

## **GIAHS Proposal**

### **Globally Important Agricultural Heritage Systems (GIAHS) Initiative**

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# **Jasmine and Tea Culture System of Fuzhou City**

Location: Fuzhou City, Fujian Province, P.R.China



Fuzhou Municipal Government

February 20, 2014

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**SUMMARY INFORMATION**

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| <p><b>Name of the Agricultural Heritage System:</b></p> <p style="text-align: center;"><b>Fuzhou Jasmine and Tea Culture System</b></p>   |
| <p><b>Proponent/Requesting Organization:</b> Government of Fuzhou City, Fujian Province, P.R.China</p>  |
| <p><b>Country and Location:</b> Jin'an and Cangshan districts, Minhou, Lianjiang and Yongtai counties, Changle County-Level City in Fuzhou City, Fujian Province, P.R.China. The System lies within longitude 118°08' ~ 120°31' E and latitude 25°15' ~ 26°29'N (Map1 and Map2, Annex1).</p>  |
| <p><b>Accessibility of the site to capital city or major cities:</b> Connected by the airport expressway, the site is 50 km from the Changle International Airport of Fuzhou. It is 10 km from downtown Fuzhou. Several high-speed railways run through Fuzhou, such as the Shanghai-Xiamen railway and the Xiangtang-Putian railway. The city is also connected with other cities by highways, including the ones from Fujian to Yinchuan, Xinhua to Youxi, Beijing to Fuzhou, Shenyang to Haikou and Fuzhou to Guangzhou.</p> |
| <p><b>Approximate Surface Area:</b> 3,291 hm<sup>2</sup></p>  |
| <p><b>Agro-Ecological Zone:</b> hilly area of agroforestry eco-systems in Southeastern China</p>  |
| <p><b>Topographic Features:</b> Mountainous and hilly areas cover 72.68% of the site with complex topography.</p>   |
| <p><b>Climate Type:</b> subtropical maritime monsoon climate</p>  |
| <p><b>Approximate Population:</b> 3,710, 926</p>  |
| <p><b>Main Source of Livelihoods:</b> Green tea and jasmine cultivation constitute 30% of</p>   |

overall household income, while the rest comes from migrant labor and trade.

**Ethnicity/Indigenous Population:** Han people constitute over 99% of the total population and live at the core area. The rest (less than 1%) are mainly She people, with a small number of Hui and Man people.

### **Summary Information of the Agricultural Heritage System**

Originating in the Persian Gulf, jasmines were introduced into China during the West Han Dynasty. Ever since, they have been cultivated in China for over 2000 years. Fuzhou is most famous for their cultivation as the city boasts the most favorable climate for the many species. It's in this city that the tea scenting method was first invented more than 1000 years ago. People continued to develop scenting in the Ming Dynasty, and began to use machines in scenting since the Qing Dynasty. Jasmine tea is distinctive from other herbal teas in that it is a scented tea. Its processing is also more complicated. Combining the health effects of tea and flower, jasmine tea is good for human health. The long history has shaped a culture of jasmine and tea in Fuzhou, endowing the city with a distinct cultural significance.

The system is of great ecological significance. This is because jasmine and tea trees grow in different environments. Together with the diversified microclimates, they have shaped vertical landscapes. When one looks from the mountain top to the river, one can see, in the following order, tea plants, trees, buildings, jasmines and waterways.

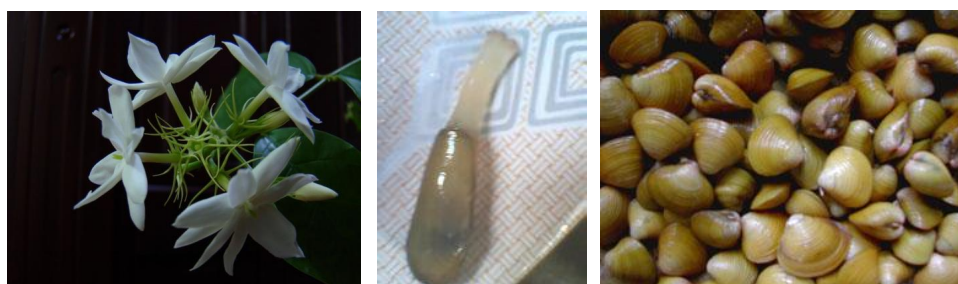




**Photo 1 Landscape of jasmine field**



**Photo 2 Landscapes of a variety of green tea fields**



Single-flowered jasmines

Single clam

Asian clam

**Photo 3 The endemic species of Fuzhou**



Preparation

Blending

Spreading and Cooling

Flower Sifting

**Photo 4 Scenting Technologies of Jasmine Tea**

## DESCRIPTION OF THE AGRICULTURE HERITAGE SYSTEM

### I Characteristics of the Proposed GIAHS

#### ◆ Global (or National) Importance

##### Unique Species

Jessamine is an improved variety of Jasmine that is endemic to Fuzhou in China and is currently on the verge of extinction. Fuzhou Jasmine is normally planted in wetlands of sand banks near the river. Single foot razor clam (Single Clam)--one of the unique species that could only be found in the habitats of Fuzhou Jasmine--was found and recognized as a new species in the year of 1979. The locals take it as an ingredient of daily meals and the harvest of this species can account to 200 kg per day. In addition, yellow *Corbicula Fluminea* (Asian Clam; also called “niuyang” in Fuzhou dialect) is another species which is also peculiar to Fuzhou. Different from its black relatives, Asian Clam could only survive in excellent wetland environment.

##### Origin of Jasmine Tea

Scenting of Jasmine tea requires the flower only to be Jasmine buds picked after 10:00 am of the day and the delivery of those flower buds to the factory shall not be later than 18:30 of the same day, which limits the scenting of jasmine tea to places close to the Jasmine plantations. According to historical records, Fuzhou started its plantation of Jasmine at as early as the Western Han Dynasty (206 BC- 9 AD). Till the Tang Dynasty (618-907), Fuzhou had become one of the major areas for tea cultivation, which indicated a long history of the coexistence of Jasmine and Tea in Fuzhou. In Northern Song Dynasty (960-1127), inhabitants in Fuzhou innovatively started the world’s first scenting of Jasmine tea. The scenting process was introduced to Suzhou in 1938 and to Guangxi later in 1979. Although the production process of Fuzhou Jasmine Tea was introduced to Guangxi Province and Suzhou City, the core scenting crafts of Fuzhou Jasmine Tea were retained in Fuzhou.

### **Specialty Tea that Differs from Other Tea in the World**

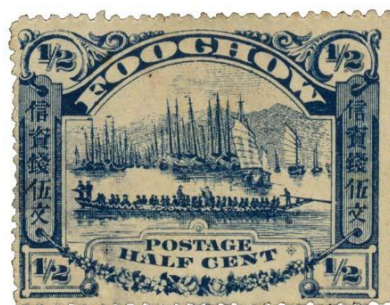
Jasmine tea is made through the scenting of the mixture of fresh Jasmine buds and tea bases. When the fragrance of the flower is absorbed by the tea leaves, the flower residue shall be timely removed (holding out of scented flower); otherwise, the Jasmine tea would smell like spoiled or frowsty. Jasmine tea is different from the herbal teas that directly used the flowers as the soaking objects; it is also different from the green tea, oolong tea and black tea that made directly from the tea leaves. The finished Jasmine tea contains strong smell of flower fragrance and vision of tea leaves while creates sweet and refreshing tastes; it is worthy of the name “Specialty Tea”.

### **Unique Tea Scenting Technology**

Tea leaves are elaborately made into tea bases, which are raw materials prepared for the Jasmine tea. The ideal moisture content of tea bases before scenting is 4-5%. When the scenting of tea bases is completed, they are left for nature cooling till they restore to room temperature; the scenting of flower buds can be done during this period of time. The ratio between tea leaves and flower buds is determined by the varieties and the grades of the finished tea. Scenting processes include: flower buds processing, mixture of tea leaves and flower buds, ventilation and cooling of flowers, stacking and re-scenting of flower buds and holding out for scented flower. The temperature, moisture content and the organic status of the flower stacks shall be carefully controlled and mastered in each process, in which the three important stages shall be seized in particular, namely: when the flower breathes its fragrance; when the tea leaves absorb the fragrance of flower and when the fragrance is retained and maintained by firing in refinement processing. During these three stages, special attention shall be carefully paid to the unique requirements of scenting, including “dry, cool, well-distribution, quick speed”. Each scenting process will take at least three days; and Fuzhou Jasmine Tea of average grades shall be processed by at least 4 rounds of scenting. Fuzhou Jasmine Tea of the highest grade shall go through at least 9 rounds of scenting, which would take more than a month.

### **Jasmine Tea is the Witness of the Cultural Exchange Between the West and the East**

Jasmine was originated from the Persian Gulf area and was introduced into China and finally planted in Fuzhou in the Western Han Dynasty (202 BC - 9 AD). The production processes of Fuzhou Jasmine Tea begun in Northern Song Dynasty (960-1127) and by Qing Dynasty (Nineteenth century); Fuzhou Jasmine Tea was sold and soon became very popular in Europe, America and Southeast Asia. On May 30, 1865, Fuzhou hosted the famous Clipper Ship Race, six vessels headed for London departed every other day and the fastest ship to reach London was called “Ta Ping”, which took a total of only 99 days to London. It shortened the original 270 days for the 16,000 miles of



Picture 1 The World’s First Sports Stamps

distance to 99 days. With the success of this race, Europeans finally had the chance to taste the authentic Fuzhou Jasmine Tea. In 1895, the World’s First Sports Stamps was born in Fuzhou; a ship heavily loaded with Fuzhou Jasmine Tea was used as the background image of this very first stamp (Picture 1), indicating that Fuzhou was already the leading source of maritime trade of tea to Europe by the time.

However, with the advance of urbanization and industrialization, the plantation areas of Jasmine experienced drastic drops in every year from the late 1990s to the early 2000s (dropped from the more than 6000 hectares in 1992 to less than 1,000 hectares in 2006), which resulted in the destruction of many biological habitats and consequently put the biodiversity under serious threat.

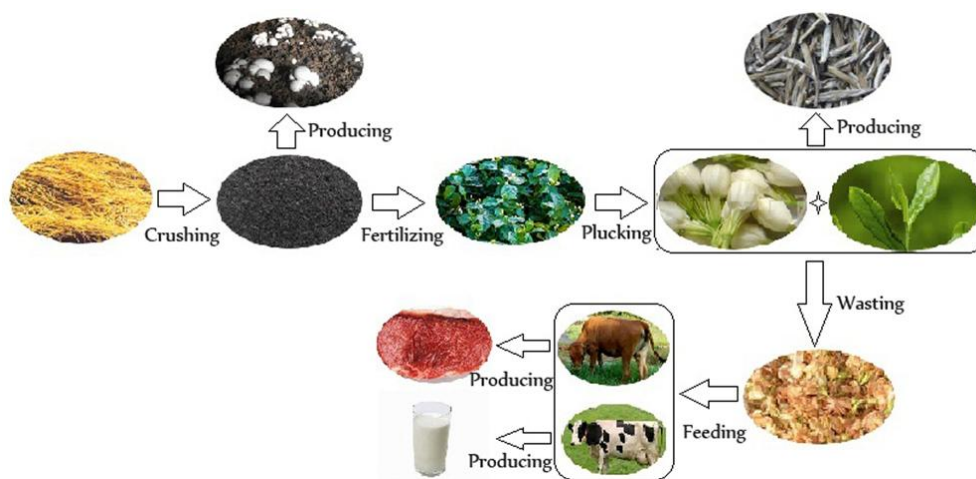
## **1 Food and Livelihood Security**

### **● Source of Diversified Food**

The Jasmine-tea System is a main source of livelihood support in that it involves diversified agriculture provisions. Primarily, it involves tea and jasmine cultivation. From November to April, the farmers cultivate mushrooms using rice straw, the residue of which is later used as fertilizer for



jasmines. From April to September, the framers are busy trimming and growing the jasmines, and plucking jasmine flowers. The flowers, when fresh, are used to make jasmine tea; when spent, they are used to make feed for beef cattle and dairy cows (see Picture 2). In these processes, mushrooms, jasmine tea, milk and meat are produced. In addition, farming in the tea plantations begins in February, producing tea leaves and other food.



Picture 2 The process of producing products in agricultural system

### ● Medical and Health Care Values of Tea, Jasmine and Jasmine tea

Both jasmines and green tea are of medicinal value. Green tea leaves contain multiple valuable substances. For example, the caffeine can stimulate the central nervous system; press the cerebral cortex to enter the excitory state from the sluggish state. It can ease sleepiness and fatigue, increase vitality and attention. That is why tea can eliminate fatigue, uplift the spirit, improve physical performance and work efficiency (*Basu, 2007*). Tea polyphenol, tea pigment and other contents have anti-bacterial, anti-virus, anti-cancer and anti-mutation effects (*Setiawan, 2001*). They are important components of medicine and health care products. Jasmine flowers are pungent, sweet and cool. They boast many medicinal functions, such as heat-clearing, detoxification, dampness-transformation, and spirit calming effects. They are mainly used to treat diarrhoea, abdominal pain, sore red swollen eyes, ulcers and pyrogenic infections (*Kuroda, 2005*). They are

also used to extract active constituents, essential oils, and Chinese medical substances. The root and leaves of the jasmines can also be used for herbal medicine purposes.

Jasmine tea has retained the nature of tea. It is bitter-sweet and cool. Because it is baked tea, it is mild. The tea can ease stomach upset. It has combined the health effects of tea and jasmine flowers. Research has shown that Fuzhou jasmine tea has the following health benefits: ① The tea content can lower the heart rate and stimulate the parasympathetic nervous system. It has calming and pain-killing effects, both mentally and physically, on all human groups (*Inoue,2003*) . ② Jasmine tea has anti-lipid peroxidation effect. It can extend lifespan; regulate the nervous system and endocrine secretion, stimulate metabolism, fend off radiation damage and increase immunity (*Zhang,1997*).

### ● Livelihood Security

Fuzhou is the most important city in producing tea in China, where jasmine and tea industries are a major source of income for local farmers, tea processing enterprises make a contribution to the local economy. Therefore, The jasmine and tea industries are crucial for local livelihoods. As to the jasmine industry, there are three contributions to livelihood maintenance. First, each mu (0.0667 hectares) of jasmines, according to surveys, yields a yearly net income of over RMB10,000 (USD1633.53). Secondly, the local government grants an allowance of RMB1,500 (USD245.03) for each new mu of jasmines, aiming to protect this distinctive industry. Thirdly, the government subsidizes jasmine farmers for using organic fertilizers. The tea industry is also a major contributor to the income of local famers. Fuzhou's tea industry practices the enterprise plus the farmer model. In 2009, twelve of the tea enterprises in Fuzhou had their own tea plantations, which covered an area of 5,835 hectares. The yearly sales of these enterprises reached on average 11,000 ton, or RMB1.37 billion (USD224 million). The tea plantations owned by the farmers cover an area of 3,232 hectares, with a yearly yield of 5,000 tons. In 2009, the average yearly income of farmers stood at RMB3,700 (USD604.41).

## 2 Biodiversity and Ecosystem Functions

## ● Abundant Biodiversity, Local, Endemic Species Observed in Jasmine ecosystem

### i Diversified Varieties of Jasmine, Single-flowered Jasmine as Endemic Species of Fuzhou

There are many varieties of jasmine. In China alone there are over 60 varieties. Most of them are categorized into single-flowered (See Picture 3) and double-flowered (See Picture 4) jasmines according to the flower shapes.



Picture 3 single-flowered jasmines



Picture 4 double-flowered jasmines

### ii Diversified Species in the Ecosystems, Single Clam and Asian Clam as Local Endemic Species

The jasmine and green tea woods boast rich biodiversity. There are 29 families and 51 varieties of animals in the jasmine ecosystems. In the tea plantations, there are 53 families, 111 genera and 147 varieties of plants, 55 families and 79 varieties of animals (See Annex 2 for details). Among them is the Single Clam (*Novaculina chinensis*) (See Picture 5), an endemic species of Fuzhou first discovered in the wetland near a jasmine wood in 1979. The Asian Clam (*Corbicula fluminea*, pronounced as “Niuyang” in the Fuzhou dialect) (See Picture 6) is also an endemic species. These two species, unlike the other clams, can only survive in well preserved wetlands. Water pollution is the No.1 threat to their survival. Surveys show that these two species exist only in Fuzhou, testifying to the suitable environment of the wetlands along the Min River, where the jasmines grow.



Picture 5 Single Clam



Picture 6 Asian Clam

### iii Diversified Related Species

Fuzhou's forest coverage rate stands at 54.9%. It also boasts unique topography, with crisscrossing rivers, natural and artificial vegetation and wetlands. All these endow it with diversified species. According to surveys, it is home to 83 species of animals on the key national protection list, 43 on the key provincial protection list, and 300 on the provincial protection list. It is also home to 37 species of plants on the key national protection list. In the city, there are 109 families, 428 genera and 945 varieties of vascular woody plants; three phyla, 160 families and 1,136 species of indigenous plants.

## ● Ecosystem Functions

### i Protection of Biodiversity in the Ecosystems

In Fuzhou, jasmines are mostly planted in riverside wetlands and shoals(See Picture 7). This provides favorable habitats and abundant food for birds and other animals, attracting flocks of migratory birds. Attracted to winter here are a total of 10 orders, 19 families and 73 varieties of migratory birds. Among them, 15% are listed in Category II on the National Protection List; while 66%, or 48 species are listed in the Sino-Japan Agreement of Protecting Migratory Birds. Tea trees, on the other hand, are planted on slopes and mountaintops at altitudes of 600 to 1,000 meters. The tea plantations are habitats to diversified beneficial insects, forming ecosystems with rich biodiversity (See Picture 8).



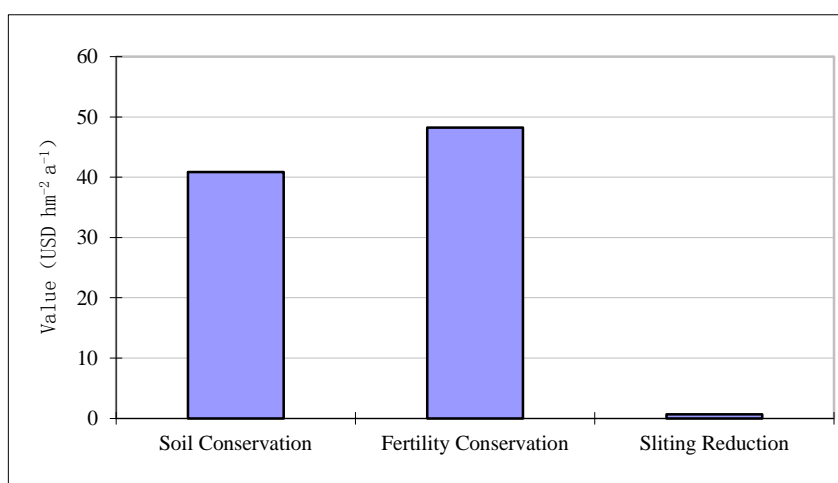
Picture 7 Jasmine plantation



Picture 8 Tea plantation

## ii Water and Soil Conservation

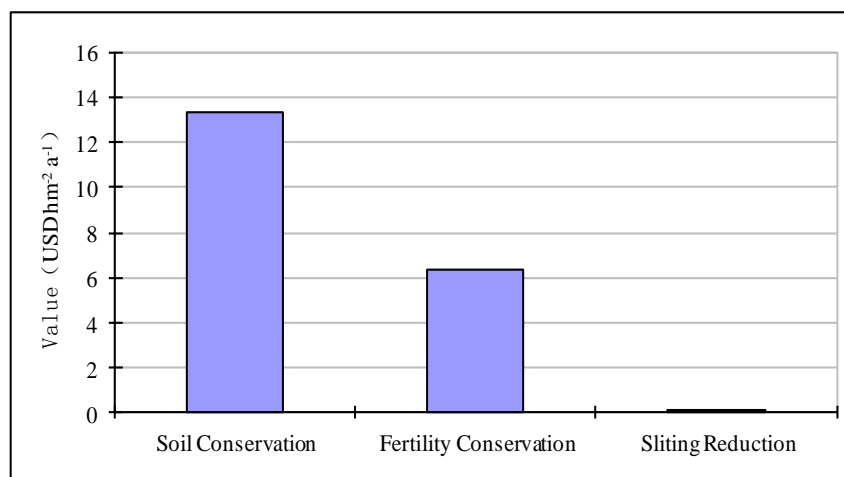
The jasmine and tea trees enhance water and soil conservation in many ways. As to jasmine trees, they are mostly planted on the riverside plains and shoals (See Graph 1). In this way, they prevent the rain from directly scouring the riverside, mitigating soil and water erosion. Secondly, they are often planted on spent mushroom compost. In this process, the ditching and ridging loosens the soil, increasing the porosity and moisture of the soil (See Table 1). The water conservation function of the jasmine plantations, in this case, is valued at  $2,293.73 \text{ yuan hm}^{-2} \text{ a}^{-1}$  ( $374.69 \text{ USD hm}^{-2} \text{ a}^{-1}$ ). Thirdly, relay intercropping of jasmines with longan, olive, citrus, magnolia etc by some farmers increases biomass and vegetation coverage of unit volume of soil. These helps to prevent soil erosion. As to tea trees, they are planted in terrace fields. They lower surface water runoff speed, enhance infiltration, reduce slope surface runoff, and ease the scouring of water on slope soils. Thus, they contribute greatly to soil and water conservation (See Graph 2)



Graph 1 The value of jasmine plantations in soil and fertility conservation, silting reduction

Table 1 Unit weight, humidity, and porosity of soil in Jasmine plantations and control samples

| Subject                     | Unit Weight ( $\text{g cm}^{-3}$ ) | Humidity (%) | Porosity (%) |
|-----------------------------|------------------------------------|--------------|--------------|
| Soil in Jasmine Plantations | 1.17                               | 35.38        | 41.46        |
| Control Samples             | 1.25                               | 32.32        | 40.43        |



Graph 2 The value of tea plantations in soil and fertility conservation, sliting reduction

### iii Climate and Atmosphere Conditioning, Air Purification

Jasmine and tea trees are planted contiguously, enhancing transpiration, forming stable microclimates, and conditioning local conditions. The air is more favorable in the jasmine plantations than nearby unvegetated areas. This is the basis of research on air quality indicators, such as temperature, humidity and anion content at the height of 1.5m. It is approximately the same case for tea plantations (See Table 2). At the same time, the jasmine and tea trees absorb  $\text{CO}_2$  and release  $\text{O}_2$  through photosynthesis. This is crucial for the carbon cycle, and the carbon balance. It also increases the concentration of  $\text{O}_2$ . Research points out that the carbon sequestration and oxygen production functions of jasmine and tea trees are valued at  $26,942.39 \text{ yuan hm}^{-2} \text{a}^{-1}$  ( $4,401.13 \text{ USD hm}^{-2} \text{a}^{-1}$ ) and  $6,781.13 \text{ yuan hm}^{-2} \text{a}^{-1}$  ( $1,107.72 \text{ USD hm}^{-2} \text{a}^{-1}$ ) respectively. In addition, the trees absorb smoke and dust, and thus purify the air.



Table 2 Air conditions of the jasmine and tea plantations and their references

| Indicator        | Jasmine Plantation | Reference of Jasmine Plantation | Tea Plantation | Reference of Tea Plantation |
|------------------|--------------------|---------------------------------|----------------|-----------------------------|
| Temperature (°C) | 20.7               | 21.4                            | 11.4           | 14.7                        |
| Humidity (%)     | 71                 | 67.1                            | 79.6           | 68.8                        |
| Anion            | 335                | 268                             | 832            | 633                         |

### 3 Knowledge System and Adapted Technologies

#### ● Knowledge System

##### i Knowledge on Jasmine Cultivation

**The best location for Jasmine is riverside sand land.** Local people have learned from their experience that the riverside shoals are perfect for jasmine cultivation. This is because they can satisfy the high water and fertilizer consumption of jasmines. The growing season of jasmines coincides with the wet season of the Min River, which replenishes the soil water. Thus, during their blooming season, the jasmines are supported by abundant water and nutrition from the river.

**Preventing insect pests by trim.** Physical measures are taken to prevent and treat common diseases and insect pests of jasmines, such as leaf roller, thrip and southern blight. Farmers trim the trees by different method in different season for preventing insect pests effectively. Before April, they trim trees to maintain row spacing. They trim the branches of the trees in different ridges to different lengths to avoid overlapping picking seasons.

**Plucking experiences of farmers impact the yield of Jasmine Buds.** Jasmine flowers are plucked during the day and used in scenting that night. Plucking observes stringent timing requirements. It usually happens between 10 a.m. and 5 p.m. It cannot be earlier because the dew would not have evaporated, resulting in high water content. This would hamper the fragrance of the flowers. It can neither be done later than 6 p.m, otherwise, the buds cannot be delivered to the tea factories in time. Flower buds plucked after 2 p.m. are the best for they release the optimal fragrance when they bloom at night. Jasmine flower plucking demands rich experience. For one thing, the

buds that have bloomed are no longer useful. For another, the pickers need to choose buds that are going to bloom that night. Buds plucked, but that do not bloom that night, and buds not plucked but bloom that night are a waste (See Picture 9). Statistics show that less than 5% of the buds picked by experienced farmers fail to bloom that night, compared to 15% to 30% of the ones picked by inexperienced farmers. In addition, experienced farmers miss less than 10% of the buds that should have been plucked while the inexperienced pickers miss as much as 20 to 30%.



Picture 9 The process of jasmine flowers blooming

**Note:** the middle bud can be plucked, the leftmost one can be used to scent for Jasmine flower right now

**Fishing gears are used as containers for Jasmine Flowers.** The buds need to be kept in containers with good ventilation when plucked. In Fuzhou, the farmers are also fishers. Therefore, every household owns fishing nets of different sizes, made from bamboo or threads (See Picture 10). These nets are perfect for holding jasmine buds, and have become indispensable in jasmine plucking (See Picture 11).



Picture 10 Outfits worn for plucking jasmine buds



Picture 11 Fishing net for holding jasmine buds

**Outfits for Plucking:** Jasmines bloom during July and August, when it is very hot and sunny

in the afternoon. Heatstroke of pickers is a concern. Sun shades made from bamboo, abound in Fuzhou, and are worn to solve reduce this problem. When working in the jasmine fields, the farmers wear pointed bamboo hats for shading. They tuck towels beneath the hats to insulate against heat and absorb sweat. Long-sleeve shirts or sleeve caps are worn to prevent sun burn. Fish baskets are attached to their waists to hold the buds. The farmers wear boots or are bare-footed for the jasmine fields are quite humid (See Picture 12).



Picture 12 Outfits for plucking

## ii Knowledge of Tea Cultivation

**The environmental conditions above altitude of 200 meters are suitable for tea growing.**

Tea trees grow well in sandy and somewhat acid red-yellow soil with sound drainage. They demand medium exposure to ultraviolet, a daily average temperature of 10°C, a yearly average temperature between 18°C and 25°C, and high air humidity. The mountains and hillsides with an altitude over 200 meters are favorable for growing tea trees.

**Preventing insect pests by trimming and interplanting.** Trimming ill branches of tea trees, interplanting with other fruit trees, are applied to maintain stable pest communities. The purpose is to ensure biodiversity in the tea plantations.

**The twigs of tea trees are recycled.** people replace logs with trimmed tea branches to grow ganoderma (*Ganoderma lucidum*) and develop related products. A series of standards have been

formulated for this practice. It's a recommendable practice for it makes use of the trimmed branches, and produces waste which is used as organic fertilizer. The process is able to protect biodiversity, while the products increase farmers' incomes.

**The quality of tea is affected by the time of plucking and plucking experiences of people.**

The quality of green tea is dependent on the timing and techniques of tea leaf picking. Generally, early Spring tea is the best, for the temperature is low, and fluctuates dramatically between day and night. Also, insects are usually not a concern in the early spring. The green tea leaves are usually picked during March and mid-April. When only the buds are picked, not the leaves, the quality of the tea is thought to be the highest. If the buds are with the similar sizes, they are sold at higher prices. The farmers will trim the branches after picking in the Spring.

**iii Knowledge on Jasmine Tea Processing**

**Tools for Scenting:** Traditional tools for scenting include dryers; sieves for preliminary and secondary sorting, for separating thin from thick tea, and higher-quality tea leaves from lower-quality tea leaves; roll cutting machines for regulating tea lumps; tea winnowers and pickers, etc.

**Processing of Jasmine Tea:** The Fuzhou jasmine tea is made by blending ready-to-bloom jasmine buds with baked green tea. This process is known as scenting. Through scenting, the tea base (cha pei in pinyin) absorbs the fragrant substances released by the jasmine flowers, taking on a strong, lasting and refreshing flavor. The specific process is as follows: preliminary processing and refining of tea base, and jasmine buds preparation (ci hua in pinyin) → blending the baked green tea with the jasmine buds (scenting) → waiting and airing the mixture to release the bio-heat → re-piling and re-scenting → removing the buds from the tea (qi hua in pinyin) ←→ repeating the process, or carrying out a half-round of scenting (ti hua in pinyin) → blending and packaging.

● **Technology System**

### **i Technologies of Jasmine Cultivation**

**Growing Seedlings by Cutting:** Robust, pest-free jasmine trees of fine breeds are selected as the seed trees. There are two growth seasons: from early and mid-March to early April, and from mid and late October to early November after the bloom season.

**Field Planting:** After four months of growing, the seedlings would have grown to 25 to 30 cm tall, and have at least two braches on the caudexes. Seedlings are removed from the plant nursery on a cloudy day after rainfall, and are replanted in a field where ridges alternate with ditches. Fields per hectare can hold 75,000 to 112,500 seedlings. Careful amounts of water are applied to ensure the adaptation of the seedlings.

**Ecological Management:** Leaf thinning, trimming, weeding and fertilizing are all conducted at the proper time. Every Spring, before the growth appears, farmers remove all the branches and leaves at the height of 10 to 15 cm. During the growth season, trimmings are conducted in a timely fashion to remove excessive or weak branches. Fertilizers used are mainly organic ones, such as the residue from growing mushroom, livestock manure, green manure, the bottom sediments of the rivers, and human excrement, etc. This reduces environmental pollution, and recycles many substances and forms of energy. Sick branches are removed and burned to stop the disease from spreading. Other technologies, such as light traps, are also applied.

**Plucking of Jasmine Flowers:** The ready to bloom buds with elongated corolla tubes are ready for picking. They are white and plump. The calyx and stalks are retained, but not the stem. No bloomed flowers or premature buds are plucked. The plucking happens after 10 a.m. and bamboo baskets are used to hold the buds.

### **ii Technologies of Tea Cultivation**

**Seedling Selection:** Vegetative propagation is applied in raising seedlings. The seedling tissue are selected to be robust, pest-free clone therophyte types with healthy roots.

**Field Planting:** It usually happens on a cloudy day after rain during October to the following

March. The plantation density is between 30,000 to 90,000 seedlings per hectare.

**Growing:** Tea trees are grown on terrace fields. Tillage and weeding is conducted at frequent intervals to keep the soil loose. Mostly organic fertilizers are used, such as green and farmyard manure. Other technologies such as trimming, removal of diseased branches; light trap and glue pesticide, are also used.

**Plucking of Tea Leaves:** The plucking is conducted at appropriate times according to local standards. The pickers grasp the tea shoot using the thumb and forefinger, with the middle finger sometimes used in combination. This method maintains the integrity of the tea leaves picked.

### iii Scenting Technologies of Jasmine Tea

**Tea Base for Scenting:** ①Drying: The tea base for scenting would usually have been dried. Traditional scenting demands the humidity to be between 4% and 4.5%. A low fired base is used. Otherwise, the tea will have a burnt taste that lowers its quality. ②Cooling: After firing in refinement processing, the temperature of the tea base pile is high, at 60 to 80°C. The leaves must be spread and cooled. They cannot be used in scenting until the temperature drops to only one to three degree centigrade above the room temperature.

**Flower Preparation:** The flower buds are picked from 10 a.m. and 5 p.m. They are best transported in netted baskets or bags to allow good ventilation. Plastic bags and heavy weights must be avoided. ①Cooling: During transportation, the transpiration of the flowers produces heat. So, they must be spread and cooled once they arrive at their destination. In this way, they can be revitalized and can bloom better to release more fragrance. ②Waiting: The optimal temperature for the pile of flowers is between 32 and 37°C. At this temperature, the buds bloom best and release the largest amount of fragrance. ③ Sifting: When 80% of the buds bloom, it's time for sifting. The process can separate the flowers according to their size, and allow the farmers to eliminate the green buds. The sifting also makes the buds bloom better.



**Blending of Tea and Flowers:** Blending is the most important process in scenting(See Picture 13). In the process, six factors need to be considered: the proportion of flowers, the openness of the flowers, temperature, humidity, thickness of the layers and timing. These factors vary for different rounds of scenting. A thin layer of tea leaves covers the pile of tea and flowers. It's thinner than one centimeter, and is used to keep the flowers from being exposed to the air, and thus helps to keep the fragrance inside the pile. This is known as "covering" (gai mian in pinyin). Because the flowers are buried in the pile, they usually stop releasing fragrance after 12 hours. The largest amount of fragrance is released five hours after the process begins. Therefore, the flowers must be blended with the tea in time to capture the fragrance. In short, the key of successful scenting is blending the tea with the flowers with proper openness, so that the tea base can fully absorb the fragrance of the flowers.



Picture 13 Blending flower with tea

**Spreading, Cooling, and Repiling:** The timing to spread and cool the piles is dependent on the temperature and moisture of the piles and the vitality of the flowers. For the first round, wait five to six hours after the scenting begins before spreading and cooling the piles. For the second round, shorten the waiting by half an hour, and for the third yet another half an hour, etc. The purpose of this process is to spread the piles and let them cool. The piles are usually 30 to 40cm high, and are spread to 10 cm high. Every 15 minute, the piles are ruffled again to allow sufficient dissipation of heat, and adequate ventilation. It normally takes one hour for the temperature to drop to the required level. When it does, rebuild the pile to about 30 cm high, and continue the scenting. After another five to six hours, the temperature will rise to 40°C again. At this time, the flowers will have withered. They would have turned yellow, and are not fragrant anymore. This indicates that it's time to remove the flowers.

**Removing the Flowers:** Ten to twelve hours after the scenting begins, the flowers are removed (See Picture14) . This process is known as “qi hua” in pinyin. For the piles at different rounds, the flowers in the piles that have been scented for many times should be removed first. For the piles at the same round, the flowers in the piles for high quality tea should be removed first. ①

The timing of the removal depends on the temperature of the piles. For the first round of scenting, the flowers should be removed when the temperature rises to 41°C; for the second round, 40°C. The temperature for removal drops as the number of rounds increases. For the last half round, the temperature for removal is 38°C. If the temperature has risen to the required level, but the duration of scenting is not long enough, the farmers need to spread and cool the piles again. ② Baking: This process aims to lower the water



Picture 14 Flower sifting

content of the tea leaves to a suitable level. It should be noted that the tea leaves must be spread and cooled after baking. Lower temperatures are desirable. It should not be over 40°C. A specialized machine is used for this purpose as the tea leaves cannot be cooled by using strong winds, because this would cause unnecessary dissipation of aroma. ③ The last half round of scenting, known as “ti hua” in pinyin, is aimed to make the tea taste fresh. High quality flowers that are white, big and have a strong fragrance are used. Flowers picked in rainy days are not allowed. Because of a lower proportion of flowers (usually six to ten kilograms of flowers to 100 kg tea leaves), the process takes a shorter time. Sometimes, to improve the taste of the first infusion of tea, this process is also applied to mid-end jasmine tea with less than six rounds of scenting. But the fresh taste resulting from this process is not lasting. After one or two months, it will dissipate.

#### **4 Agri-Culture, Value System and Social Organization**

##### **● Culture Connotations of Jasmine and Jasmine Tea**

### **i Symbolic Meaning of Jasmine**

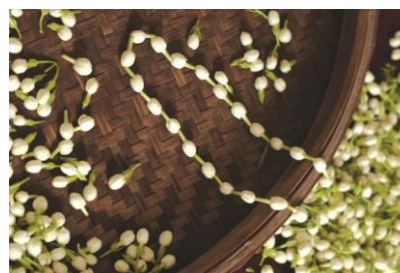
In China, jasmine symbolizes “being together forever” (the two Chinese words have similar pronunciations). Therefore, on the Chinese Valentine’s Day (the seventh evening of the seventh lunar month), the Fuzhou women dress up and take a boat. On the boat, they throw jasmine flowers into the river or towards the banks, praying that lovers would never separate(See Picture 15).



Picture 15 Throw jasmine flower for blessing

### **ii Jasmine Flowers as Decoration**

In the Han Dynasty, females made jasmine flowers into decorations, according to the record of Travel to Southern Yue by Lu Jia. This custom still prevails after two thousand years. Between the Dragon Boat Festival and the Double Ninth Festival, strings of jasmine flowers are still sold as decorations.



Picture 16 Strings of jasmine flower

### **iii Jasmine Flowers at Weddings**

In the Song Dynasty, jasmine was regarded as a symbol of loyalty between lovers. It’s still so in Fuzhou. In the epic book, The Dream of the Red Mansions depicting many customs of the old times: when the bride drinks the tea of the groom’s family, she officially becomes a member of that family. This custom is kept in Fuzhou, where they practice the marriage customs of “three cups of tea and six rituals”. The three cups of tea are: one for engagement (xia cha in pinyin), one at the wedding ceremony (ding cha in pinyin) and the one in the bridal chamber (he cha in pinyin). Beside, the next morning of the wedding, the bride would offer tea to the elders as a gesture of gratitude (bai cha in

pinyin). By doing so, she expresses the new couple's will to look after the elders and to love each other forever.

#### **iv Medical Culture relating to Jasmine Tea**

In the Fuzhou dialect, tea and medicine are both pronounced as “DA”. It shows that, in the past, people in Fuzhou considered tea as an antidote to a lot of poisons. In the Fuzhou dialect, the word for buying medicine literally means buying tea; brewing medicine, brewing tea; taking medicine, drinking tea. In the past, when the smallpox of a patient reached his feet, he would drink jasmine tea for cleansing. This was called “toujiao” in the Fuzhou dialect (which literally means through the feet). It symbolized one's being reborn. The word is now used to describe feeling good. Also, the Fuzhou people would store the jasmine flowers for five to eight years, and use them to treat diarrhea or for cleansing.

#### **v Tea Culture**

After lots of time and practice, people have come up with sophisticated technologies for processing jasmine tea, which have impressed the world. They have also shaped the art of drinking tea. For example, there are nine fixed steps in making and drinking jasmine tea, and they all have their established names. They are as follows(See Picture 17):

Taking tea leaves out (simplified: 香茗进荷, pinyin: xiangming jin he), literally “fragrant tea leaves entering the tea holder”;

Admiring the tea leaves (simplified: 尽展风姿, pinyin: jin zhan feng zi), literally “tea leaves displaying all their charms”;

Filling the teapot with tea leaves (simplified: 落英缤纷, pinyin: luo ying bin fen), literally “fallen petals lie in profusion”;

Pouring water into the teapot (simplified: 细水旋流, pinyin: xi shui xuan liu), literally “pouring water gently into the teapot”;

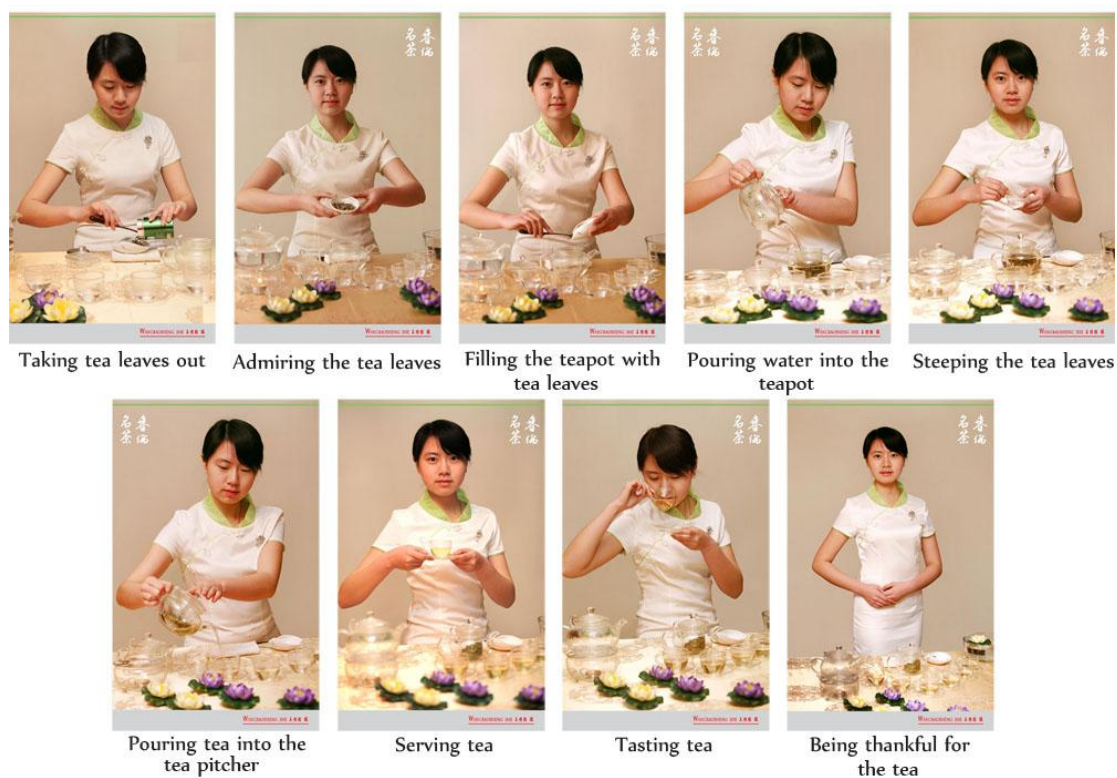
Steeping the tea leaves (simplified: 温润心怀, pinyin: wen run xin huai), literally “warming and moisturizing the heart”;

Pouring tea into the tea pitcher (simplified: 香茗入海, pinyin: xiang min ru hai), literally “fragrant tea entering the sea”;

Serving tea (simplified: 敬奉香茗, pinyin: jing feng xiang min), literally “respectfully serving the fragrant tea”;

Tasting tea (simplified: 品香思味, pinyin: ping xiang si wei), literally “tasting the fragrant tea, appreciating the flavor”;

Being thankful for the tea (simplified: 茶美人康, pinyin: cha mei ren kang), literally “the tea is excellent, the people are healthy”.



Picture 17 The art of drinking tea

## ● Cultural Legacy

### i Jasmine as a Carrier of Cosmo Vision



In Fuzhou, jasmine tea is seen as an item that reflects resilience, and a spirit to cultivate one's moral character. It's clean as ice, and pure as jade. This, people think, is similar to a scholars' indifference to fame and wealth. Lin Zexu once wrote a poem for the Fuzhou Examination Hall. The main meaning of the poem is as follows: It's hard to stand out in the imperial examinations. But not until the tea is brewed, can one really evaluate its quality. Like high quality tea, the talents stand out in competitions. The poem gives a vivid description of life in Fuzhou, which is dominated by tea processing and reading. It also shows that both in tea processing and studying, people have to first work hard, and then enjoy the fruit of their efforts. Besides, jasmine is praised for smelling heavenly. This is shown by a saying that goes, "Peony is a national beauty with no fragrance; while jasmine, being white, smells heavenly" (See Picture 18) .



Picture 18 Tianxiang platform from Song dynasty(1090 A.D.)

## ii Jasmine as an Agent for Buddhist Cultural Inheritance

Jasmine, together with winter daphne (*Daphne odora*), honeysuckle (*Lonicera japonica*) and pomegranate (*Punica granatum*) are the four holy flowers of Buddhism. In Buddhism, jasmine flowers are also known as "man hua", meaning that they can be used as hair decorations. For example, the crown of the Buddhist in the Ajanta wall paintings, a world heritage site, is decorated by golden jasmine flowers. It is recorded that the string of jasmine flowers is the prototype of Buddha's beads. In practice, it is a custom to put in front of the Buddha statues, jasmine flowers strung together by silk threads. The fragrance of jasmines is thought to be that of heaven. This is evidenced by a poem written by Li Qunyu, a poet of the Tang Dynasty. The poem, named "Ode to



the Six Ancestor Precept Platform of the Faxing Temple”, goes like this “For the sake of heavenly smell, jasmines are made; for the sake of auspicious trees, bohi is made”. It’s been agreed that people taste zen in tea. Therefore, with a lot of believers of Buddhism in Fuzhou, the city naturally became the birthplace of jasmine tea.

### **iii Jasmine as a Symbol of Emotion for Love and Hometown**

Jasmine, whose pronunciation in Chinese resembles “never separate”, symbolizes loyal love, as well as the love to one’s hometown. Over three million Fuzhou people have moved to HongKong, Taiwan or other countries. For them, jasmine tea is, what Bingxin called, ‘tea of the hometown’. It embodies the love for their hometown of the people far away from home. Its development reflects the affection of overseas patriots and is evidence that Fuzhou people share the same ancestors, culture, business practices and religions.

### **iv Jasmine as Decoration**

The book, *Travel to Southern Yue*, recorded that in the Fuzhou area, jasmine flowers “strung together by colorful silk threads were used as decoration”. In the *Picture of a Beauty Wearing Hairpins* by Zhou Fang of the Tang Dynasty, the big flower on the beauty’s hair is a peony, and the small ones are jasmine(See Picture 19). Peony is known as the national beauty symbol, while jasmine is said to smell like heaven. So using these two flowers as decorations shows the female’s position in society. To this day, jasmine flowers are still used as decorations. During May and October every year, jasmine flowers are sold in the streets of Fuzhou. The jasmine strings on the taxis are quite a sight.



Picture 19 “a Beauty Wearing Hairpins”, painted in Tang Dynasty

## ● Social Organizations Helping to Pass On Jasmine and Tea Cultures

### i Cooperation between Tea Enterprises and Farmers

Production model of Fuzhou Jasmine Tea combines enterprises and farmers to work together. In this model, enterprises would sign agreements with farmers cultivate Jasmine and farmers cultivate tea. The agreements state: when the harvest season comes, the enterprises shall purchase Jasmine and tea leaves from the farmers at a stabilized price on a regular basis. Although the management of Jasmine and tea cultivation is in the hands of the farmers, the farmers shall guarantee the fine quality of produced Jasmine and tea leaves.

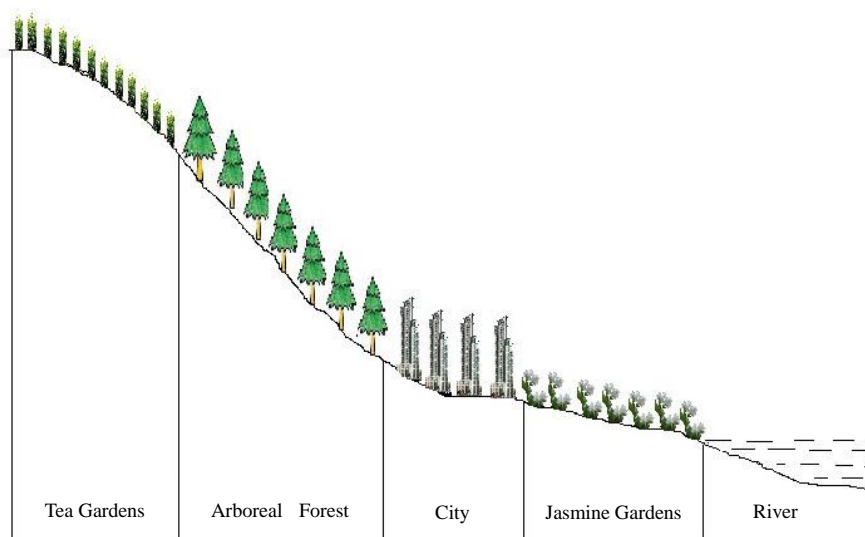
### ii Non-governmental Organizations about Tea

The jasmine tea industry has always held an important position in Fuzhou, and was once the major economic backbone of the economy. Jasmine tea culture necessitates related industrial associations, like the Fujian Tea Science Society, Fujian Tea Culture Society. These associations are made up of tea farmers, enterprises and scholars, etc. They shoulder the responsibility of improving and passing on the processing technologies and the culture of jasmine tea. The Fuzhou Jasmine Tea Industrial Alliance was formed in 2009 to better promote the tea industry and the culture. Based on the alliance, the Fujian Tea Association for Cross-Strait Exchange was founded in 2011. It's a government supported NGO, and is better positioned to promote exchange and make overall plans for the development of the industry.

## 5 Remarkable Landscape, Land and Water Resources Management Features

### ● Landscape Features

Fuzhou is a coastal city lying in the transition zone of southern and mid-subtropical areas. It is said that 80% of the city is mountainous, while 10% is water and 10% is farmland. The mountains and hills are the foundation for the tea and jasmine landscapes. Tea and jasmines trees grow in different environments, which together with the complex topography, have shaped vertical landscapes from the mountaintop to the river, constituting in a vertical sequence, tea, trees, village buildings, jasmine and the river (See Picture 20). On the rocky hills, stone terrace fields are surrounded by the thick sub-tropical forest. On the sandy hills, the terrace fields expanded to an altitude of about 200 meters, with forests below. Therefore, on sandy hills, on the top are terrace tea plantations (See Picture 21), and at the foot are forests (See Picture 22). Jasmines are planted on the alluvial plains. During the bloom seasons in spring, summer and autumn, the fields are covered by snow-like flowers which send their fragrance all over the city (See Picture 23).



Picture 20 Traditional vertical arrangement of jasmine and tea in Fuzhou



Picture 21 Terrace tea plantation on mountaintop



Picture 22 Hillside terrace tea plantation



Picture 23 Blooming jasmine

The inter-planting of lichi, longan and olives, together with jasmine also presents a splendid sight. Lichi, longan and olive have relatively tall trunks and provide some shade. Therefore their influence on jasmines is small when planted sparsely. As a result, the farmers inter-plant them with jasmines (See Picture 24), forming landscapes of inter-planting of fruit trees with jasmines along the river (See Picture 25). The System makes optimal use of the environment and forms attractive landscapes in the process. It is of high aesthetic and tourism value.



Picture 24 Inter-planting of olive with jasmine



Picture 25 Landscapes along the river

## ● Water (and Land) Resources Utilization and Management

Fuzhou is a mountainous city, presenting a simple, economical and efficient method of water utilization and management. Local farmers, considering the growth habits of jasmines, have built terraces on the mountain sides. The terraces lower the speed of surface runoff, elongate the infiltration phase, and ease the scouring of the surface. As a result, the water and fertilizers are used efficiently.

Farmers choose the riverside sandy fields to grow jasmines, after considering their nature and the hydrological conditions of the Min River. Jasmines are heliophilous and hygrophilous. They demand soil with high water content and permeability. Their roots, if soaked in water for a long time, rot easily. The wet season of the Min River is in summer. The river banks are sandy fields with sound permeability. In the jasmine growth season, their demands for water and nutrition are satisfied by the river. In their bloom season, the water level has dropped. But it is convenient to fetch water for the jasmines. In addition, jasmines are blessed with short-term flood resistance. They can still grow normally even if they are submerged for seven days. When a flood breaks out, jasmines can protect the fields for they accelerate the deposition of mud and sand.

In short, Fuzhou has arranged the planting around the nature of the plants and the characteristics of nature. Its experience could offer lessons to other areas.

## II Historic Relevance

### 1 Origin of Jasmine Tea and the Evolution of its Production Process

Thanks to its mild climate and numerous mountainous areas that mainly consist of acidic red soil, Fuzhou is a place perfect for tea cultivation. In addition, as a city close to the ocean, it has the Minjiang River that is wealthy of water flowing across its downtown area. With the favorable tea production conditions and convenient water transportation, Fuzhou became the first place that took tea as a royal tribute and with the largest amount of tea production. It also gradually developed into one of the three biggest tea markets in China. According to *The Classic of Tea* written by Luyu of

Tang Dynasty (618-907), as early as Tang Dynasty, the production of two kinds of tea as royal tributes—the Dew Bud of Fangshan Mountain and Half-rock Tea of Gushan Mountain—was started in Fuzhou.

Jasmine was originated from the Persian Gulf area was introduced into China via India and finally planted in Fuzhou in Western Han Dynasty (206 BC - 9 AD) (according to *Flora of China*). Natural conditions and climate in Fuzhou were very suitable for Jasmine plantation. Due to its diversified medical functions and beautiful metaphorical meanings, Jasmine was widely cultivated in Fuzhou. By Northern Song Dynasty (960-1127), Fuzhou had become the Capital of Jasmine in China.

The earliest production of herbal tea can be traced back to Tang Dynasty since at that time; small amounts of Dipterocarpaceae were added into the tea balm to enhance the tea aroma. In Northern Song Dynasty, people feared that the flower fragrance would affect the original smell and tastes of tea, as a result, spices were abandoned in tea scenting. Yet the production method of using spices in herbal tea production was restored in Southern Song Dynasty (1127-1279). In his *Bu Yue Yin Jasmine*, Shiyue (born in the 12<sup>th</sup> century AD) provided detailed description of scenting process of Jasmine tea.

Scenting methods of herbal tea went through great changes in Ming Dynasty (1368-1644) and created a new variety of flowers scented tea. In the chapter of “Varied Methods of Tea Production” of *The Tea* written by Gu Yuanqing (1564-1639) in Ming Dynasty, scenting methods of herbal tea were recorded and described in details: “sweet osmanthus, Jasmine, Rose, *Rosa multiflora*, Terrestrial Orchid, Orange flower, gardenia, *Rosa banksiae* and plum blossom can all be used in tea scenting”. Tea scenting process at this period of time was to pick the flower buds at the partially opened stage and the amount of flower buds would be determined by the amount of tea leaves. And this practice and experience of “Three cooling of tea leaves and one cooling of flower buds” in tea scenting was also developed during this period of time. Jasmine tea scenting technology became more matured in later periods, but the production output of Jasmine tea remained at small amount.

The aroma of Jasmine is refreshing, rich and lasting; these characteristics enabled it to be used for refreshment, consciousness recovery, inflammation diminishing and internal heat reduction. Jasmine tea enjoyed extremely high popularity in Qing Dynasty and became the most welcomed variety of herbal tea in domestic market as well as in European, American and Southeast Asian markets. Mechanized tea production was adopted at this stage. Jasmine tea still enjoys high popularity in today's market and is still taken as one of the most fundamental herbal tea variety in the market, which can be taken to prove that Jasmine tea is the product of historical selection.

## **2 ups and downs in the development of Fuzhou jasmine tea from 20th Century to 21th Century**

In the Republic of China era (1912-1949), The industry continued to develop during the Republic of China era. However, at the outbreak of the Second World War, the industry began to shrink and was even disappearing. It bounced back after 1950, which saw Fuzhou jasmine tea sold to 22 countries and regions, and became the tea of choice in the reception of foreign guests. During the mid 1980s and 1990s, the industry arrived at its summit with over 1000 manufacturers producing over 60% of the nation's jasmine tea. Their products were sold to over 40 countries. However, during the mid and late 1990s, the industry was negatively affected by urbanization and industrialization. Many jasmine plantations were closed down and the land used for urban development. Production plummeted and hit the bottom in 2006. Fortunately, in 2007, the City began to rebuild the industry. In 2008, the product was granted a geographic indicator by the State Trademark Bureau. Good news continued to arrive. In 2010, Fuzhou Jasmine Tea Industrial Association became a national demonstration base for agricultural production. In 2011, the International Tea Committee honored Fuzhou as the Birthplace of Jasmine. At the same time, traditional processing technology was listed by Fujian as an intangible cultural heritage. Jasmine tea was given the most prestigious position in the 2012 International Tea Conference (Belgium). In the same year, it was named as the most influential regional public brand in China.



### **3 Jasmine tea as Chinese culture important carrier**

Representing the spirits of indifferent to fame and wealth, hard working and austerities of Chinese literati, Jasmine is also the homophonic name for “Never Apart” in Chinese, which bears the wonderful expectation of true love. In addition, in Jasmine tea, the tea represents Yang and Jasmine represents Yin, which indicates the tea reaches harmonious balance between Yin and Yang, thus makes Jasmine tea the most comprehensive generalization of the essence of traditional Chinese culture.

In addition, Jasmine tea is unique and special because China is the only country that has mastered the critical scenting technologies. Protecting the System is important for the protection and inheritance of the Chinese culture, and of traditional technologies.

### **4 Ecological and Biological Relevance of the Protection of Single-Flowered Jasmine**

Single-flowered jasmine is the dominant jasmine species in Fuzhou, and it is endemic to the area. Single-flowered jasmines are mostly detected with 0.07% ~ 0.14% cis-jasmone, a high quality aromatic substance seldom found in other jasmine species. However, lacking protection, it has become an endangered species. Therefore, its protection is of significant ecological and biological relevance for mankind.

## **III Contemporary Relevance**

### **1 Multiple Practical Values**

#### **● Establishing China as the Prime Tea Producer**

Jasmine tea is a hit product for China to establish itself as one of the world's prime tea producers. In 2011, the average price of China's export of jasmine tea was USD5/kg. This is almost

twice that of other tea exports in the same period. What's more, the jasmine tea exports from Fuzhou were priced the highest. For example, jasmine silver needle and jasmine dragon pearl, two middle-range varieties, were USD60/kg and USD55/kg respectively.

### ● **Increasing the Income of Tea and Jasmine Farmers**

The jasmine tea industry contributes to the improved incomes of both tea and jasmine farmers. The contribution is especially significant since jasmine tea became the product of geographic indication in 2009. Since 2008, the price of jasmine flowers has increased to RMB32/kg (USD5.23/kg) from RMB14/kg (USD2.29/kg), boosting total farmers' income by RMB120 million (USD20 million). The price of premium tea base for jasmine dragon pearl has gone up to RMB330/kg (USD53.91/kg) from RMB210/kg (USD34.30/kg). As a result, the tea farmers' income has increased by RMB1, 200/mu (USD196.02/mu). The income of the tea and jasmine farmers will increase even more once the Jasmine -Tea system becomes a GIAHS.

### ● **A Subject worth Researching**

Jasmines are the source of jasmine essential oil, tea polyphenols and catechinic acids, etc. As far back as the Tang Dynasty, jasmine was the main ingredient for anesthesia powder. Jasmines can soothe the nerves, ease depression, extend lifespan, protect against radiation and oxidation. It is a subject worthy of serious research and development.

### ● **Valuable to Tourism**

Jasmine tea is a crucial component of Fuzhou's leisure agriculture. The city has built two tourist sites around jasmine tea. One is the jasmine corridor along the Min, Wulong, Ma , Ao and Dazhangxi Rivers. The other is the eco-tea garden in the alpine regions at Luoyuan, Yongtai, Lianjiang, Minhou, Jin'an and Minqing. Fuzhou has also carried out activities such as the Tea Picking Festival in the Spring and the Jasmine Flower Picking Festival in the Autumn. Jasmine tea has become a characteristic of the local leisure agriculture. In addition, the city has made good use

of its tourism resources. It is renowned as the City of Hot Spring in China. Jasmines are usually planted along the rivers. So the city has integrated all these elements, and formed a leisure tourism network featuring tea and jasmine picking, processing, fishing and hot springs.

## **2 Significance of Jasmine**

### **● Importance to Beautify the City Appearance and Boost Economic Development**

Building a city with “a sound ecosystem and livable environment” is Fuzhou’s top priority during the twelfth five-year period. The city has made it a clear goal to become a national-level eco-civilization. Building high quality jasmine and tea plantations is in line with this effort. It yields multiple benefits. For one thing, jasmines beautify and aromatize the city; promote cross-basin cooperation on ecology and environment; make economic development and industrial structure more compatible with the resources and environment capacity. For another, it would enhance Fuzhou’s efforts in building a “National Model City of Environmental Protection”, and add to the charm of this coastal city where people live and work in peace and contentment.

### **● Importance to Improve Rural Economy and Construct Countryside Environments**

Jasmine cultivation of Fuzhou is demonstrative of circular agriculture. First, jasmines are mostly planted on riverside shoals and wet lands. Secondly, the basal dressing is often mushroom compost or canal mud. Thirdly, the spent jasmine flowers contain rich protein and are used as cattle feed. In recent years, the rapid development of the jasmine tea industry has driving up the income of tea and jasmine farmers. A total of 26,000 households have seen their annual income increased by RMB12,000 (USD1,960.24). In short, the jasmine tea industry has become a model industry in making Fuzhou a more beautiful, fragrant and livable place where the farmers enjoy good incomes.

### **● The Most Critical Factors in the Protection of Traditional Production Process of Jasmine**

#### **Tea**

Production process of Fuzhou Jasmine Tea and has been inherited and passed on for more than

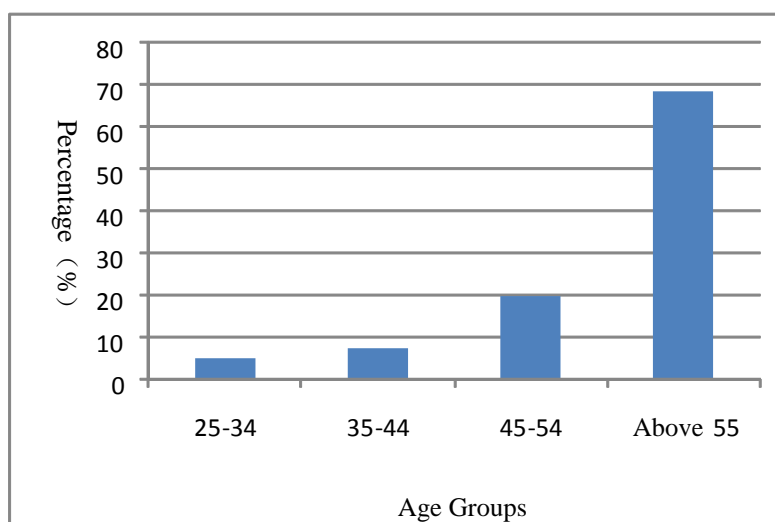
1,000 years, though Jasmine tea is also produced in Hengxian County in Guangxi Province and Suzhou City, due to confidentiality of the production process of Fuzhou Jasmine Tea, these two areas did not acquired the completed secrets of Fuzhou Jasmine Tea production. In addition, due to the unfavorable climate conditions in these areas, the quality of Jasmine produced in these two areas is inferior to that of Fuzhou, thus the Jasmine tea made in these two areas tend to be the low-end tea varieties. Currently, the complete Jasmine tea production process still can only be found in Fuzhou, therefore, the Jasmine plantation situations in Fuzhou has direct impacts on the inheritance of traditional production process of Fuzhou Jasmine Tea in the future.

## IV Threats and Challenges

### 1 Prominent Threats

#### ● Aging of Jasmine and Tea Industry Workers

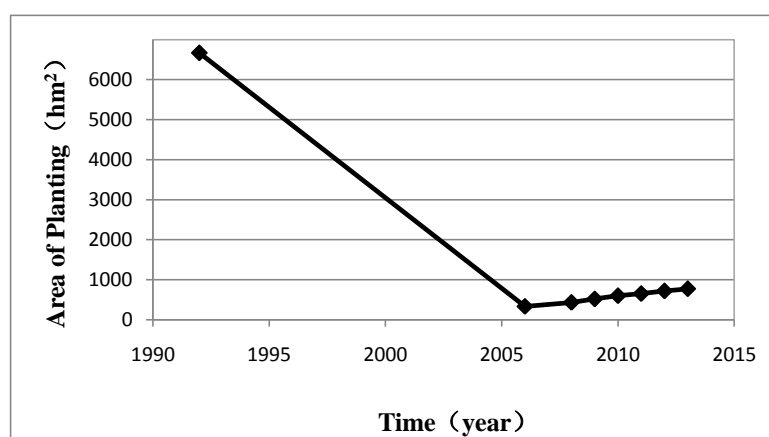
Currently, the jasmine and tea industry workforces is of an advanced age. A sample survey shows that about 68% of the famers are over 20% are 45 to 54; 7% are 35 to 44; and 5% are 25 to 34 (See Graph 3). The younger the group, the lower the percentage. The root cause is the low return for intensive work, making the industry non-appealing to young people. This is threatening the sustainability of the System.



Graph 3 Age Structure of Jasmine and Tea Farmers

### ● Drastic Drops in Plantation Areas of Jasmine

With the advance of urbanization and industrialization, urban land occupied a large acreage of Jasmine cultivation areas; Jasmine plantation areas decreased sharply from the late 1990s to the early 21<sup>st</sup> century with each passing year. (See Graph 4) The disappearance of Jasmine plantations resulted in reduction of related biodiversity. In recent years, with the establishment of encouraging policies and regulations of the government departments, decreasing trend of Jasmine plantation areas was curbed.



Graph 4 Changes of Fuzhou Jasmine Plantation Areas

### ● Lacking In-Depth Research and Development of Jasmine-Related Products

Jasmines are aromatic flowers that bloom at night. But in China, their fragrant substance is only used in making scented tea. China has not worked with jasmine essential oil, which restrains the industrial chain. This is because jasmines only release fragrance when they bloom. And they are well known for having stringent requirements for blooming. The temperature has to be between 30 and 40°C. So, jasmine essential is the hardest to extract. France, however, is leading the world in this aspect. Only three companies, in the world, produce jasmine essential oil, whose prices is six times that of rose essential. We can see that there is massive potential in the industries of jasmine essential oil, tea essential oil and tea polyphenol.

### ● Low price, Inadequate Supervision to Quality and Advertisement to Brand

Jasmine tea used to take up sizable market shares with its low price. But the industry had hit a bottle neck, and saw its market share shrink. There are several causes. Firstly, people become more concerned about quality and brand. The fact that jasmine tea was labeled as low-end tea works against the industry. Secondly, traditional processing is not efficient and is costly. Thirdly, lacking a supervising industrial association, the product quality varies. Some merchants even sell inferior goods as superior ones, hampering consumer confidence. Fourthly, there is no large-scale, high-profile festival or trade fair of jasmine tea. These factor have restrained the benefits of Fuzhou jasmine tea, a world-class brand, from being realized.

### ● **Lacking Synergy between Product Advertisement and City Publicity**

Fuzhou's economic development, city positioning and publicity have not been integrated with the advertisement of jasmine tea. Lacking coordination, the promotion of jasmine tea and the city went their own ways, thus not using the resources efficiently, nor producing the best results. Fuzhou is the birthplace of jasmine tea, and the only city in China that has jasmines as its municipal flower. In addition, the city has a long history of producing and drinking jasmine tea. Every step of the city is marked by jasmine tea processing and culture. This is not seen in any other place. Jasmine culture should be a major impetus of the city's development. These are the reasons why the industry strategy should be integrated with city planning and development.

## **2 Key Opportunities**

### ● **Increasing Demands for High-End Jasmine Tea**

At present, jasmine tea is the best-selling variety of scented tea. This is favorable for Fuzhou, because it has a rich experience of jasmine tea processing. The aroma of flowers pairs up with the fine taste of tea, giving Fuzhou jasmine tea a memorable appeal. That's why it dominates the Beijing, Tianjin and foreign markets of scented tea. What's more, many companies and public institutions have given middle and high-end jasmine tea to their employees as a benefit. This and other factors have expanded the markets of scented tea, presenting precious opportunities for Fuzhou's jasmine



tea industry.

### ● **New and Expanding Markets of Jasmine Tea**

In recent years, Fuzhou has become the major exporter of jasmine tea in Fujian, and China at large. The quantity, total value and prices of Jasmine tea exports remain stable. In 2011, over 1,200 tons of jasmine tea left the Fuzhou Port. The price was USD5/kg, almost twice as high as the national average level. In 2012, Fuzhou's jasmine tea was honored as the most influential regional public brand in China at the China Agricultural Brand Promotion Conference. In the evaluation of China's regional public brands in 2013, Fuzhou jasmine tea was valued at RMB 2.189 billion (USD356 million), ranking it in the top ten in China.

### ● **Processors and Enthusiastic Farmers**

Jasmine tea companies are growing. There are over 100 tea companies in Fuzhou. Two of them are national key leading enterprises, two are China Famous Trade Marks, five are among the top 100 tea companies in China, two are academic stations, and four are the provincial leading enterprises of agriculture industrialization. In 2010, the Fuzhou Jasmine Tea Industry Alliance became a national demonstration base of agricultural processing. In the same year, the Fujian Chunlun Group became a national research center of tea processing. The Fujian Minrong Tea Company became a national model of agricultural processing.

In addition, farmers remain keen on jasmine and tea cultivation. This is because the industry has increased their income and rewarded their knowledge, experience and hard work. A total of 26,000 households have seen their average income increase by RMB12,000 (USD1,960.24). Since 2008, the price of jasmine flower has increased from RMB14/kg to RMB32/kg (USD5.23/kg). This has increased the farmers' income by RMB11,000/mu (USD1,796.89/mu) assuming the unit yield is 500kg/mu. What's more, the government subsidizes every new mu of jasmine cultivation with RMB1,500 (USD245.03). These, together with other subsidies and supporting policies, these have

strengthened the commitment of farmers.

### ● **Economic Integration of the World's Tea Industry**

Economic integration of the world's tea industry has been shaped into a clear industrial chain. Cooperation and interest groups have been formed based on the division of labor. The competitiveness of Fuzhou jasmine tea has made the Fuzhou people who have settled down at southeastern Asian, HongKong, Taiwan, Macao, Japan and Britain very proud. This is why jasmine tea is very popular at these areas also not clear what is intended. Therefore, it should be the industry's strategy to go global and build up interest groups with the companies at these destination countries.

### ● **Publicity Brought by Applying to be a GIAHS**

Applying to become a GIAHS not only makes the System better known, but also enables people to learn more about the economic and ecological value of the jasmine tea heritage system. The government would, as a result, attach greater importance to the cultivation, protection and promotion of jasmine tea. All these would provide great opportunities for the industry and the heritage system.

## **V Practical Considerations**

### **1 Ongoing Efforts to Promote GIAHS**

#### ● **Becoming a Product of Geographical Indication, Obtaining Green and Organic**

##### **Certification for Improving Quality of Jasmine Tea**

During 2008 and 2009, Fuzhou jasmine tea was granted a National Protected Geographic Indication, and a National Agro-Product Geographical Indication. The local standards on jasmine

tea have been enforced since March 20, 2010. Jasmine and tea plantations with sound ecology, green or organic certifications have been selected to be built into high-tech and ecological plantations.

### ● **Government Implementing Privilege Policies for Jasmine Industrial Development**

A series of supporting policies have been implemented. Firstly, the tax burden of the tea industry has been lightened to promote the industry. For example, the tax rate of VAT has been reduced to 3.5%. What is it normally? Secondly, preferential policies have been employed to cultivate leading enterprises. Companies that meet the following criteria are entitled to preferential support from the government. These are companies with: an annual sales volume of over RMB30 million (USD4.9006 million); granted as a famous brand or trademark at the provincial level or above; possessing the HACCP, organic or green certifications; with a bank credit better than AA; owning over 1,000 mu of jasmine fields or 3,000 mu of tea fields. For these companies, the government : (1) considers them preferred candidates for leading enterprises; (2) prioritizes them in approving industrialization and technology upgrading projects; (3) gives back 50% of the VAT and income tax retained by the local government to the companies who submit more VAT and income tax than the previous year, so that they could expand.

### ● **Strengthening Supervision of Product Quality**

Firstly, the inspection and detection system has been set up and improved. Technologies are used to enhance the supervision of agricultural inputs to realize source control. Secondly, the supervision of green and organic jasmine tea has been enhanced.

### ● **Holding Competition of Jasmine Tea King for Passing Scenting Craft**

A program to build famous tea brands has been launched. The “Fuzhou Jasmine Tea King Competition” is carried out annually, the winner of which will be promoted in the media and

through exhibitions, conferences etc. In 2010, the city organized the Masters Tournament on Traditional Technologies of Jasmine Tea. In the event, the municipal government rewarded amply the products that had been granted as provincial or national famous trademarks or brands, or provincial famous agricultural brands.

### ● **Enhancing Brand Management**

The city has taken several actions to enhance brand management. First, it encourages qualified companies to apply for a geographical indication. The municipal administrations of agriculture, quality and technology supervision, industry and commerce, and the Fuzhou Tea Association for Cross-Strait Exchanges have been working together. Their task is to run and supervise the geographical indications and brand systems of jasmine tea. Secondly, experts are invited to improve the jasmine tea standards and the technical regulations of production and processing. The brochures of Fuzhou Jasmine Tea Standards have been handed out at training sessions. The purpose is to help the processors, tea and jasmine farmers meet the standards. Thirdly, the Administrative Rules on the Gilded Signboard of Fuzhou Jasmine Tea has been formulated by the municipal quality and technology supervision bureau, the municipal agriculture bureau and the Fuzhou Tea Association for Cross-Strait Exchange. Only qualified companies are granted the gilded signboards. Fourthly, periodic and ad hoc inspections are carried out to eliminate counterfeits and shoddy goods. All these are aimed to regulate the market supply and improve the reputation of Fuzhou jasmine tea.

### ● **Improving the Industrial Service System**

The Fuzhou Tea Association for Cross-Strait Exchange and the Fuzhou Jasmine Tea Industrial Alliance have been set up. At the same time, cooperatives are encouraged in the towns and villages, as well as among the leading processors, sales companies and farmers. By doing so, they can form horizontal interest groups, and give full play to industrial association functions in combining the efforts of government, enterprises and farmers. The result is integrated services to the market,

enterprises, as well as tea and jasmine farmers in the production, processing and sale of jasmine tea.

## **2 Potentials and Opportunities for Sustainability and Management of GIAHS**

### **● One in a Kind, Well Received Flavor**

Jasmine tea is a unique variety, and is a fine tea. It combines the sweet natural aroma of jasmine flowers, and the rich refreshing taste of tea. It is popular in China, especially in the North, where people are not used to drinking green tea. It not only has great potential in China, but is also popular in foreign markets. As one of the five treaty ports, the Fujian customs has seen jasmine tea shipped out to countries in Europe and America, and gain popularity there.

### **● Recognition in China and the World**

In 2009, Fuzhou jasmine tea was recognized as a National Product of Geographical Indication by the State Administration for Quality Supervision and Inspection and Quarantine. In 2011, Fuzhou was honored as the Birthplace of Jasmine Tea. This was the first time that a place had been recognized as the cradle for tea. In 2012, witnessed by diplomats from over 30 countries, the International Tea Committee and its President honored Fuzhou jasmine tea as a World Famous Tea.

### **● Multiple Eco-Agricultural Certificates**

In 2011, the jasmine tea produced by the Fujian Chunlun Tea Group obtained the Hazard-Free Agro-Product Certificate. The Lufeng Tea Company in Yongtai County followed suit in 2012.

Also in 2011, the jasmine tea of Chunlun Tea Group, Aofeng Minrong Tea Company and Dingshou Tea Company earned the Green Food Certificate.

In 2012, the products from the following plantations were granted the Organic Product Certificate: the Beifeng Ending tea plantation (50 mu) and the Lianjiang jasmine base (50 mu) of the Fujian Chunlun Tea Group, the 406 mu tea bases of the Fujian Tea Import and Export Company on

the Jingke Mountain, Daxiwei Mountain, Neixiama Mountain and Waixiama Mountain in Songxi County, Nanping City.

### ● **Influence of the GIAHS and NIAHS**

An increasing number of countries participate in the GIAHS initiative, signifying an increasing recognition of the values of agro-heritages and the GIAHS. In China, the GIAHS has also attracted much attention and support from the government. In 2013, the Ministry of Agriculture set up the National Important Agricultural Heritage Sites (NIAHS) initiative. This action has attracted even more attention on agro-heritage, and has thus created valuable opportunities for related products. These include a larger international market, and more foreign investment. As a result, their market value has greatly improved. The System is among the first to be listed as a NIAHS. This is bound to bring about positive and far-reaching influence on jasmine cultivation, the protection of old tea trees and jasmine tea processing technologies, and the jasmine tea industry.

### ● **Financial Support from Local Government and Companies**

To help protect the System, the government has been increasing the subsidies to tea and jasmine farmers. For example, the subsidy to jasmine farmers has been increased from RMB500/mu in 2009 to RMB1500/mu in 2013. In addition, farmers are subsidized for using organic fertilizers. As a result, their income has been increasing. This has greatly increased the appeal of jasmine cultivation. On the other hand, the government has cut or exempted the taxes of related companies. A number of companies have set up cooperation with the farmers. The former delegates the latter to produce raw materials for them. The latter, in return, receive financial support from the former.

## **3 Expected Impacts of GIAHS on Society and Ecology**

### ● **Increasing Farmers' Income and Employment, Narrowing the Gap between Rural and Urban Areas**



When the System becomes a GIAHS, jasmine tea will enjoy higher popularity and market value. More companies will enter the industry, extending the industrial chain. As a result, more jobs will be created. The subsidies of the government and the price increase of jasmine and tea will increase the farmers' income, and narrow the gap between living conditions in rural and urban areas.

#### ● **Promoting the Jasmine and Tea Culture of Fuzhou, Enhancing the Cohesion of the Locals**

The application of GIAHS enhances the cohesion of the locals in two ways. Firstly, during the application, the advertisement and activities enhance their awareness of the significance of the System as an agro-heritage system. Secondly, because of the application, studies on traditional jasmine tea culture, related knowledge and technologies have been carried out. These enable the locals to have in-depth and comprehensive knowledge of jasmine, tea and the processing technologies of jasmine tea. In the process, they become more proud of the city, and develop a sense of belonging.

#### ● **Strengthening the Locals' Awareness of Ecological Protection**

Becoming a GIAHS will strengthen the locals' awareness of ecological protection. This is because the program will promote green and organic agriculture, promote organic jasmine and tea bases, and reduce the usage of chemical fertilizers and pesticide. Also, it will reduce waste of water resources; encourage recycling and re-use of waste. Through all these, the locals will gain more knowledge on ecological agriculture, and efficient utilization of natural resources.

#### ● **Maintaining the Biodiversity and Eco-Functions of the System**

The System not only represents the major proportion of livelihood provisions for local farmers, but is also crucial for environmental protection, biodiversity and ecological balance in the area. For example, tea trees planted on the hillsides can conserve soil and water and protect against erosion. They also form a characteristic ecosystem, providing natural habitats for many plant species and

animals. Jasmines are planted on riverside wetlands, supplying birds and other animals with favorable habitats and abundant food. Every year, about 70 varieties of migratory birds spend their winter here. In short, the System is important in maintaining ecological balance and biodiversity.

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## **THE DYNAMIC CONSERVATION PLAN FOR GIAHS SELECTED SITE**

### **1 Baseline Description of Activities, Policies and Experiences**

The following activities have been enacted to protect and promote the System:

#### **● Making the Protection of the System a Government Priority**

In a 2013 governmental report, the Fuzhou authorities stressed the development of the jasmine tea industry. It also emphasized the importance of studying and protecting jasmine plantations. The purpose is to highlight the importance and urgency of jasmine cultivation, and the protection of the System.

#### **● Setting up a Leader Group for the Application**

A leader group has been initiated by the agriculture bureau, and an affiliated office has been set up. Their tasks are the application for a GIAHS designation from FAO, and the publication, organization and promotion of the protection of the jasmine tea System. They have participated in exchanges, such as the agro-culture heritage forum, organized by the FAO, the Chinese Academy of Engineering, and the Chinese Office (IGSNRR/CAS) of GIAHS. They have also widely publicized and promoted Fuzhou jasmine tea through TV, newspapers and magazines.

#### **● Becoming Certified as a Geographical Indication, a Green and Organic Product**

Ever since 2008, Fuzhou has been proactive in the certification of jasmine tea, which has returned favorable results. Fuzhou jasmine tea has been certified as a product with geographical indication by the Trademark Office of the State Administration of Industry and Commerce. The General Administration of Quality Supervision, Inspection and Quarantine, as well as the Ministry of Agriculture, have agreed that jasmine tea should be protected as a product with geographical indication. The local standards of Fuzhou jasmine tea have been enforced. Several green and

organic certified tea and jasmine plantations with sound ecological conditions have been selected to be built into hi-tech plantations for eco-jasmine and tea production.

### ● **Formulating and Implementing Supporting Policies**

Supporting policies have been formulated and implemented. First, have been implemented to discover, collect, protect and utilize the jasmine and tea germplasm resources. For example, a germplasm nursery and fine breed cultivation bases have been set up. Secondly, fine breeds of tea are introduced to improve the cultivars. Thirdly, research and development are now encouraged in the companies to help shape a diversified industrial chain, so as to improve the overall benefits. Fourthly, preferential supports are given to deep processing enterprises in an effort to improve the science and technology level of the industry. Fifthly, tax reductions are employed to promote re-investment the industry.

### ● **Improving the Supervision System of Product Quality**

Insisting product quality and safety as the lifeblood of the enterprises, Fuzhou has been building and improving the inspection and detection system for jasmine tea, and has enhanced supervision of agricultural inputs. For one thing, the technology strength has been improved based on existing resources. More devices and methods are being made available. For another, the Fuzhou detection center of agricultural products conducts periodic detection and ad hoc sampling on tea production bases, processors and sales outlets. All these are aimed to ensure quality and sanitary safety conditions of jasmine tea production. Besides, Fuzhou has accelerated the certification and supervision of green and organic jasmine tea.

### ● **Building Quality Products and Famous Brands**

A program to build famous tea brands has been launched. The “Fuzhou Jasmine Tea King Competition” is carried out annually, the winner of which will be promoted on TV, newspapers and other media, as well as in exhibitions. The purpose is to stimulate the development of high-end products, improve the quality of Fuzhou jasmine tea and further increases the percentage of quality

products. The municipal government rewards amply the products that have been granted as provincial or national famous trademarks or brands, or related provincially famous agro-products.

The city has taken several actions to enhance brand management. Firstly, it encourages qualified companies to apply for the geographical indication. The municipal administrations of agriculture, quality and technology supervision, industry and commerce, and the Fuzhou Tea Association for Cross-Strait Exchanges have been working on this together. Their task is to run and supervise the geographic indication and brand system of jasmine tea. Secondly, experts are invited to improve the jasmine tea standards and the technical regulations of production and processing. The brochures of Fuzhou Jasmine Tea Standards have been handed out in training. The purpose is to help the processors, tea and jasmine farmers meet the standards. Thirdly, the Administrative Rules on the Gilded Signboard of Fuzhou Jasmine Tea has been formulated by the municipal quality and technology supervision bureau, the municipal agriculture bureau and the Fuzhou Tea Association for Cross-Strait Exchange. Only qualified companies are granted with the gilded signboards. Fourthly, periodic and ad hoc inspections are carried out eliminate counterfeits and shoddy goods. The results of the inspections are released through local organizations and media.

### ● Status Survey and Research of the System

Experts from the Institute of Geographic Sciences and Natural Resources Research, the Fujian Agriculture and Forestry University and the Fujian Normal University, etc, have carried out numerous research activities, which have strengthened the science and technology capacity of the System. The topics of their researches on the site include: characteristics of the System, cultivation technologies, prevention and treatment of diseases and pests, cultural features, eco-functions, eco-compensation, the willingness of the locals to protect the System, and the integration of production, education and research.

## 2 Foreseeable Activities

### ● Expediting the Planning and Legislation of the Protection

The brand of Fuzhou jasmine tea will be protected through a legal approach. For one thing, in

2014, related laws will be deliberated and formulated, such as the Regulations on the Protection of Fuzhou Jasmine Tea, and the Administrative Methods of Protecting Fuzhou Jasmine Tea Agro-Culture Heritage. In addition, the practitioners of the jasmine tea industry will be organized to learn related laws, regulations, standards, administrative rules, and the importance of protection.

### ● **Setting up Ecological Processing Zones of Jasmine Tea**

An area of 5,000 mu is designated to build a world-class zone for the cultivation, processing and tourism related to jasmine tea. Firstly, a germplasm nursery and fine breed cultivation base will have been set up before 2018. Secondly, a national demonstration zone for ecological processing of jasmine tea will have been established before 2020. It will cover 1,200 mu. Thirdly, a world-class tea market will have been developed before 2020.

### ● **Enhancing Brand Publicity and Promotion**

First, a program will be launched to build the image of Fuzhou jasmine tea in 2014. Secondly, a theme park of Fuzhou jasmine tea will be set up since 2014. Thirdly, industrial workshops, tea tastings and exhibitions will be held. Fourthly, Fuzhou jasmine tea will become an important component of the city publicity. Fifthly, stores outside of Fuzhou selling authentic Fuzhou jasmine tea are encouraged to hang the unified signboards.

### ● **Devoting Greater Efforts to Expand the Market**

Activities like “tour in China” and “tour of the world” will be held to promote Fuzhou jasmine tea every year. The city will be proactive in holding international tea conferences, and the tea committee joint conferences. Companies and farmers with large yields will receive guidance in setting up exclusive outlets in large and medium sized cities. A website will be set up for Fuzhou jasmine tea. Promotions and sales will also be conducted online. All these are efforts to set up a marketing network for Fuzhou jasmine tea.

### ● **Boosting the Industry by Developing the Tea Culture**

Fuzhou will apply for the national and international initiatives of intangible cultural heritage protection since 2014. It will then create a performance tea art called the Charm of Fuzhou Jasmine Tea. Thirdly, a creative industrial park will be set up surrounding the culture of Fuzhou jasmine tea. Fourthly, a museum of the Jasmine tea industry will be built. Fifthly, a talent team will be built up to carry on the traditional processing technologies, which are intangible cultural heritages. Also, efforts will be made to further establish Fuzhou as the world's cradle of jasmine tea.

### ● **Enhancing Fiscal Supports**

Fiscal supports for the development and protection of jasmine tea will be enhanced. The following are some examples. An exclusive fund will be set up for developing the jasmine tea industry. The fund will be replenished every year. Fine breeds of jasmine and tea will be cultivated. A model base of ecological jasmine tea will be established. Other efforts include advocating the culture of the brand, holding competitions and evaluations in which the winners will be rewarded, supervising the market, organizing technology training sessions, formulating, implementing and publicizing the tea standards.

### ● **Organizing Extensive Investigation on the System, Building a Comprehensive Database**

Extensive investigations will be done on aspects relating to Fuzhou's jasmine and tea plantations since 2014, such as the preferred areas, quantity, germplasm resources, agricultural landscapes, land use, folk culture, folk skills and art, and traditional buildings etc. The results will be used to build a comprehensive database which can be used for further research and development as well as assessments to monitor and evaluate progress. Jasmine and tea plantations within the conservation zones will be put on the protection list. Other efforts will also be made to enrich the database. For example, Fuzhou will dig into the history of ancient jasmine and tea plantations, and sort out their path of development. An agro-heritage exhibition room will be built. Seminars will be held on jasmine tea culture. Research will be conducted on ideas, policies and measures to protect the System, which will lead to the publication of books like *Agro-Culture Heritage*, *The Fuzhou Jasmine and Tea Culture*.



### ● **Drawing the Boundaries of the Agro-Culture Heritage Site to Exert Strict Protection of Ancient Jasmine and Tea Plantations**

The system is located in Fuzhou, a city in east-central Fujian Province, on the Min River. It lies between longitude 118°08'~120°31' E and latitude 25°15'~26°29' N. In this region, there are six counties (cities, districts): Jin'an District, Cangshan District, Minhou County, Changle City, Lianjiang County, and Yongtai County. These counties are divided into 31 towns and villages, covering a total area of 3,291 km<sup>2</sup> (Map 3, Annex 1). Jasmines are mostly planted on the alluvial plains and shoals along the Min River, while tea trees are on the mountainsides in Yongtai and Jin'an District, etc. The subjects of the protection are the ancient jasmine plantation at the Heshang Town, Changle City, and the ancient tea plantation at the Huanxi Town, Jin'an District.

### ● **Rationally Developing Tourism at the Site**

Carefully planned tourism will contribute to the protection and sustainable development of ancient tea and jasmine plantations. First, Fuzhou will spend greater efforts in becoming a national model of leisure agriculture and countryside tourism, an initiative of the Ministry of Agriculture and the National Tourism Administration. It will make use of its unique resources to promote the development of tourism at the site (Map 4, Annex 1). Ecological tourism and leisure sightseeing will be developed at the demonstration tea and jasmine plantations at Gushan Mountain and Difengjiang Wetland.

### ● **Constructing Production Bases of Organic Jasmine Tea**

A quality inspection center will be put in place in 2016. A quality inspection station will be set up in Chengmen Town, the main production area of jasmine tea. Fuzhou will also strengthen quality monitoring during the whole process, including raw material purchasing, production and transportation.

### ● **Holding Jasmine Tea Culture Festivals in Due Course**

Fuzhou will display, from different angles and levels, the rich connotations of its jasmine tea culture. It will dig into the history, folk culture, culinary culture, landscapes and art relating to jasmine tea. Festivals will be held regularly to speed up the exchanges and communications within China's jasmine tea industry. Two examples are the China Fuzhou Jasmine Tea Culture Festival, and the Tour to Collect Folk Songs of Jasmine Tea.

#### ● **Reinforcing Research and Construction of Protection Network**

Fuzhou will continue to participate in domestic and international tea seminars. It will also continue to strengthen the awareness of the protection of ancient jasmine and tea plantations. Based on this, a network of protection and development will be formed in Fuzhou with other jasmine and tea production areas, scientists and technicians.

### **3 Response to Threats and Challenges**

#### ● **Aging of Jasmine and Tea Workforces**

Sampling has shown that among the farmers, 68.3% are over 55; 19.5% are between 45 and 54. This is because of the low return for intensive work makes the industry non-appealing to young people. The situation threatens the continuous development of the jasmine and tea cultures. In addition, the survey shows farmers lacking awareness and skills of new and ancient technologies, restraining the yield and attractiveness of the system.

**Response:** Subsidies are given to attract more young people into the industry. Production philosophies have been changing. Instead of relying on individual farmers, production now relies on the production bases. More will be invested in science and technologies, so that they can promote production. More efforts will be made in developing the model plantations, bases and villages of science and technology, so as to give full play to their demonstration and leadership effects.

#### ● **Low Investment in Science and Technologies, Lacking In-Depth Research and Development of Jasmine-Related Products**

Not enough organic measures are employed to prevent and treat plant disease and pests. As a result, jasmine yield fluctuates greatly. Besides, China has not experimented in the production of jasmine essential oil, restraining the industrial chain. This is because jasmines only release fragrance when they bloom. And they are well known for blooming at night, which are demanding requirements. So, jasmine essential oil is difficult to extract. There is great potential in the industries of jasmine essential oil, tea essential oil and tea polyphenols.

**Response:** Research of jasmine tea will be set up in some special institutes or universities by cooperation between government and them. More will be invested in science and appropriate technologies, which will boost the jasmine tea industry, and extend its industrial chain. Enterprises are also encouraged to set up exclusive R & D departments to conduct in-depth product development.

#### ● **Incorrect Brand Positioning, Inadequate Supervision and Advertisement**

As people's living standards improved, they have higher demands on the quality and brand of consumer items such as tea. Unfortunately, jasmine tea was once counterfeited by some factories in other regions and labeled as low-end tea. Thus, the industry has hit a bottle neck. Traditional processing is not efficient and is high cost, causing the market to shrink. In addition, incorrect positioning and unstable quality have worsened the problem.

**Response:** The influence of Fuzhou jasmine tea will be enlarged through the following measures. First, forums will be held to discuss the development of the industry, and the positioning of jasmine tea in various markets. Secondly, effective laws and regulations will be formulated to promote orderly operation of the industrial chain. Thirdly, periodic seminars, folk culture festivals, tea tasting etc will be held to increase the appreciation of jasmine tea

#### ● **Lack of Synergy between Product Advertisement and City Publicity**

Fuzhou is the birthplace of jasmine tea. Evidence is available to show the complete and clear map of the development of jasmine and jasmine tea culture. Every step of the city is marked by jasmine tea processing and culture. This is not seen anywhere else in China. Jasmine culture should have been a major impetus of the city's development. However, Fuzhou's economic development,

city positioning and publicity have not been integrated with the promotion of jasmine tea. Lacking coordination, the promotion of jasmine tea and the city have gone their own way, not using the resources efficiently, nor producing the best results.

**Response:** Promotion of jasmine, the municipal flower, has been speeded up. Jasmines will also be used to decorate the city to let the citizens and tourists learn more about the culture and history of Fuzhou jasmine tea. Jasmine tea is used in the receptions of guests. It's also advocated as the tea of hometown for overseas Chinese. All these are aimed to integrate jasmine tea and the city's culture with its economic progress and with it, the protection of the system.

### ● **Vulnerability against Natural Disasters and Poor Infrastructure**

It is destructive for the industry if there are continuous rainy days during the bloom season of jasmines. The farmers would suffer great losses if no effective measures are adopted. What's worse: jasmines are relatively sensitive to flooding. If the drainage system doesn't work well, their roots will rot, and they can die. In addition, the processing technologies demand that only ready-to-bloom flowers should be picked. This, together with poor information on supply and demand, aggravates economic losses during production.

**Response:** A climate disaster alarm system is set up during the picking seasons of jasmines and tea. Local agricultural weather forecasting will be improved to more accurate and local TV will create a special forecasting for crops including teas and Jasmines. The government promotes agriculture insurance. Inter-planting and intercropping are used to defend and ease the economic risks caused by natural disasters. Also, an exclusive fund has been set up to build hi-tech infrastructure. It strengthens the capacity of the jasmine and tea production bases and their capacity to stand against natural disasters. A networked supply and demand platform will be put in place to optimize the utilization of jasmine flowers, and thus increase the income of the jasmine farmers.

### ● **Threats Caused by Global Competitors**

In the globalized tea market, a large number of famous brands have become known. This puts Fuzhou jasmine tea in an unfavorable position due to a lack of international publicity. It's not conducive for expanding the global market.

**Response:** Becoming a GIAHS will make it a famous brand of agro-heritage. Fuzhou jasmine tea will enjoy prominent advantages in the international market. The reason is that many Fuzhou people have migrated to other countries. Fuzhou will also attach more importance to the cultural factors during the promotion. The integration of the tea industry has presented the city with an opportunity to go global. The city will take the opportunity and will build interest groups with companies in the destination countries.

#### ● **Impacts Posted by Modern Agricultural Concepts and Technologies**

Modern agricultural technologies have been threatening traditional agricultural production. It has given rise to conflicts between economic benefits and organic agriculture. Since Fuzhou began to promote organic agriculture, it has seen troubling economic returns. This is because yields have been dramatically lowered by not using chemical fertilizers and pesticides and the prices of organic products are not different from other products .

**Response:** Fuzhou will make use of the regulation effects of the market, and the governmental subsidies. It will set up exclusive supply chains and expand the sales channels for Fuzhou jasmine tea, as an organic product.

### **4 How to Obtain and Utilize Funding**

#### ● **Expanding Financing Channels**

To enhance the protection of the System, an exclusive fund will be set up. The fund should receive financing from multiple channels. The production site and the government can leverage funding through the following channels:

(1) International donors: The Fuzhou people who have migrated to other countries are willing to invest in their hometown. Therefore, some will provide certain donations.

(2) Enterprises: Strategies can be employed which will leverage the economic benefits of leading enterprises to fund further protection.

(3) Exclusive funds: Funding can be provided by international organizations and governmental institutions which provide exclusive funds for the protection of agro-heritage systems.

(4) Ecological compensation: Ecological compensation can be obtained from certain industries through fiscal transfer payments.

(5) Program of poverty alleviation and the construction of new socialist countryside program: China demands that governments at all levels provide exclusive funds for the development of new countrysides. These funds can also be used to protect the village system. In this way, the government can promote rural areas while protecting agro-heritages.

### ● Funding Utilization

(1) A proportion of the fund will be used in daily operation relating to the industry's development.

(2) The fund will be used to finance disaster prevention and alleviation, so as to protect the interests of the practitioners.

(3) The fund will be used for increasing the proportion of counterpart funds for major projects, such as agricultural infrastructure construction, improvement of agricultural production conditions, and the improvement of equipment and technologies in the whole process of agricultural production and sales, etc.

(4) The fund will be used to finance scientific research, popularization of science, promotion and forums relating to the industry. In this way, the research on the System can go on smoothly.

(5) The fund will be used for ecological compensation (environmental goods and services).

### ● Supervision and Inspection of Funding Utilization

A specialized department will be designated to supervise and oversee the fund's utilization. It is responsible for monitoring and inspecting whether: the fund for daily operation has been used properly; the fund for disaster prevention and alleviation has been used in these aspects; the responsibilities of project construction and quality have been fulfilled; the rectification measures have been implemented.

## 5 Organization and Policy Development at Different Levels

**● Institutions at the National Level**

The country has provided favorable policies and funds for the protection of agro-heritage sites. The Ministry of Agriculture, the Ministry of Science and Technology and other departments have given generous attention and support for Fuzhou in its application for the GIAHS. However, more efforts can be made to enhance the departments that manage the agro-heritage sites, to provide more support, guidance and promotion of the agro-heritage system. These will ensure smooth progress of the application.

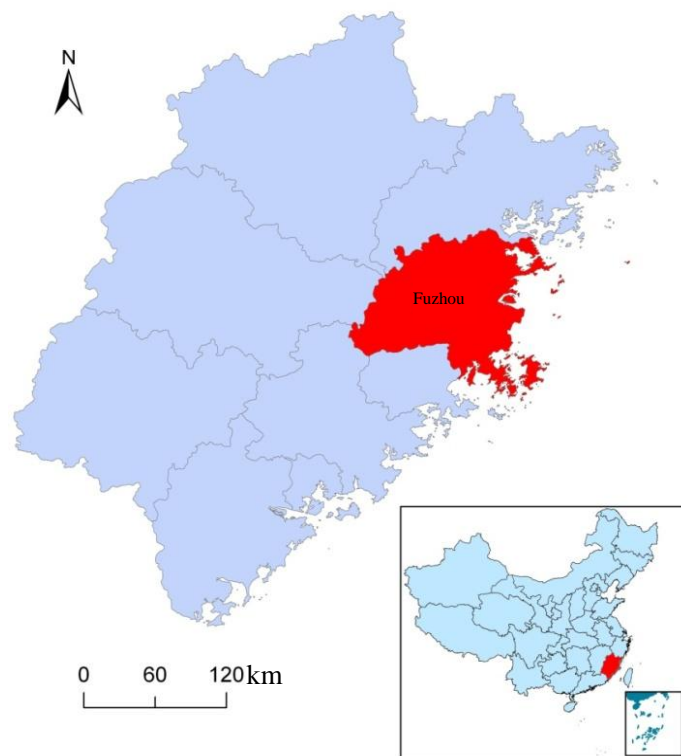
**● Institutions at the City, District and Town Level**

Relative institutions will be set up at the city-district-town levels. The governments at these levels will work together to set up an agro-heritage protection committee. The committee will mainly be the responsibility of the municipal government. It will ensure the smooth progress of the project, and will be responsible for managing and implementing international and national projects. An office will be set up under the committee. The office will be responsible for the implementation of the committee's decisions. It is located in the municipal bureau of agriculture for administrative convenience. The districts and towns will established corresponding organizations and designate personnel to support the committee and its work.

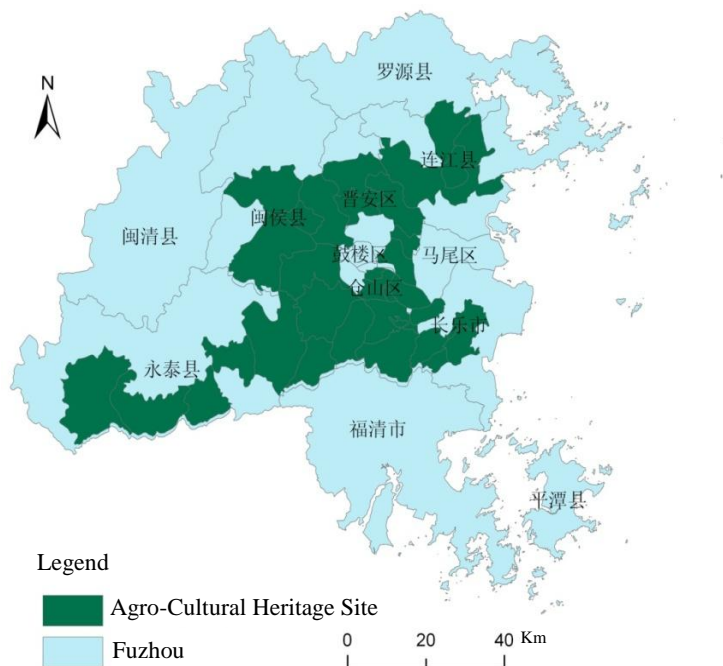
**● Institutions at the Community Level**

Community residents are the main bodies in protecting the System. A committee will be set up, which will be governed by the residents, supported by the local governments and enterprises. This will improve the local residents' awareness of and initiative in the protection and improvement of their livelihood system. The resulting community co-management will ensure the actual implementation of the protection schemes.

### Annex 1 Maps

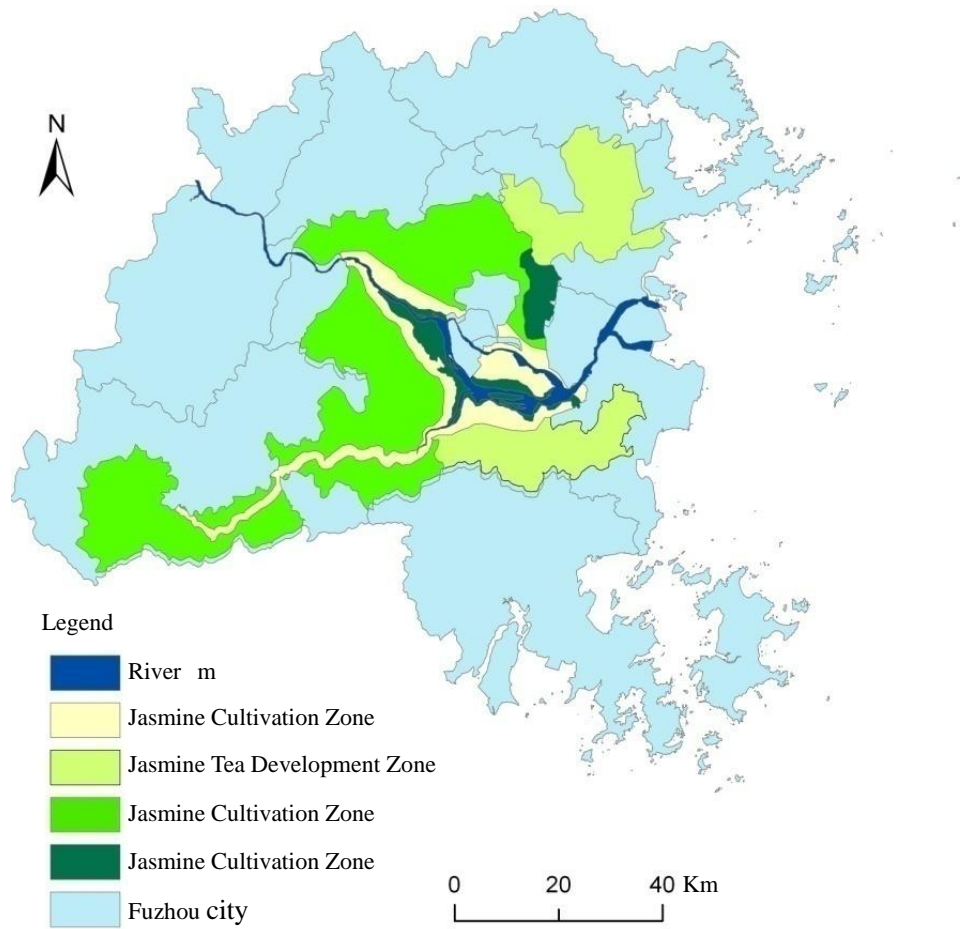


Map1 Location of Fuzhou City

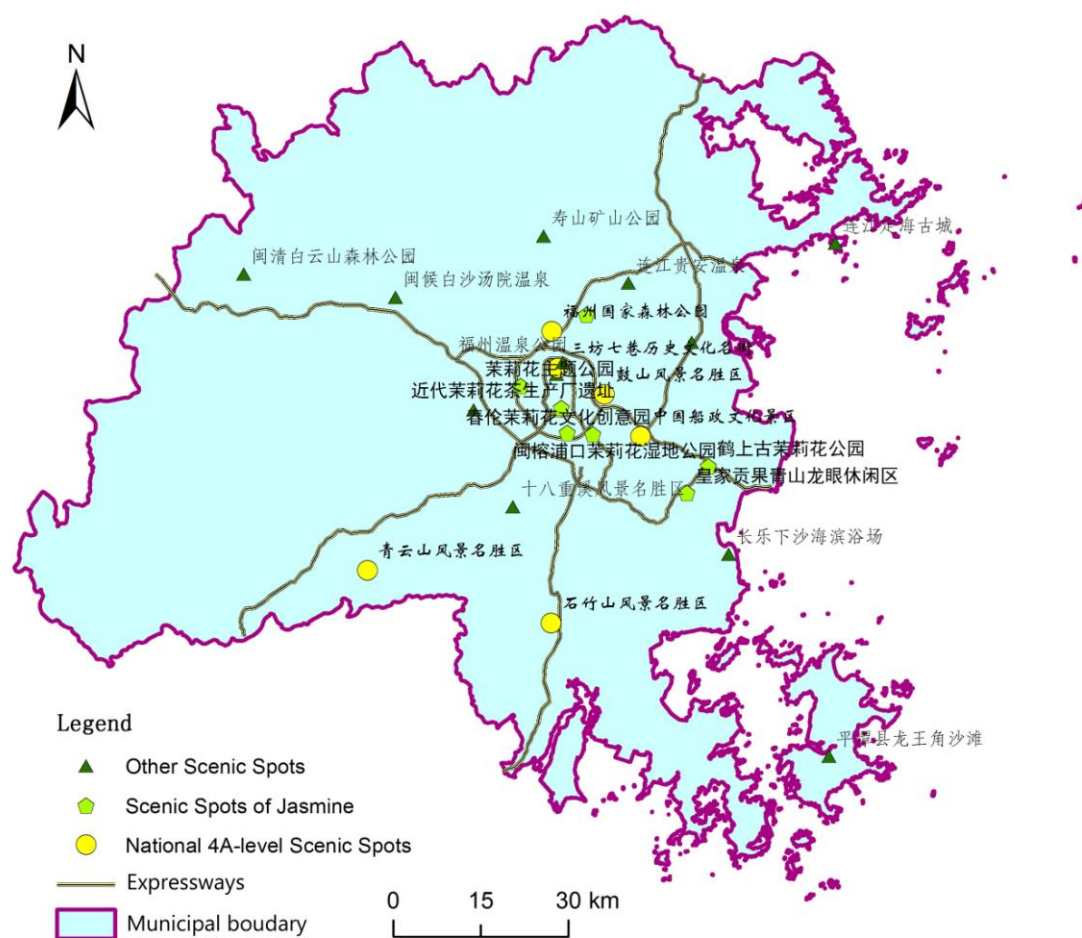


Map 2 Scope of the System





Map 3 Functional Zones of the System



Map4 Distribution of Tourism Scenic Spots in Fuzhou city, Fujian Province

## Annex 2 Species in the Tea and Jasmine Plantations

Table 1: Botanical Species in the Tea and Jasmine Plantations

| Family                         | Genus                   | Species                                    |
|--------------------------------|-------------------------|--|
| Primulaceae                    | Lysimachia              | Lysimachiafortunei MaXim.                  |
| Labiatae                       | Mosla                   | Mosla scabra (Thunb.) C. Y. Wu et H. W. Li |
| Euphorbiaceae                  | Ricinus                 | Ricinus communis                           |
| Euphorbiaceae                  | Vernicia                | Vernicia fordii (Hemsl.)                   |
| Euphorbiaceae                  | Sapium                  | Chinese tallow                             |
| Fabaceae                       | CajanusDC.              | Cajanus cajan                              |
| Fabaceae                       | Vigna Savi              | Vigna unguiculata                          |
| Fabaceae                       | Arachis                 | Arachis hypogaea                           |
| Leguminosae sp.                | Cassia L.               | Chamaecradta nictitans                     |
| Leguminosae sp.                | Vicia L                 | Vicia gigantea                             |
| Leguminosae sp.                | Tri folium re pens L.   | Trifolium                                  |
| Leguminosae sp.                | Lotononis Eckl. et Zeyh | Lotononis bainesii Baker                   |
| Leguminosae sp.                | Acacia                  | Acacia confusa                             |
| Leguminosae sp.                | Phaseolus L.            | Vigna radiata                              |
| Leguminosae sp.                | Astragalus              | Astragalus sinicus                         |
| Leguminosae sp.                | Vicia                   | Vicia faba Linn                            |
| Leguminosae sp.<br>Mimosoideae | Albizzia                | Albizzia julibrissin                       |
| Leguminosae sp.                | Arachis                 | Arachis pintoi cv.Reyan No.12              |
| Leguminosae sp.                | Crotalaria Linn.        | Crotalaria assamica                        |
| Leguminosae sp.                | Sesbania Scop.          | Sesbania cannabina Pers.                   |
| Leguminosae sp.                | Tephrosia Pers.         | Tephrosia candida                          |
| Leguminosae sp.                | Lupinus L.              | Lupinus polyphyllus                        |
| Leguminosae sp.                |                         | Vigna sesquipedalis                        |
| Leguminosae sp.                | Vicia L                 | Vicia L                                    |
| Leguminosae sp.                |                         | Lablab purpureus (Linn.)Sweet              |
| Leguminosae sp.                | PuerariaDC.             | Puerarialobata(Willdenow)Ohwi              |
| Leguminosae sp.<br>Faboideae   | Amorpha L.              | Amorpha fruticosa L.                       |
| Leguminosae sp.<br>Faboideae   | Glycine Willd.          | Glycine max                                |
| Leguminosae sp.<br>Faboideae   | Kummerowia Schindl.     | Kummerowia striata                         |
| Leguminosae sp.<br>Faboideae   | Dalbergia               | Dalbergia odorifera                        |

| Family                              | Genus        | Species   |
|-------------------------------------|--------------|---|
| Leguminosae sp.<br>Caesalpinioideae | Delonix Raf. | Delonix regia   |
| Elaeocarpaceae                      | Elaeocarpus  | Elaeocarpu sylvestris   |
| Elaeocarpaceae                      | Eucommia     | Eucommia ulmoides   |
| Gramineae                           | Brachiaria   | Brachiaria mutica (Forsk) Stapf.  |
| Gramineae                           | Paspalum     | Paspalum natatu   |
| Gramineae                           | Cynodon      | Cynodondactylon(Linn.)Pers.   |
| Gramineae                           | Paspalum     | PaspalumwettsteiniHackel.   |
| Gramineae                           |              | Nakai   |
| Gramineae                           | Imperata     | Imperata cylindrica (Linn.) Beauv.  |
| Gramineae                           | Microstegium | Microstegium geniculatum (Hayata) Honda   |
| Gramineae                           | Ischaemum    | Ischaemum bartatum Retz.  |
| Gramineae                           | Paspalum     | Paspalum thunbergii Kunth ex Steud.   |
| Poaceae                             | Digitaria    | Digitaria sanguinalis (L. )Scop.  |
| Poaceae                             | Setaria      | Setaira viridis(L.)Beauv  |
| Poaceae                             |              | Gramineae   |
| Poaceae                             | Setaria      | Setaria glauca (L. )Beauv.  |
| Poaceae<br>Subfam                   | Miscanthus   | Miscanthus sinensis   |
| Juglandaceae                        | Juglans      | Juglans regia   |
| Betulaceae                          | Alnus Mill.  | Alnus cremastogyne Burk.  |
| Zingiberaceae                       |              | Fructus Amomi   |
| Chloranthaceae                      | Sarcandra    | Sarcandra glabra  |
| Malvaceae                           | Abelmoschus  | Hibiscus esulentus L.   |
| Malvaceae                           |              | Urena lobata Linn.  |
| Compositae                          |              | Conyza canadensis (L. ) Cronq.  |
| Compositae                          | Emilia       | Emilia sonchifolia (Linn.)DC.   |
| Compositae                          | Atractylodes | Atractylodes macrocephala Koidz. A-tractylis macrocephala<br>(Doidz.) Hand.-Mand.-Mazz. |
| Compositae                          |              | Ageratum conyzoides L   |
| Compositae                          | Rudbeckia    | Rudbeckia laciniata   |
| Compositae                          | Kalimeris    | Kalimeris indica (Linn.) Sch.   |
| Compositae                          | Erechthites  | Erechthites hieracifolia (Linn.) Raffin ex DC.  |
| Simaroubaceae                       | Ailanthus    | Ailanthus altissima   |
| Orchidaceae                         | Gastrodia    | Gastrodia elata Blume   |
| Nyssaceae                           | Camptotheca  | Camptotheca acuminata   |
| Meliaceae                           | Toona        | Toona sinensis.A.Juss.  |
| Meliaceae                           | Melia        | Melia azedarach Linn.   |
| Polygonaceae                        | Polygonum    | Polygonum perfoliatum L.  |
| Polygonaceae                        | Polygonum    | Polygonum caespitosum Bl.   |
| Polygonaceae                        |              | Polygonum flaccidum   |

| Family                | Genus                    | Species   |
|-----------------------|--------------------------|---|
| Lindsaeaceae          | Stenoloma Fee, Gen. Fil. | Stenoloma chusanum (L.) Ching [Sphenomeris chusana Copel. |
| Podocarpaceae         | Podocarpus               | Podocarpus macrophyllus                                   |
| Ranunculaceae         | Coptis                   | Coptis chinensis Franch                                   |
| Magnoliaceae          | Magnolia                 | Magnolia liliiflora                                       |
| Magnoliaceae          | Magnolia                 | Magnolia liliflora Desr.                                  |
| Magnoliaceae          | Subgenus Yulania         | Magnolia denudata   |
| Magnoliaceae          | Michelia                 | Micheliamacclurel   |
| Magnoliaceae          | Michelia                 | Michelia maudiaeDunn                                      |
| Casuarinaceae         | Casuarina                | Casuarina equisetifolia L                                 |
| Oleaceae              | Jasminum                 | Jasminum sambac (Linn.) Aiton                             |
| Oleaceae              | Osmanthus                | Osmanthus fragrans Lour.                                  |
| Equisetaceae          | Equisetum est a          | Equisetum hiemale L.                                      |
| Vitaceae              | Vitis L.                 | Vitis vinifera  |
| Anacardiaceae         |                          | Mangifera indica Linn                                     |
| Anacardiaceae         | Rhus L.                  | Toxicodendron vernicifluum (Stokes) F. A. Barkl.          |
| Anacardiaceae         | Choerospondias           | Choerospondias axillaris (Roxb.)Burt et Hill              |
| Rubiaceae             | <i>Hedyotis L.</i>       | Hedyotis Chrysotricha (Palib.) Merr.                      |
| Rubiaceae             | Gardenia                 | Gardenia jasminoides Ellis                                |
| Rosaceae              | Rubus                    | Rubus hirsutus Thunb                                      |
| Rosaceae              | Malus Mill.              | Malus domestica   |
| Rosaceae              | Rosaceae                 | R. chinensis  |
| Rosaceae              | Pyrus                    | Pyrus spp   |
| Rosaceae              | Prunus                   | Amygdalus persica Linn                                    |
| Rosaceae              | Eriobotrya               | Eriobotrya japonica                                       |
| Rosaceae<br>Maloideae | Malus                    | Malus spectabilis (Ait.) Borkh.                           |
| Rosaceae              | Photinia                 | Photinia serrulata  |
| Caprifoliaceae        | Lonicera                 | Lonicera Japonica   |
| Saururaceae           | Houttuynia               | Houttuynia cordata Thunb.                                 |
| <i>UMBELLIFERAE</i>   | <i>Centella L.</i>       | Centellaasiatica  |
| Cyperaceae            | Cyperus                  | Cyperus iria L.   |
| Cyperaceae            |                          | Rhizoma Cyperi  |
| Theaceae              |                          | Camellia oleiferaAbel                                     |
| Theaceae              | Camellia                 | Camellia japomica   |
| Taxodiaceae           | Metasequoia              | Metasequoia glyptostroboides Hu et Cheng                  |
| Cruciferae            | Raphanus                 | Raphanus sativus L.                                       |
| Cruciferae            | Brassica                 | Brassica campestris L.                                    |
| Caryophyllaceae       | Pseudostellaria          | Pseudostellaria heterophylla                              |
| Ebenaceae             |                          | Diospyros kaki  |
| Rhamnaceae            | Ziziphus                 | Jujube/ Chinese date                                      |

| Family                              | Genus        | Species   |
|-------------------------------------|--------------|---|
| PINACEAE Lindl.                     | Keteleeria   | Keteleeria evelyniana Mast.                                 |
| PINACEAE Lindl.<br>PINOIDEAE Pilger | Pinus        | Pinus massoniana Lamb                                       |
| Myrtaceae                           | Eucalypteae  | Eucalyptus  |
| Guttiferae                          |              | HypericumjaponicumThunb.                                    |
| Araceae                             | Pinellia     | Pinellia Tuber  |
| Scrophulariaceae                    | Paulownia    | Paulownia   |
| Salicaceae                          | Populus      | Populus adenopoda Maxim.                                    |
| Myricaceae                          | Myrica       | Myrica rubra (Lour.)Zucc.                                   |
| Ginkgo biloba Linn.                 | Ginkgo       | ginkgo  |
| Rutaceae                            | Citrus       | Citrus reticulata   |
| Rutaceae                            | Citrus       | Citrus maxima   |
| Lauraceae                           | Cinnamomum   | Cinnamomum camphora (L.) Presl.                             |
| Lauraceae                           | Cinnamomum   | Cinnamomum pedunculatum                                     |
| Lauraceae                           | Cinnamomum   | Cinnamomum camphora (L.) Presl.                             |
| Lauraceae                           | Cinnamomum   | Cinnamomum longepaniculatum (Gamble) N. Chao ex H.<br>W. Li |
| Palmae                              | Trachycarpus | Trachycarpus fortunei                                       |
| Oxalidaceae                         | Oxalis       | Oxalis corniculata L.                                       |
| Convolvulaceae                      |              | Cuscuta Chinensis Larnb                                     |
| Lygodiaceae                         |              | Lygodium japonicum (Thunb.) Sw.                             |
|                                     |              | Microlepia hancei Pranti                                    |
|                                     |              | Tephrosia purpurea (Linn.) Pers.                            |
|                                     |              | Ina-igofera endecaphylla jacg                               |
|                                     |              | Macroptiliumatropurpureum(DC. )Urb.                         |
|                                     |              | Clitoria ternatea Linn.                                     |
|                                     |              | Canavalia ensiformis)                                       |
|                                     |              | Clitoria ternatea Linn.                                     |
|                                     |              | Chamaecristarotundifolia                                    |
|                                     |              | Setaria glauca (Linn.) Beauv.                               |
|                                     |              | P.Aquilinum   |
|                                     |              | Smilax microphylla C. H. Wright                             |
|                                     |              | SmilaxchinaL.   |
|                                     |              | Celosia argentea Linn.                                      |
|                                     |              | Setaria anceps Stapf cv.                                    |
|                                     |              | Bulbus Fritillariae Thunbergii                              |
|                                     |              | Zenia insignis Chun   |
|                                     |              | Photinia ×fraseri   |
|                                     |              | Phoebe microphylla H. W. Li                                 |
|                                     | Prunus       | Prunus salicina Lindl.                                      |
|                                     |              | Dalbergia hainanensis Merr. et Chun                         |

| Family | Genus | Species                              |
|--------|-------|--------------------------------------|
|        |       | Chloranthus spicatus (Thunb.) Makino |

Table 2: Animal Species in the Jasmine Plantations

| Family                  | Genus        | Species                                   |
|-------------------------|--------------|---|
| Termitidae              |              | Odontotermes for-mosanus                  |
| Carabidae               |              | Carabidae                                 |
| Carabidae               |              | Carabid beetles                           |
| Chrysopidae             |              | Chrysopa perla                            |
| Lymantiridae            |              | Porthesia scintillans                     |
| Diaspididae             |              | Parlatoria per-gandii Comstock            |
| Diaspididae             |              | Pseudaonidia duplex                       |
| Diaspididae             |              | Chrysomphalus ficus Ashmead               |
| Diaspididae             |              | Aonidiella au-rantii                      |
| Diaspididae             |              | Lepidosapidosaphes gloverii               |
| Pseudococcidae          |              | Pseudococcus sp.                          |
| Pseudococcidae          |              | Trialeurodes vaporariorum                 |
| Ichneumonidae           |              | Ichneumon                                 |
| Tachinidae              |              | Tachinidae                                |
| Thripidae               |              | Thrips hawaiiensis                        |
| Thripidae               |              | Thrips darus Moulton                      |
| Thripidae               |              | Frankliniella intonsa Trylom              |
| Braconidae              |              | Bbraconid                                 |
| Scarabaeinae            | Scarabaeinae | Scarabaeinae                              |
| Tortricidae             |              | Adoxophyes crylosema Meyrick              |
| Tortricidae             |              | Homona coffearia Nietner                  |
| Tortricidae             |              | Cacoecia asiatica Wals                    |
| Tortricidae             |              | Adoxophyes orana Fischer von Rmler-stamrn |
| Sturnidae               | Acridotheres | Acridotheres cristatellus                 |
| Passeridae              | Passer       | P. montanus                               |
| Pyralidae               |              | Nausinoe geometralis                      |
| Pyralidae               |              | Nausinoe perspeotata                      |
| Pyralidae               |              | Hendecasis duplifascialis                 |
| Pyralidae               |              | Thichoghyselis cretacea                   |
| Pyralidae               |              | Nausinoe geornetralis Guenee              |
| Cossidae                |              | Zeuzera coffeae Nietner                   |
| Coccinellidae           |              | Coccinella septempunctata                 |
| Sphingidae              |              | Psilogramma menephron                     |
| Sphingidae              |              | Acherontia styt Westwood                  |
| Sphingidae              |              | Smerinthus planus Walker                  |
| Anura                   |              | Frog                                      |
| Gryllotalpidae Saussure |              | Gryllotalpidae Saussure                   |
| Gracilariidae           |              | Caloptilia                                |
| Curculionidae           |              | Sympiezomias citri Chao                   |

| Family        | Genus | Species                    |
|---------------|-------|----------------------------|
| Chalcididae   |       | Hockeriahakonensis Ashmead |
| Corvidae      | Pica  | Pica pica                  |
| Corvidae      |       | Corvus                     |
| Noctuidae     |       | Prodenia litura            |
| Noctuidae     |       | Agrotis ipsilon            |
| Formicidae    |       | Formicidae                 |
| Staphylinidae |       | Staphylinidae              |
| Cecidomyiidae |       | Contarinia sp.             |
|               |       | Araneida                   |
|               |       | Pantatomidae               |
|               |       | Trichophysetis cretacea    |
|               |       | Lizard                     |

Table 3: Animal Species in the Tea Plantations

| Family            | Genus           | Species                           |
|-------------------|-----------------|-----------------------------------|
| Mymaridae         |                 | Mymaridae                         |
| Bradybaena        |                 | Bradybaena similis                |
| Elasmid           |                 | Elasmid                           |
| Bombycidae        |                 | Andrena bipunctata Walker         |
| Geometridae Leach |                 | Buzurasuppressaria Guenee         |
| Geometridae Leach |                 | Ectropis oblique hypulina Wehrli  |
| Trichogrammatidae | Trichogrammatid | Trichogrammatid                   |
| Nitidulidae       |                 | Haptonchus luteolus               |
| Cordulegasteridae |                 | Anotogaster gigantea              |
| Lymantriidae      |                 | Euproctis pseudoconsersa Strand   |
| Diaspididae       |                 | Aonidiella citrina Cog.           |
| Geisha            |                 | Geisha distinctissima             |
| Aleyrodidae       |                 | Aleurocanthus spiniferus          |
| Aleyrodidae       |                 | Dialeurodes citri Ashm            |
| Clubionidae       |                 | Trachelas japonica Boes. et Str., |
| Telenomus         |                 | Telenomus theophilae wu et Chen   |
| Vespidae          |                 | Vespa                             |
| Formicidae        |                 | Ant                               |
| Anthocoridae      |                 | Orius similisZheng                |
| Acrididae         |                 | Xenocatantops brachycerus         |
| Acrididae         |                 | Acrididae                         |
| Ichneumonidae     | Ichneumon       | Ichneumon                         |
| Eulophidae        |                 | Eulophidae                        |
| Onychiuridae      |                 | Poduridae                         |
| Oribatida         |                 | Oribatida                         |
| Braconidae        |                 | Braconid                          |
| Pteromalidae      |                 | Nasonia                           |
| Tortricidae       |                 | Homona magnanima Diakonoff        |
| Thysanoptera      |                 | Thrip                             |
| Reduviidae        |                 | Sphedanolestes impressicollis     |



| Family                  | Genus       | Species                               |
|-------------------------|-------------|---------------------------------------|
| Reduviidae              |             | Reduviidae                            |
| Neuroptera              |             | Chrysopidae                           |
| Hemiptera Miridae       |             | Trigonotylus ruficornis               |
| Oxyopidae               |             | Oxyopes sertatus L. Koch              |
| Linyphiidae             |             | Erigonidium graminicolum              |
| Sphecidae               |             | Sphecidae                             |
| Coccinellidae Latreille |             | Ladybird                              |
| Theridiidae             |             | Theridion octomaculatum Boes. et Str. |
| Labiduridae             |             | Labidura                              |
| 食蚜蠅科<br>Syrphidae       |             | 食蚜蠅<br>Scaeva pyrastris               |
| Mantidae                | Tenodera    | Tenodera sinensis Saussure            |
| Mantidae                |             | Mantis                                |
| Encyrtidae              |             | Encyrtidae                            |
| Salticidae              | Evarcha     | Evarcha albaria                       |
| Gryllidae               |             | Teleogryllus emma                     |
| Gryllidae               |             | Gobiodon okinawae                     |
| Gracilariidae           |             | Caloptilia theivora                   |
| Curculionidae           |             | Myllocerinus aurolineatus Voss        |
| Curculionidae           |             | Curculionidae                         |
| Scolytidae              |             | Teashot-holeborer                     |
| Chalcidoidea            |             | Chalcidoidea                          |
| Thomisidae              |             | Misumenops tricuspatus                |
| Aphidiidae              |             | Aphidiidae                            |
| Aphididae               |             | Aphididae                             |
| Aphelinidae             |             | Aphytis sp.                           |
| Cicadellidae            |             | Empoasca flavescens                   |
| Cicadellidae            |             | Empoasca vitis Gothe                  |
| Cicadellidae            | Oligonychus | Oligonychus coffeae                   |
| Noctuidae               |             | Noctuidae                             |
| Formicidae              |             | Polyrhachis affinis Smith             |
| Cynipidae<br>Cynipinae  |             | Cynipinae                             |
| Araneida                |             | Araneida                              |
| Tettigoniidae           |             | Gampsaoctis gratiosa                  |
| Tettigoniidae           |             | Ducetiajaponica Thunberg              |
|                         |             | Coleoptera                            |
|                         |             | Pentatomidae                          |
|                         |             | Diaspididae                           |
|                         |             | Culicidae                             |
|                         |             | Muscidae                              |
|                         |             | Staphylinidae                         |
|                         |             | Ceraphronidae                         |
|                         |             | Diapriidae                            |
|                         |             | Aeolesthes induta Newman              |
|                         |             | Anystis baccarumLinnaeus              |

| <b>Family</b> | <b>Genus</b> | <b>Species</b>       |
|---------------|--------------|----------------------|
|               |              | sp.                  |
|               |              | Kalielladepressa     |
|               |              | Lathridius m inutus  |
|               |              | Palorus cerylonoides |
|               |              | Brevipalpusphoenicis |

### Annex 3 Photographs



Distant View of a Tea Plantation in Fuzhou



Farmers Busying in the Jasmine Fields



Picking Jasmine Flowers





Jasmine Flower Preparation



Blending Tea and Jasmine Flowers





Spreading and Cooling





Flower Sifting





Tea Tasting



Tea Art Performance