traditional tea agriculture

### 3.2 Historical records related to Hadong tea

Excellence of Hadong green tea agriculture found in historical

Hadong is geographically suitable in the production of tea with a suitable climate, environmentally friendly components and more. It also has numerous conditions that influences the development of tea culture in a positive way. It is also an important area to lead the tea culture and industry of South Korea with its long tea history. Among the numerous traditional tea production sites, Hadong, which is a part of the Jiri Mountain requires attention in both historical and cultural aspects. It has especially been known as the country's tea field for a long period of time and produced the most tea during the Korea and Joseon Dynasty. In *The Chronicle of the Three States*, *Dongkukyisangkukjib* and *Doongdasong* are records of the excellence of the Hadong tea culture.

Table 14. Historical records of the transmission and excellence of the traditional tea agriculture of Hadong

Groups	Characteristics
Three Kingdoms Era	In <i>Samguk Sagi</i> (Silla bongi Vol. 10, Chapter 17, King Heungdeok), it is mentioned that “Daeryeom, the envoy on his way back from Tang brought tea seeds, which the king order to plant near Jiri Mountain. Tea has been in the nation since the days of Queen Seondeok, but the tea became prevalent from this period.”
Goryeo Dynasty	Yi Gyubo (1168~1241) wrote, “To talk over the tea harvest in Hwagae, the local government encourages both the old and the young to harvest it. They harvest the tea leaves by the skin of their teeth and carried them over to the capital in loads.” This shows that Hwagae was a representative tea-producing region at the time, and the quality was excellent enough to be offered to the central government.
Joseon Dynasty	Ha Yeon, the Joseon Dynasty official who served successively as the governor of Gyeongsang-do Province gave Minister Min Euisaeng Hwagae tea of Hadong when the latter was on a private trip to China and told him “I have heard that Hwagaegol as some excellent tea. / It is as refreshing as tea of Yangseon Mountain, / and the value of its aroma is akin to precious metal and gems. / I send you this tea from my heart to supplement your travel expenses.” Choewi, a Zen Buddhist master in the late Joseon Dynasty, praised its excellence in his panegyric titled <i>Dongdasong</i> and mentioned that “In Hwagaedong near Jiri Mountain, tea plants grow over the area of 40 to 50 leagues”.

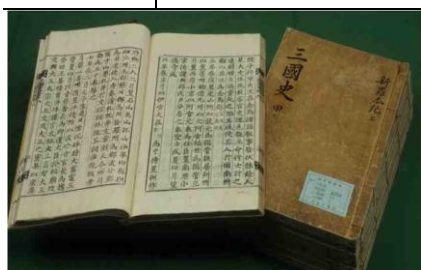


Photo 53. *Samguk Sagi*

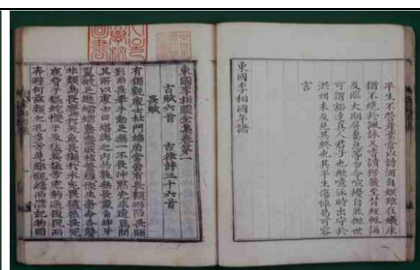


Photo 54. *Dongkukyisangkukjib*-Lee Gyu-Bo's a garland during Koryo-Dynasty



Photo 55. *Dongdasong*

### 3.3 Hadong tea and the Buddhist culture

#### Traditional tea agriculture spread around the Buddhist temples

Tea culture over the world in general developed with temples at the center. The tea culture in the temples started in the Ancient India, the home of Buddhism, and as Buddhism spread across China and to Korea, the temple tea culture followed as well. In Buddhism, tea accompanies the seekers of the ultimate enlightenment on their paths and is more than a mere beverage to be imbibed.

For the traditional tea of Hadong with its roots in Buddhist traditions, the tea culture was assumed to have been formed in order to manage and maintain the tea field after the plantation near the temple as the tea was planted by *Kim Dae-ryeom*, the man responsible for the introduction of the tea seed plants, by the order of the king and no village was present in the area aside from the temple near the Jiri Mountain area.

Tea of Hwagae region praised by numerous Zen Buddhist monks and Confucianist scholars. Even at the period when the distribution of tea was not facilitated, monks at Ssanggye Temple including the Zen master *Choewi* and literary figures exchanging poems for requesting and presenting tea between each other, sharing the tea of Hwagae. As the agricultural technology developed and spread in the late Joseon Dynasty, rice paddy and field farming reached across to the foot of Jiri Mountain to shape the Hwagae region from its former status as a village with the temple and the tea fields. That was when the traditional tea agriculture of Hadong truly started.

**Table 15.** A Poem from Ssanggye Temple by the Zen master *Choewi*

I happened to walk near the mountain temple / and I enjoyed myself to the fullest.  
 The stream runs through the meandering gorge / and the shape of the mountain surrounds the heavens.  
 I may not keep the promise / that I will come to stay another night later,  
 but much rain has fallen on the temple deep in the mountain / only to clear up in the evening.  
 The air has become cold while I was unaware / and in the empty temple in front of the old pine tree  
 with its roots entangled like dragons with the color of old / duck-shaped incense burner lies in the service hall.  
 Alas! At my path to Huangmei / where can receive the teachings of the Fifth Patriarch Hongren

Modern tea culture of Korea changed radically in the late 1970's. Tea culture movements were active, and the Buddhist society was the leading force. The monks at the time did not stop at the preaching of Zen, managing and maintaining the tea fields of Hwagae-myeon and teaching the locals about the transmission of the knowledge system regarding the tea agriculture and even the method of tea cup and utensil usage and tea production. The Buddhist names and the temple names were even used for tea products and tea utensils akin to brand names. This shows that the tea of Hwagae was managed by the monks from production to distribution.

Traditional tea production method of Hwagae-myeon today preserves the form transmitted from the monks of Ssanggye Temple in Hwagae. *Kim Dong-gon*, a tea maestro, was taught the Zen method of tea production by monks *Geumsong*, the former head monk of Ssanggye Temple, and *Deokryong* and eventually undertook Ssanggye Tea Co., Ltd. The traditional tea agriculture of Hwagae-myeon in Hadong is inseparable from the Buddhist culture, as it is rooted in the temple tea culture.



**Photo 56.** Buddhist mass of tea culture transmission at Ssanggye Temple



**Photo 57.** Tea offering ceremony at Chilbul Temple



## 4. Contemporary relevance

### 4.1 Value of tea agriculture as a future resource

Hadong-gun Hwagae myeon is an area suitable for tea production with its location at the mountain side and the climate conditions. Hence, the traditional method of tea cultivation and processing craftsmanship has been maintained that the production profit of Hadong green tea industry is 13.7 billion won accounting for 80% of entire tea leaf sales. Today, 20% of the Hadong-gun population work in the green tea industry and inside the Hadong region, there are 179 green tea and tea processing companies in operation, establishing the foundation for the traditional tea production.

Recently, along with the well-being culture, new perspectives emerged regarding natural food related to food and the tea culture among the everyday lives of modern people. Green tea is a functional beverage, having a long history worldwide. Along with the spread of its functions such as the cholesterol reduction, enhancement of immunity, anticancer effects and more, green tea is coming to be used in more industries such as the bio-industry and food industry based on green tea.



### 4.2. Use of tea fields as a tourism cultural resource

Hadong-gun Hwagae myeon is an area suitable for tea production with its location at the mountain side and the climate conditions. Hence, the traditional method of tea cultivation and processing craftsmanship has been maintained that the production profit of Hadong green tea industry is 13.7 billion won accounting for 80% of entire tea leaf sales. Today, 20% of the Hadong-gun population work in the green tea industry and inside the Hadong region, there are 179 green tea and tea processing companies in operation, establishing the foundation for the traditional tea production.

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**Photo 60.** Picking tea leaves experience



**Photo 61.** Traditional tea manufacture experience



**Photo 62.** Tour of the first tea field

The tea culture center located in the Hadong-gun Hwagae-myeon has a exhibition area exhibiting the cultivating method of Hadong wild tea, cultivating tools and tea utility as well as experience areas to learn about tea culture and taste wild tea.

As a tourist cultural resource, the vitalizations of tea field played a leading role in the Hadong tea culture and industry and Korean tea culture. It also helped to expand the consuming level and create new consumption of green tea and vitalized the regional economy even to the 6th industry through accommodation, food industry and experiencing tourism.



**Photo 63.** Tea ceremony experience place of Handog tea culture center

The Hadong Wild Tea Culture Festival was held in May of 1995 to announce that it is the hometown of traditional handmade green tea and support the cooperation of the townspeople and distribution of tea culture. The strongest point of the Wild Tea Culture Festival is the beautiful scenery of the tea field and the experience activity. Leaves picking experience, traditional tea manufacture experience, first tea field tours invite visitors to experience with all senses and are programs open to everyone.

**Table 16.** Hadong and wild tea culture festival visitor status

Classification	2011	2012	2013	2014	2015
Hadong-gun	3,025,466	2,545,349	2,449,701	3,682,132	5,240,395
Wild tea culture festival	475,368	453,778	361,859	-	421,321

※ Resource : a internal resource of Hadong-gun Office, Tourism Knowledge & Information System(Tour.go.kr) main tour site visitor statistics

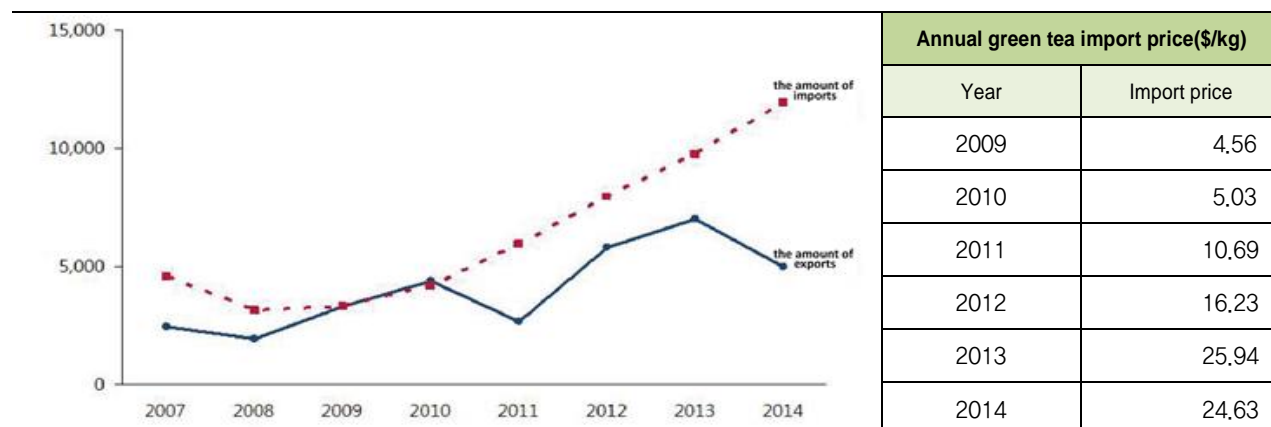
## 5. Threats and challenges

### 5.1 The expansion of market through the FTA

Methods to spread the Hadong tea industry within the threat of world tea market

Along with the conclusion of the FTA starting from 2004 with Chile, US, Turkey, Australia and more, the agricultural environment is becoming more demanding. Until 2010, the national tea import and export status was relatively in a structure of import and export competition. However, from 2011, export exceeded import. Along with weakness in sales and being the 39th in world tea consumption, the income of farming households decreased. With the FTA taking place, tea import is expected to continuously grow. In such situation, there is a need to have competitiveness for the Hadong tea as a national significant tea producing area.

**Table 17.** Status of tea import and export

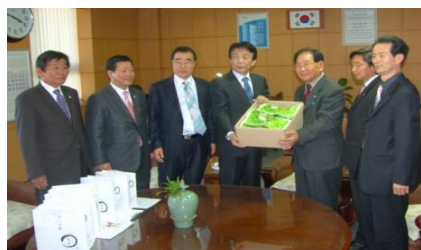


※ Resource : Import and Export Trade Statistics, Korea Customs Service/ Recent tea import trend, Korea Customs Service, July, 2014

In December 29, 2014, the ‘Korean tea industry development and tea culture promotion act’ was signed in the National Assembly, creating a foothold for the expansion of the tea industry market.

Also, as high value resources contributing to the health of mankind, tea trees are being recognized to be substances effective in stabilizing the mind and the body, prevention of dementia and studies as well as concentration. Various products use tea leaves including not only green tea and black tea but also powder green tea, green tea extract and more. These products are being introduced in the market. Not only in food products but in cosmetics, architecture and everyday life products, the use of tea tree is various, being developed into various products.

Based on this, national significant tea producing area Hadong is proud of the traditional handmade tea becoming a worldwide excellent tea with high value. It supports green tea drinking movement, the vitalizations of green tea research center, development of new programs of wild tea culture festival, Hadong green tea brand publicization and sales promotion to energize national green tea vitalizations and spread its market.



**Photo 64.** Hadong tea drinking movement



**Photo 65.** Vitalizations of Hadong tea research



**Photo 66.** The Hadong Wild Tea Culture Festival

## 5.2 Threats of tea field preservation due to decrease in labor population

### Hardship of tea field conservation due to decrease and aging of Hadong-gun labor population

After the 1960's, urbanization began based on the development of city industry requiring a big labor consumption and the production trend and convenience of approach. The young people of rural areas moved to urban areas, creating the problem of aging society that it became harder to preserve the tea field due to a decrease of labor population and an increase of fallow ground.

In the 1990's, the total population of Hadong-gun was 60,848. However in 2015, the number decreased to 50,870. Also, in 1999, Hadong-gun was classified as aging society and in 2003, super aging society. The ratio of population

above 65 has gradually increased 2~4% that it now composes 28% of the entire population of Hadong-gun. It is the main cause of decrease in production decrease and the preservation of tea field is under threat.

**Table 18.** Hadong annual change of population

Classification		1999	2003	2007	2011	2015
Population		60,848	58,110	55,757	54,332	50,870
Above 65	Population	9,966	11,418	12,952	13,645	14,407
	Ratio(%)	16	20	23	25	28

※ Resource : Hadong Office annual statistics

Although the number of farming households in Hwagae-myeon, a main tea production site of Hadong-gun increased to 2,016 in 2012, it decreased by 57 to 1,956 in 2014. From 2012 to 2014, the production quantity increased to 1,014ha of tea field area and 1,974 tons of tea leaf production, but the profits decreased to 22 billion won.

**Table 19.** Hadong annual change of tea cultivation status

Classification	2010	2011	2012	2013	2014	'13년 대비 증감
Number of farming households	1,956	1,947	2,016	2,013	1,956	▽57
Cultivating area (ha)	1,022	1,010	1,032	1,042	1,014	▽28
Production(ton)	2,327	2,169	1,952	1,967	1,974	△7
Profit(100million)	285	245	280	241	220	▽21

※ Resource : Hadong Office internal resource

Although Hadong-gun has mechanized part of the cultivating environment, it maintains the old method of traditional cultivating method. However, along with the decrease of labor population, supplying labor to manage and preserve the tea field is not easy. Therefore, tea fields have decreased and fallow ground increased and commercial crop take up the space of tea fields. Even foreign commercial crop are frequently brought and planted. The increase of fallow grounds cause damages of land and influences national economy negatively.

The Hadong-gun is making various policy development in efforts for the development of rural area with the city, profit based expansion business and welfare agriculture administration upon stability based rural society. These include cooperative package supply, production facility and equipment support, environmentally friendly organic fertilizer support and increase of excellent personnel in tea industry department to vitalize the tea industry.

### 5.3 the Destruction of the wild tea fields by developing tourist destinations

#### Damage of tea fields due to indiscreet development as a tourist spot

Hadong vitalized regional economy and attracted about 5 million domestic and foreign tourists through Ssanggye Temple, Samsong Palace and Hwagae marketplace in 2015. Also Hadong even made a contract of MOU about constructing cable car in Geumoh Mountain (located at an altitude of 850m) and seawater hot spring business. However as a result of the thoughtless exploitation, the indiscriminate appearance of resorts, vacation homes and pensions and increase of tourists, negligence of trash and cases of forest fire due to sightseers are frequently happening.



**Photo 67.** Opening of a Resort in Hwagae-myeon

Hadong is primarily cracking down on illegal dumping of trash and taking an administrative measures in order to protect natural environment and landscape. Also Hadong is trying to create a pleasant atmosphere by thorough cleaning and collecting illegally disposed wastes. Plus Hadong is carrying on forest fire-prevention campaign to mountain hikers and residents in an attempt to cut back cases of it.



Photo 68. Hadong fire prevention promoting campaign



Photo 69. Thorough cleaning of Hadong

#### 5.4 Natural farming, keeping clean natural environment

Hwagae is a rough highland region, surrounded by Jiri Mountain. As a woodland that 93% of its total area consists of tea-plant and bambboo, it has a disadvantageous condition for cultivating. And as most of the place is a part of mountain slope, machinery operation is hard.

In order to overcome this unfortunate environment, residents utilized mountain regions by planting tea near valleys, mountain hills and cracks in the rocks. Also, as mountain slopes are poor for mass production, farmers strengthened their competitiveness by producing luxurious tea in small quantity.



Photo 70. Traditional tea field located in the mountain slope

Hadong has been growing tea for almost 1200 years in a form of cottage industry, in its own traditional cultivation and processing skills. And they are preserving species diversity through eco-friendly farming. They don't use chemical fertilizers in every steps; rather, with organic ones they minimized destruction of the nature.

On the basis of this, Hadong is keeping their high quality and creating their own identity through premium farming. Also they're creating environment-friendly agricultural craftsmanship supplement system and promoting organic farming-quality-certification business.

## 6. Practical considerations

### 6.1 Effort to be designated as Global Important Agricultural Heritage

#### The local government's promotion for the appointment and maintenance of Important Agricultural Heritage

Hadong recognized the historical value of its traditional tea fields and carrying on various policies for their continuous conservation and development. Hadong helped tea industries such as tea farms by holding wild-tea culture festivals in relation to traditional tea culture. And the city is putting an effort on fostering their local business through drawing tourists. Thanks to devotion of public officials and local residents, their festival was nominated as the best festival in Korea by the central government for four years in a row. This led to the vitalization of local economy and cultural exchange between city and country.

Also in 2006, Green tea industry cluster was built to form the network of industry, education and research aiming to set up long term plans for production and management of supreme-traditional tea. In 2007, Hadong established the government-designated green tea research center and built. It promoted specialized industries through contributing to construction of joint-green tea-processing facility and Hadong Green tea Science Center.

It helped making Hadong tea a luxury good and developed it as the leading industry of the local economy and finally contributed to increase of the income of local residents. Especially, green tea research center directly presented to regional green tea processing firms technological support, safety analysis of the green tea and test analysis and solving of technical problems. They are also carrying forward collaborative business with another regional industries which is leading to increase of awareness about the traditional tea.



Photo 71. Institute of Hadong Green Tea

#### Enactment of regulations considering Hadong Tea industry and effort to preserve agricultural heritage through the participation of local residents

In 2012, Gyeongsangnam-do tea industry development and tea culture promotion regulation was enacted. In November of 2014, approximately 120 people related to tea industries held a seminar and promoted on National Assembly for passage of law related to development of tea industries and tea culture and finally it went through the parliament.

Also by turning wild farms into tourism resource and by submitting consent of 563 out of 800 tea farmhouses that they agree the active participation to admittance of tea as National and World Important Agricultural Heritage for constant preservation of traditional tea field and recognition of the value of it, people shared that they should hand down the importance and value of tea farm to descendants.

#### Constant cooperation with local organization of tea, residents and school

In 2012 local residents and tea manufacturing farmhouses agreed into mutual cooperation for conservation of their heritages. And to strengthen local people's will and recognition about their culture and to implement a sustainable landscape protection project, people promoted a maintenance and administration business about 200ha of wild tea fields. Also they planned a tea industry fostering project that built foundation for tea field that can use machines, promoted processing industries, and implemented green tea production foundation. Like this they promoted many projects to create regional income, conservation of residents' income and inspire their self-confidence.

Also to secure demand of local teenagers and for green tea-love campaign, Hadong is supplying green tea to feeding facilities in schools and advertising the efficiency of green tea. Also it is pushing ahead standardization of Hadong green tea and establishment joint packaging brand. Moreover, through periodical meeting of tea producers and collaboration with government it is building a sustainable network for growth of green tea industry and preservation of wild tea farms.



Photo 72. Kyongnam School Food EXPO

## 6.2 Promoting projects for conservation and utilization of agricultural heritage

### Promoting various fusion business related to green tea industry fosterage

Hadong graft on many industries using green tea and conducted research for vitalization to grow universal, high quality green tea. In 2015 Hadong invested 2 billion won in mechanization of workplace, safety analysis support, supplying machine for reducing labor cost, developing tourism items such as massage goods using green tea and green tea experiencing kit and providing recipes for green tea cuisine. Also through adding processing facilities to existing installations that provided joint package, tea bag production and toll processing.

Also in an attempt to connect with local tourism resources Hadong is planning to invent and manage many trial programs that things such as health therapy are mixed, run tea café for advertisement and sale of tea-related products, create and operate pottery or red clay trial programs, find green tea-hiking track and run temple-stay programs. Hadong is hoping to broaden distribution channel and is planning to advertise green tea product and promotion in order to cultivate new market.

Table 20. Promoted projects for green tea industry

Section	Date	Cost(Thousand won)
Promoting industries based on prime-gene-elected species	2006. 10	4,930
Development of Hadong green tea, King's green tea BI	2007. 05	19,110
Designation as a Hadong green tea Specific territory	2007. 05	20,000
Preventing tea trees from being damaged by frost And inventing related technologies	2013. 03	30,000
Consulting green tea production, processing firms	2013. 05	10,000

### Reinforcement of Hadong eco-friendly agriculture

As main industry of Hadong is agriculture, as a policy especially to build trust between consumer and manufacturer it paid attention to fostering nature-friendly agriculture.

By promoting various organic fosterage project, Hadong rooted eco-friendly agriculture in local community. Hadong also achieved some results; enabled supplement of eco-friendly agriculture in 2012, was chosen as the best institution for eco-friendly fertilizer and 42 products produced in Hadong is obtained environment-friendly certification.

From 2015 Hadong is carrying out 'pesticide-free earth' project, Hwagae in center aiming for share of recognition between producers and consumers, environment protection and producing safe foods. Hadong hopes to expand production of pesticide-free agricultural products, and fostering tourism production/processing/experiencing/staying tourism-agricultural business, expanding selling channels through constructing distribution basis and branding.

### 6.3 Strengthening of residents abilities with tea producers at the center

Seeking the way for coexistent development through technological training collaboration between local residents and tea producers

By opening local residents' discussion and debate, Hadong confirmed various opinions and shared cultivating skills and educational, cultural values. It also established constant-collaboration network with other organizations such as universities, TP, locally specialized centers.

**Table 21.** Technological training of cultivation farmhouses

Type	Date	Target	Number of People	Object
Technological training	2014. 10. 30	Fermented tea processing farmhouses	30	Microorganism fermented tea producing process education

**Table 22.** MOU for popularization of Hadong tea

Name of organizations	Form	Major performance
National regional government research center conference (Cooperation organization)	Conference	- Attendance: Head of the center - Content: Conference workshop
Dongseo regionally specialized industry exchange (Cooperation organization)	MOU	- Contracted business agreement
National regional government research center conference (Cooperation organization)	Conference	- Attendance: Head of the center - Content: Conference workshop
World Tea Culture Exchange (Cooperation organization)	MOU	- Contracted business agreement
China Bokgunsung Muisansi tea science research center (Cooperation organization)	MOU	- Contracted business agreement
Mokpo University International tea culture Industry research center (Cooperation organization)	MOU	-Contracted business agreement

**Table 23.** Education of tea producers

Type	Date	Target	Number of people	Object
Debate(Forum)	2013.4.20	Green tea producer organization/residents	180	Joint school food system using local food including Hadong green tea
Conference (Symposium)	2013.5.2	Green tea related industry participants/residents	89	Hadong green tea culture and site for industrial, educational evaluation
Debate	2012.9.19	Public officers, School authorities and tea manufacturers(residents)	141	Debate for enacting ordinance of utilizing Hadong green tea in elementary, middle and high school meals in Gyeongsangnam-do
Debate	2012.11.16	Public officers and school authorities, manufacturers(residents)	70	Preventing food poisoning by leading students to drink green tea and avoiding cavity through gargling



Understanding the value of Hadong traditional tea and strengthening abilities of residents for conservation activities

Every January, eco-friendly agriculture education about management of soil, cultivation skills, safety-pesticide examination is done among residents inside heritage region. And by inviting foreign green tea master and presenting education about processing for processors, Hadong is improving their processing skills. Hadong also made and distributed comics about green tea histories to educate teenagers.

**Table 24.** Strengthening of residents abilities brochures



**Photo 73.** Why green tea is good for us

**Photo 74.** Tea and Hadong

**Photo 75.** Hadong traditional tea stories

**Photo 76.** Finding Korean premium tea

**Photo 77.** High-quality Hadong Green tea

**Photo 78.** Korean tea culture, industry promotion sourcebook

## 7. Dynamic Conservation Plan For GIAHS selected site

### 7.1 Establishing plans for conservation, management of Hadong traditional tea agriculture

First, presenting system for support and preservation, management of traditional tea agriculture

Hadong tea farming produce high-quality tea through eco-friendly farming and collaboration among the residents using green tea that adapted in the rough Jiri mountain side. These activities that give positive effect to nearby natural environment and landscape are maintained.

However due to aging of the farmers and change of conditions from the reduction of tea consumption extent of tea farmland, income of farmhouses are decreasing. And because of indiscreet cultivation of tea field the traditional tea agriculture system that had been healthy is in crisis these days. In response to this situation Hadong is offering policies for conserving and keeping surrounding natural environment and landscape, custom farming skills and productivity of traditional tea agriculture.

Second, boosting the value of Hadong tea farming and reinforcement of inner capability for transmissio

Hadong traditional tea farming has built its own knowledge system in histological context such as various agricultural technics and lifestyle for a long time as the major occupation for most residents.

But except for only few, reconsideration about the meaning and the value of Hadong traditional tea farming is necessary. So, dragging social attention to Hadong traditional tea farming knowledge system and effort for passing it down to descendants is needed. Also as a main agent for the transmission, growing internal capability of the region and locals is in need of.

Third, expand its plural value as a agricultural heritage

Hadong traditional tea farming was acknowledged its historical, cultural, environmental values and made as a Nation’s Important Farming Heritage. So further and wider understanding and sharing of its worth is needed and organized conservation and utilization method should be searched

Expanding the value of Hadong traditional tea farming through building colabortive network between domestic and foreign organizations related to agricultural heritage such as FAO(United Nations Food and Agriculture Organization of the United Nations) , GIAHS(Globally Important Agricultural Heritage Systems), ERAHS is necessary.

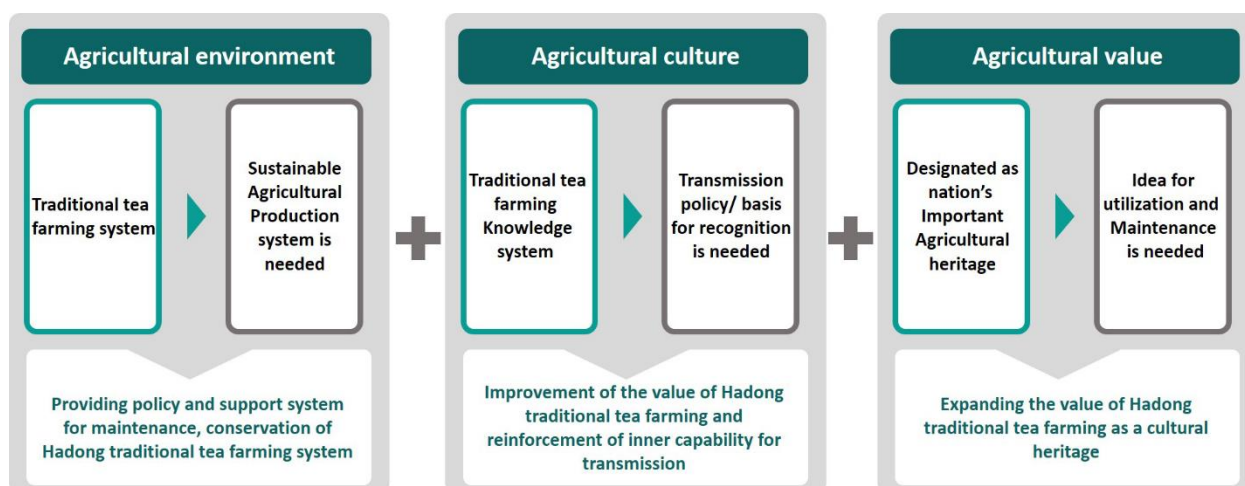


Figure 13. Basic direction of Hadong traditional tea agrosystem conservation and management

## 7.2 Action plans to preserve and utilize Hadong’s traditional tea agriculture

### Preservation and maintenance of Hadong traditional tea agrosystem

First, conserve physical environment tea trees in the farms, species diversity, landscape to continue the traditional tea agriculture. Also support the farming activities of farmhouses that prefer to keep their traditional method and encourage them by supply of manpower and financial aids.

### Understanding and transmission of knowledge system of Hadong traditional tea agrosystem

Hadong traditional tea farming’s knowledge remains in agricultural skill, custom and culture. As it has 1200 years of historical value, it needs to be continuously passed down to our descendants. So through education of transmission

toward Hadong residents and enculturation of tea in life, Hadong promotes mature recognition toward agricultural heritage and train professional locals that passes these value to descendants.

### Activation in exchange of Hadong traditional tea agrosystem's value

Carry out trial, advertising programs for many to participate in order to expand outside value of Hadong traditional tea farming. Changing the viewpoint that the value of traditional tea farming is limited to Hadong region into another approach and collaborate with nearby Jiri mountain regions and GIAHS agricultural heritage region to build social and cultural relationship.

Strategies for the preservation and management	Detailed plan
<p><b>1</b></p> <p>Hadong's traditional tea agriculture environment [Preserve · Maintain]</p>	<p>1-1 Preservation and management of Hadong's traditional tea field</p> <ul style="list-style-type: none"> <li>▶ Projects to support traditional tea field scenery preservation</li> <li>▶ Monitoring scenery and biodiversity of Hadong traditional tea fields</li> </ul> <p>1-2 Supporting preservation of Hadong's traditional tea agriculture methods</p> <ul style="list-style-type: none"> <li>▶ Managing labor exchange groups of traditional tea</li> <li>▶ Selecting and supporting the traditional agriculture zone in Hwagaemyeon</li> </ul> <p>1-3 Creating high added value through traditional tea</p> <ul style="list-style-type: none"> <li>▶ Brand development and utilization of high added value in traditional tea agriculture</li> <li>▶ Developing traditional tea products and supporting distribution</li> </ul>
<p><b>2</b></p> <p>Knowledge system of Hadong's traditional tea agriculture [Understand · Pass on]</p>	<p>2-1 Transmission of traditional tea agriculture technology</p> <ul style="list-style-type: none"> <li>▶ Compilation of technological manuals on the traditional tea agriculture</li> <li>▶ Managing technology transmission academy for the traditional tea agriculture</li> </ul> <p>2-2 Voluntary facilitation of the traditional tea culture</p> <ul style="list-style-type: none"> <li>▶ Promotion of cultural movement about the traditional tea ceremony</li> <li>▶ Creation of traditional tea village museum</li> </ul> <p>2-3 Capacity enhancement for local experts of the traditional tea agriculture</p> <ul style="list-style-type: none"> <li>▶ Managing training and selection systems for the local traditional tea master in Hadong</li> <li>▶ Managing recording projects on traditional tea agriculture of Hadong</li> </ul>
<p><b>3</b></p> <p>Hadong traditional tea agriculture's value [Publicity · Tourism]</p>	<p>3-1 Managing agricultural heritage experience tourism and publicity programs</p> <ul style="list-style-type: none"> <li>▶ Managing owner systems of traditional tea agriculture</li> <li>▶ Developing contents and storytelling elements of the traditional tea field trip in Hadong</li> <li>▶ Managing experience programs in connection with the Hadong Wild Tea Culture Festival</li> </ul> <p>3-2 Building domestic and international cooperation systems regarding tea agriculture</p> <ul style="list-style-type: none"> <li>▶ Building connection and cooperation systems among tea agriculture regions near Jiri Mountain</li> <li>▶ Holding exchange workshops among the traditional tea-producing regions of Korea, China, and Japan</li> <li>▶ Joint publicity and marketing of agricultural heritage for regions participating in ERAHS</li> </ul>

Figure 14. Hadong traditional tea agrosystem conservation and management action plan

## (1) Conservation and maintenance of Hadong traditional tea farming system

1-1 Conservation and management of Hadong's traditional tea field		
<b>Object</b>	<ul style="list-style-type: none"> <li>Created agricultural landscape from Preservation and management of the maintenance of Hadong traditional tea farming system and species variety forms a harmony and expand, keep physical environment of the region</li> </ul>	
<b>Details of the project</b>	<b>1) Projects to support traditional tea field scenery preservation</b>	Encouraging tea cultivating houses and to keep the tea tree landscape, present support for managing the tea trees
	<b>2) Monitoring scenery and biodiversity of Hadong traditional tea fields</b>	Inducing sustainable development of tea farm and conservation of environment through building general plans for maintenance, conservation, utilization of the landscape and environment of traditional tea farmland
<b>Expected results</b>	Able to figure out present status of physical, agricultural environment(Extent of tea field, management status, species diversity) in Heritage region and use it as a basis for traditional tea farm administration	

1-2 Supporting preservation of Hadong's traditional tea agriculture methods		
<b>Object</b>	<ul style="list-style-type: none"> <li>Backing farmhouses that are keeping traditional Hadong tea farming in an old-fashioned way, and supporting residents to keep their farming by following traditional ways</li> </ul>	
<b>Details of the project</b>	<b>1) Managing labor exchange groups of traditional tea</b>	Supporting labor force in a group-working team format to tea farmhouses which grow tea such as Bibae, Chaeda, Jeda in an eco-friendly way
	<b>2) Selecting and supporting the traditional agriculture zone in Hwagaemyeon</b>	Systemic support to Hwagae meon zero-pesticide project and declaration as a farming region that promotes traditional agricultural method
<b>Expected results</b>	Preserving the value as the Agricultural Heritage region by supporting tea cultivating farm houses to keep the traditional way, and establishing community spirit through nominating as a custom-farming region.	

1-3 Creating high added value through traditional tea		
<b>Object</b>	<ul style="list-style-type: none"> <li>Encourage farming and preventing from the farmhouses' retreat from traditional farming through expanding distribution channel of Hadong tea, and raising consumer's trust toward Hadong tea</li> </ul>	
<b>Details of the project</b>	<b>1) Brand development and utilization of high added value in traditional tea agriculture</b>	Luxuriate, and make tea produced by keeping Hadong traditional tea farming into own brand

	<b>2) Developing traditional tea products and supporting distribution</b>	Utilizing Hadong traditional tea farming, designated as Nation's important agricultural heritage by seeking higher-value added business such as processing, commercialization and building distribution channel.
<b>Expected results</b>	Out of former primary industry, through advertisement of Hadong tea and promoting improvement of consumer recognition activate Hadong traditional tea farming	

## (2) Understanding and transmission of Hadong traditional tea farming knowledge system

2-1 Transmission of traditional tea agriculture technology		
<b>Object</b>	• Through official education system foster messenger for Hadong traditional tea farming techniques and prevent the severance of transmission	
<b>Details of the project</b>	<b>1) Compilation of technological manuals on the traditional tea agriculture</b>	주민들로 편찬위원회를 구성하여 전통 농업기술을 전승하기 위한 기초기반 마련을 위한 기술서 제작·보급
	<b>2) Managing technology transmission academy for the traditional tea agriculture</b>	하동 전통차농업 기술서를 바탕으로 농업인이 현장에서 적용하는데 필요한 기술교육을 실시하여 전통차농업의 경영역량 강화
<b>Expected results</b>	Organizing Hadong traditional tea farming in a series of process and building data base for transmission education and use it as a base for maintaining regional farming culture.	

2-2 Voluntary facilitation of the traditional tea culture		
<b>Object</b>	• Regenerate and restore our ancestor's custom to use tea and by performing several programs to spread the culture, strengthen Hadong's location as the center of tea culture	
<b>Details of the project</b>	<b>1) Promotion of cultural movement about the traditional tea ceremony</b>	Restoring the ancestral rites culture that used tea during the ceremony and carrying out a campaign to expand that culture
	<b>2) Creation of traditional tea village museum</b>	To put tea in our lifestyle naturally, expand the targets and place of tea culture education promoted by Hadong tea culture center
<b>Expected results</b>	Sharing of the value of and understating of Hadong traditional tea farming, and further expanding it as a pan-national project	

2-3 Capacity enhancement for local experts of the traditional tea agriculture		
<b>Object</b>	• In order to promote sustainable transmission of Hadong traditional tea farming, fostering the capabilities of residents and utilizing it in conservation activities	

<b>Details of the project</b>	<b>1) Managing training and selection systems for the local traditional tea master in Hadong</b>	Designating residents that have been passing down various agricultural knowledge through family business as experts, reinforce their capabilities
	<b>2) Managing recording projects on traditional tea agriculture of Hadong</b>	Capability reinforcement program to foster residents to record Hadong traditional tea agriculture and conservation, development of tea culture and participate as a commentator
<b>Expected results</b>	Community and constant activity of enforcing the ability of the Hadong people to preserve and manage the traditional tea agriculture area culture and individuality on their own	

### (3) Exchange of value and vitalization in Hadong traditional tea agriculture

#### 3-1 Managing agricultural heritage experience tourism and publicity programs

<b>Object</b>	<ul style="list-style-type: none"> <li>Operating Agricultural heritage exchange program to spread activities related to Hadong traditional tea agriculture in the outside too and raising attention toward it</li> </ul>	
<b>Details of the project</b>	<b>1) Managing owner systems of traditional tea agriculture</b>	Running on ownership system and therefore sharing the procedures of how tea is cultivated and produced with citizens, advertise the value of Hadong traditional tea agriculture and induce them to take part
	<b>2) Developing contents and storytelling elements of the traditional tea field trip in Hadong</b>	Developing contents to make the experience of the traditional Hadong tea easy and interesting and collect interviews of the villagers to use them as the bases for storytelling material
	<b>3) Managing experience programs in connection with the Hadong Wild Tea Culture Festival</b>	Introduction and utilization of diverse experience and tourism contents to raise the awareness of Hadong's traditional tea culture as agricultural heritage
<b>Expected results</b>	Facilitation of coexisting development between rural and urban areas through continuous interaction between farming households cultivating tea based on Hadong traditional tea agriculture heritage and city people	

#### 3-2 Building domestic and international cooperation systems regarding tea agriculture

<b>Object</b>	<ul style="list-style-type: none"> <li>Through constant interaction between Hadong traditional tea agriculture and related regional organizations, form social agreement about agricultural heritage and building basis for its conservation</li> </ul>
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<b>Details of the project</b>	<b>1) Building connection and cooperation systems among tea agriculture regions near Jiri Mountain</b>	By checking the status of tea production and species diversity among similar 7 other cities included in Jiri mountain region, establish collaborative network
	<b>2) Holding exchange workshops among the traditional tea-producing regions of Korea, China, and Japan</b>	Building a collaborative network between World Important Agricultural Heritage designated Japanese Shizuoka tea farming, Chinese Pore traditional tea farming and Jasmine tea culture, Hadong at the center of it
	<b>3) Joint publicity and marketing of agricultural heritage for regions participating in ERAHS</b>	Promotion of joint marketing to build the integrated network of East Asian tea agriculture heritage regions and management of various public relations programs to facilitate local publicity and tourism
<b>Expected results</b>	Sharing research results and other resources, knowledge system and know-hows for the advance of traditional tea farming to result in synergy effects	

### **Preservation and management activities of Hadong's tea agriculture based on the idea of symbiosis and its future**

The traditional tea agriculture of Hadong is a natural agricultural activity producing and managing the autogenous tea plants that adapted to the steep mountainous regions in environment-friendly and traditional agricultural method, making it a system of knowledge and agriculture valuable in its functions to preserve coexistence and symbiosis not only in terms of surrounding ecosystems but also for the local sociocultural aspects.

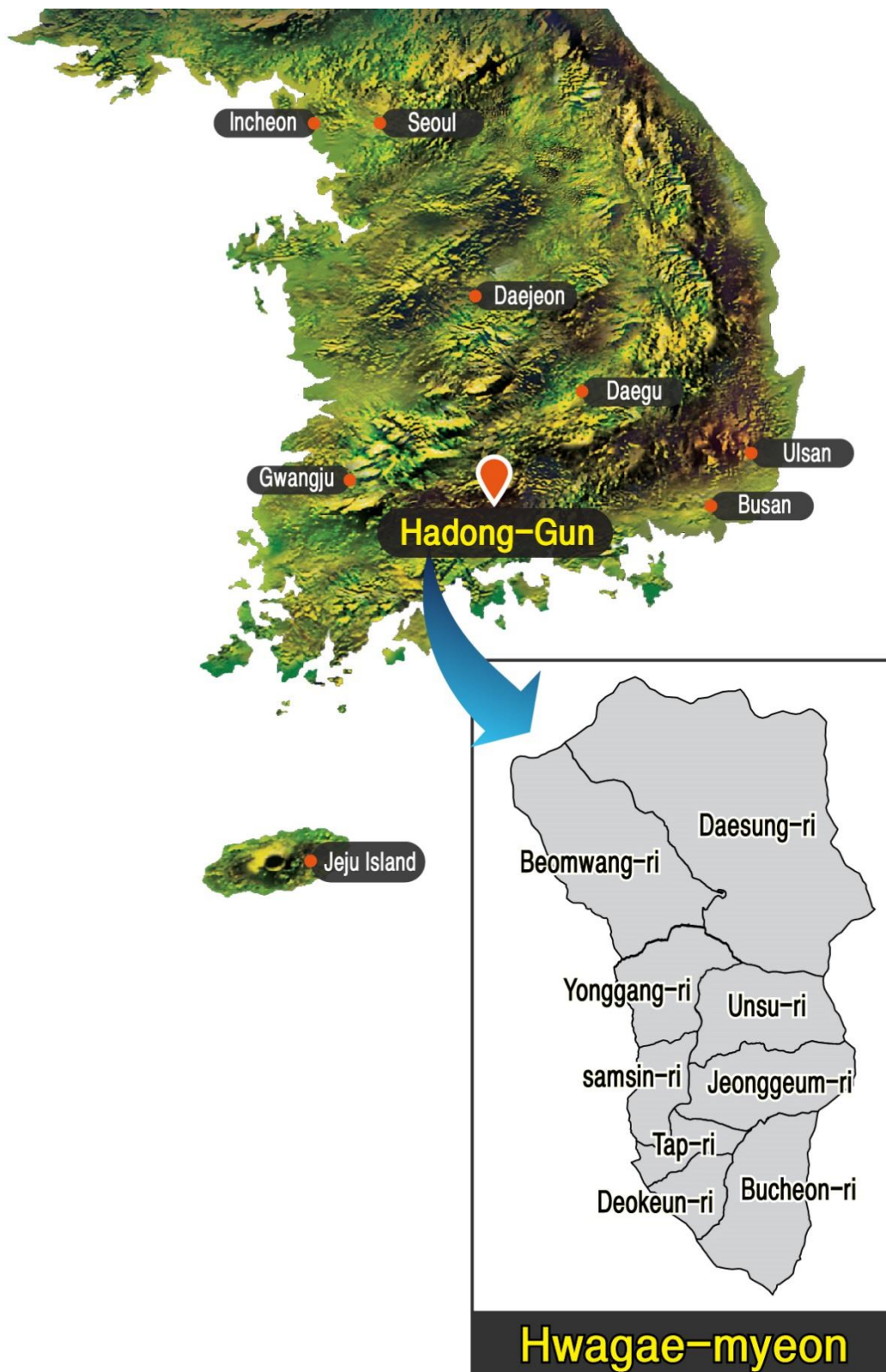
Facing the decrease in the area of tea fields and the number of farming households following the changes in the domestic agricultural conditions such as aging agricultural population and decrease in tea consumption, Hadong-gun and the residents at Hwagae are establishing the foundation to prepare for the future. Hadong Traditional Tea Agriculture Preservation Council and Hadong-gun are taking institutional measures to preserve and manage the traditional tea agriculture of Hadong by planning the institutional and support system to maintain and pass on the tea production and traditional agricultural craftsmanship and preserve and maintain the surrounding ecosystem and scenery.

Moreover, plans for sustainable preservation and management through induction of interests from the farming households and the local community toward the knowledge system on the traditional tea agriculture and the guidance of voluntary transmission activities and capacity enhancement by the locals are being established and executed. In terms of external activities, exchanges between the agricultural heritage-related organizations and other regions in order to enhance and share the recognition toward the domestic and global value of the said heritage and cooperative systems are being constructed as the part of the planning and promotion of diverse exchange and public relations programs and activities to proliferate the pluralistic value of Hadong traditional tea agriculture.

Such activities and endeavors by the locals are parts of the important mission to form and prepare the future history of traditional tea agriculture of Hadong. As the residents of Hwagae at Hadong in its olden days maintained and passed on the tea agriculture in its symbiotic method of over a thousand years of history in their recognition of its natural significance, the traditional tea agriculture will continue to promote its agricultural value in which the history and the future coexist.

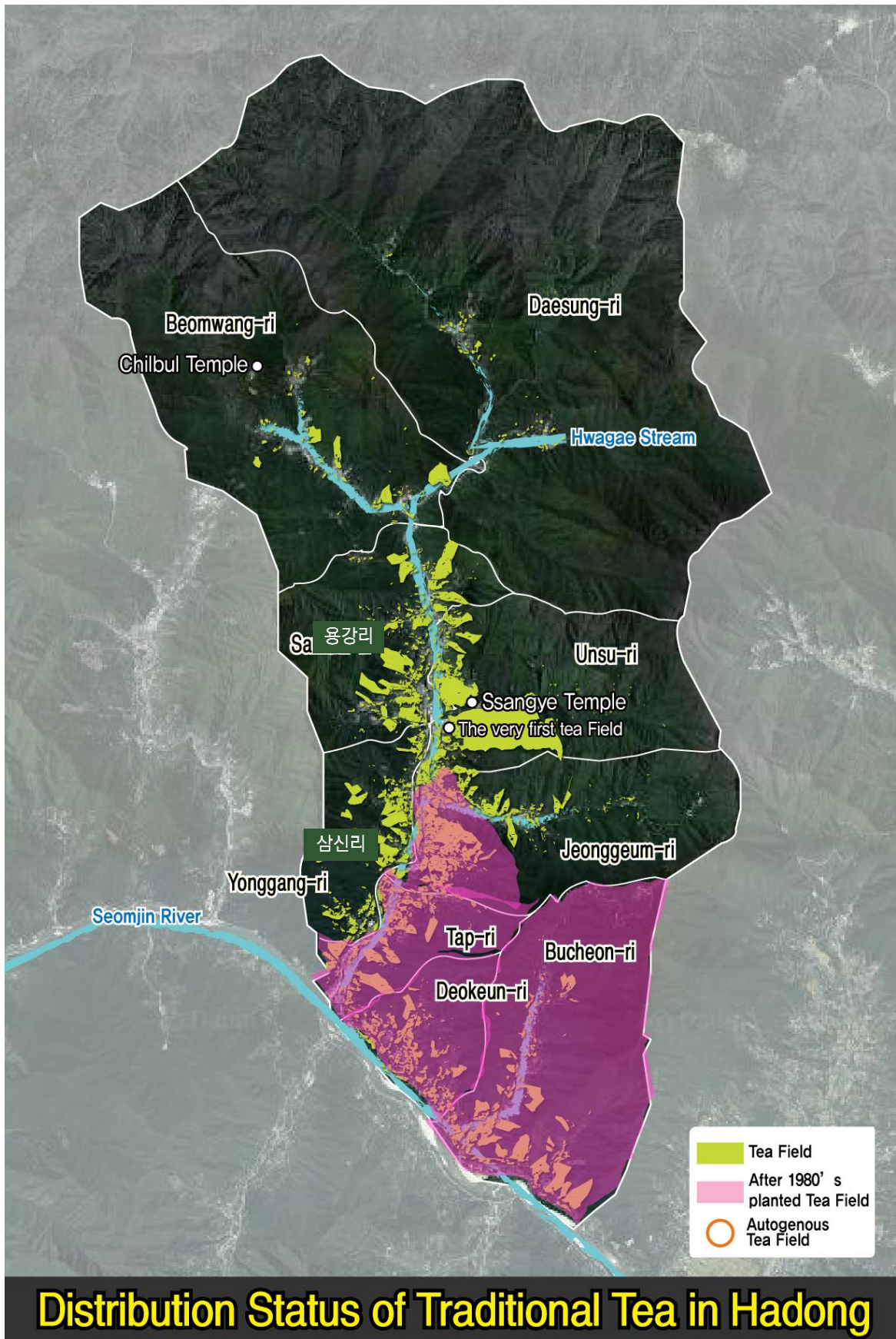
## 8. Suggested Annexes

### ■ Location of GIAHS Site at Hadong-gun

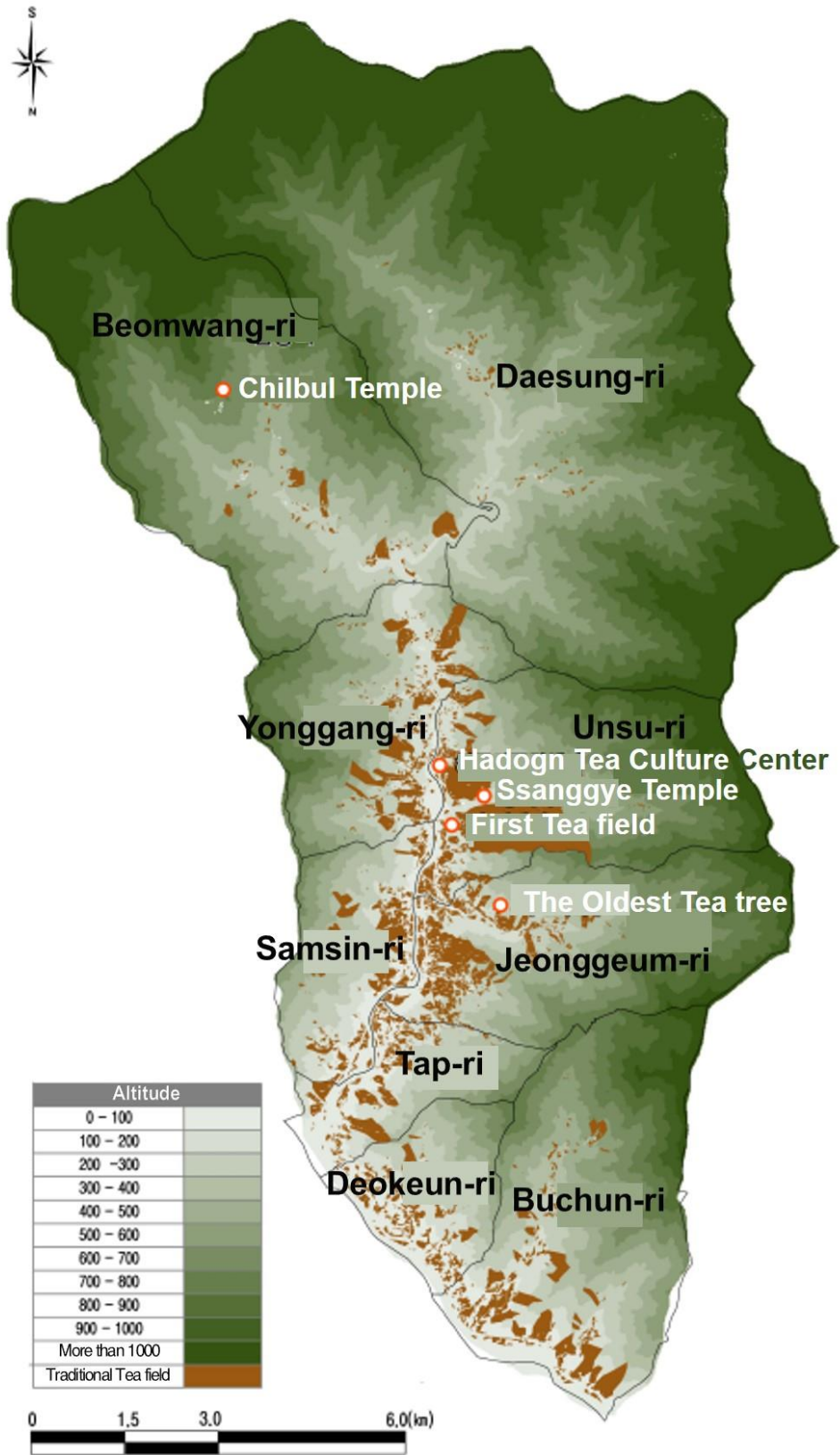




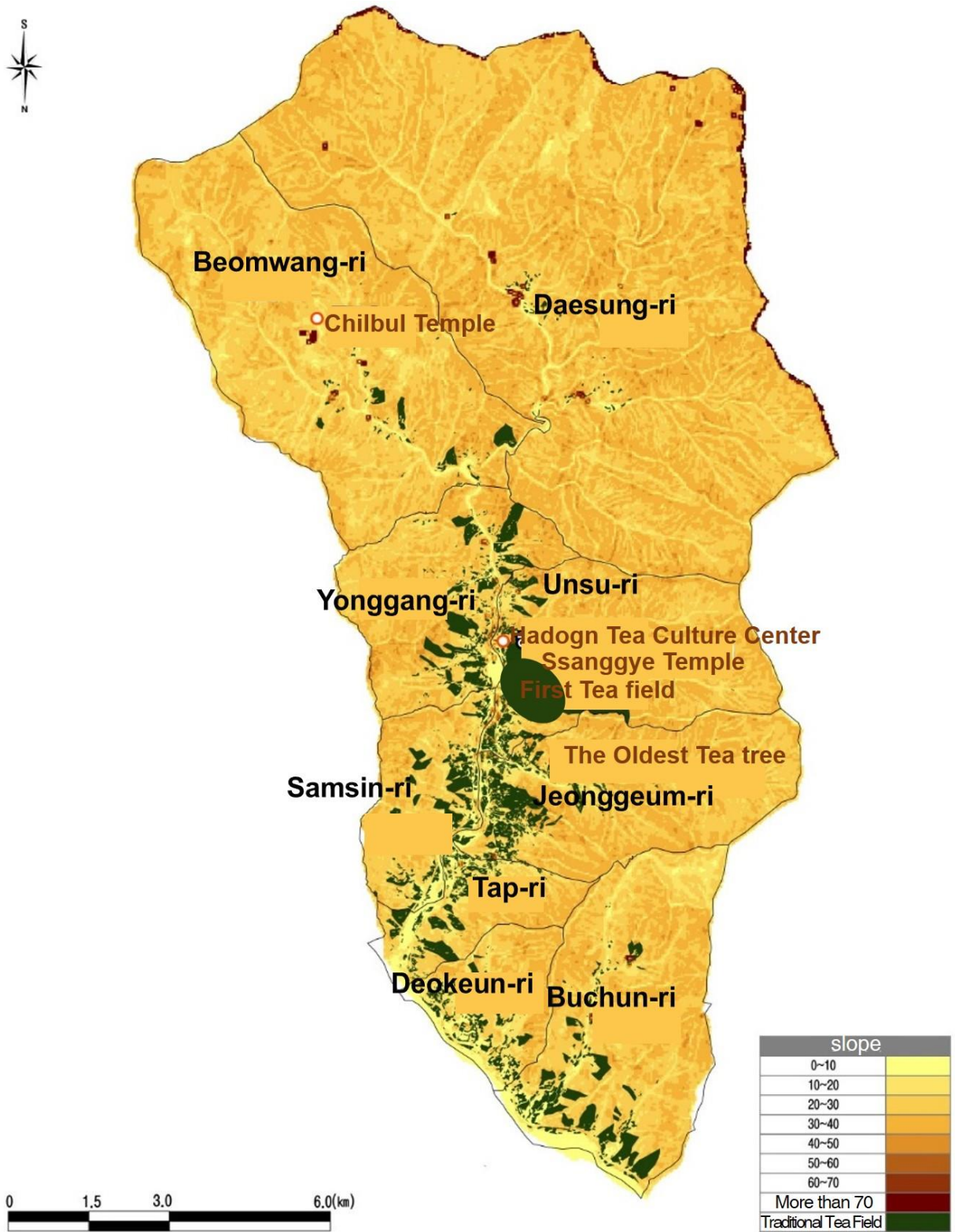
■ Distribution status of traditional tea in Hadong



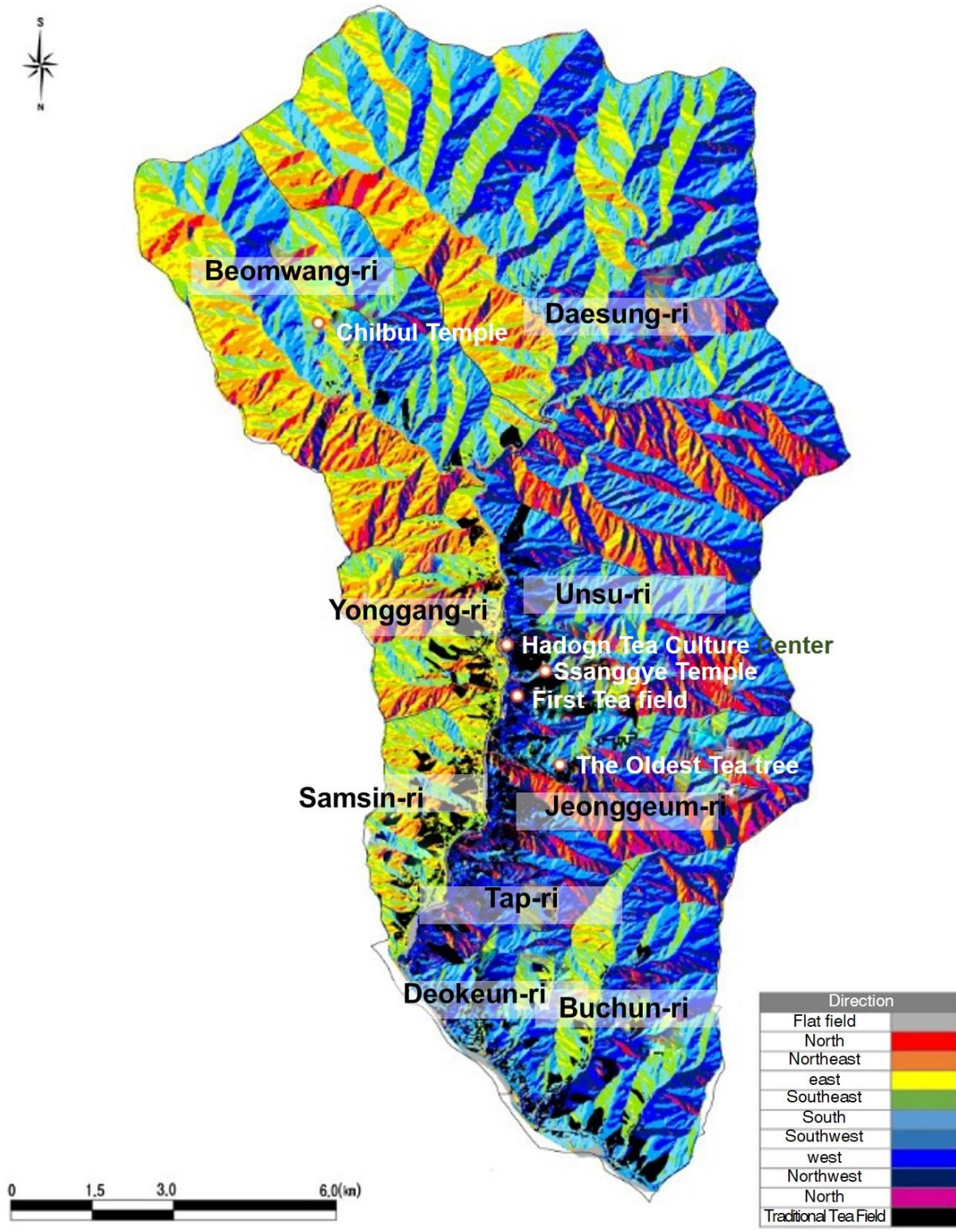
■ Characteristics of traditional tea field in Hadong – Altitude



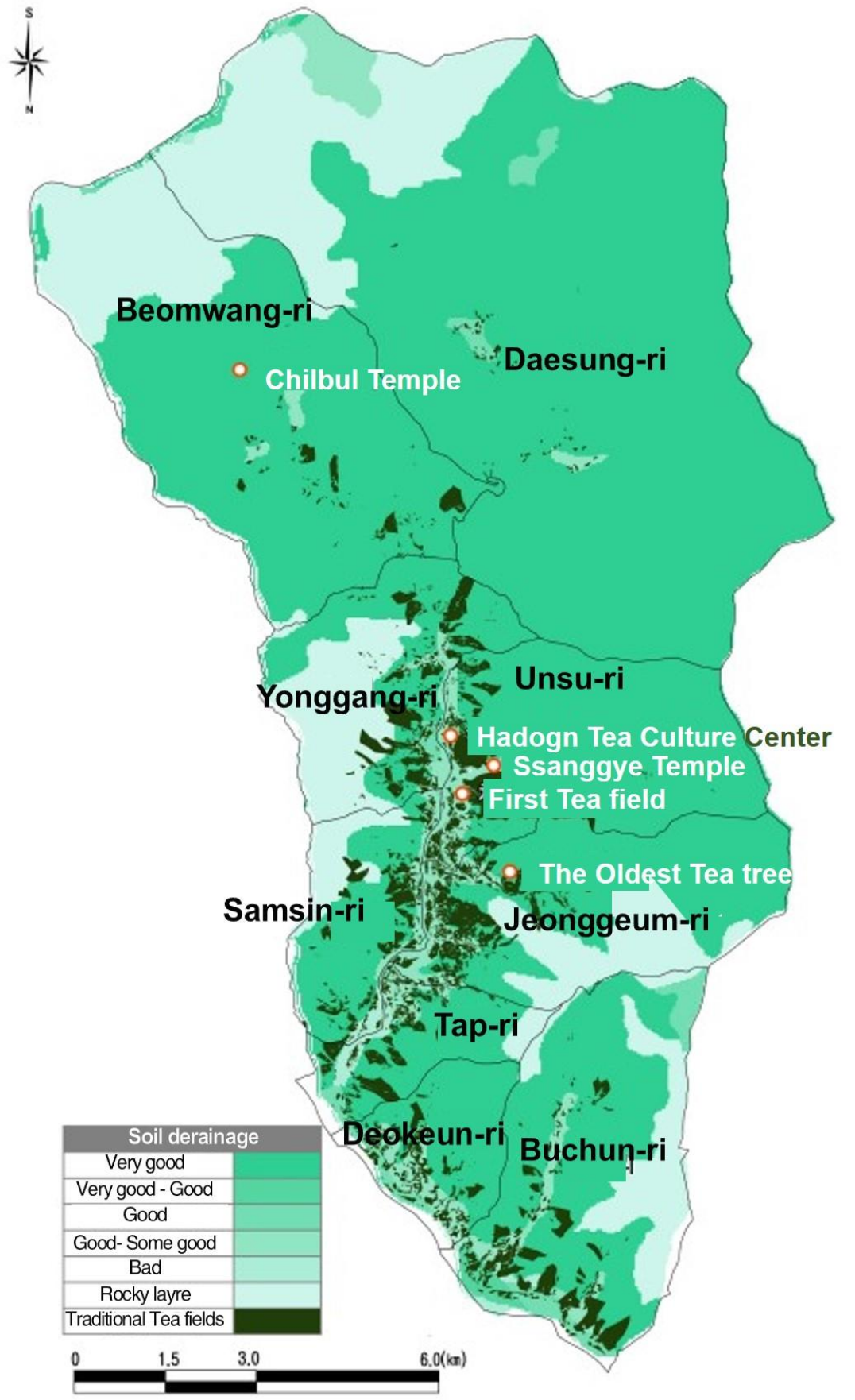
■ Characteristics of traditional tea field in Hadong – slope



■ Characteristics of traditional tea field in Hadong – Direction



■ Characteristics of traditional tea field in Hadong – Soil derainage



## ■ List of Biodiversity

### 1) Flora

Family	Scientific name	Species
Betulaceae	<i>Carpinus tschonoskii</i> Maxim. var. <i>tschonoskii</i>	개서어나무
	<i>Carpinus laxiflora</i> (Siebold & Zucc.) Blume var. <i>laxif</i>	서어나무
	<i>Betula ermani</i> Cham.	사스래나무
	<i>Betula ermanii</i> Chamisso var. <i>subcordata</i> (Regel) Koidz. subvar. <i>saitoana</i> (Regel) Koidz.	좁고채목
층층나무과	<i>Cornus controversa</i> Hemsl. ex Prain	층층나무
소나무과	<i>Pinus densiflora</i> Siebold & Zucc.	소나무
	<i>Abies koreana</i> Wilson	구상나무
	<i>Picea abies</i> (L.) H.Karst.	가문비나무
진달래과	<i>Rhododendron mucronulatum</i> Turcz. var. <i>ciliatum</i> Nakai	털진달래
	<i>Rhododendron schlippenbachii</i> Maxim.	철쭉
물푸레나무과	<i>Fraxinus chiisanensis</i> Nakai	들메나무
참나무과	<i>Quercus serrata</i> Thunb. ex Murray	졸참나무
	<i>Quercus variabilis</i> Blume	굴참나무
석송	<i>Lycopodium selago</i> L.	좁다람쥐꼬리
고사리삼	<i>Sceptridium nipponicum</i> (Makino) Holub	단풍고사리삼
처녀이끼	<i>Hymenophyllum polyanthos</i> (SW.) SW.	좁처녀이끼
봉의파리	<i>Coniogramme japonica</i> (Thunb.) Diels	가지고비고사리
	<i>Coniogramme x fauriei</i> Hieron	개가지고비고사리
고사리	<i>Pleurosoriopsis makinoi</i> (Maxim. ex Makino) Fomin	좁고사리
꼬리고사리	<i>Asplenium pekinense</i> Hance	사철고사리
	<i>Asplenium varians</i> Wall. ex Hook. et Grev.	애기꼬리고사리
면마	<i>Cyrtomium fortunei</i> var. <i>clivicola</i> (Makino) Tagawa	산쇠고비
	<i>Dryopteris erythrosora</i> (D. C. Eaton) Kuntze	홍지네고사리
	<i>Dryopteris fuscipes</i> C. Christensen	큰홍지네고사리
	<i>Dryopteris medioxima</i> Koidz.	반들지네고사리
	<i>Thelypteris japonica</i> var. <i>glabrata</i> Ching	민지네고사리
	<i>Thelypteris torresiana</i> var. <i>calvata</i> (Baker) K. Iwats	각시고사리
	<i>Deparia x angustata</i> (Nakai) Nakaike	개좁진고사리
	<i>Deparia orientalis</i> (Z.R.Wang et J.J.Chien) Nakaike	흰털고사리
	<i>Diplazium squamigerum</i> (Mett.) Matsum	내장고사리
	<i>Woodsia macrochlaena</i> Mett. ex Kuhn	참우드풀
고란초	<i>Lepisorus onoei</i> (Franch. et Sav.) Ching	애기일엽초
	<i>Pyrosia petiolosa</i> (Christ. et Baroni) Ching	애기석위
속새	<i>Equisetum hyemale</i> L.	속새
	<i>quisetum arvense</i> L.	쇠뜨기

Family	Scientific name	Species
면마	<i>Cyrtomium fortunei</i> J. Smith	쇠고비
	<i>Dryopteris lacera</i> (Thunb.) O. Kuntze	비늘고사리
부들	<i>Typha orientalis</i> Presl	부들
가래	<i>Potamogeton crispus</i> L.	말즘
텍사	<i>Alisma canaliculatum</i> All. Br. et Bouchb	텍사
벼	<i>Phyllostachys nigra</i> var. <i>henonis</i> Stapf	숨대
	<i>Alopecurus aequalis</i> var. <i>amurensis</i> (Kom.) Ohwi	독새풀
	<i>Zizania latifolia</i> Turcz.	줄
	<i>Phragmites communis</i> Trin.	갈대
	<i>Phragmites japonica</i> Steud.	달뿌리풀
	<i>Eragrostis japonica</i> (Thunb.) Trin.	각시그령
	<i>Eragrostis ferruginea</i> (Thunb.) P. Beauv.	그령
	<i>Pseudoraphis ukishiba</i> Ohwi	물잔디
	<i>Pennisetum alopecuroides</i> (L.) Spreng.	수크령
	<i>Setaria viridis</i> (L.) Beauv.	강아지풀
	<i>Setaria chondrachne</i> (Steud.) Honda	조아재비
	<i>Digitaria sanguinalis</i> (L.) Scop.	바랭이
	<i>Echinochloa crus-galli</i> (L.) Beauv.	돌피
	<i>Echinochloa crus-galli</i> var. <i>frumentacea</i> (Roxb.) Wight	피
	<i>Beckmannia syzigachne</i> (Steud.) Fern.	개피
	<i>Glyceria ischyronera</i> Steud.	진들피
	<i>Imperata cylindrica</i> var. <i>koenigii</i> (Retz.) Durand et Schinz	띠
	<i>Leptochloa chinensis</i> Nees	드령새
	<i>Miscanthus sacchariflorus</i> Benth.	물억새
	<i>Cymbopogon tortilis</i> var. <i>goeringii</i> (Steud.) Hand.-Mazz.	개솔새
	<i>Isachne globosa</i> (Thunb.) O. Kuntze	기장대풀
	<i>Arthraxon hispidus</i> (Thunb.) Makino	조개풀
	<i>Leersia oryzoides</i> (L.) Sw.	좁혀풀
	<i>Panicum bisulcatum</i> Thunb.	개기장
사초	<i>Eleocharis dulcis</i> (Burm. f.) Trin.	남방개
	<i>Eleocharis kuroguwai</i> Ohwi	올방개
	<i>Eleocharis congesta</i> D. Don	바늘골
	<i>Bulbostylis densa</i> Hand.-Mazz.	꽃하늘지기
	<i>Fimbristylis dichotoma</i> Vahl	하늘지기
	<i>Scirpus wichurae</i> Bocklr.	방울고랭이
	<i>Scirpus tabernaemontani</i> Gmel.	올챙이고랭이
	<i>Carex thunbergii</i> var. <i>appendiculata</i> (Trautv.) Ohw.	큰고랭이
	<i>Carex dispalata</i> Boott	독사초
	<i>Carex gibba</i> Vahl.	삿갓사초
	<i>Carex forficula</i> Fr. et Sav.	나도별사

Family	Scientific name	Species
사초	<i>Cyperus amuricus</i> Max.	산뚝사초
	<i>Cyperus difformis</i> L.	방동사니
	<i>Cyperus serotinus</i> Rottb.	알방동사니
	<i>Cyperus exaltatus</i> var. <i>iwasakii</i> T.	너도방동사니
	<i>Koyama</i>	왕골
	<i>Cyperus orthostachyus</i> Fr. et Sav.	쇠방동사니
곡정초	<i>Eriocaulon miquelianum</i> Koern.	개수염
닭의장풀	<i>Commelina communis</i> L.	닭의장풀
	<i>Aneilema keisak</i> Hassk.	사마귀풀
골풀	<i>Luzula capitata</i> (Miq.) Miq.	평의밥
	<i>Juncus effusus</i> var. <i>decipiens</i> Buchen.	골풀
소나무	<i>Pinus densiflora</i> S. et Z.	소나무
	<i>Pinus rigida</i> Mill.	리기다소나무
측백나무	<i>Cryptomeria japonica</i> (L. fil.) D. Don	삼나무
	<i>Chamaecyparis obtusa</i> (S. et Z.) Endl.	편백
버드나무	<i>Populus deltoides</i> Marsh.	미루나무
	<i>Populus tomentiglandulosa</i> T. Lee	은사시나무
	<i>Populus alba</i> L.	은백양
	<i>Salix koreensis</i> Anderss.	버드나무
	<i>Salix gracilistyla</i> Miq.	갯버들
	<i>Salix graciliglans</i> Nakai	눈갯버들
자작나무	<i>Carpinus coreana</i> Nakai	소사나무
참나무과	<i>Castanea crenata</i> S. et Z.	밤나무
	<i>Quercus variabilis</i> Bl.	굴참나무
	<i>Quercus acutissima</i> Carruth.	상수리나무
느릅나무	<i>Zelkova serrata</i> Makino	느티나무
뽕나무	<i>Morus alba</i> L.	뽕나무
삼과	<i>Humulus japonicus</i> S. et Z.	환삼덩굴
쑤기풀	<i>Urtica thunbergiana</i> S. et Z.	쑤기풀
	<i>Pilea hamaoi</i> Makino	큰물통이
	<i>Boehmeria spicata</i> Thunb.	좀깨잎나무
마디풀	<i>Rumex acetosella</i> L.	애기수영
	<i>Rumex acetosa</i> L.	수영
	<i>Rumex crispus</i> L.	소리쟁이
	<i>Reynoutria elliptica</i> (Koidz.) Migo	호장근
	<i>Persicaria perfoliata</i> H. Gross	며느리배꼽
	<i>Persicaria senticosa</i> Gross	며느리밑씻개
	<i>Persicaria sieboldi</i> Ohki	미꾸리뉘시
	<i>Persicaria nipponensis</i> Gross	넓은잎미꾸리뉘시
	<i>Persicaria thunbergii</i> H. Gross	고마리
	<i>Persicaria viscosa</i> H. Gross	기생여뀌



Family	Scientific name	Species
마디풀	<i>Persicaria hydropiper</i> (L.) Spach	여뀌
	<i>Polygonum aviculare</i> L.	마디풀
명아주	<i>Chenopodium album</i> var. <i>centrorubrum</i> Makino	명아주
비름	<i>Amaranthus mangostanus</i> L.	비름
	<i>Achyranthes japonica</i> (Miq.) Nakai	쇠무릎
자리공	<i>Phytolacca esculenta</i> V. Houtte	자리공
쇠비름	<i>Portulaca oleracea</i> L.	쇠비름
석죽	<i>Arenaria serpyllifolia</i> L.	벼룩이자리
	<i>Stellaria alsine</i> var. <i>undulata</i> Ohwi	벼룩나물
	<i>Stellaria aquatica</i> Scop.	쇠별꽃
	<i>Stellaria media</i> Villars	별꽃
	<i>Cerastium holosteoides</i> var. <i>hallaisanense</i> Mizushima	점나도나물
미나리아재비	<i>Climatis apiifolia</i> A. P. DC.	사위질빵
	<i>Ranunculus sceleratus</i> L.	개구리자리
	<i>Ranunculus tachiroei</i> Fr. et Sav.	개구리미나리
	<i>Ranunculus chinensis</i> Bunge	젓가락나물
	<i>Pulsatilla koreana</i> Nakai	할미꽃
양귀비	<i>Chelidonium majus</i> var. <i>asiaticum</i> (Hara) Ohwi	애기똥풀
현호색	<i>Corydalis turtshaninovii</i> Bess.	현호색
	<i>Corydalis incisa</i> Pers.	자주괴불주머니
	<i>Corydalis speciosa</i> Max.	산괴불주머니
십자화	<i>Lepidium apetalum</i> Willd.	다닥냉이
	<i>Capsella bursa-pastoris</i> (L.) Medicus	냉이
	<i>Cardamine flexuosa</i> With.	황새냉이
	<i>Cardamine lyrata</i> Bunge	논냉이
	<i>Thlaspi arvense</i> L.	말냉이
	<i>Rorippa indica</i> (L.) Hiern	개갓냉이
	<i>Rorippa islandica</i> (Oed.) Borb.	속속이풀
	<i>Draba nemorosa</i> var. <i>hebecarpa</i> Lindbl.	꽃다지
	<i>Brassica campestris</i> var. <i>nippo-oleifera</i> Makino	유채
	<i>Brassica campestris</i> var. <i>pekinensis</i> Makino	배추
돌나무	<i>Sedum sarmentosum</i> Bunge	돌나물
범의귀	<i>Philadelphus schrenckii</i> Rupr.	고광나무
장미	<i>Spiraea prunifolia</i> var. <i>simpliciflora</i> Nakai	조팝나무
	<i>Stephanandra incisa</i> Zabel	국수나무
	<i>Duchesnea chrysantha</i> (Zoll. et Morr.) Miq	뱀딸기
	<i>Potentilla kleiniana</i> Wight et Arnott	가락지나물
	<i>Potentilla fragarioides</i> var. <i>major</i> Max.	양지꽃
	<i>Rubus crataegifolius</i> Bunge	산딸기
	<i>Rubus parvifolius</i> L.	명석딸기
	<i>Sanguisorba officinalis</i> L.	오이풀

Family	Scientific name	Species
장미	<i>Agrimonia pilosa</i> Ledeb.	짚신나물
	<i>Rosa multiflora</i> Thunb.	찔레꽃
	<i>Rosa wichuraiana</i> Crep.	돌가시나무
괭이밥	<i>Oxalis corniculata</i> L.	괭이밥
대극	<i>Euphorbia supina</i> Rafin.	애기땅빈대
콩	<i>Aeschynomene indica</i> L.	자귀풀
	<i>Slavescens</i> Ait.	고삼
	<i>Lespedeza thunbergii</i> var. <i>intermedia</i> (Nak.) T. Lee	풀싸리
	<i>Lespedeza maximowiczii</i> Schneid.	조록싸리
	<i>Lespedeza cuneata</i> G. Don	비수리
	<i>Kummerowia striata</i> (Thunb.) Schindl.	매듭풀
	<i>Vicia angustifolia</i> var. <i>segetilis</i> K. Koch	살갈퀴
	<i>Vicia tetrasperma</i> Schreb.	얼치기완두
	<i>Vicia hirsuta</i> S. F. Gray	새완두
	<i>Pueraria thunbergiana</i> Benth.	참
	<i>Robinia pseudo-acacia</i> L.	아까시나무
	<i>Amorpha fruticosa</i> L.	죽제비싸리
	<i>Astragalus sinicus</i> L.	자운영
	<i>Trifolium repens</i> L.	토기풀
포도	<i>Parthenocissus tricuspidata</i> (S. et Z.) Planch,	담쟁이덩굴
피나무	<i>Triumfetta japonica</i> Makino	고슴도치풀
제비꽃	<i>Viola patrinii</i> DC.	흰제비꽃
	<i>Viola mandshurica</i> W. Becker	제비꽃
	<i>Viola acuminata</i> Ledeb.	줄방제비꽃
보리수나무	<i>Elaeagnus umbellata</i> Thunb.	보리수나무
부처꽃	<i>Rotala mexicana</i> Cham. et Schldl.	가는마디꽃
바늘꽃	<i>Oenothera odorata</i> Jacq.	달맞이꽃
	<i>Oenothera lamarckiana</i> Ser.	큰달맞이꽃
두릅나무	<i>Aralia elata</i> Seem.	두릅나무
산형	<i>Hydrocotyle maritima</i> Honda	선피막이
	<i>Oenanthe javanica</i> (Bl.) DC.	미니라
층층나무	<i>Cornus controversa</i> Hemsl.	층층나무
진달래	<i>Rhododendron yedoense</i> var. <i>Poukhanense</i> (Lev.) Nakai	산철쭉
앵초	<i>Androsace filiformis</i> Retz.	애기봄맞이
	<i>Lysimachia barystachys</i> Bunge	까치수영
마전	<i>Mitrasacme alsinoides</i> var. <i>indica</i> Hara	벼룩아재비
용담	<i>Gentiana squarrosa</i> Ledeb.	구슬봉이
	<i>Trachelospermum asiaticum</i> var. <i>intermedium</i> Nakai	마삭줄
박주가리	<i>Metaplexis japonica</i> (Thunb.) Makino	박주가리
지치	<i>Trigonotis nakaii</i> Hara	참꽃마리
Family	Scientific name	Species

지치	<i>Trigonotis peduncularis Benth.</i>	꽃마리
꿀풀	<i>Ajuga decumbens Thunb.</i>	금창초
	<i>Meehania urticifolia (Miq.) Makino</i>	벌개덩굴
	<i>Prunella vulgaris var. lilacina Nakai</i>	꿀풀
	<i>Leonurus sibiricus L.</i>	익모초
	<i>Lamium amplexicaule L.</i>	광대나물
	<i>Salvia plebeia R. Br.</i>	배암차즈기
가지	<i>Solanum nigrum L.</i>	까마중
	<i>Datura stramonium L.</i>	독말풀
현삼	<i>Mazus miquelii Makino</i>	누운주름잎
	<i>Lindernia procumbens Borbas</i>	밭둑외풀
	<i>Veronica polita var. lilacina (Hara) Yamazaki</i>	개불알풀
꼭두서니	<i>Rubia akane Nakai</i>	꼭두서니
	<i>Galium spurium L.</i>	갈퀴덩굴
마타리	<i>Valeriana fauriei Briq.</i>	쥐오줌풀
인동	<i>Weigela subsessilis L. H. Bailey</i>	병꽃나무
	<i>Weigela florida for. candida Rehder</i>	흰병꽃나무
	<i>Lonicera japonica Thunb.</i>	인동
박	<i>Trichosanthes kirilowii Max.</i>	하늘타리
국화	<i>Gnaphalium affine D. Don</i>	떡쑥
	<i>Gnaphalium japonicum Thunb.</i>	풀솜나무
	<i>Gnaphalium japonicum Thunb.</i>	금불초
	<i>Xanthium strumarium L.</i>	도꼬마리
	<i>Ambrosia artemisiifolia var. elatior Descourtil</i>	돼지풀
	<i>Erigeron annuus (L.) Pers.</i>	개망초
	<i>Erigeron canadensis L.</i>	망초
	<i>Senecio integrifolius var. spathulatus (Miq.) Hara</i>	솜방망이
	<i>Senecio vulgaris L.</i>	개쑥갓
	<i>Aster koraiensis Nakai</i>	벌개미취
	<i>Artemisia annua L.</i>	개똥쑥
	<i>Artemisia japonica Thunb.</i>	제비쑥
	<i>Artemisia capillaris Thunb.</i>	사철쑥
	<i>Artemisia viridissima (Kom.) Pampan.</i>	외잎쑥
	<i>Artemisia princeps var. orientalis (Pampan.) Hara</i>	쑥
	<i>Siegesbeckia glabrescens Makino</i>	진뎃찰
	<i>Eclipta prostrata L.</i>	한련초
	<i>Bidens tripartita L.</i>	가막사리
	<i>Cirsium japonicum var. ussuriense Kitamura</i>	엉거귀
	<i>Hemistepta lyrata Bunge</i>	지칭개
<i>Taraxacum mongolicum H. Mazz.</i>	민들레	
<i>Taraxacum officinale Weber</i>	서양민들레	
Family	Scientific name	Species

국화	<i>Ixeris japonica</i> Nakai	범음씀바귀
	<i>Ixeris dentata</i> (Thunb.) Nakai	씀바귀
	<i>Lactuca indica</i> var. <i>laciniata</i> (O. Kuntze) Hara	고들빼기
	<i>Sonchus oleraceus</i> L.	방가지뚥
	<i>Lapsana apogonoides</i> (Max.) Hooker fil. et Jackson	보리쟁이

## 2) Fauna

Group	Family	Scientific name	Species	Note
Mammal	Canidae	<i>Nyctereutes procyonoides koreensis</i> Mori	Raccoon	
	Felidae	<i>Felis bengalensis Euphilura</i>	Leopard cat	
		<i>Felis catus</i>	Cat	
	Mustelidae	<i>Mustela sibirica coreana</i> Domaniewski	Siberian weasel	
		<i>Martes flavigula</i> Koreana	Yellow-throated marten	
		<i>Meles meles</i>	European badger	
		<i>Lutra lutra</i>	Eurasian otter	
	Ursidae	<i>Ursus thibetanus ussuricus</i>	Asian black bear	
	Cervidae	<i>Hydropotes inermis</i>	Water deer	
	Suidae	<i>Sus scrofa</i>	Wild boar	
	Talpidae	<i>Mogera robusta</i>	Mole	
	Sciuridae	<i>Tamias sibiricus</i>	Squirrel	
		<i>Sciurus vulgaris</i>	Red squierrel	
	Leporidae	<i>Lepus coreanus</i>	Korean hare	
Muridae	<i>Apodemus agrarius</i>	Striped field mouse		
Bird	Paridae	<i>Parus major</i>	Great tit	
		<i>Parus palustris</i>	Marsh tit	
	Pycnonotidae	<i>Microscelis amaurotis</i>	Brown-eared bulbul	
	Sylviidae	<i>Paradoxornis webbianus</i>	Vinous-throated parrotbill	
	Cinclidae	<i>Cinclus pallasii</i>	Brown dipper	
	Passeridae	<i>Passer montanus</i>	Eurasian tree sparrow	
	Motacillidae	<i>Motacilla cinerea</i>	Grey wagtail	
	Emberizidae	<i>Emberiza elegans</i>	Yellow-throated bunting	
	Turdidae	<i>Turdus pallidus</i>	Pale thrush	
	Anatidae	<i>Mergus squamatus</i> Gould	Scaly-sided merganser	
	Accipitridae	<i>Buteo buteo</i>	Common buzzard	
		<i>Butastur indicus</i>	Grey-faced buzzard	
	Scolopacidae	<i>Numenius madagascariensis</i>	Far eastern curlew	
	두견이	<i>Cuculus canorus telephonus</i> HEIN	뺨꾸기	
칼새	<i>Apus pacificus pacificus</i> (LATHAM)	칼새		
휘파람새	<i>Acrocephalus arundinaceus</i>	개개비		

Group	Family	Scientific name	Species	Note
Bird	물총새	<i>Alcedo atthis bengalensis</i>	물총새	
		<i>Halcyon pileata</i>	청호반새	
	파랑새	<i>Eurystomus orientalis</i>	파랑새	
	딱따구리	<i>Picus canus</i>	청딱따구리	
	피꼬리	<i>Oriolus chinensis</i>	피꼬리	
Fish	Anguillidae	<i>Anguilla japonica</i>	뱀장어	
	Engraulidae	<i>Engraulis japonica</i>	멸치	
		<i>Thryssa aselae</i>	풀반댕이	
	Clupeidae	<i>Konisirus punctatus</i>	전어	
	Cyprinidae	<i>Carassius auratus</i>	Goldfish	
		<i>Cyprinus carpio</i>	Common carp	
		<i>Acheilognathus chankaensis</i>	가시납지리	
		<i>Acheilognathus koreensis</i>	칼납자루	Indigenous to Korea
		<i>Acheilognathus lanceolata</i>	납자루	
		<i>Acheilognathus majusculus</i>	큰줄납자루	Indigenous to Korea
		<i>Acheilognathus rhombeus</i>	납지리	
		<i>Acheilognathus somjinensis</i>	임실납자루	Indigenous to Korea
		<i>Rhodeus notatus</i>	Rosy bitterling	
		<i>Rhodeus uyekki</i>	Korean rose bitterling	Indigenous to Korea
		<i>Coreoleuciscus splendidus</i>	Swiri	
		<i>Hemibarbus labeo</i>	누치	
		<i>Hemibarbus longiro</i>	참마자	
		<i>Microphysogobio yaluensis</i>	돌마자	Indigenous to Korea
		<i>Pseudogobio esocinus</i>	Goby minnow	
		<i>Pungtungia herzi</i>	돌고기	
		<i>Sarcocheilichthys nigripinnis morii</i>	중고기	Indigenous to Korea
		<i>Sarcocheilichthys variegantus wakiyae</i>	참중고기	Indigenous to Korea
		<i>Squalidus chankaensis tsuchiga</i>	참물개	Indigenous to Korea
		<i>Squalidus gracilis majimae</i>	긴물개	Indigenous to Korea
		<i>Tribolodon hakonensis</i>	황어	
		<i>Opsariichthys uncirostris amurensis</i>	꼬리	
		<i>Zacco platypus</i>	피라미	
		<i>Zacco koreanus</i>	참갈겨니	Indigenous to Korea
		<i>Hemiculter eigenmanni</i>	치리	Indigenous to Korea
		미꾸라지	<i>Cobitis tetralineata</i>	줄종개
	<i>Iksookimia longicorpa</i>		왕종개	Indigenous to Korea
	<i>Misgrunus mizolepis</i>		미꾸라지	
	메기	<i>Silurus asotus</i>	메기	
<i>Silurus microdorsalis</i>		미유기	Indigenous to Korea	
동자개	<i>Leiocassis ussuriensis</i>	대농갱이		
	<i>Pseudobargrus koreanus</i>	눈동자개	Indigenous to Korea	

Group	Family	Scientific name	Species	Note
어 류	통가리	<i>Liobagurs mediadiposalis</i>	자가사리	Indigenous to Korea
	바다빙어	<i>Hypomesus nipponensis</i>	빙어	
		<i>Plecoglossus altivelis</i>	은어	
	연어	<i>Onchorhynchus keta</i>	연어	
	송어	<i>Chelon haematocheilus</i>	가송어	
		<i>Mugil cephalus</i>	송어	
	학공치	<i>Hyporhamphus intermedius</i>	졸공치	
	실고기	<i>Syngnathus schlegeli</i>	실고기	
	숨뱅이	<i>Platycephalus indicus</i>	양태	
	꼭지	<i>Coreoperca herzi</i>	꼭지	Indigenous to Korea
		<i>Siniperca scherzeri</i>	쏘가리	
	점농어	<i>Lateolabrax maculatus</i>	점농어	
	보리멸	<i>Sillago sihama</i>	보리멸	
	전갱이	<i>Trachurus japonicus</i>	전갱이	
	주둥치	<i>Leiognathus nuchalis</i>	주둥치	
	감성돔	<i>Acanthopagrus schlegeli</i>	감성돔	
	동사리	<i>Odontobutis interrupta</i>	얼룩동사리	Indigenous to Korea
		<i>Odontobutis platycephala</i>	동사리	Indigenous to Korea
	밀어	<i>Rhinogobius brunneus</i>	밀어	
	망둑어	<i>Tridentiger brevispinis</i>	민물검정망둑	
		<i>Acanthogobius flavimanus</i>	문절망둑	
		<i>Acanthogobius lactipes</i>	흰발망둑	
		<i>Acentrogobius pflaumi</i>	줄망둑	
		<i>Favonigobius gymnauchen</i>	날개망둑	
		<i>Gymnogobius mororanus</i>	얼룩망둑	
		<i>Synechogobius hasta</i>	풀망둑	
<i>Tridentiger bifasciatus</i>		민물두줄망둑		
꼬치고기	<i>Sphyaena pinguis</i>	꼬치고기		
가자미	<i>Kareius bicoloratus</i>	돌가자미		
	<i>Eopsetta grigorijewi</i>	물가자미		
양서류	<i>Hynobius leechii</i>	도롱뇽		
	<i>Bombina orientalis</i>	무당개구리		
	<i>Bufo gargarizans</i>	두꺼비		
	<i>Hyla japonica</i>	청개구리		
	<i>Rana coreana</i>	한국산개구리		
	<i>Rana dybowskii</i>	옴개구리		
	<i>Rana rugosa</i>	북방산개구리		
	<i>Rana catesbeiana</i>	황소개구리		
파충류	<i>Chinemys reevesii</i>	남생이		
	<i>Scincella vandenburghi</i>	도마뱀		
	<i>Takydromus amurensis</i>	아무르장지뱀		

Group	Family	Scientific name	Species	Note
파충류	-	<i>Elaphe dione</i>	누룩뱀	
	-	<i>Enhydryis rufodorsata</i>	무자치	
	-	<i>Raphidophis tigrinus tigrinus</i>	유혈목이	
	-	<i>Dinodon rufozonatus rufozonatus</i>	능구렁이	
	-	<i>Gloydus ussuriensis</i>	쇠살모사	
	-	<i>Gloydus saxatilis</i>	까치살모사	
	-	<i>Gloydus brevicaudus</i>	실모사	
Insect	잠자리	<i>Orthetrum albistylum speciosum (Uhler)</i>	밀잠자리	
		<i>Pantala flavescens (Fabricius)</i>	된장잠자리	
		<i>Sympetrum depressiusculum (Selys)</i>	고추잠자리	
		<i>Sympetrum eroticum eroticum (Selys)</i>	두점박이잠자리	
		<i>Sympetrum infuscatum (Selys)</i>	깃동잠자리	
	사마귀	<i>Tenodera angustipennis Saussure</i>	사마귀	
	메뚜기	<i>Acrida cinerea cinerea(Thunberg)</i>	방아깨비	
		<i>Gastrimargus marmoratus(Thunberg)</i>	콩중이	
		<i>Oedaleus infernalis Saussure</i>	팔중이	
		<i>Oxya japonica japonica(Thunberg)</i>	벼메뚜기	
		<i>Patanga japonica(Bolivar)</i>	각시메뚜기	
		<i>Shirakiacris shirakii(Bolivar)</i>	등검은메뚜기	
	땅강아지	<i>Gryllotalpa orientalis(Burmeister)</i>	땅강아지	
	긴꼬리	<i>Oecanthus indicusSaussure</i>	긴꼬리	
	섬서메뚜기	<i>Atractomorpha lata(Motschulsky)</i>	섬서구메뚜기	
	여치	<i>Phaneroptera falcata(Poda)</i>	실베짱이	
		<i>Ruspolia lineosa(Walker)</i>	애매부리	
	좁쌀메뚜기	<i>Xya japonica(deHaan)</i>	좁쌀메뚜기	
	실노린재	<i>Metatropis tesongsanicus</i>	대성산실노린재	
	물벌레	<i>Hesperocorixa kolthoffi(Lundblad)</i>	왕물벌레	
		<i>Micronecta (Basilionecta) sedula Horváth</i>	꼬마물벌레	
	허리노린재	<i>Cletus trigonus(Thunberg)</i>	벼가시허리노린재	
		<i>Cletus schmidtii Kiritschenko</i>	우리가시허리노린재	
		<i>Homoeocerus dilatatus Horváth</i>	넓적배허리노린재	
		<i>Hygia opaca(Uhler)</i>	애허리노린재	
		<i>Riptortus clavatus(Thunberg)</i>	톱다리개미허리노린재	
	소금쟁이	<i>Aquarius paludum (Fabricius)</i>	소금쟁이	
	큰벌노린재	<i>Physopeltac incticollis Stal</i>	여수벌노린재	
	긴노린재	<i>Geocoris varius(Uhler)</i>	큰딱부리긴노린재	
		<i>Lethaeus assamensis(Distant)</i>	아쌈긴노린재	
<i>Nysius plebejus Distant</i>		애긴노린재		
<i>Pachygrontha antennata(Uhler)</i>		더듬이긴노린재		
<i>Panaorus japonicus(Stal)</i>		굴뚝긴노린재		
긴노린재	<i>Paromius exiguus(Distant)</i>	흑다리긴노린재		

Group	Family	Scientific name	Species	Note
Insect	뽕나무노린재	<i>Chauliops fallax</i> Scott	게눈노린재	
	장님노린재	<i>Adelphocoris suturalis</i> (Jakovlev)	변색장님노린재	
		<i>Adelphocoris triannulatus</i> (Stal)	설상무늬장님노린재	
		<i>Orthocephalus funestus</i> Jakovlev	암수다른장님노린재	
		<i>Stenodema rubrinervis</i> Horváth	보리장님노린재	
		<i>Stenodema (Brachystira) calcarata</i> (Fallén)	홍맥장님노린재	
	쌌기노린재	<i>Nabis(Nabis) stenoferus</i> Hsiao	긴날개쌌기노린재	
	노린재	<i>Aelia fieberi</i> Scott	메추리노린재	
		<i>Anthemina varicornis</i> (Jakovlev)	나비노린재	
		<i>Carbula putoni</i> (Jakovlev)	가시노린재	
		<i>Dolycoris baccarum</i> (Linné)	알락수염노린재	
		<i>Eurydema gebleri</i> Kolenati	북쪽비단노린재	
		<i>Eysarcoris aeneus</i> (Scopoli)	가시점등글노린재	
		<i>Eysarcoris ventralis</i> (Westwood)	배동글노린재	
		<i>Halyomorpha halys</i> (Stal)	씩덩나무노린재	
		<i>Homalogonia obtusa</i> (Walker)	네점박이노린재	
		<i>Plautiastali</i> Scott	갈색날개노린재	
	알노린재	<i>Megacopta punctatissima</i> (Montandon)	무당알노린재	
	참노린재	<i>Oncocephalus assimilis</i> Reuter	비울빈참노린재	
		<i>Oncocephalus breviscutum</i> Reuter	어리큰참노린재	
	잡초노린재	<i>Rhopalus maculatus</i> (Fieber)	붉은잡초노린재	
		<i>Rhopalus sapporensis</i> (Matsumura)	삿포로잡초노린재	
		<i>Stictopleurus crassicornis</i> (Linné)	흑다리잡초노린재	
	광대노린재	<i>Eurygaster testudinaria</i> (Geoffroy)	도토리노린재	
	거품벌레	<i>Aphrophora maritima</i> Matsumura	갈잎거품벌레	
		<i>Eoscartopsis assimilis</i> (Uhler)	쥐머리거품벌레	
	매미충	<i>Austroasca (Austroasca) vittata</i> (Lethierry)	노랑줄애매미충	
		<i>Bothrogonia japonica</i> Ishihara	끝검은말매미충	
		<i>Cicadella viridis</i> (Linné)	말매미충	
		<i>Doratulina grandis</i> (Matsumura)	큰앞뽕족매미충	
		<i>Handianus limbifer</i> (Matsumura)	앞흰넓적매미충	
		<i>Ledra auditura</i> Walker	귀매미	
		<i>Nephotettix cincticeps</i> (Uhler)	끝동매미충	
	매미	<i>Meimuna opalifera</i> (Walker)	애매미	
	멸구	<i>Epeurysa nawaii</i> Matsumura	대멸구	
		<i>Laodelphax striatellus</i> (Fallén)	애멸구	
	상투벌레	<i>Orthopagus lunulifer</i> Uhler	깃동상투벌레	
	방패멸구	<i>Ossoides lineatus</i> Bierman	운계방패멸구	
	하늘소	<i>Agapanthia pilicornis</i> (Fabricius)	남색초원하늘소	



Group	Family	Scientific name	Species	Note
		<i>Oberea inclusa</i> Pascoe	사과하늘소	
Insect	하늘소	<i>Phytoecia rufiventris</i> Gautier	국화하늘소	
		<i>Spondylis buprestoides</i> (Linné)	검정하늘소	
	꽃무지	<i>Gametis jucunda</i> Faldermann	풀색꽃무지	
	길앞잡이	<i>Cicindela</i> ( <i>Eugrapha</i> ) <i>elisae koreanica</i> Mandl	꼬마길앞잡이	
	앞벌레	<i>Cassida</i> ( <i>Cassidulella</i> ) <i>nobilis</i> Linnaeus	명아주남생이앞벌레	
		<i>Cassida</i> ( <i>Cassida</i> ) <i>piperata</i> Hope	애남생이앞벌레	
		<i>Chrysolina aurichalcea</i> (Mannerheim)	썩잎벌레	
		<i>Gallerucida</i> ( <i>Gallerucida</i> ) <i>bifasciata</i> Motschulsky	상아잎벌레	
		<i>Lema</i> ( <i>Lema</i> ) <i>concinnipennis</i> Baly	배노랑긴가슴잎벌레	
		<i>Physosmaragdina nigrifrons</i> (Hope)	밤나무잎벌레	
	무당벌레	<i>Calvia</i> ( <i>Aniscocalvia</i> ) <i>quatuordecimguttata</i> (Linné)	유럽무당벌레	
		<i>Coccinella septempunctata</i> Linné	칠성무당벌레	
		<i>Harmonia axyridis</i> (Pallas)	무당벌레	
		<i>Propylea japonica</i> (Thunberg)	꼬마남생이무당벌레	
	바구미	<i>Episomus turritus</i> (Gyllenhal)	흑바구미	
		<i>Lissorhoptrus oryzophilus</i> Kuschel	벼물바구미	
		<i>Lixus subtilis</i> Boheman	채소길쭉바구미	
	먼지벌레	<i>Chlaenius</i> ( <i>Chinelaus</i> ) <i>pallipes</i> Gebler	풀색먼지벌레	
		<i>Dolichus halensis</i> (Schaller)	등빨간먼지벌레	
	풍뎅이	<i>Adoretus tenuimaculatus</i> Waterhouse	주둥무늬차색풍뎅이	
		<i>Bifurcanomala aulax</i> (Wiedemann)	흙줄풍뎅이	
		<i>Mimela splendens</i> Gyllenhal	풍뎅이	
		<i>Popillia mutans</i> Newmann	콩풍뎅이	
	꿀벌	<i>Apis mellifera</i> Linné	양봉꿀벌	
	말벌	<i>Polistes jadvigae jadvigae</i> Dalla Torre	등검정쌍살벌	
		<i>Vespa crabro flavofasciata</i> Cameron	말벌	
	흰나비	<i>Artogeia rapae</i> (Linné)	배추흰나비	
	잎말이나방	<i>Archips breviplicanus</i> (Walsingham)	사과무늬잎말이나방	
		<i>Archips oporanus</i> (Linnaeus)	솔잎말이나방	
		<i>Cydia kurokoi</i> (Amsel)	밤애기잎말이나방	
	썩어나방	<i>Microleon longipalpis</i> Butler	꼬마썩어나방	
	창나방	<i>Rhodoneura pallida</i> (Butler)	흰점무늬상수리창나방	
		<i>Striglina cancellata</i> (Christoph)	창나방	
	포충나방	<i>Agrotera nemoralis</i> (Scopoli)	연보라들명나방	
		<i>Ancylolomia japonica</i> Zeller	벼포충나방	
		<i>Calamotro phapaludella purella</i> (Leech)	흰포충나방	
		<i>Catagela subdatella</i> Inoue	갈색긴날개명나방	
		<i>Chilo luteelus</i> (Motschulsky)	이화명나방붙이	
		<i>Conogethes punctiferalis</i> (Guenée)	복숭아명나방	
		<i>Cnaphalocrocis medinalis</i> (Guenée)	흑명나방	

Group	Family	Scientific name	Species	Note	
Insectd	포충나방	<i>Elophila(Cyrtogramme) turbata(Butler)</i>	얼룩애기물명나방		
		<i>Eurrhyarodes accessalis(Walker)</i>	애기무늬물명나방		
		<i>Haritalodes derogata(Fabricius)</i>	목화명나방		
		<i>Herpetogramma luctuosalis(Guenée)</i>	포도들명나방		
		<i>Hymenia recurvalis(Fabricius)</i>	흰띠명나방		
		<i>Maruca vitrata(Fabricius)</i>	콩명나방		
		<i>Neopediasia mixtalis(Walker)</i>	깨다시포충나방		
		<i>Nomophila noctuella(DenisetSchiffermüller)</i>	등심무늬물명나방		
		<i>Palpita nigropunctalis(Bremer)</i>	수수꽃다리명나방		
		<i>Pleuroptya balteata(Fabricius)</i>	갈참나무명나방		
		<i>Pycnarmon lactiferalis(Walker)</i>	알락흰들명나방		
		<i>Pyrausta fuliginata Yamanaka</i>	검정각시들명나방		
	명나방	<i>Aphomia zelleri(Joannis)</i>	큰부채명나방		
		<i>Endotricha flavofascialis Bremer</i>	노랑꼬리뽕족명나방		
		<i>Etiella zinckenella Treitschke</i>	팔알락명나방		
		<i>Nyctegre tistriangulella Ragonot</i>	세모알락명나방		
		<i>Oncocera semirubella(Scopoli)</i>	앞붉은명나방		
		<i>Orthopygia nannodes(Butler)</i>	갈색띠비단명나방		
	자나방	<i>Abraxas miranda Butler</i>	버드나무얼룩가지나방		
		<i>Abraxas niponibia Wehrli</i>	각시얼룩가지나방		
		<i>Ascotis imparata(Walker)</i>	남방네눈썹가지나방		
		<i>Chiasmia hebesata(Walker)</i>	세줄점가지나방		
		<i>Fascellina chromataria Walker</i>	갈고리가자나방		
		<i>Hemithea tritonaria(Walker)</i>	녹색푸른자나방		
		<i>Heterolocha aristonaria(Walker)</i>	뒷분홍가지나방		
		<i>Idaea muricata(Hufnagel)</i>	분홍애기자나방		
		<i>Jankowskia fuscaria(Leech)</i>	줄구름무늬가지나방		
		<i>Macaria shanghaiaria(Walker)</i>	각시가지나방		
		<i>Phthonandria emaria(Bremer)</i>	토끼눈가지나방		
		<i>Timandra comptaria Walker</i>	홍띠애기자나방		
	박각시	<i>Acherontia styx medusa Moore</i>	탈박각시		
		<i>Theretra japonica(Boisduval)</i>	줄박각시		
	독나방	<i>Euproctis pulverea(Leech)</i>	꼬마독나방		
		<i>Euproctis similis(Fuessly)</i>	흰독나방		
	불나방	<i>Spilarctia alba(BremeretGrey)</i>	홍배불나방		
		<i>Spilarctia seriatopunctata Motschulsky</i>	줄점불나방		
		<i>Spilosoma lubricipeda(Linnaeus)</i>	배점무늬불나방		
		<i>Stigmatophora flava(BremeretGrey)</i>	알락노랑불나방		
	밤나방	<i>Abrostola ussuriensis Dufay</i>	작은알락밤나방		
		<i>Acontia bicolora Leech</i>	노랑무늬꼬마밤나방		
	Group	Family	Scientific name	Species	Note

Insect	밤나방	<i>Acronicta(Viminia) rumicis(Linnaeus)</i>	배저녁나방
		<i>Aedia leucomelas(Linnaeus)</i>	뒤흰날개밤나방
		<i>Anterastria atrata(Butler)</i>	우단꼬마밤나방
		<i>Apamea aquila Donzel</i>	붉은나무결밤나방
		<i>Athetis albisignata(Oberthür)</i>	흰점국화밤나방
		<i>Axylia putris(Linnaeus)</i>	썩은밤나방
		<i>Callopietria repleta Walker</i>	얼룩어린밤나방
		<i>Calyptra hokkaida(Wileman)</i>	북방갈고리밤나방
		<i>Catocala patala Felder &amp; Rogenhofer</i>	노랑뿔날개나방
		<i>Chrysodeixis(Chrysodeixis) eriosoma(Doubleday)</i>	붉은금무늬밤나방
		<i>Corsa petrina(Butler)</i>	잔줄밤나방
		<i>Cryphia mitsuhashi(Marumo)</i>	띠이끼밤나방
		<i>Ctenoplusia agnata(Staudinger)</i>	콩은무늬밤나방
		<i>Ctenoplusia albostrigata(Bremer &amp; Grey)</i>	긴금무늬밤나방
		<i>Cucullia fraterna Butler</i>	맵시곱추밤나방
		<i>Earias pudicana Staudinger</i>	붉은가밤나방
		<i>Hadjina chinensis(Wallengren)</i>	중국두점박이밤나방
		<i>Helicoverpa armigera(Hübner)</i>	왕담배나방
		<i>Helicoverpa assulta(Guenée)</i>	담배나방
		<i>Herminia tarsicrinalis(Knoch)</i>	갈색줄수염나방
		<i>Hydrillodes lentalis Guenée</i>	남방담흑수염나방
		<i>Hypena kengkalis Bremer</i>	선두리수염나방
		<i>Hypersynoides submarginata(Walker)</i>	검스레흰별밤나방
		<i>Maliattha signifera(Walker)</i>	넓은띠흰꼬마밤나방
		<i>Mecodina subviolacea(Butler)</i>	보라애기잎밤나방
		<i>Micreremites pyraloides Sugi</i>	뒷무늬꼬마짚름나방
		<i>Microxyla confusa(Wileman)</i>	세모무늬꼬마밤나방
		<i>Mimachrostia fasciata Sugi</i>	검은줄노랑짚름나방
		<i>Mythimna(Morphopoliana) stolidia(Leech)</i>	큰점박이줄무늬밤나방
		<i>Niphonyx segregata(Butler)</i>	영경퀴밤나방
		<i>Oligonyx vulnerata(Butler)</i>	끝갈색밤나방
		<i>Olivenebula oberthueri(Staudinger)</i>	큰뿔노랑밤나방
		<i>Oraesia excavata(Butler)</i>	붉은갈고리밤나방
		<i>Paragona inchoata(Wileman)</i>	담흑꼬마짚름나방
		<i>Parallela dulcis(Butler)</i>	꼬마수종다리밤나방
		<i>Plusia festucae(Linnaeus)</i>	벼금무늬밤나방
		<i>Plusiodonta casta(Butler)</i>	은무늬갈고리밤나방
		<i>Sesamia inferens(Walker)</i>	벼밤나방
		<i>Sophita subrosea(Butler)</i>	점분홍꼬마밤나방
		<i>Spodoptera depravata(Butler)</i>	잔디밤나방
<i>Spodoptera litura(Fabricius)</i>	담배거세미나방		

■ GIAHS Site-related photos of Hadong



□ Harvesting tea in the traditional tea field on a slope



▣ Harvesting tea in Korea's first tea field 1



▣ Harvesting tea in Korea's first tea field 2



▣ Harvesting tea in Korea's first tea field 3



▣ Harvesting tea in Korea's first tea field 4



□ The first tea field in Ssanggye Temple



□ The Oldest Tea Tree



▣ Traditional tea field on a slope 1



▣ Traditional tea field on a slope 2





□ Traditional tea field on a slope 3



□ Traditional tea field on a slope 4



▣ Traditional tea field on the slope in winter



▣ Flatland tea field



▣ Roasting process of the traditional tea of Hadong



▣ Paying attention to the traditional tea of Hadong



▲ Drying process of Hadong's traditional tea



▣ Pungdaje, the rite of praying for the abundant tea harvest



▣ Traditional Hadong tea harvesting experience



▣ Moonlight tea gathering in Seomjin River of Hadong