Proposal of Candidate System

For

The Globally Important Agricultural Heritage Systems (GIAHS) Programme

Pu'er Traditional Tea Agrosystem

Location: Pu'er City, Yunnan Province, P.R. China

People's Government of Pu'er City, Yunnan Province

April 19, 2012

Summary Information

a. Country and Location: Pu'er City, Yunnan Province, P.R.China

b. Name of the System: Pu'er Traditional Tea Agrosystem

c. Area: 187,000 ha

d. Ethnic Minorities: Hani, Yi, Dai, Lahu, Wa, Blang, Yao, etc

e. Proponent/Requesting Organization: People's Government Pu'er City, Yunnan Province

- **Through NFPI:** Ministry of Agriculture, P.R. China

f. Governmental Counterparts and Other Partners:

- Center for Natural and Cultural Heritage Research (CNACH) of the Institute of Geographic Sciences and Natural Resources Research(IGSNRR) of China Academy of Science (CAS)Department of Agriculture of Yunnan Province
- Department of Agriculture of Yunnan Province, P.R. China

g. Summary

Yunnan Province of China is the world's provenance of tea trees. It's also the province that boasts the largest area of wild tea tree communities and ancient tea plantations with the largest amount of old tea trees and wild tea trees. The area along the Lancang River is the center of the provenance. Proposing the Pu'er Traditional Tea Agrosystem as a pilot system of GIAHS is of great significance in terms of protecting and exploiting old tea tree resources, tea plantation ecosystem and tea culture in the Lancang River Basin and in the whole nation on a larger scale. Pu'er Tea Agriculture System is centered on Pu'er tea and tea culture. The system contains a complete vertical evolution of ancient magnolias and tea trees, which proves that southwest China is the world's provenance of tea trees. The system is composed of old wild tea tree populations, ancient transitive tea plantations, ancient cultivated tea plantations, and all sorts of tea tree populations in the ecological tea plantations that have been upgraded according to the cultivation and management mode of traditional tea plantations. Different crops are cultivated in the system, with a rich biodiversity. The system emphasizes cultural diversity remaining consistent. It relies on the traditional methods of Blang, Dai, Hani and other minorities. Located at the starting point of the Ancient Tea-Horse Route, it's an important node in tea culture diffusion.

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1. Description of the System

1.1 Production Area of Pu'er Tea

Pu'er tea is a "big leaf" variety named after its production area in Yunnan, China. Since the Ming and Qing Dynasties, Pu'er Area has been a tea trading post of the middle and lower reaches of the Lancang River. The tea from surrounding tea mountains are now shipped to Pu'er Area to process and on local markets and abroad. Therefore, tea produced in this area is named pu'er. This is proved by Li Shizhen (Ming Dynasty), who wrote in his book *Compendium of Materia Medica* that "Pu'er tea is produced in Pu'er, Yunnan". But tea cultivation and utilization in Pu'er Area date back to the Tang Dynasty. Fan Chuo reported in his book *The History of Yunnan* that "Tea is produced on the mountains around the Yinsheng City. Tea leaves are collected, but subjected to no processing. Yunnan people drink their tea with Chinese red pepper, ginger and cinnamon." This is believed to be the earliest record of pu'er cultivation and tea-drinking. Scholars have different opinions about the "Yinsheng City". Some argue that it's Jingdong, a small county of Pu'er city. Some believe that it covers Pu'er City and the Xishuangbanna Prefecture. Either way, it proves that over 1100 years ago, people in this area have started to collect and use tea leaves.

At present, pu'er tea is mainly produced in (not sure) the lower and middle reaches of the Lanchang River, where the old tea trees of Yunnan concentrate. The area covers Xishuangbanna Prefecture, Pu'er, Lincang and Baoshan cities. With Pu'er City at its heart, it is divided into the south and north tea production areas. Pu'er City is a major producer of pu'er tea. It presents the complete evolution of tea trees, rich biodiversity and culture diversity. As the starting point of the Ancient Tea Horse Route, it's the center of pu'er tea culture. Pu'er City provides a comprehensive demonstration of Pu'er Traditional Tea Agrosystem (See Annex 1 for the map of Pu'er City).

1.2 System Components

The three components of the Pu'er Traditional Tea Agrosystem are old tea tree resources and ancient tea plantation ecosystems. The first component includes magnolia fossils, wild tea tree populations, old transitive tea trees and ancient cultivated tea plantations.

1.2.1 Old wild tea trees and ancient tea plantation ecosystems

The *Yunnan Province Regulations on the Protection of Old Tea Trees* states that "Old Tea Trees refer to old wild tea trees and their communities, half-domesticated tea trees, and ancient cultivated tea plantations (forests) with over 100 years of human intervention." Old tea tree resources include old wild tea trees and their communities, old cultivated tea trees, old transitive tea trees and ancient tea plantations. Old tea trees located at the Lancang River Basin are of three ecotypes: wild, cultivated and transitive, represented respectively by the Wild Tea Tree at Bada Township, Menghai County, Xishuangbanna Prefecture (hereafter, Bada Wild Tea Tree), the Cultivated Tea Tree King on Mt.Nannuo (hereafter, Nannuo Cultivated Tea Tree King), the Transitive Tea Tree at Bangwei Village, Lancang County (hereafter, Bangwei Transitive Tea Tree). Table 1 shows that Yunnan is blessed with a complete set of old tea trees, most of which are distributed along the lower and middle reaches of the Lancang River.

Table 1. Distribution of Old Tea Tree Resources in Yunnan

Types	Areas
Old tea tree resources	Zhenyuan, Menghai, Jinggu, Jingdong, Ning'er, Lancang, Longling, Cangning, Tengchong, Lincang, Yunxian, Shuangjiang, Zhenkang, Fengqing, Yongde, Cangyuan, Jinping, Nanjian
Old wild tea trees	Jingdong, Zhenyuan, Ning'er, Lancang, Ximeng, Yongde, Menghai, Baoshan
Old cultivated tea trees	Zhenyuan, Ning'er, Jinggu, Shuangjiang, Fengqing, Yunxian,

	Menghai, Tengchong
Ancient tea plantations	Jinggu, Jingdong, Zhenyuan, Mojiang, Lancang
Old tea tree communities	Mt.Ailao, Mt.Mengku, Mt.Wuliang at Qianjiazhai Village, Mt.Nannuo, Mt.Fohai, Mt.Bada, Mt.Blang, Mt.Jingmai, Mt.Baiying, Mt.Mengsong, Mt. Nanjiao

(1)Magnolia Fossils

The academy circle has recognized that big leaf magnolia of the Tertiary Period was the predecessor of tea tree. The Jinggu Big Leaf Magnolia Fossils discovered in the Mangxian Village, Jinggu Basin, Pu'er City, were flora relics from the Early Miocene of the Tertiary Period. Big leaf magnolia is the main component of the fossils dating back some 35.4 million years. Geologists and palaeontologists named them the "Jinggu Flora".

Ancient magnolia is the ancestor of the tea variety, the genus Magnolia, the family Magnoliaceae, the order Magnoliales and the division Angiospermae. It's the ancestor of tea plants. Jinggu Flora contains fossils of 19 families, 25 genera and 39 species. Among them are the only two fossil magnolia species in China, including the big leaf magnolia (new variety), and the Chinese magnolia. Up till now, the former is only found in Jinggu County, Pu'er City, Yunnan Province; while the latter has been found in Jinggu, Lancang and Jingdong Counties of Pu'er, Cangyuan and Lincang Counties in Lincang City, and in the Tengchou County in Baoshan City and the Lianghe County in Dehong Prefecture.

（2）Wild Tea Tree Population

In a wild tea tree population, wild tea trees concentrate in an area, take up a specific space, dominate the composition of the wood as a group, and play functional roles. An example exists on the Mt.Wuliang in Zhenyuan Couty. Old wild tea trees and their populations are distributed mainly on Mt. Wuliang, Mt.Ailao and along the lower and middle reaches of the Lancang River between the altitudes of 1,830 to 2,600 meters. According to incomplete statistics, there are 19 old wild tea tree

populations in Pu'er City (see Table 2), most of which are in natural forests. Wild tree plants are high trees with height between 4.35 to 45 meters high, basal diameters between 0.3 to 1.43 meters, and ages between 550 to 2700 years. Their leaf buds are green or purple.

Table 2. Distribution of Wild Tea Tree Populations in Pu'er City

Population Name	Area（ha）	Related Township and Town
Wuliang Mountain Population	16534	Jinping, Wenlong, Anding, Manwan, Linjie, Jingfu, Dachaoshandong and other towns and townships in Jingdong County; Houshan, Baishui Village, Mengda Town, Zhenyuan County
Ailao Mountain Population	8164	Huashan, Dajie, Taizhong and Longjie Towns of Jingdong County; Jiujia, Zhedong, Heping Towns of Zhenyuan County
Wuliang Mountain Subpopulation	6657	Enle, Mengda, Anban, Tianba Towns of Zhenyuan County
Niujiaojian Mountain Population	1727	Zhulian Town of Mojiang County
Yangshenmiao Mountain Population	800	Yutang Township and Tongguan Towns of Mojiang County
Lushan Population	473	Abayakou, Dayutangjing, Shanxingjiebian of Lushan Village , Yayi Township, Mojiang County
Sujia Mountain & Manlong Mountain Population	967	Yizhi, Zhengxing and Weiyuan Townships of Jinggu County
Ning'er, Jinggu Wuliang Mountain Subpopulation	8087	De'an, Babian Townships and Mohei Town of Ning'er County; Houshan Township of Ning'er Town, Zhengxing Town of Jinggu County
Banshan Mountain Population	775	Puyi and Mengxian Towns of Ning'er County
Dashifang Houshan Population	788	Liming Township of Ning'er County, Kangping Township of Jiangcheng County
Dajian Mountain Population	625	Qushui Township of Jiangcheng County
Paling, Madasi, Dakongshu, Batan Population	4488	Jiujing, Menglang, Fazhanhe of Lancang County, Palingheshan, Madasi Liangzi, Dakongshu Dashan and Batan Houshan of Nuozhadu Township
Dahei Mountain Population	2103	Zhutang Township of Lancang County
Longtan Population	5705	Lisuo Township and Mengsuo Town of Ximeng County

Wenggake Population	2652	Wenggake Township of Ximeng County
Fodianshancheng Zishuiku Population	2144	From the old town area of Ximeng Town to the border of Myanmar
Lasilong Population	1370	Xinchang and Zhongke Townships of Ximeng County
Yeniu Mountain Population	1028	Lisuo Township of Ximeng County
Lafu Dahe Mountain Population	5444	Mengma Town of Xilian County

In the Ailao Mountain Population exists the Qianjiazhai Village Wild Tea Tree, where the oldest tea tree in the world can be found. The tree grows among a wild tea tree population in a natural forest at the altitude of 2,450m. Its height is 25.6m, tea site is 22×20m, and basal diameter is 1.02m. It's growing normally. At the age of about 2700 years (see Figure 1).

Fig. 1. Qianjiazhai Village Wild Tea Tree, Zhenyuan County

（3）Old Transitive Tea Trees

Old transitive tea trees are the evidences of human's domestication and utilization of tea trees. We can still find old transitive tea trees which are over 1,000 years old along the lower and middle reaches of the Lancang River. The Bangwei

Transitive Old Tea Tree is an example.

It is located in the Bangwei Village, Fudong Township, Lancang Lahu Autonomous County at the altitude of 1,900m. It's a big leaf tea tree with upright posture and dense branches. It has grown to be 11.8m tall, with a tree site of 8.2× 9.0m and a basal diameter of 1.14m. Its leaves are long oval-shaped, with slightly bulged and lustered surfaces. The leaves' underside, midrib, petiole, flake and sprou are hairy. The sprouts are yellow-green. The tree shows the morphological features of the flower, fruit and seed of wild tea trees. It also shows the characteristics of sprouts, leaves and shoots of cultivated tea trees. Scientists believe that it is a transitive type lying between the wild type and cultivated type. It's an old tea tree that can be used directly. The fact that the tree is 1000 years old shows that the origin, domestication and early utilization of tea trees happened in the same place.

Fig. 2. Bangwei Transitive Tea Tree

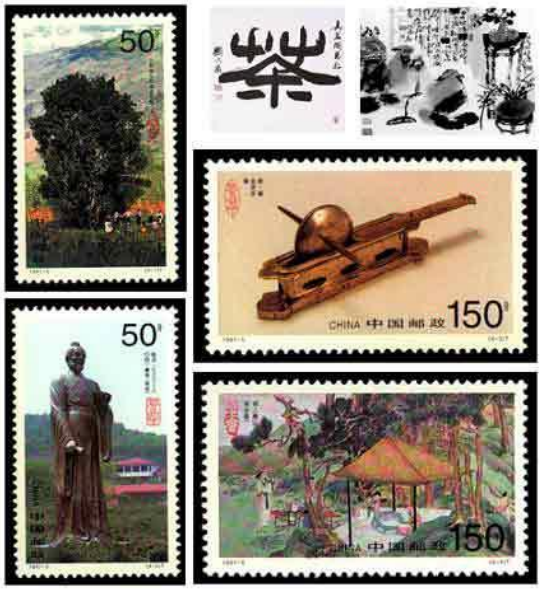

Fig. 3. Tea Stamps

The discovery of this tree is of great scientific value to the studies of tea tree origin and evolution, tea provenance, tea tree domestication biology, tea tree breeding, agricultural heritage, agriculture history and local sociology, etc. It represents an important chapter in the tea history of China and of the world.

On April 8, 1997, China General Post Office issued a four-piece set of stamp named Tea. The first piece shows the Bangwei Transitive Tea Tree (see Figure 3).

（4）Old Cultivated Tea Trees and Ancient Tea Plantations

On the highest point of Xiangzhujing, a village not far from Fengqing County, Lincang City, sits the representative of old cultivated tea trees—Fengqing Old Cultivated Tea Tree. At the age of 3200, it's the world's oldest cultivated tea tree and one with the largest basal diameter. It grows at the altitude of 2,245m, with a basal circumference of 5.8m, a height of 10.6m and a trunk diameter of 1.84m. It's renowned as the "Splendid Tea Father" (see Figure 4). Prior to its discovery, the Nannuo Cultivated Tea Tree King was the representative of old cultivated tea trees.

Fig. 4. Fengqing Old Cultivated Tea Tree

Ancient cultivated tea plantations are ones with a history of over 100 years represented by the Jingmai Mountain Tea Plantation in Lancang, the Kunlu Mountain Tea Plantation at Ning'er (see Figure 5). The tea trees in traditional tea forests are mostly of cultivated type. These tea forests concentrate in red or yellow brown soils in mountainous areas or farm areas at the altitude of 1500-2300m. The plantations at the

following places are relatively well-known: Mt.Nannuo, Menghai County, Xishuangbanna Prefectures; Huashang and Jingfu Towns, Jingdong County, Pu'er City; Mt.Jingmai, Lancang County; Hetou Town, Zhenyuan County; Tianba and Wenshan Towns, Jinggu County; Mt.Kunlu, Ning'er County; Jiepai and Chachang Towns, Mojiang County; Nuodong Town, Menglian County, and etc. Tea plants in these tea forests at the altitude between 1,150-2100m are upright trees 5.5 to 9.8 meters tall, with tree sites between 2.7 to 8.2m, basal diameters at 0.3-1.4m and ages between 181 to 800 years. A total of 26 tea forests exist in Pu'er City, covering an area of 12,123ha. Like the other crops, tea plants have been domesticated from wild tea trees to transitive ones, and to cultivated tea trees.

Fig. 5. Ancient Tea Plantation on Mt. Kunlu

The ecosystems of cultivated tea forests usually have three layers: tree (not tea tree) layer, tea plant and bush layer, and herb layer (see Figure 6).

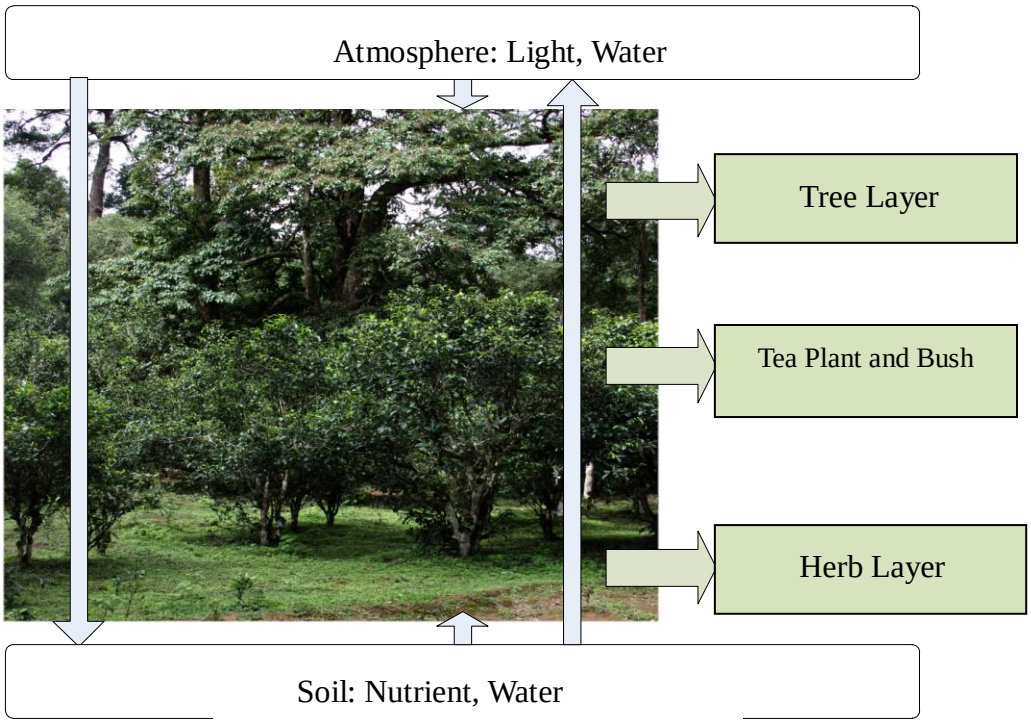

Fig. 6. Ecosystem of the Ancient Tea Plantation

The tree layer is consists of tall natural trees (The farmers may select tree species according to their needs). The tea and bush layer mainly consists of economic crops. The herb layer contains natural herbs, as well as cultivated grain crops and vegetables, etc. There is a variety of parasitic plants and fungi distributed randomly at different layers. There is also free-range livestock in the tea plantations (See Figure 7). At present, Pu'er City is striving to reconstruct tableland tea plantations according to the ecosystem structure of tea forests.

Fig. 7. Companion Planting of Tea Trees and Other Crops

1.2.2 Traditional Knowledge and its Application

During the long history of tea forests, locals have accumulated rich living and production experience which is passed down in written or oral texts. This forms a traditional knowledge system of tea plantation management and utilization, and forest protection.

When running the tea forests, locals choose and protect shading trees which have economic or cultural values. To prevent and control pest, and improve the flavor of the tea, the ethnic minorities plant certain trees, flower, fruit trees, and vegetables in the plantations. This not only increases land efficiency, but also improves tea quality. For example, the Jinuo people keep a lot of wild fruits and vegetables growing in the pu'er tea plantations. Their handmade raw pu'er is of high quality and excellent fragrance. The Dai people have created an interplant system of big leaf tea tree and Yunnan camphor tree (*Cinnamomum glanduliferum*) to prevent and control tea pest. The Jingpo and Lisu people plant big leaf tea tree together with *Alnus nepalensis.* By doing so, they manage to produce a high-quality tea, and protect water, soil and

ecosystem.

The extensive management pattern adopted by the ethnic minorities is, in part, determined by the characteristics of the tea plantations. In the tea forests, the fallen branches and leaves of the tea trees and other trees provide rich nutrients. The system is resistant to diseases and pest, and is relatively stable. These features were discovered thanks to studies on the ecosystem of the tea plantations and have been used to reconstruct tableland tea plantations. The goal is to build modern ecological tea plantations with multiple species and a three-dimension structure of tree-tea-grass. The high trees, like camphor trees, pine trees, fir trees, osmanthus trees and fruit trees are planted criss-crossly to shade the tea trees. The standard is every 0.06 ha of land should have eight trees of at least six species. Below the tea trees are forage plants and other crops. This structure can reduce weeds, pest, pesticide residues, and boost the breeding industry.

Fig. 8. Ecological Tea Plantation

1.2.3 Tea Culture

Pu’er tea production area is one of the most ethnic diversified regions in China.

There are 26 nationalities in Pu'er City alone, including Han, Hani, Yi, Lahu, Wa, Dai and etc, blessing it with rich cultural diversity. The ethnic culture related to tea is an important component of China's tea culture. Tea culture refers to material culture, belief, taboo, mechanism, customs, behavior, and history related to tea.

Yunnan is a border province with multiple ethnic groups. The ethnic minorities, native to the lower and middle reaches of the Lancang River, have a long history of tea cultivation and production. In the process, they have generated unique and rich tea culture including tea ceremony, tea art, tea etiquette, tea medicine, tea songs, tea dances and tea meals, etc. Chen Jin et al have done botanical studies and pointed out that the ethnic groups (mainly Blang, and Wa) in Yunnan and surrounding areas were probably the first people to domesticate wild tea trees and use tea leaves in their food. The ethnic groups have distinctive ways to process and drink tea, like the "bamboo-tube tea" of the Dai nationality, the "earthen-pan tea" of Hani, the "green bamboo tea" and the "sour tea" of Blang, the "tea cold dish" of Jinuo, the "burnt tea" of Wa, the "roasted tea" of Lahu and the "earthed-pot tea" of Yi (see Figure 9). These customs have been passed down from generation to generation. Tea is often indispensible in major festivals and events like marriage ceremonies, funerals, celebrations and religious rituals. In addition, tea is of medical value. For example, it can ease tiredness, inflammation, intoxication and stomach conditions. Tea's influence can be seen in almost all aspects, including daily life, spirits and religions.

Another important component of tea culture is the Ancient Tea Horse Route, which is an ancient transportation network connected by tea on the Asian continent. The route is one that has the highest altitude and the most complicated situation in the world, as well as historic and cultural significance. The Ancient Tea Horse Route is a special geographic term referring to the cross-border trade route located in southwest China. Horse caravans were the main transportation means of this corridor of economic and cultural exchanges. The route was started sometime in the Tang and Song dynasties because of the tea and horse trade. It reached the peak in Ming and

Qing dynasties. The route bears witness to the significance of tea in daily life, and the prosperity of tea industry along the lower and middle reaches of the Lancang River.

Lahu Nationality's Toasted Tea

Wa Nationality's Burnt Tea

Dai Nationality's Bamboo Tube Tea

Yi Nationality's Earthen-Pot Tea

Fig. 9. Tea Customs of Different Nationalities

1.3 Diversified Tea Varieties

Up till now, the tea plants discovered throughout the world fall into 4 categories, 49 species and 3 varieties. Among them, 4 categories, 31 species and 2 varieties, or 82.5%, can be found in Yunnan. What's more, 25 species and 2 varieties only exist in Yunnan. Table 3 shows the tea species in the Lancang River Basin. Table 4 displays their distribution. China has four concentration areas of old tea trees, three of which are in Yunnan. Tea germplasm resources spread throughout almost the entire province, but mainly concentrate in the southwest part (the lower and middle reaches of the

Lancang River). This area boasts all categories and species of Yunnan's old tea trees. The eastern and middle regions of Yunnan are also rich in old tea trees. A preliminary estimate points out that old tea trees in Yunnan take up an area of over 3.33×10^4ha.

Table 3. Tea Species in the Lower and Middle Reaches of the Lancang River

Species or Variety	Types	Distribution Area
C.taliensis	Wild	Pu'er, Baoshan, Lincang
C.irrawadiensis	Wild	Xishuangbanna, Pu'er, Baoshan, Lincang
C.crassicolumna	Wild	Pu'er
C.assamica	Cultivated	Xishuangbanna, Pu'er, Baoshan, Lincang
C.sinensis	Cultivated	Xishuangbanna, Pu'er, Baoshan, Lincang
C.manglaensis	Cultivated	Xishuangbanna, Baoshan, Lincang
C.grandibracteata	Wild	Lincang
C.parvisepala	Cultivated	Lincang
C.multisepala	Cultivated	Xishuangbanna
C.assamica var. Kucha	Cultivated	Xishuangbanna
Camelliasp.	Transitive	Pu'er

Table 4. Distribution of Old Tea Tree Resources along the Lancang River in Yunnan

Prefecture (City)	Area (ha)	Altitude (m)	Type	Germplasm Quantity
Xishuangbanna	8700	760-2060	Mainly ancient cultivated tea plantations	3 categories，7 species and varieties
Pu'er	90220	1450-2600	Wild tea trees and ancient cultivated tea plantations	2 categories，4 species
Lincang	17034	1050-2750	Wild tea trees	4 categories，7 species
Baoshan	4000	1200-2400	Wild tea trees and ancient cultivated tea plantations	3 categories，5 species
Dali	About 100 plants	2300-2450	Old transitive tea tree populations	Not clear
Nujiang			none	
Diqing			none	

1.4 Landscape Features

Landscapes of the Pu'er Traditional Tea Agrosystem include traditional agricultural landscape consisting of ancient and modern tea plantations, and their construction techniques, as well as traditional residences and vernacular buildings that are suitable to local natural and environmental conditions. Ancient tea plantations are forest-tea compound systems. From afar, they appear to be thick subtropical evergreen big-leaf forests. While inside the plantations, one can see tall trees with various heights at the upper layer, and tea trees of different density at the lower layer. Among the tea trees of some ancient plantations, there are still plenty of fruit plants and vegetables, as well as residences. These present a cultural landscape in which nature and human being coexist in harmony (see Figure 10, 11, 12).

Fig. 10. Modern Tea Plantation on Mt. Yingpan

Fig. 11. Modern Tea Plantations and Cities

Fig. 12. Kulun Mountain Ancient Tea Plantation and the Village

1.5 Core Reserve

The Pu’er City is a representative of the Pu’er Traditional Tea Agrosystem along the lower and middle reaches of the Lancang River. Meanwhile, the Lancang Lahu

Autonomous County is the representative of Pu'er City. The county displays the complete vertical evolution of tea trees. It has typical tea forests and modern tableland tea plantations, rich biodiversity and agricultural diversity, sound landscape features and a complete traditional knowledge system of the ethnic minorities. The county shows all the major characteristics of the Pu'er Traditional Tea Agrosystem. Therefore, the Jingmai Ancient Tea Plantation on Mt.Jingmai in Huimin Town, Lancang Lahu Autonomous County, Pu'er City, Yunnan Province is proposed to be the core reserve of the GIAHS pilot system (see Figure 2 in Annex 1).

1.5.1 Geography

Lancang Lahu Autonomous County is located at southwest Yunnan, to the west of the Lancang River, bordering Burma in the west and south. It's adjacent to Jinggu, Simao, Menghai, Menglian, Ximeng, Shuangjiang, Cangyuan and other counties. Its total area is 8807km², of which 52.3×10^4ha, or 59.84%, is forest land. The forest coverage rate stands at 53.9%. The altitude of the county ranges from 2,516m to 580m, and averages at 1,050m. Its elevations are lower from the northwest to the southeast. A total of 98.8% of its land is mountainous or semi-mountainous. Only 1.2% is plain area with a gradient lower than 8°. The county is rich in land resources with per capita usable land exceeding 1.73ha. However, there is a large area of dry land, and only a small area of paddy field. Its soil shows clear vertical zonal distribution: laterite at the altitude of 580-800m, lateric red soil at 800-1500m, red soil at 1500-1900m, and yellow brown soil at 1900-2516m. Wild tea trees grow on the red soil and yellow brown soil at the altitude of 1600-2500m. Some tea communities sit in the azonal limestone areas. Over 130 rivers run through the county, including the Black River, Nanlang River, Mangpa River, Xiayun River and other branches of the Lancang River. The overall surface flow is about 62.5×10^8m³. The underground water reserve stands at around 19.7×10^8m³. Its hydropower reserve is 25.5×10^4kw. Most of the county lies in the subtropical mountainous monsoon weather zone with manifest vertical variations of climate. It has distinct dry and rainy seasons. The

former lasts from late October to the following May, while the latter lasts from mid-May to Mid-October. The temperature averages at 19.7℃. Average precipitation is 1600mm.

Jingmai Ancient Tea Plantation is located on Mt.Jingmai, at south Lancang County. It lies between latitudes 22° 08' and 22° 13'N, and longtitudes 99° 59' and 100° 33'E. It's in the subtropical monsoon climate zone with abudant precipitation and constant fogs. The ancient tea forests sits on the mountain range running from the northwest to the southeast. The mountain range is higher in the northwest than in the southeast. The plantation is located in the red soil zone with altitudes ranging from 1,662m to 1,100m, and averaging at 1,400m. Average temperature is 18℃.

1.5.2 Economy and Society

By the end of 2009, population of Lancang Lahu Autonomous Regions reached 49.97×10^4, the largest in Pu'er City. Agriculture dominates the economy of this agriculture power of Pu'er. Its farmland area was 41,220ha, with a grain yield of 182,231 tons, the highest in the city. But given the large population, its per capita grain yield was relatively low, only 334kg. In 2009, the county's GDP was 23.19×10^8 RMB, among which 8.01×10^8RMB, or 34.5% came from the first industry. The same year, tea plantations took up an area of about 1.76×10^4ha. The tea industry produced 8,467 tons of rough tea, amounting to 0.93×10^8 RMB. We can see that the tea industry is important for Lancang's agriculture. Rural per capita net income stood at 1,737 RMB, ranking 9th among the ten counties of Pu'er. That year, the national rural per capita net income reached 5,153RMB, three times that of Lancang. According to the national poverty standard, 1,196RMB, the poverty population of Lancang's are 28.97×10^4, or 58% of its total. The county is lagging behind in economic development. Lancang County consists of 24 townships, 2 towns, 143 villages and 14 subdistricts. It's noted for ethnic diversity as over 20 nationalities can be found here. About 78.97% of its population is minorities, including Lahu (the

dominant nationality), Wa, Hani, Yi, Dai, Blang, Hui and etc.

72km away from Lancang County, the Jingmai Ancient Tea Plantation covers a total area of 18.7×104ha, among which 666.7ha is continuous picking area. It includes Jingmai, Mengben, Manggeng, Nuogang, Mangjing, Wengju, Wengwa, Manghong and other villages. Ethnic minorities like Lahu, Wa, Hani, Yi, Dai and others inhabit here. Surveys have found that people in this area are relatively less educated with only, on average, seven years' of education.

1.5.3 Current Situations of Old Tea Tree Resources

（1）Tea Germplasm Resources

Jingmai big-leaf tea (*Camellia sinensis var. assamica* cv. Jingmai-dayecha) was originated in Jingmai Village and Mangjing Village, Huimin Township, Lancang County, Yunnan Province. It remains a main species there. Another tea, Yingpan Dahei Tea (*Camellia sinensis var. assamica* cv. Yingpan-daheicha) is grown in the surrounding areas of the Fazhanhe Township, Lancang County.

（2）Old Tea Tree Communities and Ancient Tea Plantations

Lancang is one of the provenances of Yunnan big-leaf tea. A large amount of wild tea trees used to spread across a large area in Lancang. Many of these trees were later eliminated when people cleared the forests for other usage. However, some wild trees were left in the alpine primitive forests in the eastern, western and northern areas of Lancang. To be more specific, these areas include the Fazhanhe Township, Mt. Palinhei, Mt. Batanghou, Mt.Chongqiangfang of Yakou Township, Malutang and Yanfengjing Villages of Zhutang Township, Mt.Habumahou of Muga Township, Mt.Mangdenghou of Xuelin Township, Mt.Nanzhahou of Ankang Township, Wanheshanxin of Fudong Township, Wangfoyeshanxin of Donghe Township, Maliheshanxin and Mt. Mibagu of Nanling Township, and etc. Local peoples started to pick and process wild tea leaves, and drink tea since early times. Stretches of old

wild trees exist at the altitude of 1500-2300m in the following areas: Jiujing, Menglang, Fazhanhe, Mt.Palinghei of Nuozhadu Township, Madasiliangzi, Dakongshudashan and Mt. Batanghou. Their combine area amounts to about 4,488ha. On every 0.06ha, there are 25 old wild tea trees at most, and 3 to 5 at least.

The Jingmai Tea Plantation in the Huimin Township is one in the best condition, with the longest history and largest area. In addition, this ancient cultivated tea plantation is still providing production and ecological services. The 800-year-old plantation stretches out for over 10,000mu, with a combine area of about 1,095ha with uneven density. There is 333.3ha in which every 0.06ha holds over 500 trees. These trees were planted by Blang and Dai people. A stela in a temple at Mangjing recorded in Dai language that as early as the fifty-seventh year of Dai calendar (696AD), 1,300 years from now, people in Mangjing have started to plant tea trees.

1.5.4 Biodiversity

（1）Rich Regional Biodiversity

Lancang is a mountainous county with a high forest coverage rate and sound natural conditions. It's blessed with rich natural biodiversity and agricultural biodiversity (see Table 5).

Table 5. Biodiversity in Lancang

Category	Species
Tree	Simao Pine (*Pinus kesiya*), Sawtooth Oak(*Quercus acutissima*), Chinese Cork Oak (*Quercus variabilis*), *Castanopsis remotidenticulata*, *Castanopsis cerebrina*, *Cyclobalanopsis glaucoides*, *Lithocarpus grandifolius*, *Schima grandiperulata*, *Schima superb*, *Albizia kalkora*, birch (*Betula spp*), *Bennettiodendron leprosipes*, *Anthocephalus chinensis*, *Alcimandra cathcartii*, Chinese Weeping Cypress (*Cupressus funebris*), *Vigna angularis*, *Cassia lancangensis*, *Dalbergia hupeana Hance* , *Lagerstroemia intermedia*, *Bauhinia bohniana*, *Pterocarpus santalinus*, *Anogeissus acuminata* , *Alnus cremastogyne*, *Alnus nepalensis*, banyan, willow, *Araucaria cunninghamii*, *Pseudotsuga forrestii*, *Grevillea robusta*, *Acacia confuse*, *Acacia mearnsii*, gum tree, *Camptotheca*

Category	Species
	acuminate, Gmelina arborea, camphor tree, *Mesua ferrea , Tectona grandis, Trigonobalanus doichangensis*, etc.
	Cinnamomum camphora、*Pterocarpus santalinus*、*Mesua ferrea , Tectona grandis, Trigonobalanus doichangensis, Pseudotsuga forrestii* are rare and precious species.
Medicine Plant	Chinese goldthread (*Coptis chinensis*), Eucommia (*Eucommia ulmoides*), *Angelica sinensis, fructus amomi, Panax notoginseng, Amomum costatum*, Chinese cinnamon (*Cinnamomum aromaticum*), sappanwood (*Caesalpinia sappan*), pepper, Safflower (*Carthamus tinctorius*), *Salvia miltiorrhiza*, etc
Wild Animal	bison, loris, red deer, tiger, leopard, bear, otter, pangolin, wild boar, gibbons, blue sheep, deer, pythons, vacancies, parrots, white pheasant, etc
Livestock	Cattle, buffalo, horse, mule, chicken, , pig, sheep, goose, duck, etc
Main Crop	paddy rice, upland rice, corn, wheat, buckwheat, bean, tuberous crop
Economic Crop	tea, coffee, sugar cane, banana, palm tree, southern medicine herb, chestnut, walnut, hemp, cotton, tobacco, etc
Oil Crop	rapeseed, peanut, castor oil plant, tung tree, etc
Fruit	Hardy banana (*Musa basjoo*), Cavendish banana, pear, peach, plum, orange (*Citrus sinensis*), Burma banana, pomegranate, Burma pomegranate, cantaloupe, mango, pineapple, jackfruit, Tamarind (*Tamarindus indica*), grape, etc

Mountain farming is the main livelihood for locals. There is rich agricultural bio-diversity. The main grain crops in the region include: paddy rice, upland rice, corn, wheat, winter buckwheat, beans, tuberous crops and oil crops, most of which have a long cultivation history. According to a 1982 survey, there are 186 paddy rice varieties in the county; 124 upland rice varieties, most of which are landraces; 22 corn varieties, four of which are landraces; 90 wheat varieties, most of which are imported varieties; tartary buckwheat and sweet buckwheat; white sweet potato, red sweet potato, yams and other tuberous crops; broad beans, soybeans and other bean varieties; peanut, rapeseed, sesame, sunflower seeds, perilla and other oil crops; sorghum, rice beans, red rice, barley and other grain crops. Economic crops include tea, coffee, sugar cane, cotton, tobacco, tung tree, castor, hemp, rubber, coffee, medicine herbs, fruits, vegetable, chestnuts, walnuts, camellia, palm and etc. Besides, Lancang people also grow green feed, like plantain, chayote, sweet potato vine, canna, water hyacinth and corn for livestock (see Annex 2 for more details).

Besides crops, locals also raise different kinds of livestock, like cattle, buffaloe, small-ear pig, goat, rabbit, landrace chicken, local duck, and landrace goose, etc (see Table 6).

Table 6. Main Livestock Species

Livestock	Main Species
Bovid	cattle, landrace buffalo, landrace humped cattle, milk cow, etc
Horse, Mule, Donkey	
Pig	small-ear pig, Berkshire pig, Yorkshire pig, Jinhua pig, Soviet pig, Sichuan Neijiang Pig, Duroc Pig, Dannish landrace pig
Sheep	landrace goat, sheep, etc
Rabbit	landrace rabbit
Chicken	local chicken（Chahua chicken (*Gallus gallus*), Luhua Chicken, Maojiao Chicken, Ma Chicken, Fanmao Chicken, Piao Chicken, Heirou Chicken, Aijiao Chicken, etc）, Laihang Chicken, Beijing Baidan Chicken, Luosi Chicken, turkey, Australorps, Hongbuluo Chicken, Xingbuluo Chicken, Shuang-A Chicken, etc
Duck	local Sheldrake duck
Goose	landrace goose

（2）Biodiversity in the Tea Plantations

Qi Danhui et al from the Xishuangbanna Botanical Garden of the Chinese Academy of Science have conducted a research on the Jingmai Ancient Tea Plantation. They conducted field surveys in 78 sample plots of 20m×20m using sampling survey method and household-based agro-biodiversity assessments. They found five endangered, seven vulnerable and three rare species in the plantation. Among them, 11 species are listed in Category III of the State Protection List (see Table 7). Comparing the biodiversity of ancient tea plantation, natural forest, and modern plantation, the former two share more similarities. Therefore, protecting the biodiversity of this area is of great significance.

Table 7. Major Plant Species in Jingmai Ancient Tea Plantation

Species	Endangered category	Protective category	Main use
Carallia lanceaefolia	Endangered	Category Ⅲ	Timber & medicine
Toona ciliata	Endangered	CategoryⅢ	Spicery & timber
Cinnamomum mollifolium	Endangered		Timber
Canarium subulatum	Vulnerable		Medicine
Hovenia acerba	Vulnerable		Timber & medicine
Calophyllun polyanthum	Vulnerable	Category Ⅲ	Timber
Dalbergia fusca var. enneandra	Vulnerable	Category Ⅲ	Medicine
Helicia terminalis	Vulnerable	Category Ⅲ	Timber
Paramichelia baillonii	Vulnerable	Category Ⅲ	Timber
Premna szemaoensis	Vulnerable	Category Ⅲ	Medicine
Protium yunnanensis	Rare		Medicine
Zingiber menghaiense	Rare		
Cyclobalanopsis rex	Endangered	Category Ⅲ	
Magnolia henryi	Endangered	Category Ⅲ	
Pellacalyx yunnanensis	Rare	Category Ⅲ	Timber

1.5.5 Landscape Features

Villages scatter in the tea plantations, presenting a harmonious picture of human and nature (see Figure 13, 14).

Fig. 13. Jingmai Ancient Tea Plantation and the City

Fig. 14. Blang Nationality's Village on Mt. Jingmai

1.5.6 Management of Tea Forests

Planting tea trees in natural forests is a simulation of forest ecosystem. It's a special and ancient tea cultivation mode based on local's knowledge of tea's growth habits. The method has long been used by Hani people, especially by Jinuo people, who have been using the method for over one thousand years. The management mode of ancient tea plantations also differs from that of other plantations. It's an extensive management mode. People rarely apply fertilizers or plough in these tea forests. In addition, they only pluck the tea leaves in springs. This is because inconvenient transportation makes it difficult to ship the tea leaves out. This means that the tea trees

can use all the other seasons to accumulate nutrient. On the tea trees in these ancient plantations, there are many phytoparasites and epiphytes, but only few pests like tea seed bug, aphid and tea tussock moth. The wild tea communities in Yunnan has survived for hundreds of years, thanks to favorable natural conditions, and rich genetic diversity of the tea trees. It's also contributable to (due? Linked? The result of?) the traditional cultivation and management methods. This farming pattern based on traditional experiences has contributed to the establishment of a way to live in harmony with the nature for the famers. It serves as a model for other areas with similar conditions to use land effectively, and to find a lifestyle that is conform to local conditions.

- Irrigation and Fertilization

The tea trees in the forests rely on natural fertility. They don't need artificial fertilizers, irrigation and deinsectization.

- Weed Control

After they pluck the autumn tea leaves (usually in December), the farmers use hoes or sickles to remove the weeds in the forests. It takes three to eight working days, depending on the plantation area. The entire work force participates in the weeding. After that, more tea seedlings are planted (cutting), which will take several years to grow before the farmers can pluck their leaves.

- Picking

There are usually three pickings in one year: picking of spring tea during lunar February and April, summer tea (rain tea) during lunar May and July, and autumn tea (guhua tea) during lunar August and September. They are all handpicked. The tea is divided into three categories: for high-class tea, one bud and one tenderest leaf or one bud and two tenderest leaves are picked; for large-scale production, one bud and two tenderest leaves or three tenderest leaves are picked; for rough tea or tea sold at the borders, one bud and three tenderest leaves or four tenderest leaves are picked.

Generally speaking, picking tea leaves is women's work. But men also participate (see Figure 15).

Fig. 15. Picking Tea Leaves

1.5.7 Cultural Diversity relating to Tea

Agricultural ecosystem is the foundation of rural culture inheritance and traditional culture acquisition. A tea forest, as a dynamic agricultural ecosystem, is a major livelihood for the region. In return, the continuity of traditional knowledge ensures sustained utilization of tea plantations. A society's cultural values are important for the protection of regional biodiversity and forests. The key of forest protection lies in what management mode the region and the nationality choose. Yunnan people were once slash-and-burn farmers. But they have also invented and developed tea forests, by which they have made historic contribution to forest protection.

Lancang Lahu Autonomous County's population is made up by ethnic minorities

represented by the Lahu nationality. The ethnic minority groups have accumulated different cultivations, managements and utilizations of tea trees. These are the foundations of cultural diversity in this region. The ethnic groups demonstrate their cultures through festivals, worship rituals, etiquette, customs and arts, etc. For example, the Blang people not only drink tea, they also use tea leaves as vegetables and medicines. They also use tea leaves into "Mien", a tea cold dish. The Dai people use tea as seasoning (yellow) in their rice, add tea leaves into dishes, and use tea as skin care products. In addition, as mentioned above, these nationalities brew tea in different ways. Tea also appears in many legends of nationality origin. The Blang people believed that their ancestors accidentally ate tea leaves, which manifested medicinal effects or nutrient values and helped the nationality survive. Similar legends also exist in the other ethnic minority groups, leading to the worship of tea soul. A typical example is the "Tea Ancestor Worship" activity of Blang people (see Annex 4 for details).

2. Products and Services Provided by the System

2.1 Livelihood Services

2.1.1 Products and Food Safety

Besides tea, the tea plantations also produce wild or cultivated fungi, parasites (e.g. crab feet, *Juncus diastrophanthus*), grain crops, vegetables, fruits, oil crops, medicinal crops and other economic crops. These products are not only food for locals, but also their livelihood foundation. The farmers sell rough tea to factories, which make the leaves into various products and sell them worldwide.

Ancient tea plantations are special systems in which tea trees grow in the forests. These are organic and pollution-free plantations without any artificial fertilizers and pesticides. They are low-cost, compared to plantation bushes that demand heavy applying of fertilizers and pesticides. In addition, the tea produced by tea forests tastes

better than that produced by tableland tea plantations. One reason is that the former contains higher concentration of alcohol, tea polyphenol, tea catechin, total sugar, and trace elements like Fe, Mn, Cu. Another reason is that shading trees in tea forests form a microclimate with more favorable moisture and temperature for the growth of tea trees.

Pollution-free tea and organic tea products have become consumers' preferences as their consumption level improve and their consumption concepts change. Comparing the tea produced in ancient tea plantations and tableland tea plantations, the former is less in quantity, but five times higher in price. Therefore, the economic value of ancient tea plantations is obvious. In 2009, Lancang County had 1.75×10^4ha of tea cultivation area, 6.76×10^4 households or 27.05×10^4 people planting tea. Their average household income was 1,377 RMB, while their average per capita income was 344 RMB. In 2010, Pu'er City started to promote ecological tea plantations, and upgraded conventional tea plantations. They limited the quantity of tea trees to be less than 300 in every 0.06ha of land, banned fertilizers and pesticides in the plantations, planted various trees and advocated green production. By doing so, they managed to improve the quality and price of the tea produced in tableland tea plantations. At the beginning, tea farmers' incomes dropped because of the lower density of tea trees. Ancient tea plantations are semi-artificial ecosystems, which are fertilizer-free and pesticide-free. They effectively guarantee food safety at the primary production stage.

2.1.2 Dwelling and Energy

Management is indispensible for tea plantations. In tea forests, villages and tea trees coexist closely. People live in the plantations, plant tea trees around their houses. The plantations provide a sound natural environment to live in. Besides, the dry branches of trees in the plantations provide fuel for the locals.

2.2 Environmental Services

Pu'er tea forests are ecosystems lying between natural forest ecosystems and artificial ecosystems. They provide multiple environmental services.

2.2.1 Climate Regulation

In ancient tea plantations, the tea canopy layer reflects and absorbs a large amount of light. This causes negative temperature effect during the day, lowering the air temperature around the tea trees; and causes positive temperature effect during the night, raising the air temperature. This is an effective regulation of microclimate. In the low altitude area, strong sunshine results in high air temperature and surface temperature, which leads to active transpiration. The leaves of big-leaf tea have low water content and age easily. As a result, tea quality drops. The regulation of microclimate in the tea forests lowers the transpiration effectively, and thus improves tea quality and creates sound economic effects. It's also meaningful for conserving soil moisture.

2.2.2 Carbon Neutrality

Researches show that the NEP of China's tea plantations is positive (meaning they are carbon sinks). Tea plantations have better carbon sequestration effect than forests and farmland ecosystems. This is because in tea plantations, a large amount of lops and fallen branches and leaves compensate the soil organic carbon lost during the farming, and thus accumulate carbon in the systems. Compared to surrounding forests, tea plantations have a higher NEP and more active heterotrophic respiration. This means that compared to forests, mature tea plantations are systems with high carbon inflows, carbon outflows and carbon flows. The average NEP of China's tea plantations is three times that of China's forests (0.7 Mg $\cdot$C $\cdot$ha^{-1}), and fifty times that of China's grasslands (0.04 Mg $\cdot$C $\cdot$ha^{-1}). Pu'er City's tea plantations cover a total area of 21.2×10^{4}ha. They are estimated to absorb 44.52×10^{4}Mg $\cdot$ C of carbon per year.

2.2.3 Water Conservation and Soil Protection

Ancient tea plantations have some features of forest ecosystems, such as water conservation functions. They mainly include hydrologic effects and water storage demonstrated as: rainfall redistribution by tree canopies, rainfall interception by bushes and grass, water conservation by forest litter and soil, as well as runoff regulation and flood peak reduction by the forests.

Through their growth and metabolism, tea trees constantly change the physical and chemical features of soil, and participate in the internal material circulation and energy flows of the forests. Their affects on the soil are reflected in two aspects: water and soil conservation, and fertility conservation.

In modern tea plantations, tea trees are planted on terrace lands. Compared to common slope farmlands, they have better effects on water and soil conservation.

2.2.4 Biological Control

The ecosystems of ancient tea plantations have strong resistance against pest and insects, and are relatively stable. Researches show that management methods of ancient tea plantations can strengthen their resistance to diseases and pest. These methods include timely picking, proper pruning and winter clearance, etc. Interspecies competition can be used to prevent and control pest. For example, *ichneumon* can be used to reduce the larvae of white green moth; *encyrtidae* is a parasite of *paratachar-dina theae*. Some tree species, like camphor trees, can significantly reduce pest. The crown density in these plantations is high, leading to small daily temperature variations. This is conducive to the reproduction and growth of natural enemies and parasites. It means that ancient tea plantations use natural mechanisms to prevent and control pest and diseases, which is not the case in other types of plantations.

2.3 Social and Cultural Services

As the foundation of ethnic culture in the region, the tea plantation ecosystem has borne on culture features and systems related to tea, including material culture, believes, taboos, systems, customs, behaviors and history memory. Major social and individual cultural behaviors, like traditional knowledge, festivals, ceremonies and individual milestones, are more or less connected to tea. Old tea trees that are in good condition often become tea gods of the regions. People believe that these trees can protect the tea plantations and bring good harvests. They become spiritual sustenance for locals. For example, the Blang people hold grandest ceremonies to worship their tea god during the Shankang Festival. Many other ethnic minorities have similar traditions. This seems to be connected to Pu'er tea cultivation and to the origin of wild tea. Usually, an old tea tree which is growing well is selected to be the tea god (see Figure 16). Before picking tea leaves, people will go and worship this tree, and wish for a good harvest.

Fig. 16. Tea God

A tea plantation ecosystem is an important component of local society and

culture. More importantly, it's the foundation for ethnic identity.

3. Threats and Challenges

Supported by local traditional knowledge, Pu'er Traditional Tea Agrosystem is a compound ecosystem in which forests, tea trees and villages coexist in harmony. But economic development has posted threats and challenges to it. Over the last five decades, tea genes drifted and tea plantation ecosystem degradation have been caused by population growth, irrational harvesting, over-exploitation, large scale elimination of tea trees for grain and sugar cane cultivation, homogenized tea plantations and new tea plantations constructed around ancient tea plantations. In recent years, organic tea produced in the ancient tea plantations has attracted much attention from both the international and domestic markets. Business men over-sold old wild tea which has driven tea farmers to cut down old wild tea trees and pick tea leaves excessively. The area of ancient tea plantations in Yunnan dropped to 20 000ha in early 21st century from over 33 000ha in the 1950s.

3.1 Natural Courses

A tea tree has a life cycle of over one hundred years. When a tree lives past 100 years, it has pasted its prime. Currently, many tea trees in Yunnan are over 100 or even 1000 years old. With poor health, they cannot survive the hostile natural environment. But only few trees die of this cause. The life-threatening dangers to old tea trees and ancient tea plantations are mainly posed by human beings.

3.2 Destruction of Habitats in Tea Agricultural Systems

A Pu'er Traditional Tea Agrosystem is a simulation and utilization of forest ecosystems based on locals' knowledge of tea growth habits. It maintains relatively rich biodiversity. Yunnan big-leaf tea is shade-tolerant, thermophilic and hydrophilic. The tea reaches its best state and produces the largest yield when the light intensity is

at around 80%. Therefore, the forests are important for the biodiversity protection and sustainable development of tea agricultural systems. Local people traditionally select and protect the shading trees in the plantations. Most of the trees they selected have certain economic or cultural values. Some tea species are thought to be of little value, and are eliminated when they are young, even though they might be common species or even pioneer species in local natural forests, like *Macaranga denticulate* and *Macaranga indica*. The trees that remain are protected by ethnic culture or village laws and regulations.

Since the establishment of PRC, there have been many times when ancient tea plantations underwent massive destruction (DAO Zhiling, personal exchanges). From 1955 to 1956, many tea trees were cut down for army constructions. Mr. Dao recalled that over 500 trees, with diameters larger than two meters, were cut. In 1962, the skin of *Paramichelia baillonii* was steamed for oil. This led to the death of over 200 *Paramichelia baillonii* whose diameters were over one meter. In early 1970s, a fire broke out in Jingmai and destroyed more than 80 houses. As a result, over 1000 trees with a diameter of over one meter were cut down for reconstruction. Since the 1980s, the wood materials for new buildings have mostly been taken from ancient tea plantations. State-owned and private tea plantations have been developing quickly since 1990s. As population increases, and tea processing industry develops, some farmers have begun to cut down the trees in ancient tea plantations as firewood. At present, the high profit of rubber has also driven some farmers to clear the forest and plant rubber trees. These have severely impacted the botanical diversity in the ancient tea plantations.

3.3 Unsuitable Management

Extensive management was applied on ancient tea plantations, meaning no fertilizer or pesticides were used on the tea trees. The fallen branches and leaves of the arbors and tea trees were sufficient to provide nutrients for the tea trees. Ancient tea plantations had strong resistance against diseases and pest, and were relatively

stable. Interspecies restriction could constrain pest outbreak (LONG Chunlin et al, 1997a). So, the main management work needed is weed control. Once or twice a year, farmers remove weeds or young trees standing too close to each other. If there are too many crab feet or other phytoparasites, farmers would remove them or chop out the dead branches of the tea trees. Unsuitable management measures hamper the old tea's growth and even kill them. These include excessive management and over -protection.

- Excessive Management

During the 1960s and early 1970s, the technicians of the Agricultural Science Institute of Lancang County went to Jingmai to experiment upgrading the ancient tea tree plantations. They took measures like soil improvements (deep ploughing and applying fertilizers, changing slope land to tableland), replanting, collar pruning and etc. These measures exerted negative impacts on the tea trees and other plants in the plantations. Society development increases the demand of organic food, old tea included. As a result, the price of old tea goes up, which drives farmers to be more active in plantation management. They increase the weeding frequency from twice a year to four or five times a year. They replace sickles with hoes in weed control. Some even overturn the soil. In fact, as long as the grass and bushes do not hamper the tea trees, they should be kept, even they are though useless.

- Over-Protection

In recent years, some farmers carried out excessive collar pruning to increase yields. This has severely destructed ancient tea plantations, and thus has attracted the attention of relevant authorities. These authorities add forest policemen, and banned pruning on old tea trees. These measures have stopped damage in ancient tea plantations, and necessary management, like moderate pruning and taking off sick branches (branches that have been infected by pest or have turned into hosts of *Loranthaceae* plants) was introduced.

3.4 Threats to Traditional Tea Culture

Traditional tea culture includes knowledge related to tea cultivation, picking, processing and brewing, and resource allocation mechanisms, nature worship and celebrations centered (social customs and etiquette) on tea. It is an important component of and is important for maintaining the Pu'er Traditional Tea Agrosystem. But modern culture has influenced young people's recognition of and sympathy with traditional tea culture. In addition, the passing of elder people who were familiar with traditional lifestyles, customs, religion and etiquette also threaten the traditional tea culture.

3.5 Threats Posted by Tableland Tea and Market Fluctuation

Ancient tea plantations produce tea with higher quality and corresponding higher prices. But their production is lower. Besides, the old tea is of various specifications, a low marketization and high processing levels. Supervision of old tea market is lagging behind which enables businessmen to pass off tableland tea as old tea. This has hampered the sustainable development of old tea because its value cannot be fully appreciated. In addition, market fluctuations also impact the protection of pu'er tea culture. Overselling causes a shortage of rough old tea and a price hike. Driven by benefit, farmers pick tea leaves excessively. After picking up all the buds, they pick old leaves before the bud comes out. Some farmers even pick up all the leaves of the tea trees, or cut down tall tea trees so that they can pick the leaves. It can be seen that a stable market is crucial for the sustainable development of the Pu'er Traditional Tea Agrosystem.

4. Policy and Development Relevance

4.1 Improvement of Protection Laws and Regulations

To effectively protect the Pu'er Traditional Tea Agrosystem, the Pu'er City has formulated regional regulations and measures, such as the *Regulations on the Protection of Old Tea Trees of Lancang Lahu Autonomous Region of Yunnan*, and the *Provisional Management Regulations of Jingmai & Mangjing Ancient Tea Plantation Scenic Sites of Lancang Lahu Autonomous Region*. These regulations can serve as a reference for other regions concerning the protection of old tea trees and ancient tea plantations. They are conducive for setting up and improving relevant laws and regulations to higher levels.

4.2 Development of Ecological Tea Plantations

Pu'er Traditional Tea Agrosystem has multiple values. Especially, tableland tea plantations can learn from its ecosystem and the quality of its tea leaves. The Pu'er City greatly promotes ecological tea plantations, and upgrades tableland tea plantations to be three-dimensional ones with a rich biodiversity. The essence is to apply the traditional Pu'er Traditional Tea Agrosystem in tableland tea plantations. This can not only improve the biodiversity of tea plantations, but also guarantee the safety of tea leaves. Up till now, the Pu'er City has formulated the *Opinions on Implementing the Ecological Tea Plantation Project in Pu'er City* and the *Technical Specification of Developing Ecological Tea Plantations in Pu'er City*. The city has also made the development of ecological tea plantations a priority in its twelfth five-years plan of the tea industry. The plan states that the area of ecological tea plantations will be increased to over 90% of the total tea plantation area. At the same time, guidance and trainings for farmers about tea cultivation will be stepped up to help them improve their efficiency. Cultivation technologies and management will be regulated to improve the quality of tea leaves, and to increase yield to over 100kg.

5. Global Significance

Tea is one of the three most popular beverages in the world. Incomplete statistics show that 40×10^8 people across the world drink tea. Tea is a basic food in China and an important component of the Chinese culture. PEI Wen of the Tang Dynasty wrote in *Tea (Cha Shu)* that "Tea is clear, puer (pure?) and fragrant. Drinking tea can let one forget one's troubles and be at peace. Tea, even blended with other liquids, does not lose its taste. It's the best beverage. People all like drinking tea. They never get bored with it. They drink tea and stay healthy. Otherwise, they become ill." Short as they are, these sentences have explained the importance of tea in Chinese food culture, the medicinal value of tea and Chinese's attachment to tea. Tea is not only a necessity in people's daily life. It also embodies emotional attachment and cultural values.

Pu'er is one of the ten famous tea in China, considering people's affection to it, as well as its history, culture and ecology values. The lower and middle reaches of the Lancang River are the main production areas of pu'er tea in China and are the global centers of pu'er tea culture. Sitting at the core of this area, Pu'er City is striving to renew its image as a traditional production area of pu'er tea. It positions itself as the "tea provenance of the world, tea city in China and capital of pu'er".

Jingmai & Mangjing Ancient Tea Plantation is the world's best preserved cultivated tea plantation with the longest history and largest area. It's renowned at home and abroad as the "natural museum of tea trees." It's the first place to plant tea trees in natural forests, which makes it the original place of large scale tea production and industrialization of tea production. The plantation is the birth place of the world's tea culture. With the tea genetic bank, it is also the foundation for tea industry's future development.

5.1 Lower and Middle Reaches of the Lancang River- An Important Species Gene Reserve of the World

The Lancang River Basin possesses diversified geomorphologic and climate

characteristics. It's a concentration area of species and is a global species gene reserve. The area is irreplaceable as it's crucial for geography and biology studies on the relations between environment and ecosystem evolution. In the Jingmai Ancient Tea Plantation, there are a huge amount of plants growing, some of which are old tall trees. Hundreds of rare species live in the plantations, making it a precious species gene reserve. Ancient tea plantations are blessed with a rich botanical diversity. They hold a large amount of wild plant resources. In the Jingmai Tea Plantation alone, there are 125 families, 489 genera and 943 species of plants.

As to tea species, 4 categories, 49 species and 3 varieties of tea plants have been discovered throughout the world. Among them, 4 categories, 31 species and 2 varieties, or 82.5% of the world's total, can be found in Yunnan. What's more, 25 species and 2 varieties can only be found in Yunnan. These prove that the province is a significant tea specie gene reserve.

5.2 Sipu Area-A World's Provenance of Tea Trees

Tea trees have probably evolved from big leaf magnolia via Chinese magnolia. This is the conclusion of studies on the spatial and temporal distribution of magnolia fossils, geography, climate and environment of ancient times, the ecological characteristics of modern magnolia and tea trees, the morphological features of tea leaves, and gene, etc. The southern and southwestern parts of Yunnan are the provenances of tea trees. This is proven by the following discoveries. Spatial distributions of Jinggu magnolia fossils and tea trees overlap. The fossils were located closed to the old wild tea communities in Qianjiazhai Village. The fossilized magnolia and old wild tea trees share many similar morphological and ecological characteristics. The spatial and temporal distributions of the magnolia of the Tertiary Period and tea trees of modern times have close links. People have discovered the Jinggu magnolia fossils and the large old wild tea community in Qianjiazhai Village, Zhenyuan. The academic circle believes that the Sipu area in Yunnan has the three elements of being a provenance of tea trees: physical traits of tea archetype; the vertical evolution

system of ancient magnolia and tea trees; being an area for magnolia flora distribution in the Tertiary Period. Therefore, this area is a provenance of tea trees of the world.

A 3200-year-old cultivated tea tree was discovered in Fengqing, Lincang. This discovery proves that this area has the longest history of tea cultivation and utilization.

In Jingmai and Mangjing, people discovered the largest area and amount of old cultivated tea trees of more advance ages. They are representatives of old cultivated pu'er tea. The Jingmai ancient tea plantation covers an area of about ten thousand mu. It's an ancient cultivated tea plantation which is still in use. No old pu'er tea forest of such a scale can be seen in other areas in Yunnan. The old tea trees in Jingmai and Mangjing may be the original varieties of the Yunnan big-leaf species. Discovering the three types of tea trees proves that the origin, domestication and cultivation of tea trees happened in the same place.

5.3 The Starting Point of the Ancient Tea Horse Route---Center of Asian Tea Culture

China has a long history of tea drinking. It started in the period of Yan Emperor, prospered since the Tang Dynasty and reached the peak during the Yuan Dynasty. Since the Ming and Qing Dynasties, tea has become a common beverage for the general public. The history of pu'er tea basically coincides with the development path of Chinese tea. Pu'er tea exemplifies tea utilization and tea culture development. Many ethnic minorities have legends about their ancestors using tea as medicine. In the Three Kingdoms period, when Zhu Geliang led the army on an expedition to the south, people there had began to drink tea. In the Tang Dynasty, pu'er had already entered into trade. It's recorded that "the people in the west began to drink pu'er tea in the Tang Dynasty". Tea-horse trade appeared in the Song Dynasty. In the Yuan Dynasty, tea became an important commodity in border trade. In the Qing Dynasty, "both the general public and government officials drank tea". During the Wanli Emperor Reign of the Ming Dynasty, an officer was specially designated to manage

tea trade. In the Qing Dynasty, pu'er tea became a royal tribute. During the same period, the domestic and cross-border trade routes were put into use. The Pu'er area (now Pu'er and Xishuangbanna) became a center of tea production and trade, and tea culture.

Historians found that as early as the Eastern Han Dynasty, tea was cultivated in the Pu'er City (once named as the Pu'er Area). It was over 1800 years from now. In the Tang Dynasty, pu'er was sold to areas like Tibet. In the Qing and Ming Dynasties, tea was shipped in large amount to other countries. In this process, the "Pu'er-Kunming Offical Horse Route", the "Pu'er-Dali-Tibet Tea-Horse Route" and other four tea-horse routes were formed. They are known as the "highest ancient roads spreading civilization" (see Figure 13). From Pu'er, along these ancient routes, people take the tea and tea culture out of the mountainous areas and on to the world.

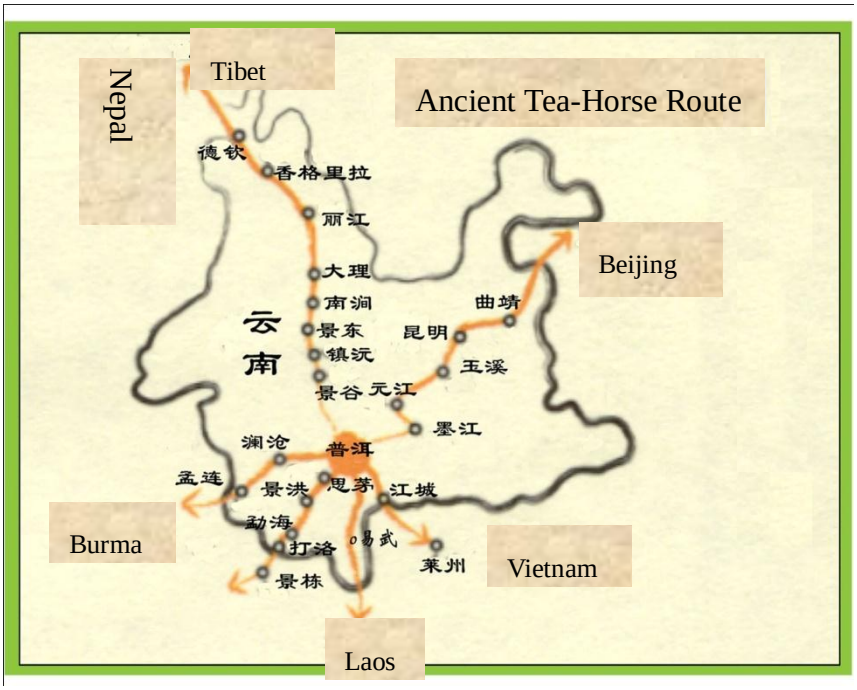

Fig. 13. Ancient Tea-Horse Routes

5.4 Pu'er City – An Important Tea Production Area for China

In recent years, Yunnan's tea industry has been developing with leaps and bounds. Tea production, tea farmers' incomes, and company revenues have been soaring. By the end of 2010, Yunnan's tea plantations took up an area of 37.3×10^4ha, among which 26.9×10^4ha were picking areas. The tea production of 2010 was 19.72×10^4t, with the overall output standing at 150×10^8 RMB. Farmers received a net income of 29.51×10^8 RMB from tea leaves. There were 5644 tea preliminary processing plants and over 1000 refining factories, with a combined production capacity of over 25×10^4t.

Tea industry is a traditionally predominant industry in Yunnan. The province released the *Opinions on Accelerating the Tea Industry Development* in 2005, and the *Comprehensive Standards of Pu'er Tea*, a local standard, in 2006. The province began to implement the national standard *Pu'er Tea—A Geography Symbolic Product* in 2008. In 2009, Yunnan published the *Management Method on Protecting Pu'er Tea—A Geography Symbolic Product*. In 2010, the provincial government issued the *Opinions on Further Accelerating the Tea Industry Development*, which made clear the position of the tea industry in Yunnan's agriculture, ensured a sound development direction for the tea industry, which was standardization, industrialization and intensification. These documents are conducive to improving the safety and quality standards of tea products. Currently, a mature marketing network of tea has taken shaped in Yunnan. Tea products represented by pu'er tea is spreading from traditional markets in south and northwest China to other areas, such as east, middle, north and northeast China. They have also been sold to over 30 foreign countries and regions, including Russia, east and west Europe, North America, Japan, Korea and Malaysia.

At the same time, the area continues innovating and has developed many brands and high-quality teas. According to preliminary statistics, by 1999, among the 21 national tea brands (black, green, purple, dark tea) of Yunnan, 13 came from the Pu'er tea production area, 62% of the total. There were 65 provincial tea brands in Yunnan, out of which 32, or 50%, came from the Pu'er tea production area.

Cities and prefectures located at the lower and middle reaches of the Lancang River are the leaders of tea industry in Yunnan. They include the Xishuangbanna and Dali Prefectures, the Pu'er, Lincang and Baoshan cities. In 2010, the tea production of these five areas added up to 80% of the province's total, realizing an output of 53.14×10^8 RMB, 35.5% of the province's total. By 2010, tea plantations in Pu'er City took up a combined area of 21.2×10^4ha, among which 9.3×10^4ha were modern tea plantations, 7.9×10^4ha were old wild tea communities, and 1.2×10^4ha were ancient cultivated tea plantations. The area of tea plantations in Pu'er City amounts to 24.7% of Yunnan's total. Table 8 presents the situations of the tea industry in the cities and prefectures along the lower and upper reaches of the Lancang River.

Table 8. Tea Industry along the Lancang River Basin, 2010

Prefecture (City)	**Production （10^4t）**	**Processing Quantity （10^4t）**	**Output （10^8RMB）**	**Factories**
Xishuangbanna	1.8*	-	5.21	582 primary processing plants, 166 refining plants. Menghai Tea Factory, Dadugang Tea Factory, Puwen Tea Factory, Liming Tea Factory, and Shangyong Tea Factory are some of the famous ones.
Pu'er	5.35	-	16.9	1099 primary processing plants, 155 refining plants of green tea, 208 refining plants.
Lincang	5.94	>10	18.35	Over 600 primary processing plants, among which Dianhong Group and Menggu Tea Co., Ltd are famous.

Prefecture (City)	Production (10^4t)	Processing Quantity (10^4t)	Output (10^8RMB)	Factories
Baoshan	2.749	2.01	8.18	741 primary processing plants. The eighteen leading companies have an operating area of over 333.3ha. Nine companies have an radiation area of over 10,000 mu.
Dali	0.55	1.5	4.5	A group of famous tea processing companies exist in Dali, including Yunnan Xiaguantuo Tea Group, Yunnan Tulin Tea Co., Ltd, Yunlong Dalishu Tea Factory, Yunnan Nanjian Tea Factory, Nanjian Heilongtan Tea Factory, Weishan Tea Company and etc.
Nujiang	A tea base of 0.7×104ha is under construction.			
Diqing	Tea industry is not the main sector of Diqing.			

* 2008 data

6. Protection and Development

6.1 Outline of Activities

In order to set up the GIAHS pilot system as soon as possible, the Pu'er municipal government should vigorously create favorable conditions. It should collect and organize systematic and comprehensive materials related to the Pu'er Traditional

Tea Agrosystem, and step up the application, participate in more activities related to agricultural heritages, and learn from other pilot systems. To this end, following activities have been carried out:

(1) In July and December, 2010, experts of IGSNRR were invited on an inspection trip to advice on the application.

(2) In Juanary, 2011, the leader group of application work and the agricultural heritage application office were set up.

(3) On March 11, 2011, Mr.Li Anqiang, Deputy Secretary-General of Pu'er Municipal Government was accompanied by Mr.Zi Guoha, Deputy Director of the municipal agricultural bureau, and Mr. Wang Zhibing, researcher of the bureau to the IGSNRR. They carried out exchange and cooperation consultation about the application. On the meeting, a cooperation agreement was signed, marking the official launch of the application.

(4) From March 28 to April 3, 2011, relevant staff participated in the eleventh "Natural and Cultural Heritage Protection Forum", the theme of which was "Exploitation and Management of Agricultural Products at the Agricultural Heritage Sites".

(5) On June 9, 2011, participated in the International Forum of Globally Important Agricultural Heritage Systems held in Beijing.

(6) In July 2011, helped the GIAHS Chinese Office carry out investigation to collect and organize materials related to the Pu'er Traditional Tea Agrosystem.

(7) In December, 2011, participated in the International Forum on Agricultural Heritage and Tourism Development held by FAO in the Honghe Prefecture, Yunnan.

(8) During December 3 and 5, 2011, a filed inspection was carried out in Pu'er City. Participants include: Parviz Koohafkan, Director of the Water and Land Resources Department and the General Coordinator of GIAHS; Dr. Maryjane Dela Cruz, Project Officer; Mr. Percy Misika, FAO Chinese, Magnolia and North Korea Representative; Mr. Dai Weidong, Project Officer; Mr.Dong Shuwei, Vice Mayor of Pu'er; Mr. Min Qingwen, Deputy Director of CNACH, IGSNRR, CAS.

6.2 Work Plan

- Formulate a protection and development planning as soon as possible.

The planning is the foundation of the application of agricultural heritage and the prerequisite of implementing protection measures. The protection plan should be based on the traditional managerial philosophies, and be supplemented by existing village rules, like the utilization and management practices of water resources, and forest management methods. The planning will be used to maintain the biodiversity and cultural diversity of the region. The planning should make clear the scope of the Pu'er Traditional Tea Agrosystem Reserve. It should also analyze comprehensively the social, economic and natural conditions, the advantages, disadvantages, opportunities and challenges confronting the protection. The document should also propose the targets and principles of the protection and utilization, and define the content and projects of protection and development.

- Improve laws and regulations.

Building on existing regulations, the laws and regulations of old tea trees and plantation protection should be further improved. The legislation work should observe the principle of sustainable development, respect and reflect ecological laws, and lay equal stress on protection and proper utilization, respect and reflect local culture and customs, and encourage public participation. The laws and regulations should define the protection scope, the unified management organization, the ownership and usufruct, and the management measures.

- Enhance the education and publicity of old tea tree and ancient tea plantation protection.

Pu'er governments, especially local governments should organize periodic educations for the people. They can use forms that are attractive or in line with local customs, like worshiping old tea trees. During this process, the emphasis of the importance of old tea trees and ancient tea plantations would be combined with the admiration of tea. If so, the education would produce better effects. These efforts aim to: improve locals and the society's recognition of the Pu'er Traditional Tea

Agrosystem, stop excessive old tea tree cutting and destruction of ancient tea plantations, and appeal to the local people to protect old tea trees and ancient tea plantations.

- Scientific service system construction.

The multiple values of the Pu'er Traditional Tea Agrosystem will be studied. Management measures which will maintain the economic value of ancient tea plantations and protect biodiversity will be developed and promoted. Farmers' management of ancient tea plantations will receive moderate intervention. We will find out and promote best pruning methods as soon as possible. With the support of the National Supervision and Inspection Center of Pu'er Tea Products and the China Research Institute of Pu'er Tea, we will step up the efforts to set up the Yunnan Tea Science and Technology Innovation Center in the Pu'er City. The construction of a pu'er tea cultural center will be accelerated. The government will strive to improve inspection and examination of tea products, and strengthen relevant scientific researches. Infrastructure projects as the Pu'er tea square and the Longsheng tea market will be built. The government is also planning to build the "Yunnan Pu'er Tea Trade Center", which will cover an area of over 600mu, and will become the largest trading post in China of rough pu'er tea and tea products.

- Strengthen community construction

We will hold relevant activities in local communities. For example, workshops on cultural and regional biodiversity will be organized in the communities. Production technologies and related traditional cultural consistency will be enhanced. Trainings for teachers and middle school students will be arranged. Production technology system will be studied and improved. We will strengthen the value of education, science and technology as the core of research and development. To this end, materials related to gene, local culture, agricultural technologies, business and etc will be collected and stored in a systematic manner. Seeds and a technologic support will be provided to local farmers.

- Tea culture tourism

The Jingmai Ancient Tea Plantation's application to be a World Cultural Heritage

site presents an opportunity for the tourist industry of Pu'er City. We will seize this opportunity to develop tourist sites, such as the Qianjiazhai Old Wild Tea Tre, the Jingmai & Mangjing Ancient Cultivated Tea Plantation, the Tourist Tea Plantation on Mt. Yingpan, the Chinese Pu'er Tea Museum and the Ancient Tea-Horse Route. We will build the World Pu'er Tea Park, and promote the image of Pu'er City as an ancient tea capital. The goal is to shape the Pu'er City into a tourist destination of tea culture. Tea culture inheritance and tea industry development will be strengthened through tourism development.

- Step up industry oversight, regulate and standardize tea market orders.

First, tea production and processing sites will be regulated. We will implement rigorously the *Pu'er Tea --- A Geography Symbolic Commodity*, the *Norms of Pu'er Tea Processing Technology and Management* and other tea quality standards. Small tea plants without a business license, a production permit and a sanitation permit will be closed, especially those factories with poor environment, inefficient management that fail to meet food sanitation standards and waste resources. We will shut down unnecessary tea primary processing plants, stop disorderly competition, raw material contest and price competition. Secondly, agricultural material market will be regulated. We will earnestly implement the classification of pesticides, which will be categorized into "allowed on tea leaves" and "banned on tea leaves". We will prevent highly toxic pesticides from entering the tea bases. Thirdly, tea markets will be regulated. We will standardized the pu'er tea powder production and trade, crack down on counterfeiting and shoddy goods, ban adulteration, false propaganda and misleading marketing, etc. The purpose is to maintain healthy tea market orders.

Annex 1. Maps

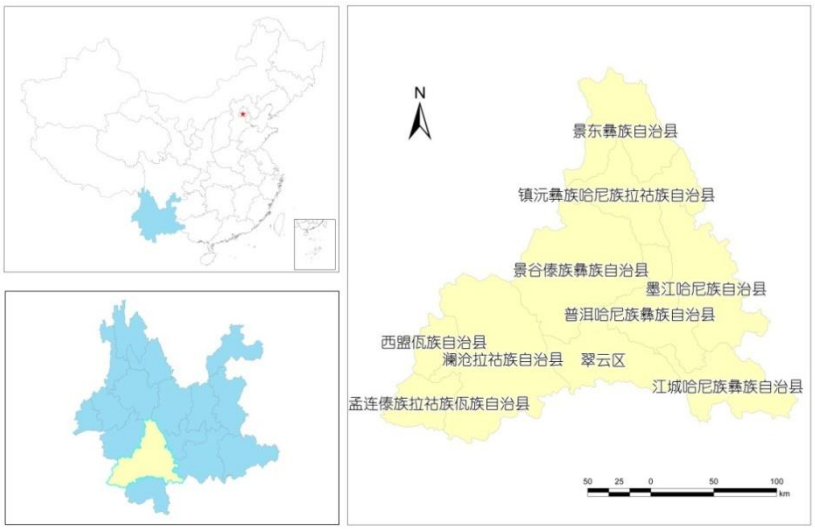

Fig. 1. Location Map of Pu'er City

Fig. 2. Core Area

Fig. 3. Distribution of Old Tea Trees in Pu'er City

Annex 2. Tea Germplasm Resources of the Pu'er City

1.Local Tea Varieties of the Pu'er City

Table 1. Local Varieties

Variety	Local Name	County (Area)
Wenlong Dabaicha Tea	Lengyin Baihao	Jingdong County
Changdishan Dayecha Tea	Changdi Variety, Changdicha Tea	Jingdong County
Dashancha Tea	Dashucha Tea, Bacha Tea, Laoheicha Tea	Jingdong County
Juyecha Tea		Jingdong County
Madengcha Tea	Madeng Dalvcha Tea	Zhenyuan County
Wenhe Baihao		Zhenyuan County
Yangta Lvya Dabaicha Tea		Jinggu County
Yangta Huangya Dabaicha Tea		Jinggu County
Midicha Tea		Mojiang County
Xulicha Tea	Xuligongcha Tea, Dabaicha Tea	Mojiang County
Mayucha Tea	Mayicha Tea	Mojiang County
Kulushan Dayecha Tea		Ning'er County
Jiangcheng Baihao		Jiangcheng County
Jingmai Dayecha Tea	Dachangye Lvyacha Tea	Lancang County
Yingpan Daheicha Tea	Daheiyecha Tea	Lancang County

2.Old Tea Tree Resources under Special Protection

Table 2. Old Wild Tea Trees under Special Protection

Investigation Number	Name	Location	Formal Name
JD2006-003	Shipopo Yecha Tea Tree	Huashang Township, Jingdong County	C.taliensis
JD2006-007	Dashifang Yecha Tea Tree	Huashang Township, Jingdong County	C.sp.
JD2006-049	Yangcaotang Dashancha Tea Tree 1	Jinping Town, Jingdong County	C.taliensis
JD2006-050	Yangcaotang Dashancha Tea Tree 2	Jinping Town, Jingdong County	C.taliensis
JD2006-052	Aoluqing Tea Tree	Jinping Town, Jingdong County	C.taliensis
JD2006-056	Wenbu Tea Tree	Jinping Town, Jingdong County	C.taliensis
JD2006-067	Shitouwo Yecha Tea Tree	Anding Township, Jingdong County	Camellia sinensis var. assamica
JD2006-074	Qinhe Yecha Tea Tree	Anding Township, Jingdong County	C.taliensis
JD2006-085	Paozhuqing Tea Tree	Jinping Town, Jingdong County	C.taliensis
JD2006-089	Caozitou Tea Tree	Jingfu Township, Jingdong County	C.taliensis
JD2006-109	Dalushan Shancha Tea Tree	Linjie Township, Jingdong County	Camellia sinensis var. assamica
JD2006-112	Dingpa Laoshancha Tea Tree	Linjie Township, Jingdong County	C.taliensis

JD2006-120	Dishuiqing Yecha Tea Tree	Manwan Town, Jingdong County	Camellia sinensis var. assamica
JD2006-131	Aoluqing Qixing Tea Tree	Jinping Town, Jingdong County	C.taliensis
ZY2006-001	Laochatang Laoyecha Tea Tree	Enle Town, Zhenyuan County	C.taliensis
ZY2006-003	Qincaitang Laoyecha Tea Tree	Mengda Town, Zhenyuan County	C.taliensis
ZY2006-006	Dashui Qingtou Laoyecha Tea Tree	Enle Town, Zhenyuan County	C.taliensis
ZY2006-014	Dachafang Laoyecha Tea Tree	Jiujia Township, Zhenyuan County	C.taliensis
ZY2006-041	Qianjiazhai Tea Tree	Jiujia Township, Zhenyuan County	C. taliensis
JG2006-026	Dongdongqingkou Yeshengcha Tea Tree	Xiaojinggu Township, Jinggu County	C. taliensis
JG2006-054	Dashuigang Dalvcha Tea Tree 1	Zhengxing Township, Jinggu County	C. taliensis
JG2006-055	Dashuigang Dalvcha Tea Tree 2	Zhengxing Township, Jinggu County	C. taliensis
JG2006-072	Manlongshan Yecha Tea Tree	Yizhi Township, Jinggu County	C. taliensis
PER2006-003	Kunlushan Yeshengcha Tea Tree	Ning’er Town, Ning’er County	C. taliensis
PER2006-007	Ganbazi Dashancha Tea	Meizi Township,	C. taliensis

	Tree	Ning’er County	
PER2006-010	Luodongshan Yeshengcha Tea Tree	Meizi Township, Ning’er County	C. taliensis
PER2006-011	Binglongshan Dayecha Tea Tree	De’an Township, Ning’er County	C.sp.
PER2006-015	Xiachahe Tea Tree	Liming Township, Ning’er County	Camellia sinensis
PER2006-021	Banshan Yeshengcha Tea Tree	Mengxian Township, Ning’er County	
MJ2006-022	Niujiaojianshan Yecha Tea Tree	Lianzhu Town, Mojiang County	C. taliensis
MJ2006-032	Lushan Ziya Tea Tree	Yayi Township, Mojiang County	C. taliensis
MJ2006-034	Shanxingjie Yecha Tea Tree	Yayi Township, Mojiang County	C. taliensis
MJ2006-103	Yangshenmiao Yecha Tea Tree	Yutang Township, Mojiang County	C. taliensis
MJ2006-108	Tuzhangfang Hongshancha Tea Tree	Wenwu Township, Mojiang County	C.sp.
CY2006-031	Babianzhai Yeshengcha Tea Tree	Yixiang Town, Simao Area	Camellia sinensis var. assamica
JC2006-012	Liangzizhai Yeshengcha Tea Tree	Jiahe Township, Jiangcheng County	C. taliensis
JC2006-025	Bajiaolin Qingkucha Tea Tree	Qushui Township, Jiangcheng County	Camellia sinensis var. assamica
LC2006-011	Xinzhai Dashancha Tea Tree 1	Fudong Township, Lancang County	C. taliensis
LC2006-012	Xinzhai Dashancha Tea Tree 2	Fudong Township, Lancang County	C. taliensis

LC2006-029	Nanfangcun Yecha Tea Tree	Mujia Township, Lancang County	C. taliensis
LC2006-030	Saihancun Yecha Tea Tree	Fubang Township, Lancang County	C. taliensis
LC2006-034	Zhanmapo Yecha Tea Tree	Zhutang Township, Lancang County	C. taliensis
LC2006-043	Anzhibie Yecha Tea Tree	Laba Township, Lancang County	C.sp.
LC2006-060	Yingpan Caoba Yecha Tea Tree	Fazhanhe Township, Lancang County	C. taliensis
LC2006-064	Dajianshan Yecha Tea Tree	Fazhanhe Township, Lancang County	C. taliensis
LC2006-066	Kanmashan Yecha Tea Tree	Menglang Town, Lancang County	C.sp.
XM2006-003	Yeniushan Tea Tree	Lisuo Township, Ximeng County	C. taliensis
XM2006-005	Mengka Yecha Tea Tree	Mengka Town, Ximeng County	C. taliensis
XM2006-007	Daheishan Lacha Tea Tree	Mengka Town, Ximeng County	C. taliensis
XM2006-016	Banmu Tea Tree	Mengsuo Town, Ximeng County	C. taliensis
ML2006-002	Lafu Lvya Yecha Tea Tree	Mengma Town, Menglian County	C. taliensis
ML2006-003	Lafu Tea Tree	Mengma Town, Menglian County	C. taliensis
ML2006-018	Nanya Ziya Yecha Tea Tree	Nanya Township, Menglian County	C. taliensis
ML2006-048	Dongnai Hongya Yecha	Mengma Town,	Camellia taliensis

	Tea Tree	Menglian County

Table 3. Old Cultivated Tea Trees under Special Protection

Investigation Number	Name	Location	Formal Name
JD2006-002	Beidie Qingcha Tea Tree	Huashan Township, Jingdong County	*C.sinensis* var. *assamica*
JD2006-005	Huashan Tea Tree	Huashan Township, Jingdong County	*C.sinensis* var. *assamica*
JD2006-006	Lushan Baicha Tea Tree	Huashan Township, Jingdong County	*C.sinensis* var. *assamica*
JD2006-010	Yingpanjiacha Tea Tree	Huashan Township, Jingdong County	*C.sinensis* var. *assamica*
JD2006-025	Qiangmenkou Yecha Tea Tree	Dajie Township, Jingdong County	
JD2006-026	Lingguangmiao Tea Tree	Dajie Township, Jingdong County	*C.*sp.
JD2006-031	Huangfengqingcha Tea Tree	Taizhong Township, Jingdong County	*C. sinensis* var. *pubilimba*
JD2006-032	Yakou Tea Tree	Taizhong Township, Jingdong County	*Camellia taliensis*
JD2006-033	Waisongshan Yecha Tea Tree	Taizhong Township, Jingdong County	*Camellia taliensis*
JD2006-036	Xiaokanmacha Tea Tree	Longjie Township, Jingdong County	*C. sinensis* var. *pubilimba*
JD2006-037	Xiejia Lipishencha Tea	Longjie Township,	*C. sinensis* var.

	Tree	Jingdong County	*pubilimba*
JD2006-038	Xietaifu Tea Tree	Longjie Township, Jingdong County	*C. sinensis* var. *assamica*
JD2006-042	Quanmalin Tea Tree	Dajie Township, Jingdong County	*C. sinensis* var. *assamica*
JD2006-054	Caihu Tea Tree	Jingping Town, Jingdong County	*C. sinensis* var. *assamica*
JD2006-066	Honggezicha Tea Tree	Anding Township, Jingdong County	*C. sinensis* var. *assamica*
JD2006-071	Minfucha Tea Tree	Anding Township, Jingdong County	*C.sinensis* var. *pubilimba*
JD2006-080	Changdishan Tea Tree	Wenjing Town, Jingdong County	*C. sinensis* var. *pubilimba*
JD2006-088	Gongping Tea Tree	Jingfu Township, Jingdong County	*Ccamellia taliensis*
JD2006-090	Mengling Laoshancha Tea Tree	Jingfu Township, Jingdong County	*Camellia taliensis*
JD2006-092	Yiwanshuicha Tea Tree	Mt.Dachao, Jingdong County	*C. sinensis* var. *assamica*
JD2006-095	Changfacha Tea Tree	Mt.Dachao, Jingdong County	*C. sinensis* var. *assamica*
JD2006-096	Fengguanshan Hongcha Tea Tree	Jingfu Township, Jingdong County	*C. sinensis* var. *assamica*
JD2006-097	Fengguanshan Baicha Tea Tree	Jingfu Township, Jingdong County	*C. sinensis* var. *assamica*
JD2006-098	Linggang Dayecha Tea Tree	Mandeng Town, Jingdong County	*C. sinensis* var. *assamica*
JD2006-103	Jinjilincha Tea Tree	Jingfu Township, Jingdong County	*C. sinensis* var. *assamica*

JD2006-107	Qingmenkou Bacha Tea Tree	Linjie Township, Jingdong County	*C. sinensis* var. *assamica*
JD2006-115	Qinghe Tea Tree	Linjie Township, Jingdong County	*Ccamellia taliensis*
JD2006-122	Manwan Wenzhucha Tea Tree	Manwan Town, Jingdong County	*C. sinensis* var. *assamica*
JD2006-124	Manwan Chahecha Tea Tree	Manwan Town, Jingdong County	*C. sinensis* var. *assamica*
ZY2006-013	Hetou Tea Tree	Zhentai Township, Zhenyuan County	*Camellia grandibracteata*
ZY2006-016	Niuxuecha Tea Tree	Jiujia Township, Zhenyuan County	*C. sinensis*
ZY2006-019	Wenli Tea Tree	Anban Town, Zhenyuan County	*C. sinensis* var. *pubilimba*
ZY2006-020	Dalvcha Tea Tree	Zhedong Township, Zhenyuan County	*C. sinensis* var. *assamica*
ZY2006-023	Baiyakoucha Tea Tree	Tianba Township, Zhenyuan County	*C. sinensis*
ZY2006-024	Madengcha Tea Tree	Zhedong Township, Zhenyuan County	*C. sinensis* var. *assamica*
ZY2006-030	Danhongcha Tea Tree	Zhentai Township, Zhenyuan County	*C. sinensis* var. *assamica*
ZY2006-032	Shanjie Gucha Tea Tree	Zhentai Township, Zhenyuan County	*C. sinensis* var. *assamica*
ZY2006-033	Wenhe Baihao Tea Tree	Zhentai Township, Zhenyuan County	*C. sinensis* var. *assamica*
ZY2006-037	Kanpen Qingcha Tea Tree	Mengda Town, Zhenyuan County	*C. sinensis* var. *assamica*
ZY2006-039	Liangtai Dashancha Tea	Mengda Town,	*C. sinensis* var.

	Tree	Zhenyuan County	*assamica*
JG2006-021	Wenshan Tea Tree	Xiaojinggu Township, Jinggu County	*C. sinensis* var. *pubilimba*
JG2006-041	Xiejia Tea Tree	Yongping Town, Jinggu County	*C. sinensis* var. *pubilimba*
JG2006-044	Shidaimao Dayecha Tea Tree	Banpo Township, Jinggu County	*C. sinensis* var. *pubilimba*
JG2006-046	Huangjiazhai Tea Tree	Banpo Township, Jinggu County	*C. sinensis* var. *pubilimba*
JG2006-047	Huangjiazhai Hongcha Tea Tree	Banpo Township, Jinggu County	*C. sinensis* var. *pubilimba*
JG2006-048	Gangzhacha Tea Tree	Yongping Town, Jinggu County	*C. sinensis* var. *pubilimba*
JG2006-049	Dapingzhangcha Tea Tree	Yongping Town, Jinggu County	*C. sinensis* var. *assamica*
JG2006-057	Waizhaiba Dayecha Tea Tree	Zhengxing Township, Jinggu County	*C. sinensis* var. *assamica*
JG2006-059	Huangcaoba Mayicha Tea Tree	Zhengxing Township, Jinggu County	*C.sinensis*
JG2006-103	Xujiacun Dayecha Tea Tree	Zhongshan Township, Jinggu County	*C. sinensis* var. *assamica*
JG2006-118	Wazi Dayecha Tea Tree	Zhengxing Township, Jinggu County	*C. sinensis* var. *pubilimba*
JG2006-120	Yangta Dabaicha Tea Tree	Minle Town, Jinggu County	*C. sinensis* var. *pubilimba*
PER2006-001	Kunlushan Dayecha Tea Tree	Ning'er Town, Ning'er County	*C.sinensis* var. *assamica*
PER2006-002	Kulushan Xiyecha Tea Tree	Ning'er Town, Ning'er County	*C. sinensis* var. *pubilimba*

PER2006-006	Dilou Dayecha Tea Tree	Meizi Township, Ning'er County	*C. gymnogyna*
PR2006-009	Jiulu Dayecha Tea Tree	Meizi Township, Ning'er County	*Camellia sinensis* var. *assamica*
PER2006-015	Xiachahecha Tea Tree	Liming Township, Ning'er County	*C. sinensis*
PER2006-019	Mohei Xinzhaicha Tea Tree	Mohei Town, Ning'er County	*C.sinensis* var. *assamica*
PER2006-020	Zhaluoshan Dayecha Tea Tree	Mohei Town, Ning'er County	*C. sinensis* var. *pubilimba*
MJ2006-001	Laozhuzhai Mayucha Tea Tree	Baliu Township, Mojiang County	*C. sinensis* var. *assamica*
MJ2006-002	Yangbazhai Mayucha Tea Tree	Baliu Township, Mojiang County	*C. sinensis* var. *assamica*
MJ2006-008	Yongxi Ziyacha Tea Tree	Lianzhu Town, Mojiang County	*C. sinensis* var. *assamica*
MJ2006-018	Xuligongcha Tea Tree	Lianzhu Town, Mojiang County	*C. sinensis* var. *assamica*
MJ2006-026	Lushancun Dayelvcha Tea Tree	Yayi Township, Mojiang County	*C. sinensis* var. *assamica*
MJ2006-048	Laoweicun Liuyecha Tea Tree	Tuantian Township, Mojiang County	*C. sinensis* var. *pubilimba*
MJ2006-050	Midigongcha Tea Tree	Xinfu Township, Mojiang County	*C. sinensis* var. *assamica*
MJ2006-063	Dapingzhang Daheicha Tea Tree	Jingxing Township, Mojiang County	*C. sinensis* var. *assamica*
MJ2006-076	Lichongzu Daheicha Tea Tree	Jingxing Township, Mojiang County	*C. sinensis* var. *assamica*
MJ2006-087	Datuanye Lvyacha Tea	Jingxing Township,	*C. sinensis* var.

	Tree	Mojiang County	*pubilimba*
MJ2006-112	Lichong Ziyacha Tea Tree	Jingxing Township, Mojiang County	*C. sinensis* var. *assamica*
CY2006-001	Laohuangtian Dayecha Tea Tree	Simao Town, Simao Area	*C. sinensis* var. *assamica*
CY2006-039	Zizhulincha Tea Tree	Simaogang Town, Simao Area	*C. sinensis* var. *assamica*
CY2006-048	Liushuqing Dayecha Tea Tree	Yixiang Town, Simao Area	*C. sinensis* var. *assamica*
JC2006-001	Dashengqing Dayecha Tea Tree	Menglie Town, Jiangcheng County	*C.sinensis* var. *assamica*
JC2006-013	Pujiacun Tea Tree	Guoqing Township, Jiangcheng County	*C.sinensis* var. *assamica*
JC2006-024	Tianfang Dashucha Tea Tree	Guoqing Township, Jiangcheng County	*C.sinensis* var. *assamica*
JC2006-033	Shanshenmiao Dashucha Tea Tree	Guoqing Township, Jiangcheng County	*C.sinensis* var. *assamica*
JC2006-034	Dajianshan Kucha Tea Tree	Qushui Township, Jiangcheng County	*C. sinensis* var. *assamica*
LC2006-001	Laomianzhai Dalvcha Tea Tree	Zhutang Township, Lancang County	*C.gymnogyna*
LC2006-002	Nuobo Daqing Tea Tree	Ankang Township, Lancang County	*C. sinensis* var. *assamica*
LC2006-003	Fofang Tea Tree	Ankang Township, Lancang County	*C.*sp.
LC2006-006	Nanwa Tea Tree	Shangyun Town, Lancang County	*C. sinensis* var. *assamica*
LC2006-008	Mangdazhai Laocha Tea Tree	Wendong Township, Lancang County	*C. sinensis* var. *assamica*

LC2006-009	Xiaozhai Laocha Tea Tree	Wendong Township, Lancang County	*C.*sp.
LC2006-013	Chalu Tea Tree	Fudong Township, Lancang County	*C.*sp.
LC2006-015	Fudong Dapingzhang Tea Tree	Fudong Township, Lancang County	*C. sinensis* var. *assamica*
LC2006-018	Zhafang Tea Tree	Dashan Township, Lancang County	*C. sinensis* var. *assamica*
LC2006-026	Dalaba Laocha Tea Tree	Mujia Township, Lancang County	*C. sinensis* var. *assamica*
LC2006-028	Nanfang Tea Tree	Mujia Township, Lancang County	*C. sinensis* var. *assamica*
LC2006-031	Bangnai Tea Tree	Fubang Township, Lancang County	*C. sinensis* var. *assamica*
LC2006-033	Monai Tea Tree	Zhutang Township, Lancang County	*C. sinensis* var. *assamica*
LC2006-035	Zizhuhecha Tea Tree	Zhutang Township, Lancang County	*C. sinensis* var. *assamica*
LC2006-049	Longtang Gucha Tea Tree	Nanling Township, Lancang County	*C. sinensis* var. *assamica*
LC2006-055	Manghong Gucha Tea Tree	Huimin Township, Lancang County	*C. sinensis* var. *assamica*
LC2006-057	Jingmai Tea Tree 2	Huimin Township, Lancang County	*Camellia sinensis* var. *assamica*
LC2006-062	Nanbing Gucha Tea Tree	Fazhanhe Township, Lancang County	*C. sinensis* var. *assamica*
XM2006-004	Pakecha Tea Tree	Lisuo Township,	*C. sinensis* var.

		Ximeng County	*assamica*
XM2006-013	Banmu Tea Tree	Mengsuo Town, Ximeng County	*C. sinensis* var. *assamica*
ML2006-016	Jingkeng Ziyacha Tea Tree	Nayun Town, Menglian County	*C.sinensis* var. *assamica*
ML2006-033	Mangxin Ziyacha Tea Tree	Mangxin Town, Menglian County	*C.sinensis* var. *assamica*
ML2006-035	Nuodong Tea Tree	Gongxin Township, Menglian County	*C.sinensis* var. *assamica*

Table 4. Old Transitive Tea Trees under Special Protection

Investigation Number	**Name**	**Location**	**Formal Name**
LC2006-023	**Bangwei Tea Tree**	**Fudong Township, Lancang County**	

1.Germplasm Collection and Conservation of Pu'er City

A germplasm nusery has been set up in Pu'er City's farm of fine tea tree varieties. By the end of 2011, the nursery has pooled 1100 garmplasm samples, the largest collection of big leaf tea germplasm in China. The germplasm of following and other precious and rare tea trees are properly preserved in the nusery: Qianjiazhai Tea Tree, Bangwei Tea Tree, Yangcaotang Tea Tree, Lingguangmiao Tea Tree, Jingmai Tea Tree, Kunlushan Dayecha Tea Tree, Yangta Dabaicha Tea Tree, Jiangcheng Baihao Tea Tree, Huangyecha Tea Tree, Kunlushan Tea Tree 1, Mengmengcha Tea Tree, Niuxuecha Tea Tree and Huayecha Tea Tree.

2.Ancient Tea Mountains in the Pu’er City

Laocangfude Ancient Tea Mountain, Jinding Ancient Tea Mountain, Manwan Ancient Tea Mountain, Yubi Ancient Tea Mountain, Aolaoshan Xipo Ancient Tea Mountain, Zhentai Ancient Tea Mountain, Laowushan Ancient Tea Mountain, Tianba Ancient Tea Mountain, Mengda Ancient Tea Mountain, Madeng Ancient Tea Mountain, Wenshan Ancient Tea Mountain, Yangta Ancient Tea Mountain, Nanban Huangcaoba Ancient Tea Mountain, Lianhe Longtang Ancient Tea Mountain, Tuanjie Ancient Tea Mountain, Xuligongcha Ancient Tea Mountain, Longba Ancient Tea Mountain, Tongguan Ancient Tea Mountain, Baliu Ancient Tea Mountain, Midi Ancient Tea Mountain, Jingxing Haomeng Ancient Tea Mountain, Kunlushan Ancient Tea Mountain, Guoqing Ancient Tea Mountain, Jingmai Ancient Tea Mountain, Bangwei Ancient Tea Mountain, Wendong Ancient Tea Mountain.

Annex 3: Agriculture Biodiversity

1.Traditional Rice Species in Pu'er City

Table 1. Distribution of *Oryza meyeriana* in the Pu'er City

County (Area)	Existing Distribution Sites
Lancang County	5
Simao Area	5
Ning'er County	4
Jinggu County	1
Mojiang County	1
Menglian County	1
Total	17

Table 2-Traditional Rice Germplasm Resources (Varieties) in Pu'er City

Variety	Local Name	Paddy Rice/ Upland Rice	Indica/ Japonica	Glutinous/ Non-glutinous	County (Area)
Guochangu	Guochangu (Lahu Nationality)	Paddy Rice	Indica	Glutinous	Lancang
Nuogu	Nuoxima (Lahu Nationality)	Paddy Rice	Indica	Glutinous	Lancang
Dahonggu		Paddy Rice	Indica	Non-glutinous	Lancang
Maxiangu		Paddy Rice	Japonica	Non-glutinous	Lancang
Laoshuya		Paddy Rice	Indica	Non-glutinous	Lancang
Laoheigu		Paddy Rice	Japonica	Non-glutinous	Lancang
Xiaomeigu		Paddy Rice	Indica	Non-glutinous	Lancang
Damagu	Lengshui Baigu	Paddy Rice	Japonica		Lancang
Qitougu	Qitougu	Paddy Rice	Indica	Non-glutinous	Lancang, Zhenyuan

Variety	Local Name	Paddy Rice/ Upland Rice	Indica/ Japonica	Glutinous/ Non-glutinous	County (Area)
Haonuo Boluo		Paddy Rice	Indica	Glutinous	Ximeng
Haomuhan		Paddy Rice	Indica	Glutinous	Ximeng
Wendao	Haoqiaqia (Wa Nationality)	Paddy Rice	Indica	Non-glutinous	Ximeng
Eshu		Upland Rice			Ximeng
Zinuomi		Paddy Rice	Indica	Glutinous	Ximeng
Xiaohonggu	Gela (Wa Nationality)	Upland Rice	Japonica		Ximeng
Yanqiadao		Paddy Rice	Indica	Non-glutinous	Ximeng
Elong		Paddy Rice	Japonica	Non-glutinous	Ximeng
Egui		Paddy Rice	Japonica		Ximeng
Wa Nationality Soft Rice		Paddy Rice	Japonica	Non-glutinous	Ximeng
Ebian		Paddy Rice	Japonica	Non-glutinous	Ximeng
Bainuomi		Paddy Rice	Japonica	Glutinous	Ximeng
Ege		Paddy Rice	Indica	Non-glutinous	Ximeng
Wanliang		Upland Rice	Japonica		Ximeng
Ailao		Paddy Rice	Japonica		Ximeng
Zhuli		Upland Rice	Japonica		Ximeng
Gaoli		Upland Rice	Japonica		Ximeng
Baike’ai	Baike’ai (Wa Nationality)	Paddy Rice	Indica		Ximeng
Eluo	Eluo (Wa Nationality)	Paddy Rice	Indica		Ximeng
Erkuai	Erkuai (Lahu Nationality)	Paddy Rice	Indica		Ximeng
Geken	Geken (Wa Nationality)	Paddy Rice	Japonica		Ximeng

Variety	Local Name	Paddy Rice/ Upland Rice	Indica/ Japonica	Glutinous/ Non-glutinous	County (Area)
Xiaobailigu	Gela (Wa Nationality)	Upland Rice	Indica		Ximeng
Geleng	Geleng (Wa Nationality)	Paddy Rice	Indica		Ximeng
Gerongnuan	Gerongnuan (Wa Nationality)	Paddy Rice	Japonica		Ximeng
Gexiao	Gexiao (Wa Nationality)	Paddy Rice	Japonica		Ximeng
Haomuhao	Haomuhao (Wa Nationality)	Paddy Rice		Glutinous	Ximeng
Kaogang	Kaogang (Wa Nationality)	Upland Rice	Japonica		Ximeng
Jingnong	Jingnong (Wa Nationality)	Paddy Rice	Japonica		Ximeng
Qunuo	Qunuo (Lahu)	Paddy Rice		Glutinous	Ximeng
Sanbaizi	Sanbaizi (Hani Nationality)	Paddy Rice			Jiangcheng
Yaojia Honggu		Paddy Rice	Indica	Indica	Jiangcheng, Mojiang
Maxiangu		Paddy Rice	Indica		Jiangcheng
Bayinuo		Paddy Rice		Glutinous	Jingdong
Jinghongnuo		Paddy Rice		Glutinous	Jingdong
Langanwu		Paddy Rice	Japonica		Jingdong
Lengshui Baigu		Paddy Rice	Indica		Jingdong
Xibaigu		Paddy Rice	Indica		Jingdong
Changmaonuo		Paddy Rice		Glutinous	Jingdong
Kesha	Dafapeng (Yi Nationality)	Paddy Rice	Japonica		Jingdong
Dahonggu			Japonica		Jingdong

Variety	Local Name	Paddy Rice/ Upland Rice	Indica/ Japonica	Glutinous/ Non-glutinous	County (Area)
Beizigu		Paddy Rice	Japonica		Jingdong
Xiaoheigu			Japonica		Jingdong
Honggengu	Luozhongqigu (Yi Nationality)	Paddy Rice	Japonica		Jingdong
Gaogan Danuo	Chuancunnuo (Yi Nationality)	Paddy Rice		Glutinous	Jingdong
Bainuo	Daxiangnuo	Paddy Rice	Indica	Glutinous	Jinggu
Hongnuo	Nuohong	Paddy Rice	Indica	Glutinous	Jinggu
Nuogu		Paddy Rice	Japonica	Glutinous	Jinggu
Jiegunuo （Purple Glutinous Rice）		Paddy Rice	Indica	Glutinous	Jinggu
Aijiaonuo	Aijiaonuo (Hani Nationality)	Paddy Rice	Indica	Glutinous	Mojiang
Baitiangu	Baitiangu (Hani Nationality)	Paddy Rice	Indica	Non-glutinous	Mojiang
Dabainuo	Dabainuo (Hani Nationality)	Paddy Rice	Indica	Glutinous	Mojiang
Gaojiaonuo	Gaojiaonuo (Hani Nationality)	Paddy Rice	Indica	Glutinous	Mojiang
Wangsangu	Wangsangu (Hani Nationality)	Paddy Rice	Indica	Non-glutinous	Mojiang
Xihonggu	Xihonggu (Hani Nationality)	Paddy Rice	Indica	Non-glutinous	Mojiang
Xiaohonggu	Xiaohonggu (Hani Nationality)	Paddy Rice	Indica	Non-glutinous	Mojiang
Xiaohuanggu	Xiaohuanggu (Hani Nationality)	Paddy Rice	Indica	Non-glutinous	Mojiang
Yuandougu	Yuandougu	Paddy Rice	Indica	Non-glutinous	Mojiang

Variety	Local Name	Paddy Rice/ Upland Rice	Indica/ Japonica	Glutinous/ Non-glutinous	County (Area)
	(Hani Nationality)				
Huangpigu		Paddy Rice		Non-glutinous	Simao Area
Mengxin Baigu		Paddy Rice	Indica	Non-glutinous	Zhenyuan
Lengshui Dahonggu		Paddy Rice	Indica	Non-glutinous	Zhenyuan
Yugu		Paddy Rice	Indica	Non-glutinous	Zhenyuan
Zaohonggu		Paddy Rice	Indica	Non-glutinous	Zhenyuan
Meixingu		Paddy Rice	Indica	Non-glutinous	Zhenyuan
Dahonggu		Paddy Rice	Indica	Non-glutinous	Zhenyuan
Xibaigu		Paddy Rice	Indica	Non-glutinous	Zhenyuan
Dabaigu		Paddy Rice	Indica	Non-glutinous	Zhenyuan
Zinuo		Paddy Rice	Indica	Glutinous	Zhenyuan
Dahei Yuanjianggu		Paddy Rice	Indica	Non-glutinous	Zhenyuan
Duanjiaonuo		Paddy Rice	Indica	Glutinous	Zhenyuan
Baigan Wuzui		Paddy Rice	Indica	Non-glutinous	Zhenyuan
Aijiao Luochan	Aijiao Luochuan (Han Nationality)	Paddy Rice	Indica	Non-glutinous	Zhenyuan

3.Other Traditional Crop Species in Pu’er City

Table 3. Other Traditional Crop Varieties in Pu’er City

Crop	Variety	Latin Name
Corn Landraces	White Corn Yellow Corn White Glutinous Corn Glutinous Corn Short Glutinous Corn	*Zea mays L.*
Wheat Landraces	Guanggoumai-2 Guangtoumai	*Triticum aestivumLinn.*
Azuki Bean	Aijiao Hongmidou	*Vigna angularis (Willd)Ohwi&Ohashi*

Crop	Variety	Latin Name
Winged Bean	Winged Bean	*Psophocarpus tetragonolobus (L.) DC.*
Sweet Potato	Simao Huangpi	*Ipomoea batatas Lam.*
Soybean	Mottled Bean Mung Bean Brown Bean	*Glycine max L. Merrill*

3. Related Biodiversity

Incomplete statistics show that within the administrative area, there are higher plants of 352 families, 1688 genera and over 5600 species. Among them, 51 species are listed as Grade I rare and endangered plants in China. Precious plants include *Paramichelia baillonii, Toona sureni, Gmelina arborea Roxb., Duabanga grandiflora, Cinnamomum camphora,* etc. Fast growing trees include *Pinus kesiya Royle, Betula alnoides, Schima wallichii* and etc. Common plants in the forests fall into over 150 families. There are 41 families of dominant trees in the timber forests alone. The area is home to 1496 animal species: over 470 bird and mammal species, 980 insect species and 46 amphibian species. Among them are rare wild animal species like: Asian Elephant (*Elephas maximus*), Indian Bison (*Bos taurus readei*), Black Crested Gibbon (*Nomascus nasutus*), Slow Loris (*Nycticebus coucang*), Indochinese Tiger (*Panthera tigris corbetti*), Clouded Leopard (*Neofelis nebulosa*), Red Deer (Cervus elaphus), Dwarf Musk Deer (*Moschus berezovskii*), Oriental Pied Hornbill (*Anthracoceros albirostris*), Great Hornbill (*Buceros bicornis*), Red-billed Leiothrix (*Leiothrix lutea*). A total of 16 mammal species, 16 bird species and 4 amphibian species in this area are national rare and endangered species.

4. Main Grain Crops in Lancang

Table 4. Diversity of Staple Grain Crops in Lancang County

Crop	Staple Variety	Remark

Crop	Staple Variety	Remark
Paddy Rice	Changmanggu	Traditional Variety
	Beizigu	Traditional Variety
	Qitougu	Traditional Variety
	Zinuogu	Traditional Variety
	Xiaomeigu	Traditional Variety
	Luochuangu	Traditional Variety
	Xiangnuogu	Traditional Variety
	Xianggu	Traditional Variety
	Dahuangnuo	Traditional Variety
	Bainuo	Traditional Variety
	Changbainuo	Traditional Variety
	Daxiangnuo	Traditional Variety
	Lengshui Dabaigu	Traditional Variety
	Dabaigu	Traditional Variety
	Maxiangu	Imported Variety from Burma
	Bainijiang	Imported Variety
	Bairigu	Imported Variety
Paddy Rice	Haoliezhang	Imported Variety
	Hybrid Rice	Imported Hybrid Specieses
	Xiaohongmi	Local Variety, but rarely planted
Upland Rice	Landigu	Local Traditional Variety
	Dabaigu	Local Traditional Variety
	Xihangu	Local Traditional Variety
	Xianggu	Local Traditional Variety
	Mingzigu	Local Traditional Variety
	Xingheinuo	Local Traditional Variety
	Huangpinuo	Local Traditional Variety
	Liandaogu	Local Traditional Variety
	Di’erkuai	Local Traditional Variety
	Xiaohuagu	Local Traditional Variety
	Jixuegu	Local Traditional Variety
Corn	Yellow Corn	Local Traditional Variety
	White Corn	Local Traditional Variety
	Glutinous Corn	Local Traditional Variety
	Maya Corn	Local Traditional Variety
	Yellow-White Corn	Imported Variety
	Landi Corn	Imported Variety
	Gaoshan Hongying	Imported Variety
	Puzhao	Imported Variety
	White Glutinous Corn	Imported Variety
	Baimaya	Imported Variety
	Jinghuanghou	Imported Variety
	Erhuanghou	Imported Variety

Crop	Staple Variety	Remark
Wheat	Jiangbianhuang	Imported Variety
	Mota	Imported from Mexico
	Moye	Imported from Mexico
	Mosha	Imported from Mexico
	Moniu	Imported from Mexico
	Xiaohuangmai	Imported Variety
	Fengmai No.5	Imported Variety
	Fengmai No.13	Imported Variety
	Ma'anshandimai	Imported Variety
	Bima No.1	Imported Variety
	Nanyuan No.1	Imported Variety
	Ourou	Imported Variety
	"36-428"	Imported Variety
Wheat	Xiaobaimai	Imported Variety
	Guangtoumai	Imported Variety
Winter Buckwheat	Tartary Buckwheat	Local Traditional Variety
	Common Buckwheat	Local Traditional Variety
Chinese Pearl Barley		rarely planted
Tuberous Crop	White Sweet Potato	
	Red Sweet Potato	
	Potato	
	Taro	
	Cassava	
Broad Bean	Broad Bean Landrace	Local Traditional Variety
Pea	Pea Landrace	Local Traditional Variety
	Early Pea	Imported Variety
Soybean	Dahuangdou	Local Traditional Variety
	Daheidou	Local Traditional Variety
	Xihuangdou	Local Traditional Variety
	Xiheidou	Local Traditional Variety
Rice Bean		rarely planted
Peanut	Xiaolihong	Local Traditional Variety
	Aoyou 33	Imported Variety
	Fushe 21	Imported Variety
Turnip Rape		rarely planted
Sesame	Black Sesame	
	White Sesame	
Sorghum		rarely planted
Perilla		rarely planted
Sunflower		rarely planted

Annex 4. History of Jingmai & Mangjing Ancient Tea Plantation

At present, there are mainly two clues for its history:

- The stele in the wood pagoda in a Mangjing temple

  The Dai script on it stated that the tea trees in the plantation were planted in the 57th year of the Dai calendar (696AD). It means that the plantation is over 1300 years old.
- The *History of Blang Nationality* discovered in the Blang community in Mugeng Village, Shan State, Burma

The book records that as early as 713BE (180AD), over 1800 years ago, people began to domesticate and cultivate tea trees in the plantation.

Annex 5. Shankang Tea Ancestor Festival of the Blang Nationality

Ⅰ. Origin of the Festival

In ancient times, Blang was associated with prehistoric religion, believing animism and worshiping their ancestors. Later (about 1000 years from now), Theravada Buddhism was introduced into this area. It blended with the prehistoric religion. For example, the charms of Blang contain languages of both religions. The Shankang Tea Ancestor Festival is also a fruit of the interaction between the two religions. "Shankang" is a traditional Theravada Buddhism. It's similar to the Spring Festival of the Han Nationality. On the Shankang Festival, people see off the old year and greet the new one. "Tea Ancestor Festival" is a traditional festival of the Blang's prehistoric religion, and is called "Haogoulong". It's a festival to commemorate tea cultivation and the great contribution of Pa Aileng, the late leader of Blang. Every year, the festival is held in late June, the wime when Blang people, led by Pa Aileng, arrived at Mt. Bulang, Mangjing. In the festival, the Blang people worship the tea ancestor, summon tea soul and put on grand shows of folk song and dance, etc.

In conclusion, at the beginning of a new year, Blang people commemorate and worship their ancestors, and pray for blessings.

II. Participants

1, Villagers, dressed in folk custome, from the same village stand in one unit. Every unit brings elephant-leg drum, beewax candles and tributes (dishes, fruit and silver coins).

2, Guests or businessmen from the same industry or system stand in one unit. They bring beewax candles and tributes (can be mainly silver coins. The coins are divided into two shares, one for the tea ancestor, and one for the altar).

III. Ritual

1, The village leader says blessings.

2, Drums start when the leader finishes. With the drums, the units enter (in the order of leaders, villagers, guests and businessmen) the Pa Aileng Temple to worship

the tea ancestor (kowtow and present tributes). They enter the temple from the right and exit from the left.

When they come out of the temple, the units circle the altar from the right to the left for one time in the same order. Next, they present their tributes at designated places and return to the starting points. When all units have returned, drums stop.

3, Beewax candles are lit. Mr. Kang Langbing chants the summon prayers. Then, Mr. Su Guowen chants calling prayers. When he finishes, people call out in chorus: "E…! E…! E…! E…! E…!"

4, When the voices stop, drums start again. People do folk dance to the drums for twenty minutes.

5, When the dance stops, an aged prepares a chicken to read chicken divination. With this, the summon ritual comes to an end.

6, People then rest and have a meal.

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