INTERNATIONAL TROPICAL TIMBER ORGANIZATION

ITTO

PROJECT PROPOSAL

TITLE	PROMOTING HOUSEHOLD REFORESTATION IN TROPICAL ZONE OF SOUTHWESTERN CHINA THROUGH DEVELOPMENT AND EXTENSION OF HOUSEHOLD-ORIENTED TECHNIQUES
SERIAL NUMBER	PD 501/08 Rev.1 (F)
COMMITTEE	REFORESTATION AND FOREST MANAGEMENT
SUBMITTED BY	GOVERNMENT OF THE PEOPLE'S REPUBLIC OF CHINA
ORIGINAL LANGUAGE	ENGLISH

SUMMARY

The implementation of collective forest land tenure reform in tropical zone of Southwestern China made rural households becoming responsible for the management of two thirds of forest lands. Thus, their participation in reforestation and forest management are highly motivated, though most households lack of appropriate techniques in reforestation.

The project intends to develop and extend 'Household-Oriented Reforestation Techniques (HORT)', as a way to promote reforestation and rural development in tropical mountainous areas of Southwestern China. Technical support, associated with tenure rights and household enthusiasm, will then become effective driving forces in promoting household reforestation and socioeconomic development in tropical zone of Southwestern China.

The specific objective of the project is to promote household-oriented reforestation techniques through close cooperation between Forestry Research Institute and local households. Outputs to be obtained are: 1) HORT developed and available for extension; 2) Grassroots network for technique extension and information services (g-NETEIS) established and capable for HORT

EXECUTING AGENCY	Yunnan Academy of Forestry (YAF)
COOPERATING GOVERNMENTS	
DURATION	36 MONTHS
APPROXIMATE STARTING DATE	TO BE DETERMINED

BUDGET AND PROPOSED SOURCES OF FINANCE	Source	Contribution in US$	Local Currency Equivalent
	ITTO	**353,435**	
	Gov't of China	238,828	
	TOTAL	**592,263**	

TABLE OF CONTENTS

LIST OF ACRONYMS

CFTR:	Collective Forest Tenure Reform in China
DOST:	Yunnan Provincial Department of Science and Technology
DSA:	Daily Substance Allowance
FAO:	Food and Agriculture Organization of the United Nations
GEF:	The Global Environment Facilities
g-NETEIS:	grassroots Networks for Technique Extension and Information Services
HORT:	Household-Oriented Reforestation Techniques
MOFCOM:	Ministry of Commerce of the People's Republic of China
MOST:	Ministry of Science and Technology of the People's Republic of China
NDARC:	National Development and Reform Commission of the People's Republic of China
P-D:	Person-Day
P-M:	Person-Month
P-T:	Person-Time
SFA:	State Forestry Administration of the People's Republic of China
WB	The World Bank Group
YAF:	Yunnan Academy of Forestry
YDARC:	Yunnan Provincial Development and Reform Commission
YPDF:	Yunnan Provincial Department of Forestry

PART I: CONTEXT

1. Origin

To increase self-sufficient rate in tropical timber, Chinese government has made great efforts on tropical forest plantation. A series of projects supported by ITTO such as PD 14/ 92 Rev. 2 (F) and PD38/98 REV. 2(F) have been implemented in Hainan and Yunnan provinces, which made great contributions to the development of tropical forest plantation in Hainan, Guangdong, Guangxi, Yunnan and Fujian provinces. Besides, Chinese government has initiated the Six Key Forestry Programs including establishment of fast-growing and high-yield timber plantation bases since 2001, so as to promote development of forest plantations in the country.

On the point of view of managerial system, China has successfully fulfilled its food security of 1.3 billion people using 121.8 million ha of farmland (the Ministry of Land and Resources 2007) on the basis of practice of 'household contract responsibility system'. On the other hand, timber demands of the same population cannot be met by 286.7 million ha of forestland. Unclear tenure right and unfound subjects in the management of collective forestland (166.7 million ha or 58.1% of total forestland) are major obstacle factors, as analyzed. In 2003, the Chinese government commenced collective forest tenure reform (CFTR) with its purpose to speed up forest resource cultivation and rural economy development through motivating farmers to participate in reforestation and forest management. The 'household contract responsibility system' is replicated as one of major managerial systems in forestland management. Farmers' rights of management, disposition, and earnings are also guaranteed through identifying their rights to use of forestland and property right of forests.

On the point of view of technology adoption, the fast development of agriculture in China not only depends upon rich experiences accumulated from thousand-year farming practices, but also and mostly benefits from application of scientific technologies and good service provision at local level. In reforestation and forest management, farmers lack in not only knowledge and experiences, but also improved seeds and practical techniques. As rural households are motivated by CFTR the necessity for developing and providing household reforestation techniques becomes imperative.

The tropical zone in Southwestern China covers a total area of 98,000 km^2 and is mainly located in Yunnan, including canyons and mid-mountains in the southeast, basins among mountains

in the south, and valleys and mountains in the southwest. The tropical area represents 25.5% of the total area of Yunnan Province (384,000 km^2). Yunnan Academy of Forestry (YAF) is located in Kunming, the capital city of Yunnan Province. As a comprehensive center for forestry scientific research and technological development, YAF has set a Tropical Forestry Institute and an Experimental Forest Farm in tropical zone of Southwestern China since 1960s. During the years, lots of researches on selection of hardwood tree species, establishment of seed orchard and technology development for reforestation have been carried out. The achievement of Technology Development and Demonstration on Reforestation Using Tropical Hardwood Species in Yunnan Province of China supported by ITTO (PD38/98 REV. 2(F)) won Yunnan Scie-Tech progress Award (II) in 2006.

However before the forest tenure reform, the project implementation related to plantation technology development and extension services was mainly focused on state and collective forest farms and forest enterprises rather than rural households. From the prospective that farmers become the subject in reforestation and forest management, previous projects are evaluated, and lessons learnt are:

- ✧ Selection of tree species for reforestation shows only interests of scientists, without views of farmers;
- ✧ Technologies developed are not suitable for household scale and capacity in terms of investment and management;
- ✧ Present forestry technique services that reach county level cannot serve all households, which are small in scale and large in number and different from large and few farms and enterprises.

In line with present forestry development trend and emerging problems in the region, the project, to promote household reforestation in tropical zone of Southwestern China through development and extension of household-oriented techniques, is initiated and proposed.

2. Sectoral Policies

The Article 26 of 'Constitution of the Peoples Republic of China' states that 'The State organizes and encourages afforestation and the protection of forests'. Article 6 of 'Forest Law of the People's Republic of China' states that 'The State encourages scientific research in forestry, popularizes advanced forestry technology in upgrading the scientific and technical level of forestry'. 'Law of the PRC on the Popularization of Agricultural Technology' standardizes legislatively the application of agro-technologies, including for plantation, forestry, animal husbandry and fishery, and encouraging various international cooperation and experience exchanges related to agro-technology extension.

Entering the 21th century, the Chinese government at all levels pays high attention to forestry development. In 2003 the Central Committee of Communist Party of China and the State Council issued 'The Decision on Accelerating Development of Forestry' [Zhongfa(2003)No.9]. Later on in 2004 "The Decision on Speeding Up Forestry Development in Yunnan Province [Yunfa(2004)No.9] was released by Yunnan provincial government. The ongoing national collective forest tenure reform (CFTR) is a great event in the country, especially in rural areas because of its profound influences on forestry and socioeconomic development. CFTR gets high concerns not only from national leaders, but also the people. In 2006, the Chinese president Mr. Hu Jintao pointed out that 'Collective forest tenure reform is of great significance for the development of the country' when his visiting in Fujian province. Premier Wen Jiabao chaired a state council committee meeting for the thematic research on CFTR. Chinese people regard it as the Third Land Reform in China after the Land Reform at the beginning of liberation and the Household Contract Responsibility System established at the beginning of the opening-up. CFTR is expected to greatly emancipate/liberate productive forces in rural areas again. Yunnan provincial government furthermore issued 'The Decision on Deepening CFTR' (Yunfa (2006) No.19), with its purpose to motivate different stakeholders to participate in reforestation, management and utilization of forests, so as to further improve forestry productivity and ecological restoration.

'Suggestions of State Council on Deepening Reform and Strengthening Capacity of Grassroots Agricultural Technology Extension System' [Guofa(2006) No.30] issued by the State Council, dedicates to promoting applications of forestry-related research results and practical techniques in rural areas. 'The Decision on Enhancing Popularization Ability in Forestry Science and Technology' released by State Forestry Administration (SFA) [Linkefa (2005) No.184], points out that advanced and practical research results should be screened out and assembled in the front line of production. The decision aims to reach the goal of 40% of science progress contribution rate in forestry by year 2010 through speeding up the transformation of research achievements into forestry practices. 'The Action Plan for Promoting Forestry Development by Revitalizing Science and Education (2005-2007)' [Linkefa (2005) No.185] by SFA points out that 'the forestry sectors at local level and forestry households are the organizers and major forces in forestry production and development. The action plan focuses on the diffusion of science and technology in the countryside. Priorities in 2008 of SFA Technology Extension General-Station include: 1) to explore new approaches for the technology extension; 2) to enhance the role of forestry station; 3) to further organize training and propaganda in an improved way. All the actions taken show that authorities at each level give very close attention to the development of practical technology and extension services.

3. Programs and Operational Activities

At the beginning of 2001, the State Council approved the implementation of the Six Key Forestry Programs and integrated it in the tenth-five-year plan. By the August of 2002, the Programs have been fully launched. Within the Six Key Programs, some of them have direct relation with the project: 1) natural forest protection program; 2) restoration slope farmland to forest program; and 3) fast-growing and high-yield timber forest plantation program. The objective of the fast-growing and high-yield timber forest plantation program is to establish 13.3 million ha of timber plantation bases by year 2015, so as to supply 40% of domestic timber consumption. Major countermeasures adopted in the program include new reforestation, improvement of low yield plantation, and proper logging and utilization of the existing forest resources.

During the Tenth-five-year plan period, Yunnan Provincial Forestry Industry Master Plan was formulated. Pu'er Municipality, in Southern Yunnan, has been identified as key forestry industry zone for forest-pulp-paper integration and forestry chemical industry since its largest proportion of commercial forest in the province. At the beginning of the eleventh-five-year plan period, 'Yunnan Provincial Forestry Industry Development Plan' was formulated by Yunnan Provincial Department of Forestry (YPDF). To establish another new 2.24 million ha forest plantation has been proposed in the plan, so as to gradually shift logging in natural forests to plantation harvesting.

In order to promote the development of tropical plantation in Southwestern China, the State government, Yunnan provincial government and international organizations have implemented many projects in Pu'er Municipality and 2 of which are funded by ITTO:

1) ITTO: Demonstration on Reforestation Using Tropical Hardwood species in Yunnan Province of China, PPD 16/96 Rev. 2 (F), 1997-1998;
2) National Western Development Drive: Experimentation and Demonstration on Industrializing Resource Cultivation for Modern Forestry, 1999-2005;
3) ITTO: Technology Development and Demonstration on Reforestation Using Tropical Hardwood Species in Yunnan Province of China PD38/98 REV. 2(F), 2001-2004;
4) Yunnan Provincial Development and Reform Commission (YDRC): Construction of Forest Tree Breeding Base in Tropical Yunnan, 2001-2006;
5) SFA: Experimentation and Demonstration on Reforestation Technologies using Precious Hardwood Tree Species in Tropical Yunnan, 2003-2007;
6) MOFCOM: China International Training Course on Sustainable Management of Tropical Forest Plantations, 2003-2007.

PART II: THE PROJECT

1. Project Objectives

1.1 Development objective

Promote household reforestation as well as rural development in tropical mountainous areas of Southwestern China through development and extension of household-oriented reforestation techniques (HORT).

1.2 Specific objective

Promote household-oriented reforestation techniques (HORT) through close cooperation between Forestry Research Institute and local households.

2. Justification

2.1 Problems to be addressed

The total area of Pu'er Municipality is 44 450 km^2, sharing same border with Miyama, Laos and Vietnam. In Pu'er Municipality, there are 30 080 km^2 of forestlands, accounting for 67.7% of the total area, while the collective forestland covers an area of 19 730 km^2 or 65.6% of total forestland.

Implementation of CFTR laid a good basis for fast forestry development in Pu'er institutionally. It is however questionable if households are willing and capable to carry out reforestation and plantation management activities as expected. Thereafter a relevant thematic interview with different stakeholders has been carried out. Stakeholders interviewed include local forestry authorities, extension stations at county level, forestry stations at township level, households, forestry enterprises, and forestry research institutes, etc. Several interesting findings summarized, among others, are:

1) At the beginning of the interview the local forestry authorities think that the implementation of the forest tenure reform can surely get participation of rural residents in plantation and forest management. They recognize at the end of interview that there is still a long way to go to get actual involvement of rural residents into forestry practices.

2) The forestry extension stations at county level express that they are not capable to serve all rural households in the whole county though they hope to do so.

3) The forestry stations at township level express their high interest in technical provision for rural households (because this can improve their images resulting from working at law enforcement only). But it is much difficult to carry out technical services because of lack of experiences and related facilities;

4) Forestry industry enterprises are very interested in promoting household reforestation and forest management since they can access more raw materials at lower prices in nearby areas. But they also doubt if households have techniques for reforestation and plantation management and if households can really benefit from such operations.

5) Forestry research institutions have recognized the change of target groups or serving objects after CFTR implementation. But no specific action and countermeasure have been taken yet at the moment.

6) Rural households are greatly motivated to carry out reforestation and forest management activities on their contract forestland. At the same time many problems still facing them, among others, are:

   - ✧ Lack of knowledge and information for tree species selection through combination of forestland site conditions and timber market demands;
   - ✧ Lack of practical techniques on seedling raising and plantation establishment (they emphasized the "practical techniques" rather than "theoretic technologies");
   - ✧ Lack of economic resources to afford timber plantation management activity because of its long payback period.

It is clear that 'Lack of Appropriate Techniques for Household Reforestation' has become a key constraint for forest resource cultivation and rural development in Southwestern China in particular after CFTR implementation. That is the core problem the proposed project aims at. In accordance with problems found and causes analyzed, a problem tree is constructed in Annex E. There are two major causes resulting in the core problem: 1) No appropriate practical reforestation techniques available for rural households (and even forestry research institutions do not have such techniques); 2) Poor technique extension systems at grassroots level or no access for rural households to practical techniques that they catch at.

If the problem persists, then at least three consequences will appear: 1) Tropical forest resource cultivation in the region remains idle, since the largest proportion of subjects in the management of forestland are not capable to play their due roles; 2) The goal of CFTR cannot be achieved, without actual participation of local household in the reforestation and forest management; and 3) Local

households remain in poverty, though their legal status in tropical forestland management are improved.

Reasons that Pu'er Municipality was selected to implement the project are:

1) Pu'er is located in the core of tropical zone in Southwestern China. It is not only the biggest forest area in Southwestern China but also important areas for commercial timber production and forestry industry;

2) Forestry is the pillar of local economy. According to the eleventh-five year plan of Pu'er Municipality, the total forestry production value will reach RMB 7.0 billion as the end of planned period. This number amounts the total of other 8 traditional sectors such as tea, tobacco, and sugarcane, etc.;

3) Pu'er has been identified by SFA as National Demonstration Site for Forest Classification Management since 1999, and National Demonstration Site for Forest Resource Management and Administration since 2000. Also in 2000, it was approved by NDARC as the Development Zone for Modern Forestry. It is clear that implementation of the project will set a good example to show others;

4) Many previous YAF scientific research and technology development projects implemented in Pu'er lays a sound basis for the proposed project.

2.2 Intended situation after project completion

After project implementation, household reforestation in project areas will be pushed forward by three driving forces together: household legal status guaranteed, household-oriented technique available, and household enthusiasm activated. Actual participation of household in reforestation and plantation management will activate the biggest proportion of forestland, which is previous collective one and present household contract one. Activation of this proportion of forestland ensures both fast development of forest resource cultivation and rural economy. In specific, a desirable situation in project areas will be observed as follows:

1) A batch of optional reforestation tree species will be available for households, which comes out from integrated consideration of household comments, market demands, and site conditions during project implementation;

2) Household-oriented reforestation techniques (HORT) will be available, which is developed on the basis of household conditions including land scale, investment capacity, management skill, and interests. *A Technical Manual for Household reforestation* will also be available for local households through implementation of the

project;

3) Establishment of grassroots networks for technique extension and information services (g-NETEIS), with its capacity building, will make households continuously access practical techniques, improved seeds and vigorous seedlings;

4) In the course of acquiring techniques and practicing reforestation, local households will access to more market information of timber and non-wood products. The extent of information obtained decides households' bargaining power, through which fair trade in marketplace will be promoted;

5) More raw materials are available for forestry industrial enterprises to speed up their development, which will contribute to regional socioeconomic development;

6) Research institutes will continuously source information on households' technical demands from grassroots networks, and through which more projects will be initiated with clear target of households.

In addition, the project will act as a demonstration to push forward forestry resource cultivation in a larger tropical area:

1) The project implementation will promote household reforestation in the whole project areas;

2) The project results and successful experiences will be extended to the southeastern and southwestern areas of Southwestern China;

3) Successful experiences of the project will be extended to the other places with similar conditions, by the name of Pu'er as 'National Demonstration Area';

4) Establishment of g-NETEIS will be pushed forward in the whole country, through giving evidence that the technical support is essential rather than forest tenure reform is independently implemented.

2.3 Project strategy

The master strategy of the project is to develop 'Household-Oriented Reforestation Techniques (HORT)' through close cooperation between forestry research institute and local households, and transfer HORT to households through g-NETEIS establishment and capacity building. To achieve the project objectives, relevant approaches and countermeasures are initiated, and the objective tree is constructed in Annex F.

To ensure the successful HORT development the following strategies are identified:

1) **Analysis of the gap between techniques available and household demands**

- ✧ Based on literature review and key-person interview, international and national HORT progress and achievements will be evaluated, which may include tree species selection, seedling raising, plantation establishment, multi-layer forestry, and plantation management, etc.;
- ✧ Using participatory approaches, household conditions, including land scale, investment capacity, management skill, favorable tree species, and technical demands, will be evaluated;
- ✧ Using methods of gap analysis, the **gap** between household demands and techniques available will be **identified**.

2) Participatory technique development:

- ✧ Close cooperation between project personnel and local households will run through the whole process of the HORT development starting from trial design;
- ✧ All trials will be carried out directly on the household contract forestland, so as to win actual involvement of households.
- ✧ Based on active participation of local households, *A Technical Manual for Household Reforestation* will be formulated in locally accustomed styles.

To ensure successful HORT extension and further diffusion in the whole tropical zone of Southwestern China, the following strategies are recognized:

1) The g-NETEIS will be established, with a center in township forestry station and members from villages;
2) Due to rural residents' behavioral style of 'Believing by Seeing', demonstration plantations **for technique illustration and extension** will be established directly on the household contract forestland;
3) **County Forestry Technique Extension Station will be involved since the beginning of the project implementation, so as to learn extension experiences and gain its supports for the g-NETEIS;**
4) **Adopting participatory adult education approaches, trainings for network members and households will be organized respectively; and *A Handbook for Forestry Technique Extension Practitioner* will be formulated;**
5) A workshop will be organized at the end of project implementation, so as to disseminate

project achievements in the whole tropical zone of Southwestern China: Techniques for household reforestation and Experiences of grassroots networks establishment.

Alternative strategies:

1) Technique development (see right blue block in Annex F): The existing technology are simply tailored and directly transferred to technique extension agencies or directly applied in household reforestation practices. The strategy will be very cheap as far as cost concerned. On the other hand, it will decrease acceptability of the tailored technologies and increase household costs to practice reforestation. This may result in the risk of failure of the whole project;

2) Technique extension (See left blue block in Annex F): Present networks for forestry technology extension (reaching county level) are expanded to township level. However, to newly establish an independent extension agency will cost several times to expand function of existing township forestry station. In addition, it is not realistic to constitute new agencies at the project level.

2.4 Target beneficiaries

2.4.1 Direct target beneficiaries

Local households: Households who participate in technique development and trainings can get practical techniques and relevant information on tropical reforestation and plantation management at the very first time after the forest tenure reform;

The g-NETEIS members: They will gain the updated techniques and information through participation in networks operation and management, which lays a good foundation for them to become the able person in reforestation and leading person in income generation.

Pilot township forestry stations: They can benefit from the 4 aspects as bellows: 1) equipment and facilities necessary for extension services; 2) staff trained in forestry knowledge and extension skills; 3) training materials available for future extension and services; 4) technique extension and information services will contribute to strengthening law enforcement;

County Forestry Technique Extension Station: 1) A new model for technique extension and information service is available; 2) the problem that it cannot serve all households in the county will be solved through g-NETEIS; 3) its functional transition from serving state/collective forest farms to rural households will be achieved;

YAF: 1) Project staffs will learn knowledge and accumulate experiences on HORT development; 2) project implementation will help YAF re-position its target groups, upgrade social

service consciousness, and adjust development strategies, so as to adapt the changing context;

Forestry workers and local labor forces: They will obtain more incomes, practical techniques, and reforestation experiences through participation in the project activities.

2.4.2 Potential target beneficiaries

Government at all levels: 1) Along with the increase of rural households engaged in reforestation and plantation management, the government revenue will increase rather than decrease though favorable taxes is a part of CFTR; 2) project experiences give an integrated approach for government to promote socioeconomic development and ecological restoration in mountainous rural areas; 3) diffusion of the project experiences helps government to reach the goal of 'increase timber self-sufficient rate through strengthening forest resource cultivation'.

Forestry Industrial enterprises: Along with the increase of tropical plantations in the region, local enterprises can acquire more raw materials at a lower cost, so as to enlarge their profits.

2.5 Technical and scientific aspects

2.5.1 General consideration

Frequently asked technical questions during the initiation of the project are: 1) the only difference between household reforestation and previous farm/enterprise reforestation is the scale, why is it necessary to carry out HORT development, rather than to apply present technology directly? 2) What is the HORT and in which way it can be developed and extended? Answers to these questions will also scientifically explain the necessity and technical feasibility of the project.

To appropriately and clearly answer these questions, two examples are given in box 1.

Box 1

Exp 1 In 1960s, The Object-Oriented Programming (OOP) concept and philosophy were proposed in the field of computer sciences. Along with the rapid development of OOP technology, most of the computer users could use computer freely without learning complicated mathematic theory, data structure, and algorithms. People say that OOP made the popularization of the computer and leaping development of related industry.

Exp2 In mid of 1970s, Many of projects for poverty alleviation and rural development implemented in developing countries were failed. Among reasons recognized, the most important one is that local residents were not interested in actions such outsiders (government officials and experts) intended as creating infrastructure, introducing new technology, and creating institutions. Thus in later 1970s and early 1980s, RRA and PRA approaches were developed to ensure actual participation of local residents in the whole process of planning, implementing and maintaining. In this way community development were really promoted and the approaches were widely adopted in different countries of the world.

Experiences learnt and inspirations enlightened from the examples, among others, are:

1) It is necessary to develop handy techniques for local households, instead of to train them with theories of biology, plant physiology, ecology, and pedology, etc.;

2) It should not impose advanced (as experts regarded) technologies available in research institutions on local households. To simply tailor existing technology and apply it in household reforestation is also not encouraged;

3) HORT should be developed based on well understanding of household conditions including land scale, investment capacity, management skills, and interests. Households, as the user of the techniques, should be involved in the whole process of HORT development;

4) Household acceptability and accessibility should be fully considered in the course of technique extension.

'Household-oriented reforestation techniques (HORT)' is thereby defined as: Practical techniques for tree species selection, seedling raising, and plantation establishment and management on the basis of household conditions of land scale, investment capacity, management skills, and interests.

2.5.2 Development of households-oriented reforestation techniques

(1) Techniques for nursery management and seedling raising

A total 0.5 ha of trial and demonstration nursery will be established on 1-2 households' contract land in rural area of Pu'er Municipality. Trials on nursery establishment, seed handling, container selection, fertilization, and integrated nursery management will be conducted. The nursery will raise seedlings for demonstration plantation establishment, while serving as a technique demonstration for nursery construction and seedling raising. Tree species for technical trials and demonstrations include: *Betula alnoides, Altingia excellsa, Swietenia mahagoni, Aquilaria sinensis, Mytilaria laosensis, Pinus kesiya, Taxus yunnanensis, Alnus nepalensis.* Tree species can be added or canceled according to household's interests.

(2) Techniques for plantation establishment

Techniques for plantation establishment will be developed through trials of site preparation, mixture planting, planting density, fertilizing, and multi-layer management, with appropriate selection of tree species. The area of all trials totals to 10.64 ha, with participation of 36 households. Forestlands to deploy trials are mainly sparsely forested woodland, shrubbery land and bare

mountain, resulting from poor management of previous collective forestlands.

a. Site preparation trial

On sparsely forested woodland or shrubbery land, three methods will be applied for site preparation trial: strip reclaiming, block reclaiming and unprepared control. On bare mountains, four methods will be employed: burning clearing + strip reclaiming, strip reclaiming, block reclaiming, and unprepared control. *Betula alnoides* or household interested tree species is selected for the trial. The area of the trial totals to 1.26 ha, with the participation of 3 households.

b. mixture planting trial

Though many researches show that mixture forest plantation is the mainstream in the future, it is seldom practiced in large-scale reforestation of state/collective forest farms and enterprises because of its inconvenience to manage. Household reforestation with intensive management, however, gives a precious opportunity for the development of mixture forest plantations.

Three tree species (*Betula alnoides, Altingia excellsa,* and *Swietenia mahagoni*) will be mixed with two tree species (*Pinus kesiy* and *Alnus nepalensis*) respectively. Tree species can also be changed in accordance with local household interests. The mixture ratios are 1:1 and 1:2. Trial area totals to 2.16 ha, with the participation of 7 households.

c. Planting density trial

Four treatments including 2m×2m, 2m×3m, 3m×3m, and 3m×4m will be applied for planting density trial. Tree species to be selected include *Betula alnoides, Mytilaria laosensis, , Swietenia mahagoni,* or other favorable species of local households. The area of trial plantations amounts to 3.60 ha, with the participation of 10 households.

d. Fertilizing trial

Treatments for fertilizing trial are: N, P, K, N+K, N+P, K+P, NPK, manure (humus soil), and unfertilized control. Tree species to be taken include *Betula alnoides* and *Altingia excellsa,* or other favorable species according to local households. The area of the trial is 1.62 ha, with the participation of 5 households.

e. Trial of Multi-layer management

No agricultural production activities are allowed on household contract forestland, according to CFTR. Both Taungya and Agroforestry systems cannot meet the technical requirement to regulate short and long term benefits in household reforestation. The concept of Multi-layer Forestry or Multi-layer Management is, thereafter, proposed. That is 'A forest management model to realize

both short and long term benefits through fully using forest stand spaces to cultivate forest plants that can be harvested in a short-term'. The emphasis of the concept is Forest Plants, rather than Crops.

Two methods of *Betula alnoides* + *Taxus yunnanensis* + *Dendrobium offieinale* and *Aquilaria sinensis* + *Taxus yunnanensis* are initiated in the trial of multi-layer forestry. The total area of the trial is 2.0 ha, with the participation of 10 households.

2.5.3 Establishment of g-NETEIS

(1) Establishment of demonstration plantations

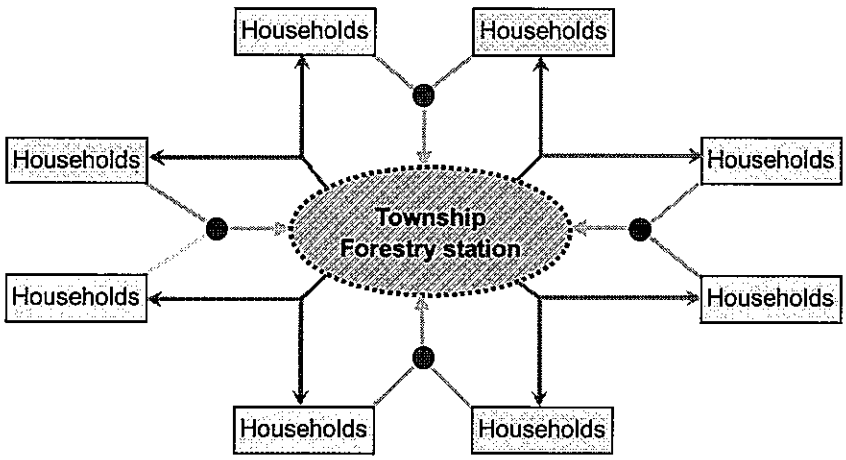
Establishment of demonstration plantations is indispensable for technique extension, because 'believing by seeing' is one of the behavioral characteristics of rural residents. A total 60.0 ha of demonstration plantations with different technique combinations will established on household contract forestland, with the participation of 180 households.

Based on different site conditions and varied inputs, a series of technique combinations for reforestation will be obtained from above trials. By techno-economic analysis, the benefit of each combination can be basically worked out using investments (economic form of inputs) and current prices of expected outputs. Then optional technique combinations with different cost effectiveness will be available for those who are interested in establishing demonstration plantations.

(2) Framework of g-NETEIS

The g-NETEIS is a grassroots technique extension system with a focus at township and village levels. Two townships of Pu'er Municipality will be selected to establish g-NETEIS, which is configured with a center in township forestry station, members from villages, and a serving target of rural households (refer to figure 1).

Figure 1 Organizational Chart of g-NETEIS



The network members may consist of **township forestry station staffs, village** forest guards, village leaders and villager representatives. Members from villages serve mainly as information carriers between the center and target group. Household technique demands and forest management conditions will be sent in time to the center (Yellow arrows in Figure 1) through information carriers (red nodes). Based on integrated analysis of information gathered, the center will make appropriate service provision (Green arrows).

The g-NETEIS will be operated under administrative and technical supervision of County Forestry Technique Extension Station.

(3) Capacity building for g-NETEIS

Following the establishment of grassroots networks in two pilot townships, the operation and management mechanism of the networks are going to be further explored. **With supports of municipal and County Forestry Technique Extension Stations, an operation regulation will be formulated for the network. At the same time, the functions of the Extension Stations will be modified, so as to realize even joint between Extension Stations and g-NETEIS. Technically, a** domestic forestry technique extension consult/expert will be invited to survey network operation, daily management, and service provision, etc. At the end of consultation, '*A Handbook for Forestry Technique Extension Practitioner*' will be drafted. Besides, two training courses will be organized, of which one focuses on extension skills and service provision, and another is for network operation and management. Totally 50 person-time will be trained by adopting participatory training approaches in accordance with adult learning habits.

Based on *A Technical Manual for Household Reforestation* formulated, household training demands are further assessed, so as to develop appropriate training materials. Three training courses will be organized to train 150 person-times of rural residents, with the participation of network members. Trainings provide technical support for practices of household reforestation on one hand, and demonstrate the grassroots networks with approaches of technique extension and service provision on the other hand.

(4) Diffusion of project achievements

There two major technical achievements after the project implementation: HORT and g-NETEIS. To extend and apply project achievements in the whole tropical zone of Southwestern China, a 'Regional Workshop on HORT Development and g-NETEIS Establishment' will be organized in YAF near project completion. There are 50 participants anticipated, and mainly from 7 prefectures and

26 counties in tropical areas. Diffusion of project achievements during the workshop will be carried out through presentations and informal discussions, so as to facilitate household reforestation in the tropical zone of Southwestern China.

2.6 Economic aspects

During the project period, only part of benefits from seedling raising, multi-layer forestry can be seen. According to investments and current prices of expected outputs, the benefit of each reforestation model can be estimated based on cost-benefit analysis. All benefits generated from the project implementation belong to involved households since trial and demonstration activities are carried out on their forestland.

HORT and g-NETEIS will be extended to the other places outside the project area. It is believed that once the involved households get benefits, more households will be motivated. The expansion of household reforestation will promote rural development in mountainous area of Southwestern China, which is a harmonious development associating economy with environment.

2.7 Environmental aspects

The project dedicates to promoting household reforestation. No big negative environmental impact will happen. Theoretically, minor environmental impacts may be produced by soil erosion during site preparation and decrease in biodiversity from pure forest plantations.

In fact, project sites for trial and demonstration plantations are previous collective forestlands, which are severe degraded because of extensive management or even abandonment for a long time. Soil and water erosion will be prevented as soon as reforestation activities complete. Forest structure and stand quality of these degraded forestland will be dramatically improved too, so as to gain higher and durable functions for soil and water conservation. In addition, the project area is located in the watershed of Mekong-Lancang River. Plantations by the project and by the extension will benefit for the whole watershed. To avoid establishing pure plantations in a large area, YAF is capable to provide 7-10 tree species for the project. Selection of indigenous tree species will further strengthened through the project of active participation of local households. Mixture reforestation and multi-layer forestry will be encouraged during the project implementation. Intensively managed household reforestation is considered as a precious opportunity in the course of promoting mixture plantations.

Timber supply (including for households self-use) will increase along with the expansion of the plantation areas, which will decrease pressures of natural forests from tropical timber demands. That helps accordingly biodiversity protection and environment restoration. In addition, trial and demonstration plantations will be built on household contract forestland, which is very close to

village and their farming system. It is expected that project implementation will give positive effect to rural living environment and farming system.

2.8 Social aspects

At the level of project areas, household participation will be highly concerned in trials, demonstrations, and capacity building. Such household participation is regarded as a key to the project success. Co-development of techniques not only creates temporary job opportunities for local people, but also strengthens their capacities in long-term employment. Sound operation of g-NETEIS enhances social images of pilot forestry stations, and improves local households' accessibility to practical techniques and updated information. In addition, the project implementation will have obvious contributions to YAF in changing its attitudes towards rural areas.

At the level of Pu'er Municipality, there are 1,929,750 people or 3/4 of the total population (2,573,000 people, 2006 census) living in rural areas, and more than 90% of rural populations live in mountainous areas. Successful implementation of the project will encourage more and more rural residents to participate in reforestation and forest management activities. At the end, such scenario is expected: a large number of rural residents are engaged in forest resource cultivation, and forestry industrial enterprises in the region grow fast with the sufficient raw material supply.

Nationally, this is the first time to carry out such kind of project in particular after CFTR implementation. The success of the project will facilitate HORT development and g-NETEIS establishment throughout the country.

2.9 Risks

The risks and mitigation measures are identified as follows:

Risk Factor	Mitigation Measures
1. Low interest of local households in participation	1.1 It is believed by project staffs (community experts) that local communities are mobilizable once appropriate approaches adopted. 1.2 To integrate local ideas into planning, like tree species selection etc.
2. Participators difficult to change their traditional ideas in HORT development	2.1 To patiently explain the benefits for them before activities start, and help them to build up objectives; 2.2 To bring them to join the activities step by step.
3. Labor forces of participated households to work out of home	3.1 To take good considerations during selection of households; 3.2 To avoid before it happens through strengthening monitoring.
4. free grazing damaging seedling and young growth	4.1 To organize patrolling team in villages to improve management; 4.2 To consult with graziers for grazing in a certain area.

3. Outputs

Specific objective

Promote household-oriented reforestation techniques (HORT) through close cooperation between Forestry Research Institute and local households

Output 1 HORT developed and available for extension;

Output 2 g-NETEIS established and capable for HORT promotion.

4. Activities

4.1 Output 1

HORT developed and available for extension

Activity 1.1 assess technique demands of household in project area;

Activity 1.2 select 1-2 households to establish 0.5 ha of trial nursery to conduct technical trials for seed handling, container selection, fertilization, and integrated management of nursery;

Activity 1.3 establish 10.64 ha of trial plantations on household forestland to conduct technical trials for site preparation, mixture planting, planting density, fertilizing, and multi-layer forestry;

Activity 1.4 wrap up project research results and review relevant literatures;

Activity 1.5 formulate *Technical Report of Household Reforestation*;

Activity 1.6 draft, publish and distribute *A Technical Manual for Household Reforestation*.

4.2 Output 2

g-NETEIS established and capable for HORT promotion

Activity 2.1 select 2 townships/towns to establish pilot g-NETEIS;

Activity 2.2 establish 60.0 ha of demonstration plantations on household forestland;

Activity 2.3 formulate *A Handbook for Forestry Technique Extension Practitioner*;

Activity 2.4 organize 5 training courses to train 50 technique extension practitioners (2 courses) and 150 rural residents (3 courses);

Activity 2.5 organize 'Tropical Southwestern China Workshop on HORT Development and g-NETEIS Establishment'.

5. Logical Framework

Project Component	Indicators	Means of Verification	Assumption
Development Objective Promote household reforestation as well as rural development in tropical mountainous areas of southwestern China through development and extension of household-oriented reforestation techniques	◆ Increased household reforestation areas; ◆ Improved quality of stand in household forestlands; ◆ Increased local household's income.	◆ Forest resources inventory data; ◆ Municipality and county governments' Yearbooks and statistic publications.	◆ Good match of the project with CFTR; ◆ Successful development and promotion of HORT.
Specific Objectives Promote household-oriented reforestation techniques (HORT) through close cooperation between Forestry Research Institute and local households	◆ HORT developed ◆ g-NETEIS established ◆ HORT accepted by households	◆ Project reports; ◆ Technical manual and report; ◆ Field inspection and interview.	◆ Good cooperation between Research Institute and local Households; ◆ Supports from local forestry authorities and extension offices.
Output 1. HORT developed and available for extension	◆ *Evaluation Report of Household Technique Demands* formulated; ◆ 0.5 ha of trial nursery and 10.64 ha of trial plantations established; ◆ Trials on seedling raising and plantation establishment carried out; ◆ *A Technical Manual for Household Reforestation* published.	◆ Project reports; ◆ Field inspection; ◆ Published research papers retrieval.	◆ Funding on schedule; ◆ Good cooperation of local households; ◆ International/national consults in places; ◆ Publisher's cooperation; ◆ Risks in implementation avoided;

Project Component	Indicators	Means of Verification	Assumption
2. g-NETEIS established and capable for HORT promotion	◆ g-NETEIS established and operational ◆ 60.0 ha of demonstration plantation established; ◆ *A handbook for forestry technique extension practitioners* formulated; ◆ 50 person-times of g-NETEIS members trained; ◆ 150 person-times of rural residents trained; ◆ Regional Workshop on HORT Development and g-NETEIS Establishment held.	◆ Project reports; ◆ Field inspection and interview; ◆ g-NETEIS operation regulation; ◆ Training certificates; ◆ Photo pictures.	◆ Funding on schedule ◆ Good cooperation of local forestry stations; ◆ Supports of local extension offices; ◆ Good cooperation of local households; ◆ National consultant in place ◆ Support of YPDF

6. Work Plan

Output/Activities	Responsible Party	Year 1 Quarter I	Year 1 Quarter II	Year 1 Quarter III	Year 1 Quarter IV	Year 2 Quarter I	Year 2 Quarter II	Year 2 Quarter III	Year 2 Quarter IV	Year 3 Quarter I	Year 3 Quarter II	Year 3 Quarter III	Year 3 Quarter IV
Output 1 HORT developed and available for extension													
Activity 1.1 assess technique demands of household in project area		■											
Activity 1.2 select 1-2 households to establish 0.5 ha of trial nursery to conduct technical trials for seed handling, container selection, fertilization, and integrated management of nursery;	YAF	■	■	■	■	■	■						
Activity 1.3 establish 10.64 ha of trial plantations on household forestland to conduct technical trials for site preparation, mixture planting, planting density, fertilizing, and multi-layer forestry	YAF and sub-contract			■	■	■	■	■	■	■	■	■	■
Activity 1.4 wrap up project research results and review relevant literatures	YAF									■	■	■	
Activity 1.5 formulate *Technical Report of Household Reforestation*	YAF											■	
Activity 1.6 draft, publish and distribute *A Technical Manual for Household Reforestation*	YAF and sub-contract												■
Output 2 g-NETEIS established and capable for HORT promotion													
Activity 2.1 select 2 townships/towns to establish pilot g-NETEIS;	YAF and sub-contract	■	■										
Activity 2.2 establish 60.0 ha of demonstration plantations on household forestland	YAF and sub-contract									■	■	■	■
Activity 2.3 formulate *A Handbook for Forestry Technique Extension Practitioner*	YAF and sub-contract		■	■									
Activity 2.4 organize 5 training courses to train 50 technique extension practitioners (2 courses) and 150 rural residents (3 courses)	YAF			■	■		■		■		■		
Activity 2.5 organize 'Tropical Southwestern China Workshop on HORT Development and g-NETEIS Establishment'	YAF											■	

7. Budget

7.1 Worksheet of budget component (US$)

Output/ Activities		Inputs Units and Quality	ITTO	CN	Unit Cost (US$)	Quarter Year	Component	Total ITTO	Total China
Output 1 HORT developed and available for extension									
Activity 1.1 assess technique demands of household in project area	1	Domestic travel (P-T)	2	0	200	Q1,Y3	32	400	0
	2	Local transport (P-M)	0.5	0	450		33	225	0
	3	DSA staff (P-M)	0.5	0	1,200		34.1	600	0
	4	Sundry	1	0	500		61	500	0
Sub-Total 1.1								**1,725**	**0**
Activity 1.2 select 1-2 households to establish 0.5 ha of trial nursery to conduct technical trials for seed handling, container selection, fertilization, and integrated management of nursery;	1	Domestic travel (Person-Time)	18	0	200	Q1-Q4, Y1;Q1-Q2,Y2	32	3,600	0
	2	Local transport (Person-Month)	2.5	0	450		33	1,125	0
	3	Daily Subsistence Allowance [DSA] staff (P-M)	2.5	0	1,200		34.1	3,000	0
	4	Local technicians(P-M)	1.5	0	300		15	450	0
	5	Local workers(P-M)	6	0	200		16	1,200	0
	6	Trial materials (seeds, fertilizer etc.)	1	0	12,000		51	12,000	0
	7	Nursery construction	1	0	13,250		21	13,250	0
	8	Nursery equipment	1	0	800		42	800	0
	9	Sundry	1	0	1,400		61	1,400	0
Sub-Total 1.2								**36,825**	**0**
Activity 1.3 establish 10.64 ha of trial plantations on household forestland to conduct technical trials for site preparation, mixture planting, planting density, fertilizing, and multi-layer forestry	1	Domestic travel (Person-Time)	24	0	200	Q3-Q4, Y1;Q1-Q4,Y2; Q1-Q4, Y3	32	4,800	0
	2	Local transport (P-M)	4	0	450		33	1,800	0
	3	DSA staff (P-M)	4	0	1,200		34.1	4,800	0
	4	Local technicians(P-M)	7	0	300		15	2,100	0
	5	Site preparations and field planting	1	0	6,000		23	6,000	0
	6	Soil sample analysis	150	0	15		24	2,250	0
	7	Measuring equipment and cartographic tool	1	0	300		42	300	0
	8	Trial materials	1	0	7,500		51	7,500	0
	9	Sundry	1	0	1,000		61	1,000	0
Sub-Total 1.3								**30,550**	**0**
Activity 1.4 wrap up project research results and review relevant literatures	1	Domestic travel (P-T)	2	0	200	Q2-Q3, Y3	32	400	0
	2	Local transport (P-M)	0.5	0	450		33	225	0
	3	DSA staff (P-M)	0.5	0	1,200		34.1	600	0
	4	Portable computer	1	0	1,500		43	1,500	0
	5	Office supplies	1		250		54	250	0
	6	Sundry	1	0	500		61	500	0
Sub-Total 1.4								**3,475**	0
Activity 1.5 formulate *Technical Report of*	1	International consultant (P-M)	0.5	1	12,000	Q3,Y3	14.1	6,000	0
	2	International trav.(P-T)	1		1,500		31	1,500	0

Household Reforestation	3	Domestic travel (P-T)	2		200		32	400	0
	4	Local transport (P-M)	7		15		33	105	0
	5	DSA staff (P-M)	7		50		34.1	350	0
	6	Portable computer	1	0	1,500		43	1,500	0
	7	Office supplies	1	0	250		54	250	0
	8	Sundry	1	0	200		61	200	0
Sub-Total 1.5								**10,305**	**0**
Activity 1.6 draft, publish and distribute *A Technical Manual for Household Reforestation*	1	National consul.(P-M)	0.5	0	1,200	Q4,Y3	14.2	600	0
	2	Domestic travel (P-T)	4	0	200		32	800	0
	3	Local transport (P-M)	0.5	0	450		33	225	0
	4	DSA staff (P-M)	0.5	0	1,200		34.1	600	0
	5	Office supplies	1	0	250		54	250	0
	6	Publishing & releasing	1	0	8,000		25	8,000	0
	7	Sundry	1	0	300		61	300	0
Sub-Total 1.6								**10,775**	**0**
Sub-Total 1								**93,655**	**0**
Output 2 g-NETEIS established and capable for HORT promotion									
Activity 2.1 select 2 townships/towns to establish pilot g-NETEIS	1	Domestic travel (P-T)	4	0	200	Q1-Q2, Y1	32	800	0
	2	Local transport (P-M)	0.5	0	450		33	225	0
	3	DSA staff (P-M)	0.5	0	1,200		34.1	600	0
	4	Office supplies for g-NETEIS	1	0	500		55	500	0
	5	Equipment & facilities for g-NETEIS	2	0	14,500		45	29,000	0
	6	Sundry	1	0	1,500		61	1,500	0
Sub-Total 2.1								**32,625**	**0**
Activity 2.2 establish 60.0 ha of demonstration plantations on household forestland	1	Domestic travel(P-T)	14	0	200	Q1-Q4, Y3	32	2,800	0
	2	Local transport(P-M)	4	0	450		33	1,800	0
	3	DSA staff (P-M)	4	0	1,200		34.1	4,800	0
	4	Local technicians(P-M)	6.5	0	300		15	1,950	0
	5	Seedling raising	1	0	3,000		22	3,000	0
	6	Site preparations and field planting	1	0	30,000		23	30,000	0
	7	Production materials	1	0	23,700		52	23,700	0
	8	Sundry	1	0	2,150		61	2,150	0
Sub-Total 2.2								**70,200**	**0**
Activity 2.3 formulate *A Handbook for Forestry Technique Extension Practitioner*	1	Domestic consul.(P-M)	0.5		1,200	Q2-Q3, Y1	14.2	600	0
	2	Domestic travel (P-T)	3	0	200		32	600	0
	3	Local transport (P-M)	0.5	0	450		33	225	0
	4	DSA staff (P-M)	0.5	0	1,200		34.1	600	0
	5	Portable computer	1	0	1,500		43	1,500	0
	6	Office supplies	1	0	250		54	250	0
	7	Copying & binding	1	0	3,000		25	3,000	0
	8	Sundry	1	0	400		61	400	0

Sub-Total 2.3								**7,175**	**0**
Activity 2.4 organize 5 training courses to train 50 technique extension practitioners (2 courses) and 150 rural residents (3 courses)	1	Domestic travel(P-T)	15	0	200	Q3-Q4, Y1;Q2、Q4,Y2; Q2,Y3	32	3,000	0
	2	Local transport(P-M)	1	0	450		33	450	0
	3	DSA staff (P-M)	1	0	1,200		34.1	1,200	0
	4	DSA Trainees (P-M)	34	0	600		34.2	20,400	0
	5	Copying and binding	1	0	1,500		25	1,500	0
	6	Training equipment and facilities	1	0	2,000		46	2,000	0
	7	Training room(Day)	25	0	400		41.2	10,000	0
	8	Office supplies	5	0	250		54	1,250	0
	9	Sundry	1	0	1,200		61	1,200	0
Sub-Total 2.4								**41,000**	**0**
Activity 2.5 organize 'Tropical Southwestern China Workshop on HORT Development and g-NETEIS Establishment'	1	Domestic travel (P-T)	6		200	Q3,Y3	32	1,200	0
	2	Local transport(P-M)	1		450		33	450	0
	3	DSA Staff (P-M)	1		1,200		34.1	1,200	0
	4	DSA workshop (P-D)	100		50		34.3	5,000	0
	5	Publishing proceeding	1		2,000		25	2,000	0
	6	Office Supplies	1		1,000		54	1,000	0
	7	Sundry	1		1,200		61	1,200	0
Sub-Total 2.5								**12,050**	
Sub-Total 2								**163,050**	**0**
Sub-total by Activity								**256,705**	**0**
Non-Activity Based Expenses									
	1	Project director(P-M)	0	36	800	Y1-Y3	11	0	28,800
	2	Deputy director (P-M)	0	36	600		12	0	21,600
	3	Project & PMO staffs	0	216	450		13	0	97,200
	4	PMO space	0	1	15,000		41.1	0	15,000
	5	1 Vehicle	1	0	24,000		44	24,000	0
	6	Fuels and electricity	0.62	0.38	13,000		53	8,000	5,000
	7	PMO equipment and facilities	1	0	5,000		47	5,000	0
	8	Office supplies	3	0	250		54	750	0
	9	Independent audit	3	0	1,000		26	3,000	0
	10	Insurance	1	0	1,800		62	1,800	0
	11	Sundry	8	0	1,500		61	8,000	0
Sub-total by Non-Activity								**50,550**	**167,600**
Total of Activity & N-activity								**307,255**	**167,600**
Executing agency mgmt cost (15% total project budget)								**0**	**71,228**
ITTO Monitoring, Evaluation and Administration	1	Monitoring and review costs					81	13,000	
	2	Ex-post evaluation cost					82	7,000	
	3	Program support cost (8% from total)					83	26,180	
Total Budget								**353,435**	**238,828**

7.2 Overall project budget by activity (US$)

Output/Activity+ Non-activity based Expenses	10 Personnel		20 Sub-Contr.		30 Duty Travel		40 Capitals		50 Consum.		60 Miscellan.		Quarter Year	Grand Total	
	ITTO	China	ITTO	China	ITTO	China	ITTO	China	ITTO	China	ITTO	China		ITTO	China
Output 1 HORT developed and available for extension															
1.1 assess technique demands of household in project area	0	0	0	0	1,225	0	0	0	0	0	500	0	Q1,Y1	1,725	0
1.2 select 1-2 households to establish 0.5 ha of trial nursery to conduct technical trials for seed handling, container selection, fertilization, and integrated management of nursery;	1,650	0	13,250	0	7,725	0	800	0	12,000	0	1,400	0	Q1,Y1	36,825	0
1.3 establish 10.64 ha of trial plantations on household forestland to conduct technical trials for site preparation, mixture planting, planting density, fertilizing, and multi-layer forestry	2,100	0	8,250	0	11,400	0	300	0	7,500	0	1,000	0	Q1-4,Y1 Q1-2,Y2	30,550	0
1.4 wrap up project research results and review relevant literatures	0	0	0	0	1,225	0	1,500	0	250	0	500	0	Q2-3,Y3	3,475	0
1.5 formulate *Technical Report of Household Reforestation*	6,000	0	0	0	2,355	0	1,500	0	250	0	200	0	Q3-4,Y3	10,305	0
1.6 draft, publish and distribute *A Technical Manual for Household Reforestation*	600	0	8,000	0	1,625	0	0	0	250	0	300	0	Q4,Y3	10,775	0
Sub-Total 1	10,350	0	29,500	0	25,555	0	4,100	0	20,250	0	3,900	0	0	93,655	0

Output 2 g-NETEIS established and capable for HORT promotion															
2.1 select 2 townships/towns to establish pilot g-NETEIS	0	0	0	0	1,625	0	29,000	0	500	0	1,500	0	Q2,Y1	32,625	0
2.2 establish 60.0 ha of demonstration plantations on household forestland	1,950	0	33,000	0	9,400	0	0	0	23,700	0	2,150	0	Q1-2,Y3	70,200	0
2.3 formulate *A Handbook for Forestry Technique Extension Practitioner*	600	0	3,000	0	1,425	0	1,500	0	250	0	400	0	Q2-3,Y1	7,175	0
2.4 organize 5 training courses to train 50 technique extension practitioners (2 courses) and 150 rural residents (3 courses)	0	0	1,500	0	25,050	0	12,000	0	1,250	0	1,200	0	Q3-4,Y1 Q2,4,Y2 Q2,Y3	41,000	0
2.5 organize 'Tropical Southwestern China Workshop on HORT Development and g-NETEIS Establishment'	0	0	2,000	0	7,850	0	0	0	1,000	0	1,200	0	Q3, Y3	12,050	0
Sub-total 2.2	2,550	0	39,500	0	45,350	0	42,500	0	26,700	0	6,450	0		**163,050**	0
Sub-total by Activity	12,900	0	69,000	0	70,905	0	46,600	0	46,950	0	10,350	0		**256,705**	0
Non-activity Based Expenses	0	147,600	3,000	0	0	0	29,000	15,000	8,750	5,000	9,800	0	Y1-Y3	**50,550**	**167,600**
Total of Activity and Non-activity	12,900	147,600	72,000	0	70,905	0	75,600	15,000	55,700	5,000	20,150	0		**307,255**	**167,600**
ITTO Monitoring, Evaluation and Administration														**46,180**	0
Executing Agency Management Cost														0	71,228
Total Budget														**353,435**	**238,828**

7.3.1 Consolidated total budget

Budget Components			Total	Total Annual Disbursement		
				Year1	Year 2	Year 3
10	**Project Personnel**					
	11	Project Director	28,800	9,600	9,600	9,600
	12	Deputy Project director	21,600	7,200	7,200	7,200
	13	Project and PMO staffs	97,200	32,400	32,400	32,400
	14	Consultant				
		14.1 International Consultant	6,000	0	0	6,000
		14.2 National consultant	1,200	0	600	600
	15	Local Technicians	4,500	1,670	1,580	1,250
	16	Local Workers	1,200	1,200	0	0
	19	Component Total	160,500	52,070	51,380	57,050
20	**Sub-Contract**					
	21	Sub-contract: Nursery Construction	13,250	11,250	0	2,000
	22	Sub-contract: Seedling Raising	3,000	0	1,000	2,000
	23	Sub-contract: Site Preparations and Field Planting	36,000	3,400	3,320	29,280
	24	Sub-contract: Soil Sample Analysis	2,250	1,200	1,050	0
	25	Sub-contract: Publishers	14,500	6,600	2,400	5,500
	26	Sub-contract: Independent Audit	3,000	1,000	1,000	1,000
	29	Component Total	72,000	23,450	8,770	39,780
30	**Duty Travel**					
	31	International Travel	1,500	0	0	1,500
	32	Domestic Travel	18,800	7,000	7,000	4,800
	33	Local Transport	6,855	2,285	2,285	2,285
	34	Daily Subsistence Allowance				
		34.1 DSA staff	18,350	6,110	6,110	6,130
		34.2 DSA trainees	20,400	6,800	6,800	6,800
		34.3 DSA workshop	5,000	0	0	5,000
	39	Component Total	70,905	22,195	22,195	26,515
40	**Capital Items**					
	41	Premises				
		41.1 Office Space	15,000	5,000	5,000	5,000
		41.2 Training Course Classroom	10,000	3,000	4,000	3,000
	42	Nursery Equipment	1,100	800	300	0
	43	Portable Computer	4,500	1,500	3,000	0
	44	Vehicle	24,000	24,000	0	0
	45	Equipment and Facilities for the Networks	29,000	29,000	0	0
	46	Equipment and Facilities for Training Course	2,000	1,000	1,000	0
	47	PMO Equipment and Facilities	5,000	5,000	0	0
	49	Component Total	90,600	69,300	13,300	8,000
50	**Consumable Items**					

Budget Components			Total	Total Annual Disbursement		
				Year1	Year 2	Year 3
	51	Trial materials	19,500	6,500	6,500	6,500
	52	Production Materials	23,700	7,800	6,700	9,200
	53	Fuel and Electricity	13,000	4,640	4,670	3,690
	54	Office Supplies (the Project)	4,000	1,500	1,000	1,500
	55	Office Supplies for g-NETEIS	500	500	0	0
	59	Component Total	60,700	20,940	18,870	20,890
60	**Miscellaneous**					
	61	Sundry	18,350	7,500	7,600	3,250
	62	Insurance	1,800	600	600	600
	69	Component Total	20,150	8,100	8,200	3,850
70	**Executing Agency Management Cost**					
	79	Component Total	71,228	27,945	27,943	15,340
80	**ITTO Monitoring, Evaluation and Administration**					
	80	Monitoring and Review Costs	13,000	4,000	4,000	5,000
	82	Ex-Post Evaluation Cost	7,000	2,000	2,000	3,000
	83	Program Support Cost	26,180	8,727	9,876	7,577
	89	Component Total	46,180	14,727	15,876	15,577
90	**Grand Total**		**592,263**	**238,727**	**166,534**	**187,002**

7.3.2 Consolidated ITTO budget

Budget Components			Total	Total Annual Disbursement		
				Year1	Year 2	Year 3
10	**Project Personnel**					
	11	Project Director	0	0	0	0
	12	Deputy Project director	0	0	0	0
	13	Project and PMO staffs	0	0	0	0
	14	Consultant				
		14.1 International Consultant	6,000	0	0	6,000
		14.2 National consultant	1,200	0	600	600
	15	Local Technicians	4,500	1,670	1,580	1,250
	16	Local Workers	1,200	1,200	0	0
	19	Component Total	12,900	2,870	2,180	7,850
20	**Sub-Contract**					
	21	Sub-contract: Nursery Construction	13250	11,250	0	2,000
	22	Sub-contract: Seedling Raising	3,000	0	1,000	2,000
	23	Sub-contract: Site Preparations and Field Planting	36,000	3,400	3,320	29,280
	24	Sub-contract: Soil Sample Analysis	2,250	1,200	1,050	0
	25	Sub-contract: Publishers	14,500	6,600	2,400	5,500
	26	Sub-contract: Independent Audit	3,000	1,000	1,000	1,000
	29	Component Total	72,000	23,450	8,770	39,780
30	**Duty Travel**					
	31	International Travel	1,500	0	0	1,500
	32	Domestic Travel	18,800	7,000	7,000	4,800
	33	Local Transport	6855	2,285	2,285	2,285
	34	Daily Subsistence Allowance				
		34.1 DSA staff	18,350	6,110	6,110	6,130
		34.2 DSA trainees	20,400	6,800	6,800	6,800
		34.3 DSA workshop	5,000	0	0	5,000
	39	Component Total	70,905	22,195	22,195	26,515
40	**Capital Items**					
	41	Premises				
		41.1 Office Space	0	0	0	0
		41.2 Training Course Classroom	10,000	3,000	4,000	3,000
	42	Nursery Equipment	1,100	800	300	0
	43	Portable Computer	4,500	1,500	3,000	0
	44	Vehicle	24,000	24,000	0	0
	45	Equipment and Facilities for the Networks	29,000	29,000	0	0
	46	Equipment and Facilities for Training Course	2,000	1,000	1,000	0
	47	PMO Equipment and Facilities	5,000	5,000	0	0
	49	Component Total	75,600	64,300	8,300	3,000

Budget Components			Total	Total Annual Disbursement		
				Year1	Year 2	Year 3
50	**Consumable Items**					
	51	Trial materials	19,500	6,500	6,500	6,500
	52	Production Materials	23,700	7,800	6,700	9,200
	53	Fuel and Electricity	8,000	3,000	3,000	2,000
	54	Office Supplies (the Project)	4,000	1,500	1,000	1,500
	55	Office Supplies for g-NETEIS	500	500	0	0
	59	Component Total	55,700	19,300	17,200	19,200
60	**Miscellaneous**					
	61	Sundry	18,350	7,500	7,600	3,250
	62	Insurance	1,800	600	600	600
	69	Component Total	20,150	8,100	8,200	3,850
70	**Executing Agency Management Cost**					
	79	Component Total	0	0	0	0
80	**ITTO Monitoring, Evaluation and Administration**					
	80	Monitoring and Review Costs	13,000	4,000	4,000	5,000
	82	Ex-Post Evaluation Cost	7,000	2,000	2,000	3,000
	83	Program Support Cost	26,180	8,727	9,876	7,577
	89	Component Total	46,180	14,727	15,876	15,577
	90	**Grand Total**	**353,435**	**154,942**	**82,721**	**115,772**

7.3.3 Consolidated Chinese government budget

Budget Components			Chinese Government	CN Gov't Annual Disbursement		
				Year1	Year 2	Year 3
10	**Project Personnel**					
	11	Project Director	28,800	9,600	9,600	9,600
	12	Deputy Project director	21,600	7,200	7,200	7,200
	13	Project and PMO staffs	97,200	32,400	32,400	32,400
	14	Consultant				
		14.1 International Consultant	0	0	0	0
		14.2 National consultant	0	0	0	0
	15	Local Technicians	0	0	0	0
	16	Local Workers	0	0	0	0
	19	Component Total	147,600	49,200	49,200	49,200
20	**Sub-Contract**					
	21	Sub-contract: Nursery Construction	0	0	0	0
	22	Sub-contract: Seedling Raising	0	0	0	0
	23	Sub-contract: Site Preparations and Field Planting	0	0	0	0
	24	Sub-contract: Soil Sample Analysis	0	0	0	0
	25	Sub-contract: Publishers	0	0	0	0
	26	Sub-contract: Independent Audit	0	0	0	0
	29	Component Total	0	0	0	0
30	**Duty Travel**					
	31	International Travel	0	0	0	0
	32	Domestic Travel	0	0	0	0
	33	Local Transport	0	0	0	0
	34	Daily Subsistence Allowance	0	0	0	0
		34.1 DSA staff	0	0	0	0
		34.2 DSA trainees	0	0	0	0
		34.3 DSA workshop	0	0	0	0
	39	Component Total	0	0	0	0
40	**Capital Items**					
	41	Premises				
		41.1 Office Space	15,000	5,000	5,000	5,000
		41.2 Training Course Classroom	0	0	0	0
	42	Nursery Equipment	0	0	0	0
	43	Portable Computer	0	0	0	0
	44	Vehicle	0	0	0	0
	45	Equipment and Facilities for the Networks	0	0	0	0
	46	Equipment and Facilities for Training Course	0	0	0	0
	47	PMO Equipment and Facilities	0	0	0	0
	49	Component Total	15,000	5,000	5,000	5,000

Budget Components			Chinese Government	CN Gov't Annual Disbursement		
				Year1	Year 2	Year 3
50	**Consumable Items**					
	51	Trial materials	0	0	0	0
	52	Production Materials	0	0	0	0
	53	Fuel and Electricity	5,000	1,640	1,670	1,690
	54	Office Supplies (the Project)	0	0	0	0
	55	Office Supplies for g-NETEIS	0	0	0	0
	59	Component Total	**5,000**	**1,640**	**1,670**	**1,690**
60	**Miscellaneous**					
	61	Sundry	0	0	0	0
	62	Insurance	0	0	0	0
	69	Component Total	0	0	0	0
70	**Executing Agency Management Cost**					
	79	Component Total	71,228	27,945	27,943	15,340
80	**ITTO Monitoring, Evaluation and Administration**					
	80	Monitoring and Review Costs	0	0	0	0
	82	Ex-Post Evaluation Cost	0	0	0	0
	83	Program Support Cost	0	0	0	0
	89	Component Total	0	0	0	0
90	**Grand Total**		**238,828**	**83,785**	**83,813**	**71,230**

7.4 Yearly project budget by source -- ITTO

Component			Total	Total Annual Disbursement		
				Year1	Year 2	Year 3
10	Project Personnel		12,900	2,870	2,180	7,850
20	Sub-contract		72,000	23,450	8,770	39,780
30	Duty Travel		70,905	22,195	22,195	26,515
40	Capital Items		75,600	64,300	8,300	3,000
50	Consumable Items		55,700	19,300	17,200	19,200
60	Miscellaneous		20,150	8,100	8,200	3,850
70	Executing Agency Management Costs		0	0	0	0
Sub-total 1			**307,255**	**140,215**	**66,845**	**100,195**
80	ITTO Monitoring, Evaluation and Administration Costs					
	81	Monitoring and Review Costs	13,000	4,000	4,000	5,000
	82	Ex-Post Evaluation Cost	7,000	2,000	2,000	3,000
	83	Program Support Cost	26,180	8,727	9,876	7,577
Sub-total 2			**46,180**	**14,727**	**15,876**	**15,577**
90	ITTO Total		**353,435**	**154,942**	**82,721**	**115,772**

7.5 Yearly project budget by source -- Chinese government

Component			Total	Total Annual Disbursement		
				Year1	Year 2	Year 3
10	Project Personnel		147,600	49,200	49,200	49,200
20	Sub-contract		0	0	0	0
30	Duty Travel		0	0	0	0
40	Capital Items		15,000	7,100	6,900	7,500
50	Consumable Items		5,000	1,640	1,670	1,690
60	Miscellaneous		0	0	0	0
70	Executing Agency Management Costs		71,228	27,945	27,943	15,340
Sub-total 1			**238,828**	**83,785**	**83,813**	**71,230**
80	ITTO Monitoring, Evaluation and Administration Costs					
	80	Monitoring and Review Costs	0	0	0	0
	82	Ex-Post Evaluation Cost	0	0	0	0
	83	Program Support Cost	0	0	0	0
Sub-total 2			**0**	**0**	**0**	**0**
90	Chinese Government Total		**238,828**	**83,785**	**83,813**	**71,230**

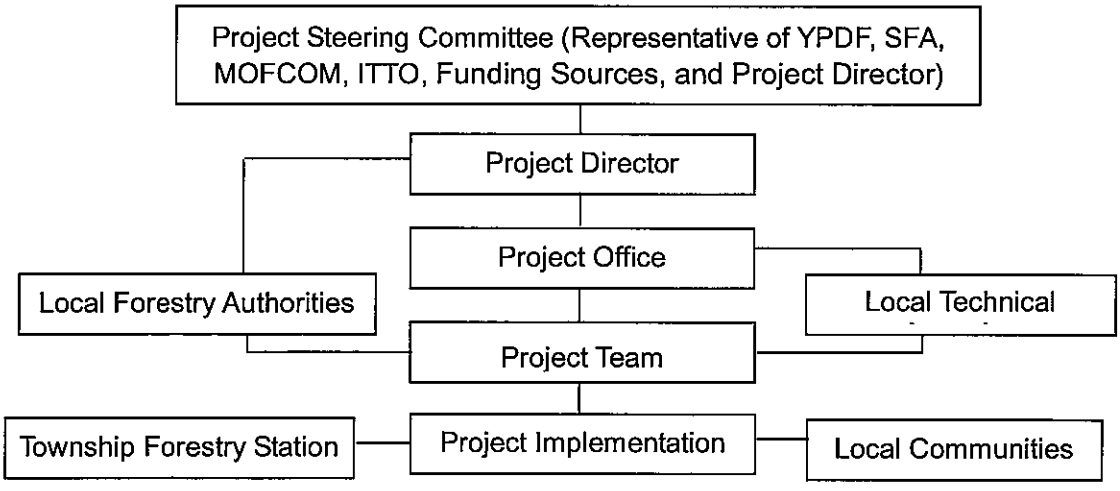
PART III: OPERATIONAL ARRANGEMENTS

1. Management Structure

To ensure the effective monitoring and management of project activities and reach the project objectives, a Project Steering Committee (PSC) will be established, consisting of representatives from Yunnan Provincial Department of Forestry (YPDF), State Forestry Administration, P. R. China (SFA), Ministry of Commerce of the People's Republic of China (MOFCOM), ITTO, Funding Sources, and Project Director. Tasks of PSC will be: 1) to monitor the annual budget, work plan and project reports and 2) to conduct annual evaluation of project implementation.

The executing agency, Yunnan Academy of Forestry (YAF), will appoint project director and deputy director. A project management office (PMO) will be set up to manage and maintain daily operations. In accordance with the designed project activities, six staffs specialized in silviculture in tropical areas and community development will be selected and appointed as project members. In order to achieve project objectives in particular the diffusion of household-oriented reforestation techniques (HORT) in a large area, project director will actively contact and coordinate with local forestry authorities at both Municipal and county levels to gain local administrative supports. PMO will also coordinate with local technical agencies such Pu'er Forestry Technique Extension Station, Pu'er Forestry Research Institute, Pu'er Forestry Vocational School, and motivate them to join the grassroots technical services. Active participation of local forestry authorities and technical agencies not only ensures success of the project, but also lays a foundation for further diffusion of project achievements after project completion. In addition, township forestry stations and local communities will be motivated to participate in whole process of the project (See figure 2).

Figure 2 Project Organization Chart



2. Monitoring, Reporting and Evaluation

2.1 Project progress reports

A Project Progress Report will be prepared and submitted to ITTO at least one month before each ITTO monitoring visit, twelve months after commencement of the project, and at such other times as ITTO may require.

2.2 Project completion report

YAF will prepare and submit the project completion report to ITTO within two months of project completion.

2.3 Project technical reports

Technical reports or research papers will be submitted to ITTO soon after they are completed or published, for ITTO's information.

2.4 Monitoring, Review and Steering Committee's Visits

The PSC and its members are responsible for external monitoring of the project. The committee meets shortly after the inception of the project, once after the first year of implementation, and once about three months before the completion of the project.

An internal evaluation is conducted by YAF within three months of the termination of the project. The evaluation focuses on the effectiveness and efficiency of project implementation, stakeholder participation and impacts, project risks and their mitigation, dissemination, and lessons learnt. In evaluation, data and relevant information will be collected by field investigation, questionnaire, and interviews. And evaluation report will be annexed to the project completion report.

2.5 Evaluation

The project will be subject to ex-post evaluation in accordance with Guidelines established by the ITTO Manual of Project Monitoring, Review and Evaluation.

3. Future Operation and Maintenance

3.1 Continuing use of assets

Nursery is during the project period used for trials and demonstration of household-oriented techniques for nursery construction and seedling raising, and to produce seedlings for demonstration plantations. After project completion, the nursery will be operated and maintained by the household who is the land contractor, with technical support from grassroots networks for technique extension and information services (g-NETEIS) established. At the same time it will be

kept on as a demonstration nursery motivating interested households to carry out seedling raising activities.

Trial and demonstration plantations belong to land contractors. Tending work will be jointly conducted by the executing agency and households during the course of project implementation. After project completion, land contractors will maintain the plantations, with technical support from the grassroots technical services established. However, those land contractors once participated in the project will not allow changing land uses during the project period and even after project completion in principle. If have to do so after project completion, consultation in advance with the executing agency are required.

The g-NETEIS will be run by the project funds during the project period. **Township Forestry Station staffs and County Extension Station officers involved in g-NETEIS daily operation are paid by government expenditure, except for project activities such as trainings and meetings. Near project completion, the g-NETEIS will be transferred administratively to County Forestry Technique Extension Station. The County Extension Station will take charge of the future management of g-NETEIS, under the leadership of County Forestry Bureau. It is capable to do so because of: 1) its full participation in the process of g-NETEIS establishment, operation, management, and maintenance; 2) its functional transition achieved during project period to match g-NETEIS operation; 3) its relatively independent power in fund allocation for technique extension; and 4) its good accessibility to local technical agencies,** such as Pu'er Forestry Research Institute, Pu'er Forestry Vocational School and Pu'er Forestry Technique Extension Stations. Once households begin to gain economic benefit from forest plantations, the networks can be partly supported by themselves through organizing and establishing Forest Household Associations.

Small items of equipment will be used by the project members and the township forestry stations under the management and coordination of the project director during the project period. After project completion, those small items will be transferred to the executing agency and township forestry stations, and naturally maintained by themselves.

3.2 Follow-up activities and project application

As CFTR goes further, demands for household-oriented reforestation techniques (HORT) may increase continuously. It is likely necessary to distribute training materials and carry out technical trainings in whole tropical zone of Southwestern China. Local technical agencies are going to be coordinated and encouraged to participate in implementation of the project, through which they will learn procedure and method for grassroots networks establishment and technique extension.

Based on HORT achieved, the project executing agency, YAF, will cooperate with forestry technique related institutions (administration, research and extension) in Southwestern China, to seek national and international financial sources to promote HORT and g-NETEIS in a larger area. While techniques, experiences and methods of the project are applied, it is hopefully that significant progress in reforestation and rural development will be achieved in tropical zone of Southwestern China.

PART IV: THE TROPICAL TIMBER FRAMEWORK

1. Compliance with ITTA 1994 Objectives

The implementation of the project proposed is directly related to the following ITTA 1994 objectives:

c) To contribute to the process of sustainable development;

The project will be implemented with the objective to promote household reforestation as well as rural development in tropical mountainous areas of Southwestern China through development and extension of household-oriented reforestation techniques (HORT). Through project strategy of close cooperation between scientific personnel and local people, indigenous knowledge will be sufficiently recognized and applied in the project. Local households on the other hand will easily access practical techniques via g-NETEIS established. All these anticipated achievements are in compliance with the ITTO Criteria and Indicators for Sustainable Management of Tropical Forests. Therefore, implementation of the project will contribute to ITTA 1994 objectives -- Article 1 point c.

In ITTA 2006, newly reached in January 2006 by representatives of ITTO member countries in Geneva, the issue of poverty alleviation is added besides "to contribute to the process of sustainable development". In line with the goal of CFTR, the project aims to upgrade the forestland productivity and increase household economic incomes, so as to contribute to poverty alleviation in rural areas of Southwestern China. The only difference between CFTR and the project is that the former endeavors on the point of view of policy motivation and the later whereas makes efforts from technical aspect. Therefore, implementation of the project is very agreed with this added point in new ITTA.

f) To promote and support research and development with a view to improving forest management and efficiency of wood utilization as well as increasing the capacity to conserve and enhance other forest values in timber producing tropical forests;

Major points of the project, either HORT development or g-NETEIS establishment, dedicate to enhancing technique application in forestry practices, so as to improve reforestation and forest management in tropical zone of Southwestern China.

j) To encourage members to support and develop industrial tropical timber reforestation and forest management activities as well as rehabilitation of degraded forest land, with due regard for the interests of local communities dependent on forest resources;

Households become subjects in management of 65.6% of forestland in Project areas through CFTR implementation. This proportion of forestland, however, is severe degraded, resulting from long-time extensive management or even abandonment. Present dominant land types are sparsely forested woodland, shrubbery land and bare mountain. The implementation/intervention of the project will continuously enhance productivity of these lands. Both forest area and unit area volume are going to be increased, so as to enhance timber supply. Besides timber production, through vegetation rehabilitation and stand structure improvement other functions of these lands will be significantly enhanced in terms of soil and water conservation and microclimate adjustment. Taking household economic status and long-term payback period of forest management into account, the project adopts the conception of multi-layer forestry. Suitable plant species (rather than crops) and relevant technologies for multi-layer forestry will be available after implementation of the project. Households can choose different models in managing his contracted forestland to balance long-term and short-term benefits.

m) To promote the access to, and transfer of, technologies and technical cooperation to implement the objectives of this Agreement, including on concessional and preferential terms and conditions, as mutually agreed;

Experiences and techniques from other countries will be learnt and absorbed in the project by inviting international experts to generate "Technical Report of Household Reforestation". The executing agency, on the other hand, will transfer techniques and experiences obtained from the project to other tropical countries and zones using YAF's ongoing International Training Course on Sustainable Management of Tropical Forest Plantations as a carrier.

Objective r) of new ITTA, Encouraging members to recognize the role of forest-dependent indigenous and local communities in achieving sustainable forest management and develop strategies to enhance the capacity of these communities to sustainably manage tropical timber producing forests.

The project is proposed on the basis of carefully identifying and analyzing the relationships between forestry development and local households in tropical zone of Southwestern China. The results show that 'the role of forest-dependent indigenous and local communities in achieving sustainable forest management' has been recognized and improved by CFTR. The ultimate goal of this project is 'to enhance the capacity of these communities for sustainable management of tropical timber producing forests', including improvement of grassroots technique service provisions.

2. Compliance with ITTO Yokohama Action Plan (2002-2006)

The project complies with the ITTO Action Plan laid down within the framework of reforestation and forest management, in particular the following points (ITTO Yokohama Action Plan 2002-2006):

GOAL 2: Promote sustainable management of tropical forest resources;

Action 5: *Monitor and assess the environmental, social and economic costs and benefits of forest plantation development and utilize that information to promote, where appropriate, new plantations within the ITTO Guidelines for the Establishment and Sustainable Management of Planted Tropical Forests;*

In course of developing HORT through close cooperation between forestry research institute and local households, the project will analyze of ecological, economic and social benefits of each technical measure. Each management model (or technique combination) is developed in accordance with ITTO Guidelines for the Establishment and Sustainable Management of Planted Tropical Forests. Project results including their influences will be summarized after implementation, so as to provide experiences for reforestation activities in similar areas.

Action10: *Encourage members and assist them, where appropriate, to:*

- *Establish and manage forests for multiple uses in close cooperation with local forest owners and communities living in forest areas;*
- *Strengthen training institutions and intensify training of forestry personnel and other stakeholders in silviculture, RIL and resource assessment, and in the management of both natural forests and timber plantations.*

The close cooperation between research institute and local households will run through the whole process of project implementation. Project personnel are required to consult with households to commonly decide tree species for seedling raising and reforestation. All trial and demonstration plantations will be established on household forestlands. HORT will be developed on the basis of household conditions including land scale, investment capacity, management skill, and interests. Moreover, exploration of technologies for multi-layer forestry in the project is to satisfy households' short, middle and long-term benefits.

As a part of capacity building for g-NETEIS, the project will conduct 5 training courses, with total trainees of 200 person-times and 1000 person-days. Trainees mainly consist of networks members (local technicians and information collectors) and households involved in the project implementation. The major content of training courses will cover approaches for HORT development, technique extension, and services provision.

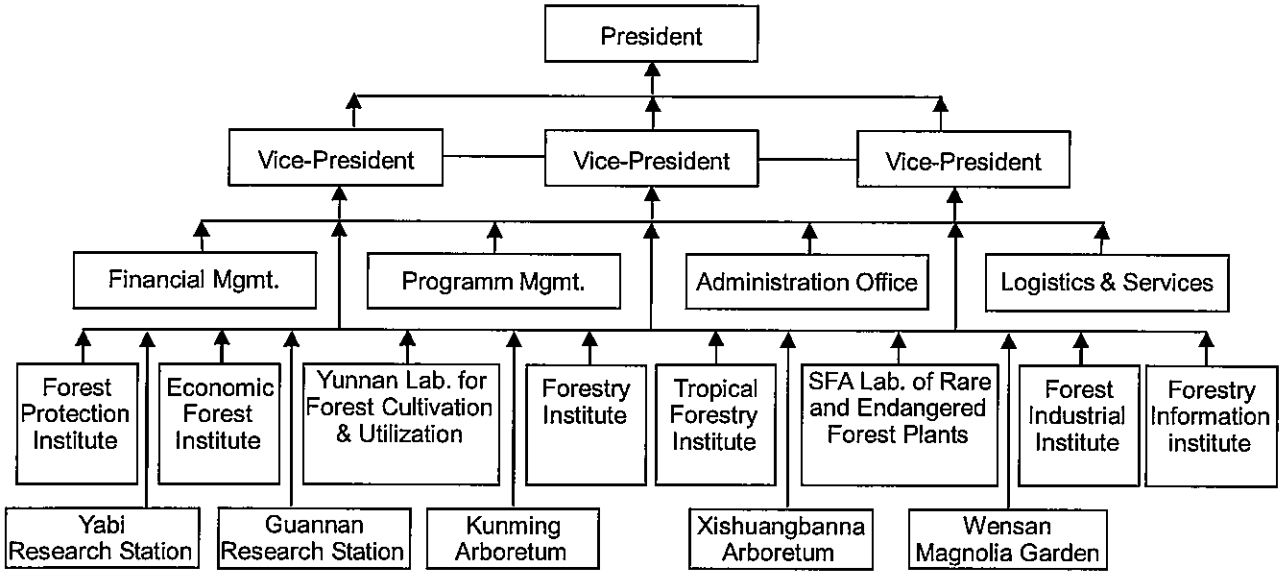
ANNEX

A. Profile of the Executing Agency

1. Expertise of the executing agency

Yunnan Academy of Forestry (YAF) is the largest forestry research institution in tropical zone of Southwestern China, and administratively subordinates to Yunnan Provincial Department of Forestry (YPDF). YAF consists of six institutes, three arboretums, and two research stations. Besides, two YAF laboratories directly subordinates to SFA and provincial government respectively. The organizational structure of YAF is summarized in Figure as follows.

Figure Organizational Chart of YAF



Programs and projects implemented by YAF in the last three years were focused on the fields of watershed protection forests, raw material plantations for industry, economic forests, nature conservation and community development, and industrialized forest tree breeding, etc. During the Tenth-Five-Year Plan period, 75 projects has been conducted, most of which were funded by NDARC, YDARC, SFA, MOST, MOFCOM, DOST, YPDF and international organizations including FAO, GEF and WB etc. YAF has also implemented several inter-government cooperation projects, such as Sino-Dutch Cooperation Forest Conservation and Community Development Program. In implementation of ITTO projects, PPD 16/96 Rev. 2 (F), 1997-1998 and PD38/98 REV. 2 (F), 2001-2004, YAF played roles as co-executing and executing agencies respectively.

2. Infrastructure of the executing agency

For carrying out tropical forestry-related work, YAF has established Tropical Forestry Institute, Yunnan Laboratory for Forest Cultivation and Utilization, Xishuangbanna Tropical Arboretum, and newly established Pu'er Forest Tree Breeding Base. There are a growing media lab and a seed inspection lab in the Tropical Forestry Institute. YAF has been equipped well with a series of advanced machineries and instruments, such as Trace Scan Plasma Spectrometer, Gas Chromatograph, High Performance Liquid Chromatograph, Portable Photosynthesis System, Automatic Microscope, Auto-controlled greenhouse, growing media production line, and automatic seeding line, etc. The area of tropical forestry related facilities is 3.98 ha and the total area of its buildings is 3 558 ㎡. Besides, YAF owns more than 120 ha of tropical fine breed bases.

3. Budget

The budget of YAF in 2005 - 2007 is listed in the following table (in US$ with exchange rate of US$:RMB = 1:8.2).

Annual	Personnel	Sub-contracts	Duty Travel	Capital Items	Consumable Items	Miscellaneous	Total
2005	719,512	14,390	203,659	11,585	458,537	16,341	1,804,878
2006	829,268	16,707	242,683	14,146	575,610	19,268	2,148,780
2007	841,463	12,805	239,024	16,829	640,244	21,098	2,228,049
Sub-total	2,390,244	43,902	685,366	42,561	1,674,390	56,707	6,181,707

The personnel (salary) were paid by government expenditure and the total project funds reached US$ 1,085,366, US$ 1,319,512 and US$ 1,386,585 in 2005, 2006 and 2007 respectively.

4. Personnel

There are total 226 staffs in YAF, comprising of the professional (161 persons) in the forestry related fields, administrative (28 persons), and logistics (37 persons). Among professionals, 35 hold senior technical title and 60 have middle level technical title. Of senior professionals 12 are supervisors of MSc. students in ecology, silviculture, genetics and environment engineering etc. Also among professionals, 35 hold PhD. Degree and M.Sc. Degree earned at domestic and abroad, and 96 have B.Sc. Degree.

B. Terms of References (ToR) of the Key Staffs

1. Project Director

1.1 Personal data

Name	Place of birth	Nationality	Date of birth	Technical title	Post
Wang, Weibin	Baoshan, Yunnan	China	Aug. 5, 1968	Professor	Vice-president
Tel:	+86-871-5211535		**Email:**	wwb@public.km.yn.cn	

1.2 Responsibilities

(1) Organize and manage generally the implementation of the project to achieve the project objectives; (2) Appoint relevant YAF professionals to constitute project team; (3) Coordinate with PSC, and administrative and technical institutions in project area; (4) Solve problems raised during the implementation in both technical and managerial aspects; (5) Manage annual working plan and budget; (6) Control expenses of project funds and contact with independent audit; and (7) Take charge technically of reforestation-related project activities.

1.3 Term of services

Serve the project for a period of 36 months once after the approval.

1.4 Professional background

Prof. Wang, Weibin got his bachelor degree from Biology Department of Yunnan University in 1990 and then served in YAF. His master degree in silviculture was earned from College of Forestry in University of the Philippines 1996. From 2004 on, he is the PhD candidate in vegetation ecology in School of Life Sciences of Yunnan University. He participated in ITTO Pre-Project (PPD 16/96 Rev. 2 (F)) as a key staff, and became project office director of ITTO project PD 38/98 Rev. 2 (F). Afterwards, he was engaged as the director in several projects on forest tree improvement and reforestation: 1) SFA project 'Development and Demonstration of Reforestation Technology in Tropical Yunnan using Precious Broadleaved Tree Species' and 2) YDARC project 'Establishment of Forest Tree Breeding Base in Tropical Yunnan'. He is the author of several books: 1) Practical Techniques for *Betula alnoides* Reforestation; 2) Practical Techniques for *Paramichelia bailonii* Reforestation; and 3) Cultivation Technology for *Taxus yunnanensis*. He was promoted to be the director of program management office of YAF in 2000 and the vice-president of YAF in 2002.

2. Deputy Project Director

2.1 Personal data

Name	Place of birth	Nationality	Date of birth	Technical title	Post
Yang, Wenzhong	DaLi, Yunnan	China	Jan. 8, 1972	Associate Professor	--
Tel:	+86-137,5949,1789		**Email:**	Wzyang2004@126.com	

2.2 Responsibilities

(1) Assist project director to organize and manage the implementation of the project; (2) Responsible for internal operation and management; (3) Prepare and submit technical reports and progress reports; (4) Take charge technically of community-related project activities.

2.3 Term of services

Serve the project for a period of 36 months once after the approval.

2.4 Professional background

Asso. Prof. Yang Wenzhong got his bachelor degree from Forest Resource and Environment College of Nanjing Forestry University in 1995, and then served in YAF. His master degree in development management was earned from Asian Institute of Management (Manila) in 2002. At present he is the director of National Natural Science Foundation of China (NFSC) project 'Ethnic Culture Based Nature Conservation in The Three Parallel River Region'. He participated in several other projects on community development and reforestation: 1) Sino-Dutch cooperation 'Forest Conservation and Community Development Program'; 2) GEF program 'China Forestry Sustainable Development'; 3) YDARC project 'Establishment of Forest Tree Breeding Base in Tropical Yunnan', and 4) aforementioned two ITTO projects.

C. ToR of Project International and National Consultants/Experts

1. ToR of International Consultant/Expert (Relevant to Activity 1.1.4)

Function: Tropical household reforestation specialist

Expected output: A draft of *Technical Report of Household Reforestation*, with cooperation of project personnel

Responsibilities:

(1) Collect and analyze relevant data from trials of seedling raising and plantation establishment, with cooperation of project personnel;

(2) Carry out field survey in project sites, including household interview, with cooperation of project personnel;

(3) Review the literature on progress and experiences of reforestation techniques at household scale;

(4) Summarize the experimental results and the project experiences, with cooperation of project personnel;

(5) Draft the '*Technical Report of Household-oriented Reforestation*'.

Qualifications:

(1) Input at least 0.5 months to work at project site and PMO;

(2) Hold at least Master degree and major in forestry-related field;

(3) At least 8 years experiences in technology development and extension in tropical areas, additional experiences of working on rural development are preferable;

(4) Good understanding in English both oral and written;

(5) Good cooperation attitude and skill to motivate partners.

2. ToR of National Consultant/Expert I (Relevant to Activity 1.2.3)

Function: Forestry practical technique developer

Expected output: A draft of *Technical Manual for Household Reforestation*

Responsibilities:

(1) Collect and calculate technical data from project trials;

(2) Analyze the techno-economic indices of different experimental treatments and technical measures;

(3) Conduct investigation on project sites, including household interview, with cooperation of project personnel;

(4) Draft '*Technical Manual for Household Reforestation*'.

Qualifications:

(1) Input at least 0.5 months to work at project site and PMO;

(2) Hold at least Master degree in forestry economics or forest sciences;

(3) At least 5 years experiences in technology development and extension in tropical areas;

(4) Additional experiences of working on forestry techno-economic analysis are preferable.

3. ToR of National Consultant/Expert II (Relevant to Activity 2.2.3)

Function: Forestry technique application specialist

Expected output: A draft of *Handbook for Forestry Technique Extension Practitioner*

Responsibilities:

(1) Learn objectives and achievements of the project;

(2) Elaborate and summarize daily operation and management of the grassroots networks for technique extension and information services

(3) Study operational mechanism of grassroots networks for technique extension and information services;

(4) Draft '*A Handbook for Forestry Technique Extension Practitioner*'.

Qualifications:

(1) Input at least 0.5 months to work at project site and PMO;

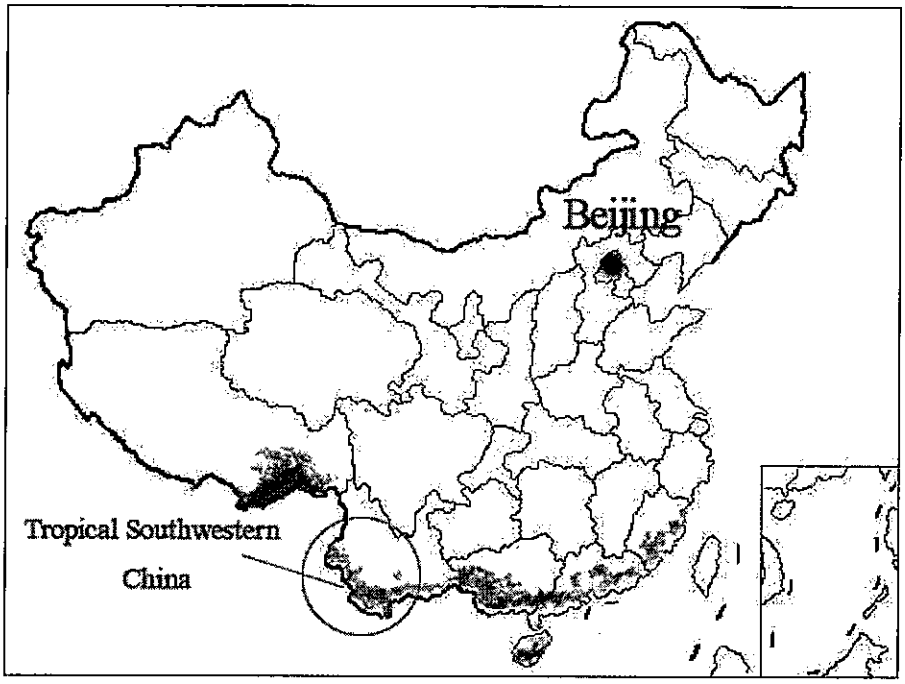
(2) Hold at least Bachelor degree in forest sciences;

(3) At least 8 years experiences in diffusion of forestry techniques in rural areas;

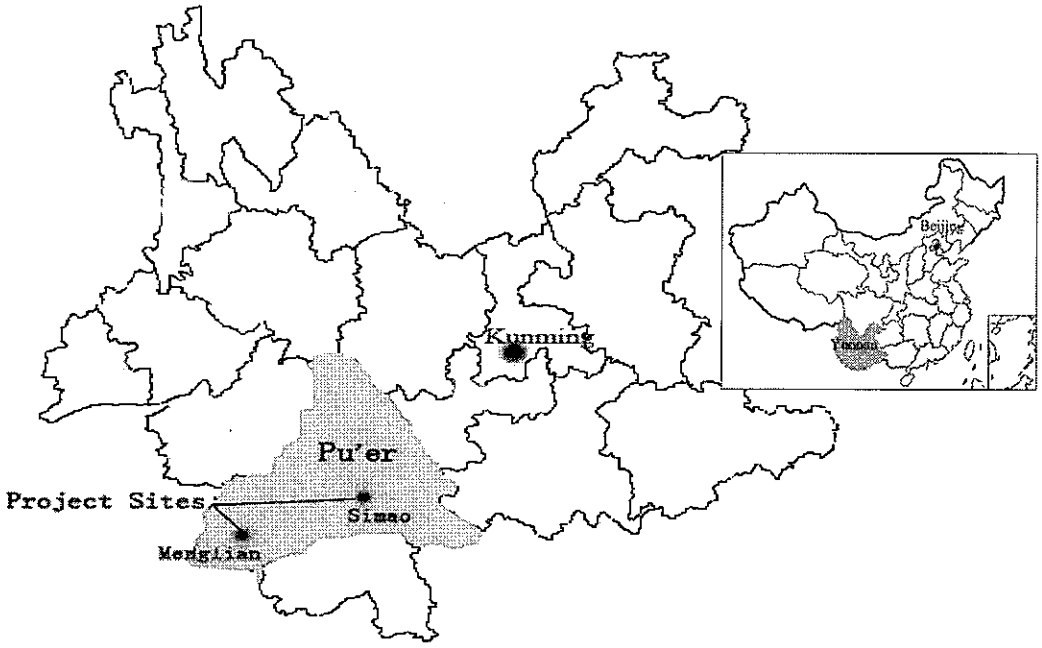
(4) Working or learning experiences in management are preferable.

D. Map of Project Area

(1) Project Area in Tropical Zone of Southwestern China

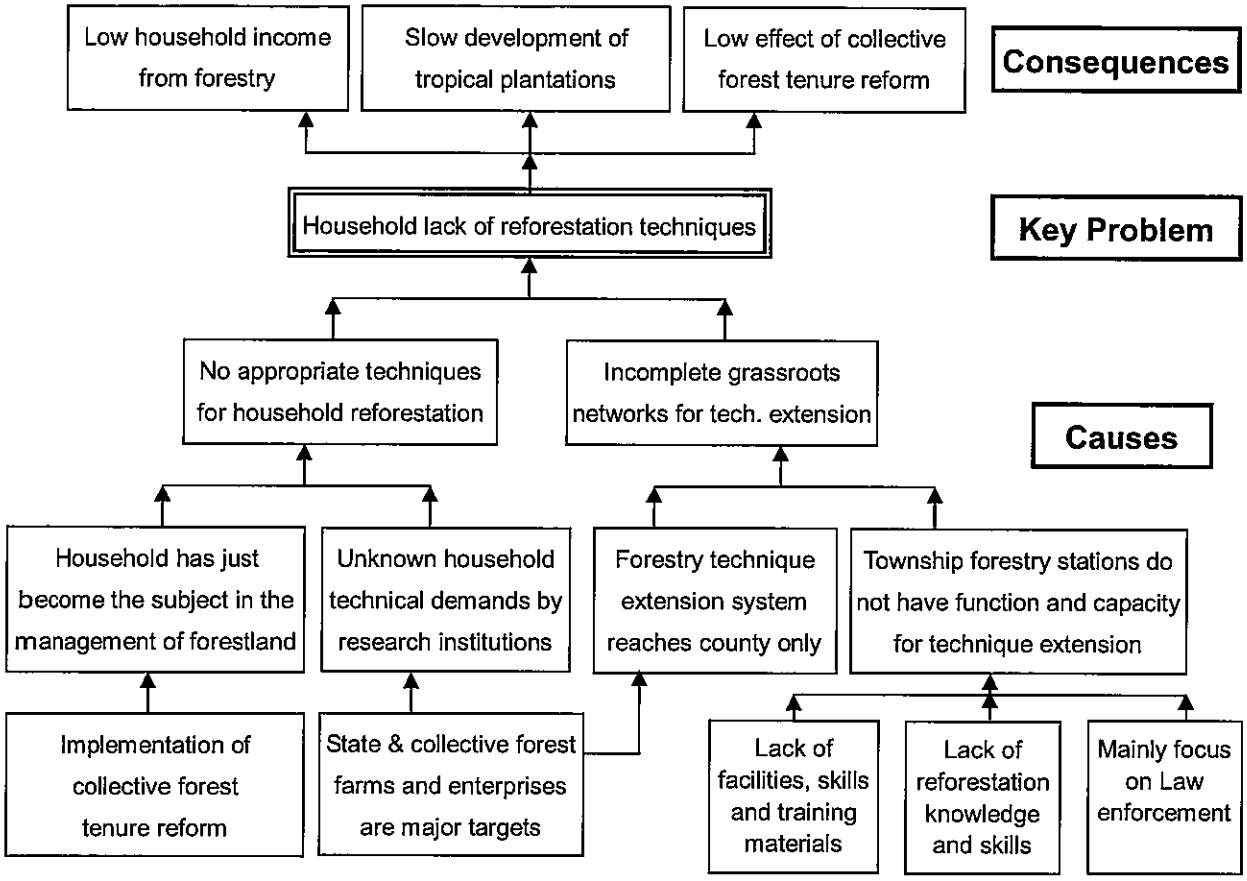


(2) Project Sites in Pu'er Municipality of Yunnan Province

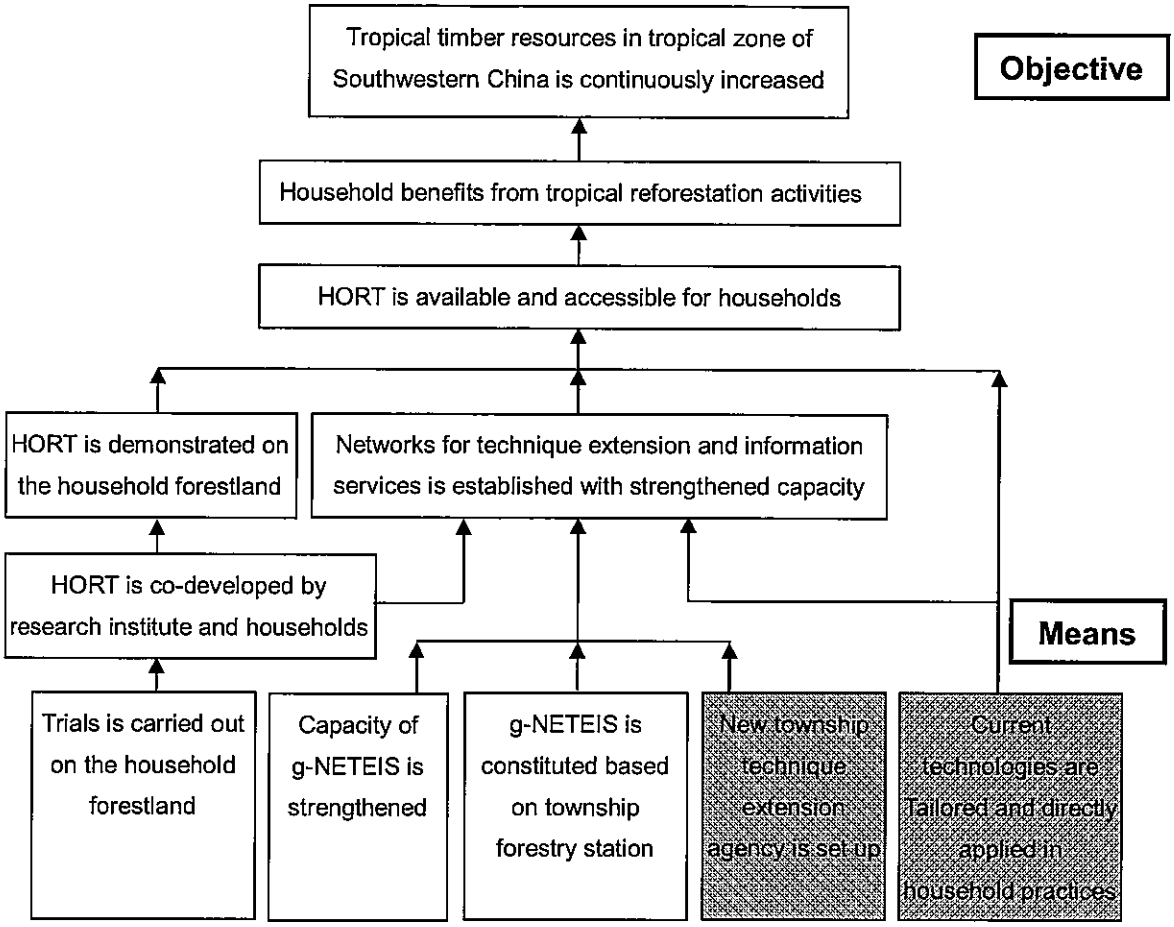


The project site, Pu'er Municipality, is located at 22°02′ - 24°50′ N and 99°09′ – 102°19′ E, with a total land area of 44,450 km^2. Elevations in Pu'er range from 317 m to 2 603 m a.s.l. The mean annual temperature is in the range of 18.1 ℃ to 21.3 ℃, with an absolute high temperature of 35 ℃ and an absolute low temperature of 0 ℃. The annual sunshine duration numbers 1 900-2 200 hours, with annual cumulative temperature ≥10℃ being 5 167 ℃-8 120 ℃. The mean annual precipitation is 1 400 mm-1 800 mm, with relative humidity ranging from 78 % to 83 %. The soil type in more than 70% of the land is red earth, with an average depth above 1.0 m.

E. Problem Tree



F. Objective Tree



Notes:

g-NETEIS: grassroots Networks for Technique Extension and Information Services

HORT: Household-Oriented Reforestation Techniques

G. References

LI Ke, The Collective Forest Tenure Reform -- the Third Land Reform in the Country, Green China, 2006,19(3):12-22.

LI Yong, Some Conception of Forestry Development of Simao Prefecture, Forest Inventory and Planning, 2003,28 (2): 116-120.

ITTO, International Tropical Timber Agreement-1994, July 1992

ITTO Policy Development Series No.11: ITTO Yokohama Action Plan 2002–2006.

ITTC(XLIII)/8: Annex 3, Comparison of Article 1 paragraphs in ITTA 1994 and ITTA 2006. Report of the Inter-Sessional Working Group on the Elaboration of A New ITTO Action Plan, Oct., 2007.

ITTO: Manual for Project Formulation (2nd edition), May 1999.

ITTO Policy Development Series No 13, ITTO guidelines for the restoration, management and rehabilitation of degraded and secondary tropical forests, 2002.

ITTO Policy Development Series No 15, Revised ITTO criteria and indicators for the sustainable management of tropical forests including reporting format, 2005.

Philip Townsley, Rapid rural appraisal, participatory rural appraisal and aquaculture, FAO Fisheries Technical Paper. No. 358, 1996.

SFA, China Forestry Development Report: 2005, China Forestry Press, Beijing, Oct. 2005.

SFA, China Forestry Development Report: 2006, China Forestry Press, Beijing, Oct. 2006.

SFA, China Forestry Development Report: 2007, China Forestry Press, Beijing, Oct. 2007.

WANG Lei and ZHANG Jinfeng, *et al.* Present Situation and Development of Indigenous Broadleaf Species in Yunnan Tropical Areas, Forest Resources Management, 2005 (05) : 45-50.

Wang Qi, Development of World Tropical Forest Plantatios, Forest Science and Technology, 1995,5 : 32-33.

WANG Weibin, ZHANG Jinfeng, *et al.* Cultivation Technologies for *Betula alnoides* Plantations, Yunnan Science and Technology Press, Kunming, 2004.

WANG Weibin, ZHANG Jinfeng, *et al.* Cultivation Technologies for *paramichelia baillonii* Plantations, Yunnan Science and Technology Press, Kunming, 2005.

WEI Zhiyang, Overview on Technique Adoption Behaviors of Household in China, Jurnal of Anhui Agricultural Sciences, 2007,35(30):9714 - 9716.

WU Zhengyi. Vegetation of China. Science Press, 1995.

YAF: Dissertation of Tree Species Suitable for Reforestation in Tropical Area. Yunnan Sci. & Tec. Publishing House, 1996.

YAF: Reforestation Technology for Major Tree Species in Yunnan. Yunnan People's Publishing House, 1985.

ZHANG Yaogang and YING Ruiyao, An Analysis of the Priority and Influencing Factors of Farmers' Demand for Technological Services. Jiang Su Social Sciences, 2007(03):65-71.

ZHENG Haishui, Progress of Cultivaiton Technologies for Tropical Forest Plantations, Scientific Chinese, 2006(09) : 69.

H. Modifications in Compliance with Recommendations at the 36th Expert Panel

ITTO Recommendation	Compliance
1. Refine the presentation of the specific objective in a more logical way.	Based on problem tree, specific objective is refined: "To promote household-oriented reforestation techniques through close cooperation between Forestry Research Institute and local households" (Cover page; section 2.1, 3; and 5 of Chapter II)
2. Refine the formulation of expected outputs to address two main causes of the key problem.	1) To address 2 main causes of the key problem, outputs were refined and merged into two from original four: output 1: HORT developed and available for extension; Output 2: g-NETEIS established and capable for HORT promotion (Cover page; section 3, 5 of Chapter II); 2) As a result, activities were reorganized (section 2.5.3; section 4, 6, 7 of Chapter II).
3. Clarify the sentence of 'two evaluation and one combination' in the section on project strategy.	The original description was changed to 'Analysis of the gap between techniques available and household demands' (section 2.3 of Chapter II).
4. Identify how the project work will be coordinated with extension offices and strengthen the engagement of extension officers.	County Forestry Technique Extension Station was taken into project framework and project implementation as a major stakeholder (section 2.3, 2.4, 2.5 of Chapter II)
5. Improve the logical framework with the inclusion of measurable indicators	Logical framework was reformulated in accordance with revisions of specific objective and expected outputs. Measurable indicators were especially reconsidered and revised (section 5 of Chapter II)
6. Study tour to Brazil is not required and this activity may be excluded together with necessary budget allocation proposed for the same.	The activity was deleted, and in consequence the related budget allocation was excluded (section 4, 6, 7 of Chapter II).
7. Improve the sustainability after project completion by clarifying how the responsibility of extension activities should be transferred to the appropriate extension services and how national and international financial sources will be secured during project implementation.	To secure funding sources during project period and smoothly transfer extension activities after project completion, the best way is: 1) bring extension offices into project framework and project implementation since the beginning; 2) build up an even joint between Extension Office administration and g-NETEIS operation (section 2.3, 2.4, 2.5 of Chapter II and section 3.1 of Chapter III).