



Newsletter

Biodiversity Conservation in Natural Bamboo Forests of Tropical and Subtropical China

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1. The demonstration sites

The project has 3 pilot sites in 3 of China's southern provinces where bamboo resources are abundant and form an important part of the forest ecosystems and local economy for rural users.

1.1 Yanling County, Hunan

Hunan is one of the provinces in the country with the richest natural mixed bamboo and broad-leaf forests. These forests are one of the major forest ecosystems in the province significantly contributing to local economic development and environmental conservation. Yanling County, situated in the east of the province, is the targeted project site in Hunan. This county is rich in natural mixed bamboo and broad leaf forests with 19,000ha of *moso* bamboo. The average share of natural bamboo forests is about 0.17ha per inhabitant, making it the highest in the country.

In an attempt to maximize utilization from the resource, over the past decade local authorities and private businesses have encouraged local farmers to shift from mixed bamboo and broad-leaf forests to monoculture bamboo forests to achieve significant short-term economic profits. This drive for short-term economic returns has accelerated biodiversity loss in natural bamboo forests and consequently the loss of long-term productivity in these forests. Other canopy trees and understory plants are gradually cleared in an attempt to achieve higher bamboo productivity.



Technical practices currently undertaken in Pikeng Village, Yanling County, Hunan:

1. Cleaning of the shrub/grass layer in the natural bamboo forest
2. Selective shrub cleaning and grass removal
3. Optimization of the structure of the mixed bamboo and broad-leaf forest
4. Reduction of the ratio of competitive species and conservation of the beneficial symbiotic species for Moso bamboo

1.2 Dagan County, Yunnan

Yunnan Province has the richest diversity of bamboo resources in the country. More than 250 bamboo species in 28 genera are found within the province and account for half of the national total, and nearly 25% of the number of species worldwide. The province is home to natural bamboo forests with the highest estimated biodiversity as well as **rare and endangered bamboo species**. *Qiongzhusia tumidinoda* (*Qiong* bamboo) is listed in the Red List of Rare and Endangered Plants in China and on the IUCN's Red List. This species and another seven members of the *Qiongzhusia* genus are being overexploited in Dagan County in Yunnan, because of their commercially valuable culms and edible shoots, which, counter to scientific findings, farmers believe will return higher yields with higher levels

of cultivation. On the contrary, this technique exhausts the plant and causes degradation in the natural *Qiong* bamboo forests. The biodiversity and productivity of ecosystems which depend on *Qiongzhuea* as the dominant species have been severely degraded. As a result, not only the bamboo but also the incomes of farmers who largely depend on *Qiong* bamboo are under threat as long. The project is introducing sustainable management practices and harvesting techniques to mitigate these losses.



- Technical practices currently undertaken in Yinji Village, Dagan County, Yunnan:**
1. Adjust the ramet density (density of above ground shoots) of *Qiong* bamboo
 2. Adjust the vegetation coverage of the understory in *Qiong* bamboo forest
 3. Control of the intensity of *Qiong* bamboo shoot harvesting
 4. Sustainable application of chemical fertilizer

Changning County, Sichuan

Sichuan is one of the most densely populated provinces in the country. The rapid growth in demand for bamboo resources over the last two decades has caused excessive exploitation of forest resources in parts of the province. This has resulted in serious disturbance and destruction of the biodiversity of ecosystems in natural bamboo forests. A vast area of natural bamboo forests in Changning County, the selected pilot site, has been turned into monoculture *Moso* bamboo forests. There is an urgent need to demonstrate long-term technical and policy strategies to halt and restore the degraded biodiversity and the natural productivity of the damaged forests.



- Technical practices currently undertaken in Changning County, Sichuan:**
1. Clean the shrub/grass layer in *Moso* bamboo forest
 2. Non-tilled fertilization
 3. Interplant broad-leaved trees with the bamboo
 4. Restore the understory in the forest

2. Activities

2.1 Bamboo Value Chain Survey



The value chain in the bamboo industry plays a significantly important role in the development of bamboo forest management and the improvement of livelihoods for local farmers who depend upon bamboo as a resource. Kathleen Buckingham, a Ph.D. candidate at University of Oxford in the UK conducted a Bamboo Value Chain Survey in Hunan and Sichuan project area in September 2008 in order to determine the suitability of adopting certification schemes with a focus upon **FSC Chain of Custody**, which was

determined to be the most applicable. Through interviews with farmers, intermediaries, factories and local government regarding the current situation and potential for uptake of bamboo certification, significant differences and challenges for certification were found, which included monitoring of annual cuts, lack of documentation and training for farmers and middlemen and lack of access to credit to upscale production at the factory level amongst others. Her investigation will constitute part of the feasibility report of sustainable bamboo forest management certification.

2.2 Biodiversity survey of microorganisms in the soil of bamboo forests

The link between the structure, composition and function of soil and the level of biodiversity is an area of growing interest in the ecology discipline. Due to the complexity of soil, it is difficult to determine the ecological status or health of a biogeo-ecosystem. Furthermore, evaluating the impact of management



activities on soil systems is difficult to conduct without good historical recorded data and knowledge of key characteristics of the soil. Over the past few years, scientists have been turning to the use of microorganisms present in the soil to provide indication of the general health of the soil in the ecosystem. The careful selection and monitoring of species present which are sensitive to any change in soil condition can provide insight into the comparative quality of soil over a time period.

The **Nematode**, one such microorganism present in earth can be used as a bio-indicator to analyze changes in the soil. Through the analysis of different classes of Nematodes, their composition and the balance of species' abundance and diversity, the general health of the soil can be ascertained.

Dr. FU Shenglei, the Principal Researcher of the South China Botanical Garden (SCBG), Chinese Academy of Sciences (CAS), led his team to Pikeng Village, the demonstration site in Hunan Province for soil sample collection in November 2008. The *Nematodes* were extracted from the samples and then analyzed using a biogeochemistry technique. The team will subsequently provide an evaluation report to address the relationship between human activities on bamboo forests and biodiversity of soil using Nematodes as bio-indicators.

2.3 Investigation of the Policy referring to Biodiversity Conservation in Bamboo Forests in Yunnan and Hunan

Dr. XU Jiliang, contracted as a short-term consultant for policy, investigated the policy for biodiversity conservation in bamboo forests in Yunnan site between 26 October -3 November 2008 and in the Hunan site from 25-29 November 2008.

Dr. Xu interviewed various project stakeholders including representatives from the Forestry Authority in Yunnan; the Forestry Authority in Hunan; the Forestry Bureau in Dagan County in Yunnan; the Forestry Bureau in Yanling County in Hunan; the local government in Mugan Town of Dagan County in Yunnan; the local government in Shidu Town of Yanling County in Hunan and the representatives of bamboo farmers in the villages.

Dr. Xu interviewed the governmental officers on the policy relating to biodiversity conservation in the natural bamboo forests under management, and discussed issues regarding implementation of policies, different ways in which to strengthen bamboo management policy and gaps which needed addressing under the current policies.

The investigation is expected to develop recommendations to the government on how to modify the current policy, as well as create more constructive policies relating to bamboo forest conservation and exploration of further sustainable techniques.

2.4 Community training of biodiversity conservation and sustainable management in natural bamboo forests

The community training of biodiversity conservation and sustainable management in bamboo forests was held in Shidu Town, **Yanling County in Hunan Province** between November 14th -16th, 2008. The training was arranged for the local bamboo farmers for raising the awareness of biodiversity conservation and advancing the uptake of bamboo management practices.

The training was divided into two parts: coursework and Hands-on practical training.

During the coursework component of the training, more than 60 bamboo farmers attended the training on November 14th. Farmers were mainly from the Pikeng Village, Qingshigang Village, Mihua Village and Nanliu Village. Expert trainer Mr. Zhang Peixin, Senior Engineer from Anji Forestry Bureau in Zhejiang Province provided training on sustainable forestry practices. Mr Zhang has over 20 years of experience on bamboo forest management, in Anji, home to much of China's industrial bamboo produce.



The hands-on component was supported by the Forestry Bureau in Jinggangshan City in Jiangxi Province. It was held in the demonstration bamboo forest in Jinggangshan, roughly 10 kilometers away from Yanjing County. Mr. Zhang taught the farmers several principles related to bamboo forest management practices such as sustainable **propagation techniques** and showed them specific hands-on process including **sustainable harvesting methods**.



In January, 2009, similar community trainings were held in the Sichuan pilot sites. The local farmers demonstrated eagerness for the technical trainings focusing upon sustainable management training. Furthermore they expressed their willingness to attend further trainings in management techniques which will hopefully provide benefit to biodiversity conservation and sustainability.

