

SCIENCE

Project development

Sino-German Cooperation Project “Conservation of cultural landscapes through diversification of resource-use strategies and technologies for agro-ecosystems in mountainous Southwest China”



Kick-off workshop held in Jinghong, Xishuangbanna from 29th -30th November, 2007

Based on previous work, the 3-year Sino-German research cooperation project has been officially inaugurated between XTBG and Hohenheim University, aiming to establish an interdisciplinary decision tool that integrating ecological, socio-cultural and economic information into a model based on a GIS platform, which is easy to understand, visually attractive, and allows modeling of different development options. Its kick-off workshop was jointly held by XTBG and Hohenheim University in Jinghong, capital city of Xishuangbanna Dai Autonomous Prefecture from 29th to 30th November, over 60 Chinese and German experts and students participated in the workshop. During the two-day workshop, discussions concerning master plans for each cluster were carried out, and a final scheme and data sharing system for the project was reached.

Mountainous Southwest China and the Greater Mekong Subregion (GMS) represent high-diversity of cultural landscapes; moreover, Southwest China has been identified as one of the world’s ‘biodiversity hotspots’. The growing population with limited natural resources, however, makes this area rely more on the world markets (globalization) with the establishment of a new highway system. Cash crops, such as rubber, which has already played a significant role in local economy, will become even more attractive and speed up land-use cover change (LUCC) with all its consequences for man and the environment. As a result, the local economy and traditional cultures



are challenged, leading to a rapid change or even disappearance of traditional land-use systems. Under such a changing environment, long-term plans concerning regional land-use are in need.

As planning sustainable land-use and regional development, it is essential to consider possible impacts of decisions on socio-economic, cultural, and ecological environment (scenario development). A systematic and detailed such scenarios requires an interdisciplinary and integrative tool to correlate such different aspects as economy, culture, environment, etc. But such a comprehensive tool does not exist now. When it comes to decision making, local decision makers have no possibilities to compare and weigh up alternative solutions, but have to rely on personal impressions and experiences.

The project will develop and apply strategies and tools (simulation modeling) to facilitate the anticipation of influences of special decisions on natural resources. With the help of these tools, a sustainable and eco-friendly land and resource use system will be established.



Ms. HUANG Shan, Vice Governor of Xishuangbanna Dai Autonomous Prefecture delivering opening speech



On-site field trip to Nabanhe Watershed National Nature Reserve

Xishuangbanna Biodiversity Conservation Corridors: a pilot project sponsored by the Asian Development Bank

This project is an important component of the Biodiversity Conservation Corridors Initiative (BCI), a flagship component of the Core Environment Program (CEP) in the Greater Mekong Subregion.

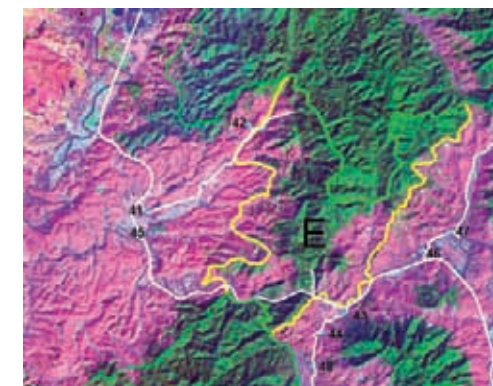
The objectives of the project is to accelerate regional sustainable development, resume and maintain ecological integrity of the National Nature Reserves in Xishuangbanna through improved management of biodiversity conservation corridors and core areas. Major activities are carried out under the categories of:

- Poverty Reduction;
- Land Use Planning and Management;
- Restoring Ecosystems Connectivity;
- Capacity Building.

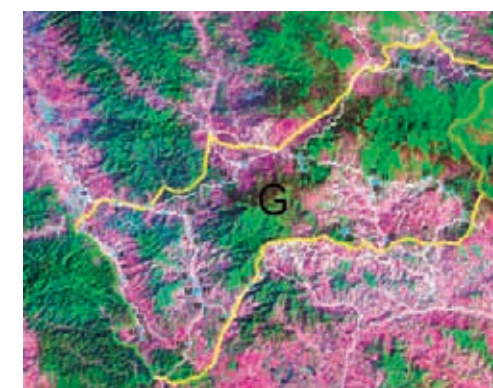
Official contract was signed on 5th April 2007 in Jinghong. A steering committee headed by the vice-governor of Xishuangbanna Dai Autonomous Prefecture has been set up to coordinate the project implementation. And the Project Management Office (PMO) has been operational since then.

A series of activities have been conducted, including training workshop for benchmarking surveys, field survey of pilot areas, land use planning and demarcation of corridors, training and hiring villagers as forest guards, operation of village revolving funds, and forest restoration in the key areas, as well as awareness building regarding the importance of biodiversity conservation corridors.

Presently, two pilot corridors have been proposed for approval by the local government after a series of consultation with different stakeholders.



Proposed Mengla-Shangyong corridor (E)



Proposed Man'gao-Nabanhe corridor (G)



At the invitation of EOC, Dr. HU Huabin, project manager, reported project progress to the 13th Meeting of the ADB Greater Mekong Subregion (GMS) Working Group on Environment WGE-13 on 13th June 2007 in Guilin, Guangxi, China.



Study on the disturbance estimation, regeneration dynamics and restoration models of degraded natural forests in Southwest China: a CAS Key project

This study investigates the response of forest to human-induced disturbance in tropical, subtropical and subalpine areas of Southwest China. The state of degraded forests will be assessed based upon the distribution pattern of 'non-constituent' species in the forests under different degrees of human disturbance, including their ecological adaptability and habitat preference. The main foci are to test the hypothesis that there exists a propagators' pressure of 'non-constituent' species in soil seed banks at the early stage of biological invasion by 'non-constituent', and to develop an approach for disturbance assessment in the forests using 'non-constituent' species as indicators of forest degradation.

A quantitative assessment tool will be developed based on soil seed bank studies for a comprehensive evaluation of forest state and to provide early warnings of forest degradation. Comparisons between natural forest regeneration and forests under human-induced disturbance regimes, particularly in relation to resprouting, will be performed. The coppicing ability of dominant plant species will be examined under natural and modified environmental conditions to test the hypotheses that 'coppicing ability of plants correlates with non-structural carbohydrate storage in radical root' and 'the concentration of nitrate in stumps induces adventitious buds'.

The results from these studies will be incorporated into protocols guiding the restoration of deforested areas or degraded forests. A series of demonstrative restoration projects will be established in different forest types in the study area, based on the detailed studies of local soil, climate, the structure and dynamics of original vegetations. The projects

will use various restoration techniques such as soil seed bank technique (promoting regeneration from local or introduced soil seed bank) and forest structure modification (species enrichment, key population recovering and mosaic combination of plant communities). The expected outcome of these projects is to establish a theoretical background for forest ecosystem manipulation and to set up a restoration template of human-mediated forest regeneration in the local areas.

This study will contribute significantly to our ability to assess disturbance in natural forests and provide technical supports for monitoring the invasion of 'non-constituent'. In addition, the restoration of degraded forests using native species will promote the health of local ecosystem and provide long-term maintenance of regional ecological security.

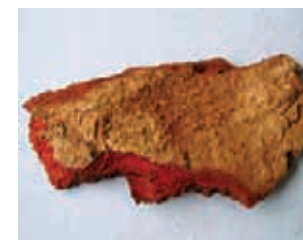


An observation spot for evergreen broad-leaved forest at Ailaoshan station



Physiognomy of Evergreen broad-leaved forest at Ailaoshan station

Study on Formation Mechanism of Dragon's Blood and Its Raw Material Production: Sub-project of the Bio-medicine Program of CAS



Dragon's Blood

After completion of a pilot project supported by the NDRC (National development and Reform Commission of China) on breeding and commercial production of dragon's blood trees (*Dracaena cochinchinense*) as medicinal plants, Dr. SONG Qisi and his team are now exploring the Biosynthesis of Dragon's Blood. This proposal has been supported by CAS as a sub-project of the Bio-medicine Program.

Dragon's Blood is a rare Chinese traditional medicine. The natural populations of Dragon's Blood are found in tropical forest and are very limited in productivity for the pharmaceutical industry. By isolating fungi that induce the production of Dragon's Blood and cultivating those fungi with stem powders and cell suspensions of the Dragon's Blood trees, Dr. SONG's team will observe the production of Dragon's Blood compounds and discover the biosynthesis pathway of this medicine. Based on the biosynthesis pathway of Dragon's Blood, they will select the active fungi that induce and stimulates the production of Dragon's Blood, find the best conditions to cultivate the active fungi and produce Dragon's Blood compounds and establish the method and technology to produce the raw materials of this medicine in the laboratory.



Experimental plot of *Dracaena cochinchinense*



Experiment on biosynthesis of Dragon's Blood compounds