



**The Study and Demonstration of the Management of
Secondary Forests in Tropical Regions for the Purpose
of Enhancing Economic and Ecological Benefits**

(Phase 2)

PD 294/04 Rev.4 (F)

Project Completion Report



August 2011

**Guangdong Academy of Forestry
Guangzhou, P. R. China**



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The People's Republic of China

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Executive Summary

This project is the second phase project of PD 294/04 Rev.4 (F), which was derived from the pre-project (PPD30/01 Rev.1 (F)). The successful completion of the pre-project (PPD30/01 Rev.1 (F)) and the first phase project (PD 294/04 Rev.4 (F)) had established two demonstration districts in southeast Guangdong and Hainan Province, China, for the purpose of improving the low-quality secondary forests. The second phase project hopes: a) to continue the management of demonstration districts for better outcomes; b) to train forestry staff and villagers with STF management technology; c) to disseminate our improvement model through publishing project-related documents.

The executive agency devoted considerable efforts to project during the past 24 months and has successfully completed all planned objectives on schedule: 1) three-time tending and twice fertilizing of the introduced plants were conducted in the SDMSTF areas, and ensured their normal growth and development; 2) Twice field investigation of the fixed sample plots was executed. Seventy nine out of 82 species of plants (96.34%) survived in the STFs. The trees had significant differences in height, diameter at breast height and individual volume. Forty one species of plants/trees displayed high adaptability to environment in STFs, implying their high potential for STF management. Seven non-timber plants have entered fruiting age and can produce economic outputs ranging from 183.8 US \$/ha to 495 US \$/ha. The improvement activities dramatically increased the biodiversity, forest coverage, and biomass of forests; 3) Priority was continuously given to forest fire precaution, disease and pest control for forest safety. No disaster has occurred so far; 4) Two training sessions were hosted for more than 100 trainees. 5) A book "Management of Secondary Tropical Forest" was published.

Additionally the EA added several activities to strengthen influences of our project on the public. 1) The EA took advantage of TV program, Internet, Scientific Journal, Consultation Activities, and High-level symposium to disseminate this project; 2) The EA successfully applied the community-based model to a new reforestation project "Dongjiang River Basin Reforestation Project" in collaboration with Hong Kong-based Heroes2 Company.

Currently, the management improved the forest quality and increased the economic and ecological benefits of the demonstration districts. The training session improved the trainees' technology, knowledge and awareness on the STFs management, and obviously promoted the influences of our project on the public. The book publication enhanced the dissemination of knowledge, experiences and technology of STF management. As the direct beneficiaries, the local farmers were motivated by the community-based model to be fully involved in this project, including

the establishment and management of DDs. Therefore, this project has considerable post-project sustainability, including social sustainability, technical sustainability, institutional sustainability and financial sustainability.

The smooth completion of our project was attributable to right strategy. Our project highly emphasized the improvement of economic outputs other than ecological benefits since the poverty was the key problem of local residents. The community-based management model played an important role in motivating the participation of local residents. Our project might act as model for STF improvement and has the potential to be replicated in other areas.

1 Project Identification

1.1 Context

China has about 5.44 million ha of secondary tropical forests (STFs), accounting for 48.3% of forestland and 50.6% of forests in the tropical region. The STFs are mainly distributed in 124 counties in Guangdong, Hainan, Guangxi, Yunnan provinces, and some parts of Fujian and Tibet. However, due to heavy population and low income, farmers almost completely rely on wood for living, which leads to the gradual reduction of natural tropical forests and tree species, increase in forest pests and disease, and occurrence of frequent drought and flood disasters.

Due to the economic pressure on local residents in less-developed regions, there is little management performed on STF to improve its quality; on the contrary, STF are constantly being damaged, resulting in a decrease in species diversity and woodland degradation. Even in relatively well-developed regions, where forests are better protected, necessary managements are also needed, the economic and ecological benefits of STF have been at a very low level. Many studies have reported that it may take as long as 100 years or longer for such STF of low quality to return to a stable community naturally. While the time for recovery could be dramatically shortened by half if sufficient management measures are taken.

It is of great significance and also of urgency to carry out a program to enhance economic and ecological benefits, and to help people, especially in the countryside, to eliminate poverty. Therefore, a STF management project was funded by ITTO in Xinhui of Guangdong and Tongzha of Hainan using an experienced model: community-based management model.

Xinhui is the major demonstration district of this project. It is located at Goudu, Yamen township, Xinhui city, Guangdong province, east longitude 112°52'30", north latitude 22°5'00", 150 km away from Guangzhou, the capital of Guangdong. It covers an area of 4,196 ha with 320 residents. People's per capita income in 2003 was 376 US \$/per year.

The major incomes are from forest wood, fruits and agricultural crops. There are 2,918 ha of STFs (69.5% of land area), 874 ha of plantation forest (20.8% of the total) and 145 ha of agricultural land (3.5% of land area). The secondary forests are mainly composed of broadleaf trees. The big portion of STF is formed through 20~30 years' natural succession after logging. Its timber production potential is fairly low because trees with diameter at breast height (DBH) greater than 3 cm and height over 5m account for only 31% and 36% of the stand, respectively.

Tongzha demonstration district is the assisting one with an area of 67 ha. It is located at hinterland of Wuzhi Mountain, the central south of Hainan, north latitude 18°50', east longitude 109°30', 200 km away from Haikou, the capital city of Hainan province, 80 km away from Sanya to the south. Residents' gain was less than 230 US \$ in 2004. The forest stands are mainly composed of natural secondary broad-leaf species. The densities of stands rang from 0.4 to 0.5, and the stands are poor in quality. The storage capacity of each hectare is less than 4 m³; the growing amount is under 0.2 m³ per year. Where the secondary forest stands are the typical representative in Hainan.

1.2 Origin and problem

Due to population explosion and poor economic development, the STFs have been under disruption for a long time. The majority of STFs have been degraded to simple species composition with decreased germplasm resource, reduced biodiversity and low economic benefit. This is the key problem. Especially in the rural area, people are still mainly relying on harvesting timber for living. STF are constantly suffering from human damage. Meanwhile, due to the lack of practical management techniques, suitable plants and excitation mechanism, the STFs have not come into a right management way.

In view of the serious problems of STFs, such as low forest productivity, losing of biodiversity, fragile ecosystem, poor stand quality, land degradation, and land-use changes, the 30th ITTC convention approved the pre-project proposal entitled "The SDMSTF in Tropical Regions for the Purpose of Enhancing Economic and Ecological Benefits" (PPD 30/01 Rev.1 (F)) submitted by Guangdong Academy of Forestry (GAF) in 2001.

The project PD 294/04 Rev.4 (F) was the continuation of the pre-project "The Study and Demonstration of the Management of SF in Tropical Regions for the Purpose of Enhancing Economic and Ecological Benefits" (PPD 30/01 Rev.1 (F)). It aimed to improve the TSTFs in south China by using better management measures. The specific objectives were: a) to establish demonstration districts in two provinces for the study and demonstration of management of TSTFs (Phase 1) and b) to train forestry staff and

villagers in TSF rehabilitation techniques and to publish and disseminate the project results (Phase 2).

To date, the phase 1 task, the establishment of demonstration districts had been finished in July, 2009. This second phase task of project PD 294/04 Rev.4 (F) hopes: a) to continue the management of first phase demonstration area for better outcomes; b) to train forestry staff and villagers with TSF rehabilitation techniques; c) to disseminate our improvement model by publishing project-related information.

2 Project Objectives and implementation strategy

2.1 Project rationale, Project Development Objective and Specific Objectives

Project rationale: the planning and design of a STF management should be based on local situation, particularly the economic condition. The methods must be of practice and easy-operation. The model of community-based management is an ideal option. The major part of this model generally includes making an overall plan for STF management, motivating the participation of local residents, recovering hills with a variety of high-quality plants or trees, avoiding human disturbance and maintaining the natural development of forests. In places where secondary forests are seriously damaged the transportation conditions are poor, the tasks are to increase the biodiversity and to promote the development of stands by reintroducing indigenous species; In places where there is easy transportation but secondary forests are often seriously damaged, the management should first assign a certain area of land (the size will be dependent on the ability to support local residents and to meet their basic economic requirements) to introduce indigenous species, and then introduce the non-timber plants for the generation of economic benefits for the local residents. The results from the pre-project strongly suggested that the most important thing for protecting STF from human disturbance and destruction is to create income sources to meet their basic living requirement. Actually, this is the rationale of this project.

Project Development Objective: To accelerate SFM by better managed STF in China. With the implementation of project, STF in the demonstration districts will be well protected with promoted forest quality, increased biodiversity, and enhanced ecological and economic benefits. The local residents will obtain higher incomes and employment opportunities. By taking project demonstration and dissemination, the awareness and interest of the public on STF management will be aroused and the government will be excited to pay more attention to improve policies and laws concerning sustainable management of STFs.

Specific Objectives:

Specific Objective 1 Establishing demonstration districts for SDMSTF (Phase 1)

(i) Selection and breeding of good planting species

It is planned to select and breed about 50 species. Among them, 35 regional native hardwood species, 5 exotic tree species like *Dipterocarpea*, 2 rattan species, 2-3 medicinal species, 2-3 bamboo (shoot) species for edible purpose, and 5 families of Masson Pines with high yield of resin.

(ii) Establishing demonstration districts respectively in Xinhui of Guangdong and Tongzha of Hainan

Specific Objective 2 Training and Extension (Phase 2)

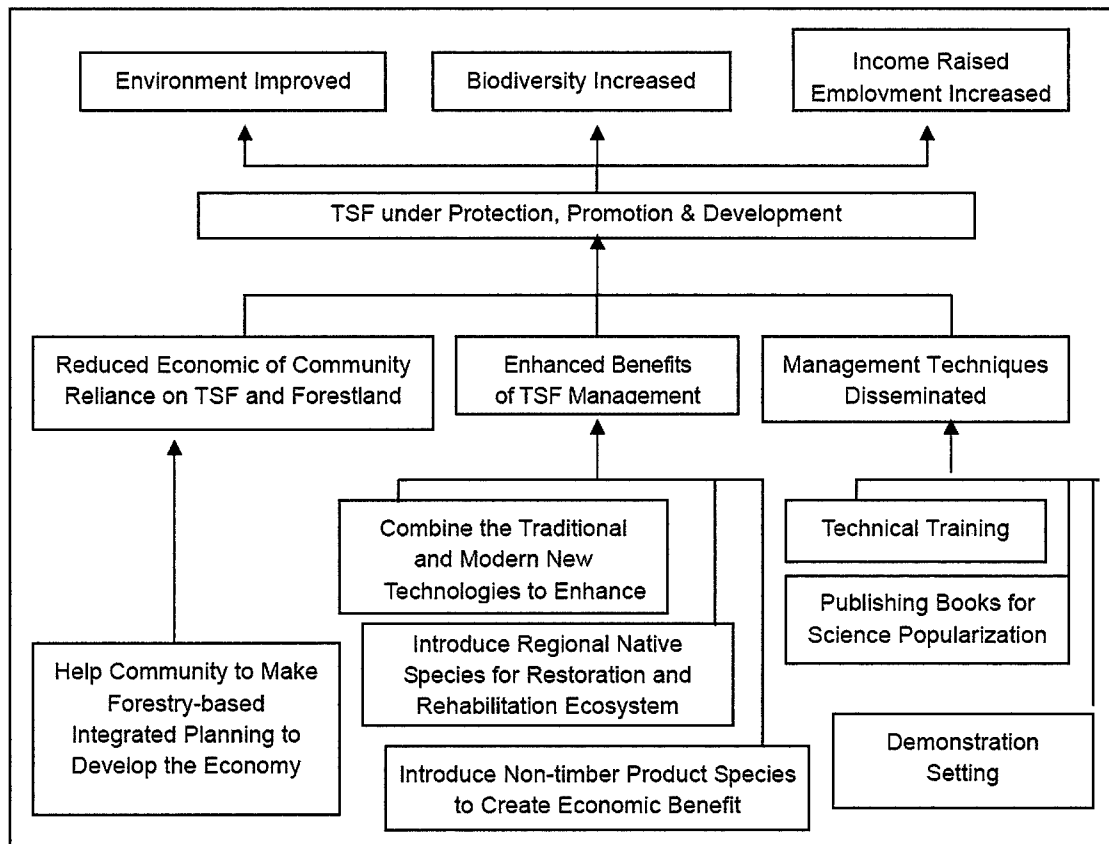
(i) Conduct technical training for two sessions. 30 forestry officials or staff and 70 community backbone technicians from different rural areas will be trained.

(ii) Compile and publish the book "STF Management Techniques" which will provide the people in the fields of science and technology, education, and management the theory and practical technology of STF management.

2.2 Project Implementation Strategy

Project Implementation Strategy: Firstly demonstration districts are established within STFs in south China to conserve the forests through stopping any unplanned degradation from hum disturbance. A community-based management model is used to motivate the active participation of local residents in the establishment and management of DDs. Non-timber plants are introduced into parts of STFs to create economic sources for farmers at relative short time, and to realize the objective of protecting STFs and enhancing ecological and economic benefits. After the project completion, the stakeholders in the demonstration districts will get economic benefits from non-timber forest products, and STFs will be improved with increased biodiversity and ecological benefits.

Objective Tree



2.3 Project Assumptions and Risks

There are several risks listed in below, maximum efforts have been made to minimize the risks.

- (i) Some introduced species in STF may not grow well on the sites with less sunlight. GAF has begun to carry out a pilot trial on tree-adaptability to different spacing and silvicultural practices. We are trying to get enough data for species selection before the project starts, thus to reduce the risk.
- (ii) The demonstration districts are usually the places where community residents conduct activities frequently, which may cause unexpected artificial damages including forest fire and animal browsing. The project team will closely coordinate with the local governments and community organizations to educate and remind of local residents. A full-time forest guard will also be hired.
- (iii) Damages of natural disaster. We will keep close contact with related forecast departments to take prevention measures.
- (iv) Change of landownership. GAF will sign contracts with the landowners to avoid the risk.

3 Project Performance (Project elements planned and implemented)

3.1 Specific Objectives (in phase II)

After the completion of this project, we have fully realized the Specific Objectives listed below (Table 1).

Table 1 Comparison of planned and realized Specific Objectives

	Planned Specific Objectives	Realized Specific Objectives
Specific objective 1	Managing demonstration districts for SDMSTF	Management and evaluation of demonstration districts for SDMSTF accomplished
Specific objective 2	Training and Extension	Training and Extension accomplished

3.2 Outputs and activities (in phase II)

After the completion of this project (Phase II), we finished all planned activities and achieved all planned outputs. Additionally, we added several activities into this project on project dissemination. The added outputs were also achieved which further strengthened influences of our project on the public. The activities and outputs are described below (Table 2).

Table 2 Comparison of planned and realized outputs and activities

	Planned outputs and activities	Realized outputs and activities
Output 1	<i>Tending and management of the introduced species</i>	<i>Introduced trees/plants in the demonstration districts were well managed and evaluated</i>
Activity 1.1	Tending and management of the introduced species	Tending and management of the introduced species was accomplished
Sub-activity 1.1.1	Tending and fertilizing of the introduced species	Three-time tending and twice fertilizing were conducted for the introduced plants/trees in DDs.
Sub-activity 1.1.2	Fire prevention, diseases and insect preventing and curing	Adequate measures were taken to ensure fire prevention, diseases and insect preventing and curing
Activity 1.2	Evaluation of the fixed sample plots	Fixed sample plots was evaluated
Sub-activity 1.2.1	Fixed sample plots observation and evaluation of the species, growth development and environment changing	Twice observations were conducted on fixed sample plots and the data were analyzed for the evaluation of plant growth and forest quality changes
Output 2	<i>Holding 2 training sessions and training 100 trainees</i>	<i>Two training sessions were held for 100 trainees</i>
Activity 2.1	Textbook writing	Textbook was compiled for training sessions
Sub-activity 2.1.1	Hold a seminar for the training textbook compile	A seminar was held for textbook compiling
Sub-activity 2.1.2	Training textbook compile	Textbook was compiled for training sessions
Activity 2.2	Holding 2 sessions and training 100 trainees	Two training sessions were held for over 100 trainees
Sub-activity 2.2.1	Training program design	Training program was designed
Sub-activity 2.2.2	Holding 2 training sessions for 100 trainees	Two training sessions were held and more than 100 trainees participated in
Output 3	<i>Publication of the book "Secondary Tropical Forest Management Techniques"</i>	<i>The book "Management of Secondary Tropical Forests" was published</i>
Activity 3.1	Information collection and symposium	Information collection and symposium for book compiling were accomplished

Sub-activity 3.1.1	Hold a symposium for the book compile	A symposium was held for book compiling
Sub-activity 3.1.2	Materials collection for the book compile	Materials was collected for book compiling
Activity 3.2	Writing and compiling	Book was compiled
Sub-activity 3.2.1	Draft writing	Draft writing was finished
Sub-activity 3.2.2	Examining and approving manuscripts	Manuscript examining and approving were accomplished
Activity 3.3	Publication	Book was published
<i>Added Output 1</i>		<i>Strengthened influences of our project on the public</i>
Added Activity 1.1		Dissemination of this project via various activities
Ad Sub-activity 1.1.1		Dissemination via TV program
Ad Sub-activity 1.1.2		Dissemination via internet
Ad Sub-activity 1.1.3		Dissemination via scientific journal
Ad Sub-activity 1.1.4		Joining in consultation activities for extending science and technology to countryside
Ad Sub-activity 1.1.5		Joining in high-level symposium for communication with peers and experts
Added Activity 1.2		Application of our community-based management model to new project

Below is our detailed description of implemented activities and achieved outputs.

Output 1 Introduced trees/plants in the demonstration districts were well managed and evaluated

Activity 1.1 Tending and management of introduced plants was accomplished

Sub-activity 1.1.1 Three-time tending and twice fertilizing were conducted for the introduced plants/trees in DD

To facilitate the growth and development of the introduced plants, we organized and conducted three-time tending and twice fertilizing for the plants in the demonstration areas. The first two tending and fertilizing were conducted in August 2009 and July 2010, and the last tending was finished in July 2011. During the tending period, we completely removed overrunning weeds, crab grasses, brambles and thistles that closely surrounded the introduced plants (Figure 3-6 in Appendix 3). As for the fertilization, we dug holes around the bases of the introduced trees and fertilized them by adding compound fertilizer into these holes.

Sub-activity 1.1.2 Adequate measures were taken to ensure fire prevention, diseases and pest control

The executing agency and local forest units held coordination meeting and organized a special working group that are specifically responsible for the followings: 1) Broadly disseminating the forest fire prevention, disease and pest control to increase the awareness of the local residents; 2) Intensively deploying various related works for the special working group to improve their responsibility and work efficiency; 3) Giving prominence to key areas on forest fire prevention, disease and pest control, and strictly controlling the disaster origin; 4) Strengthening duty and effectively channeling information flow within/among departments of this project. Fortunately, no disaster has occurred so far.

Activity 1.2 Fixed sample plots were observed and evaluated

Sub-activity 1.2.1 Twice observation were conducted on fixed sample plots and the data were analyzed for the evaluation of plant growth, economic output and forest quality changes

To disclose the potential benefits and outputs of STF improvement, we annually investigated the introduced trees/plants in three fixed standard sample plots since their plantation. These three fixed standard sample plots were rectangle with a size of 50 m × 66.67 m, in each of which 30 sub-plots with a size of 5 m × 11.11 m were included. A total of 82 species of plants were introduced into these fixed standard sample plots, including 60 native broadleaved trees, 11 species of exotic broadleaved trees, 2 species of

rattans/climbers, 7 species of pharmaceutical plants, 2 species of bamboos, and 5 families of high-yield-resin masson pines. The demonstration area was established under the support and guidance of two national consultants and in cooperation with local forest institutions.

By taking investigation, we clearly figured out the responses of each species of trees/plants to environment in the demonstration district and identified 41 species of trees that are adaptive to the environment in STFs. As for growth status, the investigation was focused on survival rate, plant height (H), the diameter-at-breast-height (DBH) and individual volume. The introduced plants displayed good growth status and their overall survival rates are more than 80% in the STFs, indicating their outstanding adaptation to the STF growth conditions (Figures 3-7, and 42-59; Table 3-4). The investigation conducted in 2007 and 2009 identified 79 species of plants/trees, representing 96.34% of the total 82 species. The ANOVA analysis showed that different plants/trees displayed significant variations in height (Table 3; $P < 0.0001$), diameter at breast height ($P < 0.0001$) and individual volume ($P < 0.0001$). Obviously different trees/plants had significant different adaptability to the environment in STFs. Additionally plant height in year 2007 differed significantly from that in year 2009 ($P < 0.0001$), indicating their rapid growth during these two years.

Table 3 Variance analysis of plant height investigated in year 2007 and 2009

Source	DF	Anova SS	Mean Square	F value	Pr > P
Species	78	435.26	5.58	8.51	<0.0001
Year	1	59.36	59.36	90.49	<0.0001
Species × Year	77	236.86	3.076	4.69	<0.0001

Of these 79 species of plants/trees, 41 had an average individual volume > 0.0004 cubic meter (See Project Technical Report). Forty species of trees displayed double or more increase in height during 2-year growth from year 2007 to 2009. These outstanding plants/trees displayed high adaptability to the environment in STFs and are considered suitable candidates for STF improvement activities. The best tree species was *Castanopsis fissa* Rehd. et Wils, that had a 4.46 m of height, a 3.62 cm of DBH and a 0.003575 m³ of individual volume in year 2009, and increased average height by 200.44% within 2 years.

The investigation in year 2011 identified 7 species of plants/trees that has come to fruiting age. These trees/plants had an economic output ranging from 183.3 US \$/ha to 495 US\$/ha (Table 4). Apparently the economic output will improve the living

standard of local residents who are in charge of the management of DDs.

Table 4 Evaluation of economic output of non-timber plants in demonstration district

No.	Chinese name	Species name	Numbers of plants (plants/ha)	Individual Productivity (kg/plant)	Total productivity (kg/ha)	Price (US \$/kg)	Economic output (US \$/ha)	Utility
1	鸡血藤	<i>Millettia dielsiana</i>	15	15.0	225	2.2	495.0	Rattan for medicine production
2	春砂仁	<i>Acidosasa villosum</i>	450	0.1	45	6.5	292.5	Fruit for medicine production
3	山苍子	<i>Litsea cubeba</i>	150	5.0	750	0.46	345.0	Fruit for medicine production
4	黄藤	<i>Daemonorops margaritae</i>	15	5.0	75	2.45	183.8	Rattan for medicine production
5	树菠萝	<i>Artocarpus heterophyllus</i> Lam	30	10.0	300	1.45	435.0	Fruiting tree
6	扶芳藤	<i>Euonymus fortunei</i> Hand.	150	0.5	75	2.64	198.0	Rattan for medicine production
7	山乌柏	<i>Sapium discolor</i>	30	15.0	450	0.85	382.5	Seeds for oil manufacture

Further investigation in year 2011 found that project implementation dramatically increased the number of large trees, total timber volume, total basal area/biomass, plant diversity, number of plant species and forest coverage ($P < 0.001$; Table 5). While the control forests have much more short plants than do improved forests. These results strongly suggested that our project has significantly improved the forest quality.

Table 5 Comparison of quality of improved and control forests

Sample plot	No. of plants (HT \geq 5 m)	No. of plants (5 > HT \geq 2.5 m)	No. of plants (HT \leq 2.5 m)	Total volume (m ³ /ha)	Basal area/Bio mass (m ² /ha)	No. of plants per hector	No. of plant species per hector	Forest coverage (%)
1 Improved	171	331	160	37.13	11.09	9990	71	63.5
1 Control	46	194	279	19.02	6.68	7815	49	43.0
2 Improved	148	333	90	36.24	11.62	8565	74	65.9
2 Control	81	264	470	18.26	6.49	8265	55	45.2
3 Improved	112	334	280	51.45	16.25	7136	60	44.8
3 Control	69	232	287	33.64	11.93	5862	48	36.3

Note: HT, height.

Table 6 Project Implementation Progress

OUTPUT/ACTIVITIES	Responsible party	SCHEDULE (in months)																									STATUS
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
Output 1 Tending and management of the introduced plants																											
<i>Activities</i>																											
Act 1.1 Tending and management of the introduced plants	Local Forest Farm																										
Sub-act 1.1.1 Tending and fertilizing	Local Forest Farm																										
Sub-act 1.1.2 Fire prevention, diseases and pest control	Local Forest Farm																										
Act 1.2 Evaluation of fixed sample plots	GAF																										
Sub-act 1.2.1 Fixed sample plots observation and evaluation	GAF																										
Output 2 Holding two training sessions and training 100 trainees.																											
<i>Activities</i>																											
Act 2.1 Textbook writing	GAF																										
Sub-act 2.1.1 Hold a seminar	GAF																										
Sub-act 2.1.2 Textbook compiling	GAF																										
Act 2.2 Holding 2 training sessions for 100 trainees	GAF																										
Sub-act 2.2.1 Training program design	GAF																										
Sub-act 2.2.2 Holding 2 training sessions for 100 trainees	GAF																										
Output 3 Publication of the book "Secondary Tropical Forest Management Techniques"																											
<i>Activities</i>																											
Act 3.1 Information collection and holding of symposium	GAF																										
Sub-act 3.1.1 Hold a symposium	GAF																										
Sub-act 3.1.2 Materials collection	GAF																										
Act 3.2 Writing and compiling of book draft	GAF																										
Sub-activity 3.2.1 Book draft writing and compiling	GAF																										
Sub-activity 3.2.2 Examining and proofing	GAF																										
Act 3.3 Publication of the book	GAF																										

Output 2 Two training sessions were held for more than 100 trainees

Activity 2.1 Textbook was compiled for training sessions

Sub-activity 2.1.1 A seminar was held for the textbook compiling

To prepare the textbook for training sessions, a seminar was hosted on the topic of Selection and Breeding of Superior Native Broad-leaf Trees and High-efficiency Cultivation Technology on the campus of GAF in May 2010. More than 60 experts and workers from eight research institutions (including GAF and 7 corporate research institutions) were invited to participate in this seminar. The coordinator of ITTO project, Prof. Zeng Linghai, was in charge of this meeting and invited 10 professionals to give presentations. The presentations were focused on introducing the current status of six important native broad-leaf trees: *Castanopsis fissa* Rehd.et Wils, *Cinnamomum campora* (L.), *Erythrophloeum fordii* Oliv, *Liquidambar formosana*, *Michelia macclurei* and *Castanopsis hicklii*. They highly emphasized the contribution of native broad-leaf trees, and briefly presented the latest progresses on selection and breeding of these trees worldwide. During this seminar, five specialties in tree genetics and breeding presented their high evaluation to our progresses. This seminar provided adequate information for the preparation of Textbook.

Sub-activity 2.1.2 A textbook was compiled for training session

To prepare two training sessions, the executing agency have invited experienced scientists to compile the textbooks. These textbooks are mainly focused on describing management technology of secondary tropical forests and the latest progresses in forest genetics and tree breeding. By the end of January 2010, the compiling of these textbooks had been finished.

The contents of the textbook included:

- Part I Overview of tropical forests and secondary tropical forests;
- Part II Sustainable management of secondary tropical forests;
- Part III Brief introduction of project PD 294/04 Rev.4 (F).
- Part IV Latest progresses in forest genetics and tree breeding

Activity 2.2 Two training sessions were held for more than 100 trainees

Sub-activity 2.2.1 The first training program was designed

To promote the management level of forestry staff and villagers, we planned a two-day training program for these workers on the campus of GAF. First of all, we arranged a well-organized training procedure according to our training program:

i) Line up the speakers

–We contacted four speakers specialized in Ecology, Tree Genetics and Breeding, Silviculture in advance, and give them a brief overview of the training purpose and profile of audience.

- We invited four professionals to give presentations.
- ii) Arrange meeting affairs
 - The training was held on the campus of Guangdong Academy of Forestry.
 - Secure meeting facilitators
 - Make arrangements for equipment
 - Arrange for exhibits and handouts
 - Meanwhile, we arranged the handout information for the speakers, the housing, meal, and training announcement for trainees and speakers.

Sub-activity 2.2.2 The first training session was held in July, 2010

On July 21, 2010, we held the first training session in Guangzhou and a total of 54 trainees joined this session. During the session, four experts were invited to give presentations. The project coordinator Prof. Zeng linghai presented an overview of tropical forests and secondary tropical forests in the world, Prof. Yin Zuoyun delivered a speech on sustainable management of secondary tropical forests worldwide, Prof. He Boxiang introduced the experiences achieved from the implementation of project PD 294/04 Rev.4 (F), and Prof. Bailian Li gave a presentation on progresses on forest genetics and tree breeding (Figure 9-11).

Sub-activity 2.2.3 The second training program was designed

To appeal the public to pay more attention to STFs, our project coordinator, Prof. Zeng Linghai, participated in an important symposium: the Advanced Research and Study Class of Sustainable Management Technology of Plantations, he gave a lecture to all participants on the topic of Management Technology of Secondary Forests on October 11-15, 2010.

Sub-activity 2.2.4 The second training session was held in 2010

The Advanced Research and Study Class was held in Nanning, the Capital of Southwest Guangxi Zhuang Autonomous Region in October 11-15, 2010. More than 80 trainees from 16 provinces joined in this symposium. The topic of this symposium is: Sustainable Management Technology of Secondary Forests. Our project coordinator, Prof. Zeng Linghai, was invited to this symposium and gave a lecture on the topic of Sustainable Management of Secondary Forests in south China (Figure 21-24 in Appendix 3). He gave a detailed presentation in the following areas:

- (i) Concept of Secondary Forests
- (ii) Worldwide Management Experiences
- (iii) Management of Secondary Forests in South
 - 1) Main Types of Secondary Forests in South

- 2) Current Situation of Management
 - 3) Management Potential
 - 4) Achievements and Experiences Achieved from Management
 - 5) Contribution of Management
 - 6) Key Problems of Management
 - 7) Mistakes Should Be Avoided During Management
 - 8) Regulations and Policies Should Be Legislated for Management
 - 9) Management Principles
 - 10) Management Strategies
 - 11) Management Measures
 - 12) Management Models
- (iv) Conclusions

In addition to Prof. Zeng Linghai, six other experts were also invited to give lectures on the following topics:

- (i) Current Situation of Plantations' Management Worldwide and Key Problems of Plantations in China, presented by Prof. Tang Shouzheng.
- (ii) Management of Multifunctional Plantations, presented by Lu Yuancang.
- (iii) International Experiences Achieved from Plantation Management and Key Problems that Management of Plantations Are Facing in China, presented by Prof. Hou Yuanzhao.
- (iv) Reasonable Management of Short-rotation Plantations (Industrial Raw Material Stands), presented by Prof. Bai Jiayu.
- (v) Management Technology of High-value Rare Trees in Southern Sub-tropical Region, presented by Prof. Cai Daoxiong.
- (vi) High-generation Genetic Improvement and Fir Plantation in Fujian Province, presented by Prof. Zheng Renhua.

Output 3 The book “Management of Secondary Tropical Forests” was published

Activity 3.1 Information collection and symposium for book compiling were accomplished

Sub-activity 3.1.1 A symposium was held for book compiling

To compile the book “Management of Secondary Tropical Forests”, the EA invited four experts to participate in a symposium on May 15, 2010, including Prof. Yin Zuoyun (from GAF), Prof. Zeng Linghai from GAF, Prof. Zhong Weihua (from South China Agriculture University) and Prof. Huang Shaowei (from SCAU). These experts have rich experiences in the field of STF management. They gave constructive suggestions on the followings: book content, organization, information collection, and knowledge on secondary tropical

forests etc. Prof. Yin Zuoyun was invited by the EA to be the first author of this book and was in charge of the book compiling.

Sub-activity 3.1.2 Materials were collected for book compiling

To help the compiling of this book, project workmates spent 12 months (from August 2009 to July 2010) to collect documents. Huge documents including 12 books, 212 scientific papers, 19 news, and 11 PPT reports were collected from a variety of sources, such as book stores, libraries, scientific journals, on-line database, magazines, newspapers, seminars, and symposium. These documents were written in English or Chinese. To accelerate the book publication, the authors were writing the book at the same time while the workmates were collecting the documents.

Activity 3.2 Book compiling completed

Sub-activity 3.2.1 Draft writing was finished in July 2011

After writing for 9 months (from November 2009 to July 2010), the compiling activity was completed by Professor Yin Zuoyun (Figure 22).

Sub-activity 3.2.2 Manuscript examining and approving were accomplished

After the completion of draft writing, the book draft was subject to professional revision immediately. Seven months later, the manuscript examining and approving were also completed in January 2011 (Figure 20 in Appendix 3).

The summary of this book "Management of Secondary Tropical Forests" is as follows:

This book is the scheduled output of the ITTO (International Tropical Timber Organization) project, "The Study and Demonstration of the Management of Secondary Forests in Tropical Regions for the Purpose of Enhancing Economic and Ecological Benefits" [No. PD 294/04 Rev.4 (F)], which is a continuation of the pre-project [No. PPD 30/01 Rev.1 (F)] with the same title. The book is aimed at summarizing the practice and research on the secondary tropical forests and their sustainable management in the world, especially in the tropical regions of China. It consists of 8 parts as follows:

- (1) The resources of tropical forests, including their geographical distribution and main types;
- (2) The management of tropical forests, introducing the up-to-date information about ITTO, ITTO activity plans, revised criteria and indicators, and policies and regulations for the sustainable management of tropical forests;
- (3) The resources of secondary tropical forests: definition of secondary forest, their position in the tropical forests, area, distribution, and main types;
- (4) The status of secondary tropical forest management, such as current situation, existing problems, and policy responses;

- (5) The advances of research on secondary tropical forest management, including research history, development and succession, productive potential, and animals of secondary tropical forests;
- (6) The techniques of sustainable management of secondary tropical forests, indicating main approaches to the management in the world and a case study of introducing non-timber plants with economic values into the degraded secondary tropical forests in South China, and putting forward three management modes appropriate to tropical China;
- (7) The biodiversity conservation of productive tropical forests, elaborating the background, key issues, and policy responses;
- (8) The management of tropical forest fire, including tactics, monitoring and research, institutional framework and capability building, and training and public education.

The sustainable management of tropical forests (especially STFs) is the key to the conservation and use of global ecosystem. The sustainable management means taking into account both economic and ecological benefits. The book will provide technical guidance for forest land managers to implement the sustainable management of secondary tropical forests, and will present professional reference for government policymakers to establish related policies and regulations.

Activity 3.3 Book was published

With the support of ITTO fund, the book "Management of Secondary Tropical Forests" was published in June 2011.

Added output 1 Strengthened influences of our project on the public

Added activity 1.1 Dissemination of this project via various activities.

One of our major missions in the Phase 2 is to disseminate our project. To achieve this goal, the executing agency added five activities into the workplan as follows (See Table 2).

Added Sub-activity 1.1.1 Dissemination via special television program

During the period of field investigation, the project leader Prof. Zeng Linghai led the project working staff and the reporters from the local TV stations to enter the demonstration areas. He took interviews with the reporters to systemically introduce the project objectives, working content, implementation approaches, progress, upcoming outputs and outcomes (Figures 1-2). In addition, the working staff was continuously interviewed and recorded by the reporters as they conducted their field investigation, introducing the investigation procedure, objectives, measurement indicators, and the potential impacts on society (Figures 3-7). These activities had been made into a special TV program, and broadcasted at the Jiangmen TV Station and Xinhui Station as News at

the daily golden moments, leading to the dramatically improved influences of our project on the public.

Added Sub-activity 1.1.2 Dissemination via internet

The project executing agency has built an internet website (<http://www.tree-breeding-gaf.com>) to comprehensively introduce the information related to this project, particularly the project origin and the progresses. This website has been browsed by a large number of users due to its popularity, which plays a very important role in promoting the project implementation, project dissemination and its impacts on the public.

Added Sub-activity 1.1.3 Dissemination via scientific journal

The project EA funded a publication of project progress materials on the cover page of a scientific journal: Guangdong Forestry Science and Technology, Volume 25, issue 5, 2009 (Figure 8).

Added Sub-activity 1.1.4 Joining in consultation activities for extending science and technology to countryside

To help local farmers shake off poverty, Guangdong Forestry Administrative Bureau initiated a consultation activity for extending science and technology to countryside in July, 2010. The purpose of this activity is to promote the development of rural areas. During the activity, more than 100 forestry experts were invited to impart the practical forestry science and technology to local farmers. Two backbone members of our project, the project coordinator Prof. Zeng Linghai and Prof. He Boxiang, joined in this consultation activity and took close communication with many local farmers on advanced forest management technology, particularly that for secondary tropical forests. Second, the experts delivered many books of science and technology to local farmers that help them solve the practical problem in forestland cultivation and forest management. Finally, they built a long-term aid relationship with these farmers to help them realize the hopes of self-enrichment (Figures 12-16).

In May 2011, project coordinator Prof. Zeng Linghai and Prof. He Boxiang were invited to participate in another consultation activity for extending science and technology to countryside in Guangning. During the process of activity, two professors gave face-to-face introduction and training to local residents on issues they concerned, including the STF management, seeding cultivation, economic benefit evaluation, non-timber product market etc (Figures 32-39).

Added Sub-activity 1.1.5 Joining in high-level symposium for communication with peers and experts

To further promote the influence of our project, our project coordinator participated in the Ninth South Symposium of Forest Management Theory and Practice on December 12 to 14, 2010. More than 300 participants from the whole country were involved in this

symposium. Our project coordinator, Prof. Zeng Linghai, had an intensive communication with these peers and experts on the following topics: low carbon economy, transformation of economic development, national policy of forestry industry, construction of an ecological Guangdong province, and development prosperity of forestry industry. These experts had a common conclusion: forest has a close relationship with global climate. We must pay high attention to the transformation from simple scale expansion to quality improvement. Forestry has a great development potential in south China. Forestry workers should make full use of the advantages of climate and environment in south to develop forest. This communication obviously will promote our awareness and technology of forest management and facilitate our project implementation in future (Figures 25-31 in Appendix 3).

Added activity 1.2 Application of our community-based model to new project

By using our community-based management model, we carried out a reforestation project in the Dongjiang River Basin (Dongjiang River Reforestation Project) through our collaboration with Heroes2, a Hong Kong-based company. Since May 2010, we have completed two rounds of tree planting at a site in Zijin County, Heyuan City, Guangdong Province, with funding from Heroes2. The Lashi Village site, which in the basin of the Dongjiang River (East River) covers an initial 160 hectares, is now home to 12,000 newly-planted seedlings of 59 different species with space for about another 100,000 tree within the site. The project goal is to create a sustainable forest that improves the environment, increases biodiversity and generates income for local communities. "This project was initiated with corporative partner support and we're now positioned to launch the Heroes2 Buy One/Plant One scheme, harnessing consumer purchasing power for reforestation in the Dongjiang River Basin. This helps protect the main source of fresh water for millions of people in Hong Kong and the Eastern PRD" said Raymond Yap, founder and chief executive of Heroes2. Our community-based approach provides local farmers with incentive to participate in tree-planting and on-going activities to maintain the health of the forest since it can be sustainably harvested for a range of non-timber produces as well as high-value hardwood timber (Figures 17-19 in Appendix 3).

Table 7 Progress of added activities

ADDED OUTPUTS/ACTIVITIES	Responsible party	SCHEDULE (in months)																									STATUS
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
<i>Added Output 1: Strengthened influences of this project on the public</i>																											
Added Activity 1.1 Dissemination of this project via various activities																											
Added sub-activity 1.1.1 Dissemination of this project via television	GAF, Local TV station																										
Added sub-activity 1.1.2 Dissemination of this project via internet	GAF,																										
Added sub-activity 1.1.3 Dissemination of this project via scientific journal	GAF,																										
Added sub-activity 1.1.4 Joining in consultation activity	Guangdong Forestry Administrative Bureau, GAF																										
Added sub-activity 1.1.5 Joining in symposium for communication with peers and experts																											
Added Activity 1.2 Application of our community-based model to new project	GAF, Heroes2																										

3.3 Project Schedule (in phase 2)

Starting date: August 1, 2009

Duration: 24 months, from August 1, 2009 to July 31, 2011.

3.4 Total amount of expenditures; analysis of applied input (in phase 2)

By the end of July 31, 2011, a total amount of 109,502 US \$ project fund was received from ITTO and 109,712 US \$ was spent on the project implementation. The 210 US \$ gap was caused by the inflation of oil price. Generally, the project fund was strictly used according to regulations and rules of ITTO and met the basic requirement of project implementation.

4 Project Outcome, Target Beneficiaries Involvement

4.1 The Project Specific Objectives were completely achieved

With the project implementation, we have successfully achieved all planned Specific Objectives. 1) The demonstration districts in Guangdong and Hainan were well managed as a result of tending, fertilizing, fire preservation, and disease and pest control. The introduced trees displayed normal growth and development, which dramatically improved the forest quality and increased the economic and ecological benefits of the demonstration districts. 2) Two training sessions were held for more 100 trainees and a book "Management of Secondary Tropical Forests" was published. The training session improved the trainees in operation skills, technology and knowledge on the STFs management, and obviously promoted the influences of our project on the public. The book publication enhanced the dissemination of knowledge, experiences and technology of STF management and provided a guideline for the operation of other related activities worldwide.

4.2 Situation comparison between project completion and pre-project

After the completion of this project, the demonstration district showed dramatic improvement as compared with pre-project situation. Our project has improved influences on the public.

- The introduced trees displayed normal growth and development as a result of three-time tending and twice fertilizing;
- the forest quality was sharply improved;
- the economic benefits of DD were significantly increased;
- A textbook was compiled for training session;

- Two training sessions were held;
- More than 100 trainees were trained. Their technology, knowledge and awareness on the STF management were apparently improved;
- A symposium was held for a book compiling;
- A book was published which further promoted the influences of STF on the public.

4.3 The involvement of target beneficiaries in this project

The target beneficiaries included local farmers, donation countries, education and research institutions and local administration agencies.

Based on our community-base management model, the local farmers were the direct participants of this project. They directly participated in the establishment and management of demonstration districts, joined in the training sessions, and have the accessibility to harvest the products from the forests.

The donation countries funded the project by which the activities in this project were implemented. Obviously, these countries made considerable contribution to the target area where the project was conducted. They indirectly enhance the improvement of forest quality, the increase of economic and ecological benefits for local residents.

The education and research institutions organized the implementation of this project in the purpose of improving the STFs. Apparently their key issues were to figure out the optimum approaches for these improvement activities through scientific researches. In this project, the EA successfully took advantage of community-based management model for the establishment and management of DDs. Additionally they disseminated their management experiences, knowledge and technology of STF management through training sessions and book publication.

The local administration agencies gave strong support to this project in policy, relationship coordination, organization and implementation. They also achieved experiences in the STFs management which would subsequently facilitate the revision of policies to enhance the STF development.

4.4 Project sustainability

This project has been sustainably managed and has good post-project sustainability in future. Below is the detailed description.

- ◆ **Social sustainability:** The local residents in the demonstration village are ordinary Han Nationality People who are equally offered with human rights and equal access to basic needs for food, shelter, education, and work opportunities. After the

completion of this project, our community-based management model will offer them equal access to the management of forests and forest products as well. Currently, some non-timber plants in the demonstration area have entered fruiting age and some other non-timber plants will enter fruiting age in near future. This will make sure that the local residents can get sustainable income for living, thereby leading to the sustainable management of forests. In the long term, the high-value rare trees will produce hard-wood for local residents to further increase their income. It will come to a balance between annual timber-harvesting and annual growth. Obviously, this project has won the support of the majority of local residents and motivated their active participation in forest management. Therefore, this project has good social sustainability.

- ◆ **Technical sustainability:** Our community-based management model supplemented with interplanting non-timber plants approach has the ability to stably motivate the active involvement of local residents in forest management and generate economic benefits for them. This model has been highly appreciated by China's government and international counterparts. Currently, this model has been applied to a newly launched reforestation project that comes from an international cooperation between Guangdong Academy of Forestry and a Hong Kong-based company, Heroes2. Additionally, this model has been broadly adopted by working groups across China for forest management during the State's 12th five-year plan. Based on these elaborations, it could be concluded that our management model is highly reasonable and able to ensure post-project sustainability.
- ◆ **Institutional sustainability:** The newly enacted law "Integrated Promotion of State-owned Collective Forestland Tenure Reform" particularly emphasizes the management tenure of forestland for farmers. The local residents are motivated to be fully involved in long-term management of DDs. The EA and local governmental agencies need the demonstration model to achieve scientific experiences for extension. They will help the local residents for further improvement of this project. Therefore, this project has good post-project institutional sustainability.
- ◆ **Financial sustainability:** Currently, seven species of non-timber plants in DDs have entered fruiting age and can produce an economic output ranging from 183.3 US \$/ha to 495 US\$/ha. The fund will be proportionally divided for different usage. Seventy percent will be used for improving living standard of local residents and the remaining 30% will used for management fund of DDs. Meanwhile, the seedling nursery funded by this project has the potential to produce one million seedlings a year. The annual profits from these seedlings are about 45,000 US \$. This will also

provide certain amount of fund for the management of DDs. Additionally, we have obtained some funds from both government and enterprises to make the management of demonstration area going on, which will further ensure the sustainability of this project. Therefore, this project has good financial sustainability.

5 Assessment and analysis

5.1 Analyses and comments on Project rationale and Project identification

Obviously the project rationale and project identification were reasonable and correct.

The planning and design of this project was based on forest quality and economic condition of local area. The poor quality and low productivity were the key factors that hindered the development of STFs in China. It is urgent to figure out a suitable approach for STFs improvement. The project identification was just based on this situation. The key issue was to improve the productivity of STFs through which the economic benefits of local residents were increased and their dependence on harvesting of timber and fuel-wood was reduced. Re-introducing non-timber plants/trees has the potential to increase the economic outputs of improved forests other than to improve the forest quality. The methods and approaches adopted by this project were practically easy operation. The community-based management model fully motivated the involvement of local residents and other stakeholders in project formulation process.

5.2 Analyses and comments on project identification process

The project identification was based on correct analyses of problems to be tackled, correct planning of project objectives and correct use of implementation strategy. This was derived from a large-scale investigation of local situations, including forest quality, people's life, residents' economic sources and their relationship with forests. The key problems that the local residents were facing were the low quality and low productivity. Therefore, the project objective was to establish a demonstration district for STF improvement for the purpose of increasing forest quality and economic outputs. At the same time, training sessions and book publication were also adopted to improve the skill, technology, knowledge and awareness of the publics on STFs management. With regard to implementation strategy, re-introducing non-timber plants/trees was the most suitable choice because it could play roles in both forest improvement and benefits increase.

5.3 Analysis of critical differences between planned and actual Project implementation

The critical difference between planned and actual project implementation was the addition of two activities into this project. 1) The dissemination of project via TV news, internet, scientific journal, joining in consultation activities for extending science and technology to countryside, and joining in high-level symposium for communication with peers and experts; 2) Application of our community-based model to new Afforestation project in Dongjiang River Basin. The addition of these activities led to a new output: Strengthened influences of our project on the public.

5.4 Comments on time and project inputs

The time was adequate for project implementation, but not enough for the target forests to fully express their productivity. The total duration of this project was 48 months. The first 24 months (in Phase I) were spent on the establishment of DDs and the later 24 months (in Phase II) were spent on management of DDs, training sessions, book publication, and project dissemination. Due to the hard work and high-efficiency organization, the EA had completed the project implementation activities, suggesting that the time was adequate for project implementation. However, since many trees need more than 8 years to enter harvesting/fruiting age, it is not the time to achieve the highest productivity at present.

Project inputs in personnel, equipment, financial resources, knowledge and expertise were adequate for project implementation. To fully complete this project, the EA organized various levels of personnel, including scientific staff, local residents, and local governmental agencies and made all of them involved in this project. These personnel had advantages in different fields and were complementary to each other in equipment, knowledge and experiences. As for the financial resources, the EA tried their best to cut cost due to which the adequacy of funds were ensured by the end of this project.

5.5 Comments on external influences

The project did not suffer any external influences and has been completed as expected. The potential risks that our project implementation might confront with have not come into true. The lack of sunlight was mitigated by opening a window for the introduced trees. The local residents did not conduct any devastating activities in the demonstration area since they know the products will be their own. The demonstration districts did not suffer any natural disasters and their landownership has not been changed.

5.6 Comments on association of project beneficiaries with project implementation

The project beneficiaries were closely associated with the project implementation and have the potential to obtain benefits from this project.

i) The local residents directly participated in project implementation and have the accessibility to harvest the products from forests in DDS: including timber and non-timber products.

ii) The donation countries funded the project implementation and make considerable contribution to the target area where the project was conducted. They indirectly enhance the improvement of forest quality, the increase of economic and ecological benefits for local residents.

iii) The education and research institutions organized the implementation of this project in the purpose of improving the STFs. During the process of project implementation, scientific staff has the possibility to figure out the optimum approaches for these improvement activities. Additionally they disseminated their management experiences, knowledge and technology of STF management through training sessions and book publication.

iv) The local administration agencies gave strong support to this project in policy, relationship coordination, organization and implementation. They also achieved experiences in the STFs management which would subsequently facilitate the revision of policies to enhance the STF development.

5.7 Analyses of project sustainability

Obviously this project has high sustainability, including social sustainability, technical sustainability, institutional sustainability and financial sustainability. The close association between the forests in DDs and local residents ensures high social sustainability. Our community-based management model and improvement technology displays high technical sustainability and institutional sustainability. The high productivity of forests ensures high financial sustainability.

5.8 Comments on institutions involved with the Project implementation

The institutions were appropriate and played an important role in ensuring the project implementation. The institutions played key roles in project identification, design, organization, implementation, evaluation, coordination, and management. Their inputs were closely associated with completion of this project.

6 Lessons learned

6.1 Lessons from project identification and design

- i) The project identification should be based on a systemic investigation of local situation, including their forest quality, economic resources, local residents' desires, transportation, environment, climate, and location etc. At the same time, the EA must figure out the key problems and causes.
- ii) The planning and design of a STF improvement program should have the potential to solve the problem that the local areas are facing.
- iii) The project identification and design should fully take into account the beneficiaries and have the potential to win their support and participation.
- iv) The community-base management model is an idea model for STF management.
- v) Non-timber plants/trees are highly productive in economic outputs. The STF management should be fully considered.
- vi) Right tree at right place is a principle of tree re-introduction for STF management.
- vii) Coordination and cooperation among beneficiary parts are very important for the project implementation.
- viii) The project design should fully take into account the economic output since it is the key factor that affects the project sustainability after its completion.
- ix) The project design should adopt the activities that have the potential to promote the awareness of local residents on STF management, such as training sessions, project dissemination and book publication etc.

6.2 Lessons from project operation

- i) Project organization and management. The project stakeholders should be organized under the guidance of ITTO and Chinese policies. Cooperation and easy-coordination should exist in all stakeholders, including The EA, Project advisers, cooperative institutions, local governmental agencies, and local residents.
- ii) Flow of funds. It is very important to establish a monitoring system for the project fund that could quickly detect problems and help the working group to take positive measures immediately. In this study, the EA established an independent fund account, and the project management office renewed progress charts at an interval of 10 days. The monitoring activities were conducted by the third party to make sure objective in judging. This approach successfully ensured the project go on schedule.
- iii) Roles and responsibilities of institutions. The institutions involved in the project, particularly the EA, should be active in all activities. Obviously, cooperation and easy-coordination is the premise for institutions to play their roles and to take their responsibilities.

- iv) Project documentation. To make the project files clear, the EA set up a documentary folder containing all files related to this project. These files make it very easy to check the project progress and details at any time.
- v) Monitoring and evaluation. It is the monitoring and evaluation that promise the smooth development of this project with high quality. During the whole process of project implementation, the EA made the project under monitoring, and conducted regular evaluation about the project development. A project progress report was submitted to ITTO every half year to report their latest achievements.
- vi) External factors. We did not face any external factors affecting the project implementation. Obviously this was closely associated with our sufficient efforts to this project, particularly the coordination between various stakeholders.

7 Conclusions and Recommendations

- i) This project was smoothly implemented and all planned specific objectives were achieved as expected;
- ii) The project identification was specifically based on the results from an investigation conducted in demonstration region. The investigation clearly figured out the key problems that the local residents were facing: stricken poverty and population growth forced local residents to harvest timber for living, leading to a gradual degradation and deforestation;
- iii) According to the local situation, the project design was focused on promoting the economic productivity of forests other than ecological benefits. Re-introducing non-timber plants/trees was an ideal approach for achieving economic benefits.
- iv) Additionally community-based management model played an important role in motivating the participation of local residents. This was an important premise for the successful completion of project since the local residents were the direct operators;
- v) The organization of this project particularly emphasized the cooperation and easy-coordination between different stakeholders. The high-efficiency management made all participants completely involved in this project. Each party played their respective role and took their respective responsibility for project implementation.

Absolutely this project has the potential to be replicated in other areas.

Responsible for the Report

Name: Prof. Zeng Linghai (曾令海)

Position held: Project Coordinator



Date: August 20, 2011

Appendix 1

PROJECT FINANCIAL STATEMENT (in US Dollar)

(To be prepared separately for ITTO funding and for Counterpart Funding)

Project No.: PD 294/04 Rev.4 (F)

Period ending on: Aug 1, 2009 ~ July 31, 2011

Project Title: The Study and Demonstration of the Management of Secondary Forests in Tropical Regions
for the Purpose of Enhancing Economic and Ecological Benefits (Phase II)

Components		Expenditures To-date Amount in US\$				Local Currency
		Original Amount (A)	Accrued (B) a/	Expended (C)	Total {B+C}	(D) Available Funds {A-D} in US\$
	I. Funds managed by Executing Agency					
10.	Project Personnel					
	11. National Experts	20,800		20,800	20,800	0
	12. National Consultants	12,000		12,000	12,000	0
	19. Component Total	32,800		32,800	32,800	0
20.	Sub-contracts					
	27. Two training sessions, 100 trainees	18,000		18,000	18,000	0
	28. Publication	15,000		15,000	15,000	0
	29. Component Total	33,000		33,000	33,000	0
30.	Duty Travel					
	31. Daily Subsistence Allowance	13,056		13,056	13,056	0
	33. Transport Costs	12,000		12,000	12,000	0
	39. Component Total	25,056		25,056	25,056	0
40.	Capital items					
	49. Component Total					
50.	Consumable items					
	53. Fuel and Utilities	8,800		9,010	9,010	-210
	54. Office Supplies	5,846		5,846	5,846	0
	59. Component Total	14,646		14,856	14,856	-210
60.	Miscellaneous					
	61. Sundry	4,000		4,000	4,000	0
	69. Component Total	4,000		4,000	4,000	0
	Sub-Total:	109,502		109,712	109,712	-210
70.	National Management Costs					
80.	ITTO Moni., Evalu. and Admi.	30,361		30,361	30,361	0
90.	Refund of Pre-Project Costs	40,500		40,500	40,500	0
100.	GRAND TOTAL:	180,363		180,363	180,573	-210

Appendix 2

PROJECT CASH FLOW STATEMENT

Project No.: PD 294/04 Rev.4 (F)

Period ending on: from Aug 1, 2009 to July 31, 2011

Project Title: The Study and Demonstration of the Management of Secondary Forests in Tropical Regions
for the Purpose of Enhancing Economic and Ecological Benefits (Phase II)

Components	Reference	Date	Amount in US\$	Local Currency in RMB ¥	
A.	Funds received from ITTO				
	1.		July 15, 2009	20,000	136,390
	2.		March 15, 2010	30,000	204,375
	3.		August 15, 2010	30,000	199,750
	4.		April 29, 2011	29,502	191,789
			April 29, 2011	109,502	732,304
B.	Expenditures by Executing Agency				
10.		July,31, 2011	32,800	219,353	
20.		July,31, 2011	33,000	220,690	
30.		July,31, 2011	25,056	167,564	
40.					
50.		July,31, 2011	14,856	99,351	
60.		July,31, 2011	4,000	26,750	
70.	National Management Costs				
	71.				
	72.				
	79.				
		July,31, 2011	109,712	733,708	
		July,31, 2011	-210	-1,404	

Appendix 3



Fig. 1 Project coordinator interviewed by TV reporters on Nov 11, 2009



Fig. 2 Project coordinator interviewed by TV reporters on Nov 11, 2009



Fig. 3 On-spot investigation by project workers in November, 2009



Fig. 4 On-spot investigation by project workers in November, 2009



Fig. 5 On-spot investigation by project workers in November, 2009



Fig. 6 On-spot investigation by project workers in November, 2009



Fig. 7 Project workers interviewed by TV reporters in November, 2009

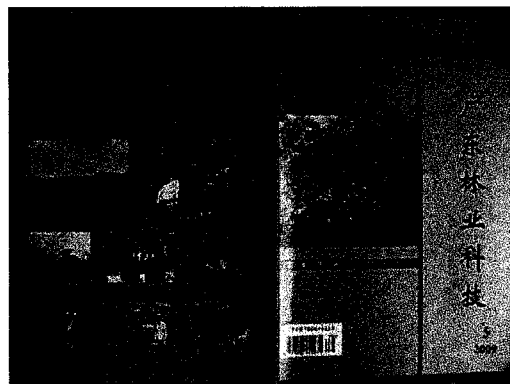


Fig. 8 Project disseminated in scientific journal: Guangdong For Sci Tech in July, 2010



Fig. 9 The opening ceremony of the first training session. The second from right to left was project coordinator Prof. Zeng Linghai on July 20, 2010

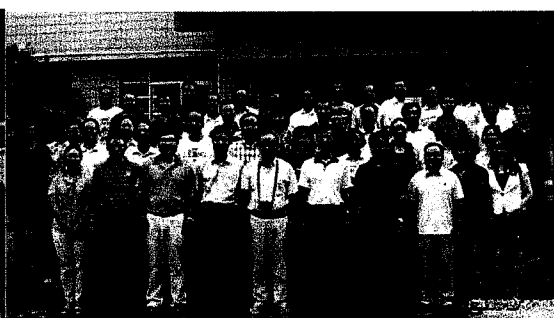


Fig. 10 A Group photo of experts and trainees. The fourth from right to left was project coordinator Prof. Zeng Linghai on July 20, 2010



Fig. 11 A group photo of experts and trainees. The fourth from left to right was Prof. Bailian Li, the vice president of NCSU, USA on July 20, 2010



Fig. 12 Opening ceremony of consultation activity for extending science and technology to countryside hosted in Renhua on July 9, 2010



Fig. 13 Project backbone member Prof. He Boxiang was taking an on-spot communication with local farmers hosted in Renhua on July 9, 2010



Fig. 14 Project members were taking on-spot communications with local farmers hosted in Renhua on July 9, 2010



Fig. 15 Project members were delivering professional books to local farmers hosted in Renhua on July 9, 2010



Fig. 16 Local TV reporters are recording the activity on spot hosted in Renhua on July 9, 2010

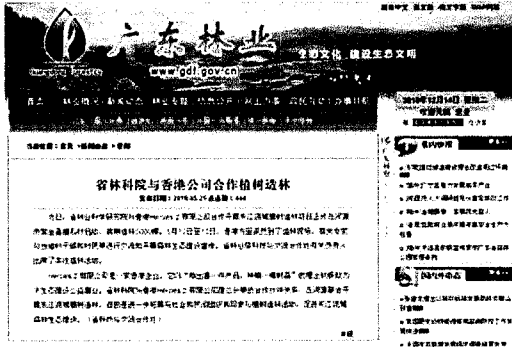


Fig. 17 Dissemination of "Dongjiang River Basin Reforestation Project" on the governmental website of Guangdong Forestry Administrative Bureau. This project was accomplished by using our community-based model in June 2010

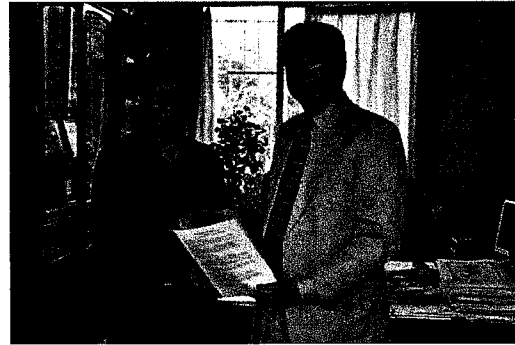


Fig. 18 Our project coordinator signed an cooperatives agreement with chairman of Hong Kong-based Heroes 2 Company for the DRBRP on February 25, 2010



Fig. 19 The working scene of "Dongjiang River Basin Reforestation Project" in May 2010



Fig. 20 Trees are growing up in the planting site of "Dongjiang River Basin Reforestation Project" (recorded in summer 2011)



Fig. 21 The survived rate of the trees planting in 2011 are nearly 95%

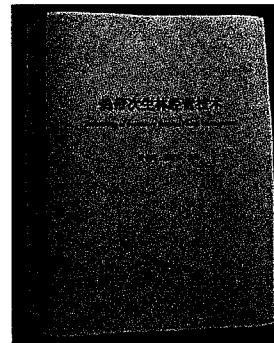


Fig. 22 the book draft of "Management of Secondary Tropical Forest" published in June 2011



Fig. 23 Experts (Prof. Tang) gave a presentation to the trainees in training class on Dec 21, 2010

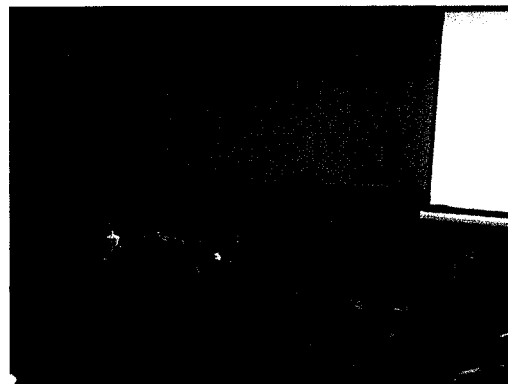


Fig. 24 Prof. Zeng gave a presentation to the trainees in training class on Dec 21, 2010

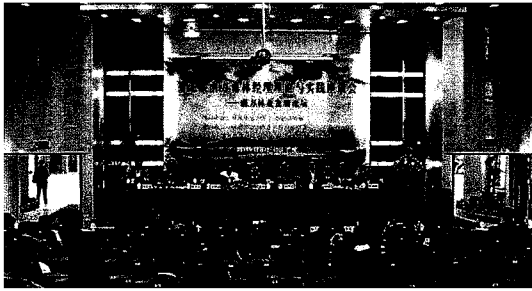


Fig. 25 The opening ceremony of the Ninth South Symposium of Forest Management Theory and Practice on Dec 12, 2010



Fig. 26 The opening ceremony of the Ninth South Symposium of Forest Management Theory and Practice on Dec 12, 2010



Fig. 27 The vice-chairman of Chinese People's Political Consultative Conference, Prof. Luo Fuhe, gave an opening speech on Dec 12, 2010.



Fig. 28 The member of Chinese People's Political Consultative Conference, Mr. Liu Yuhe, gave a speech on Dec 12, 2010



Fig. 29 President of South China Agriculture University, Prof. Chen Xiaoyang, gave a speech on Dec 12, 2010



Fig. 30 Executive leader of Guangdong Forestry Administrative Bureau, Mr. Zhang Yuwen, gave a speech on Dec 12, 2010



Fig. 31 The participants of the Ninth South Symposium of Forest Management Theory and Practice. Enclosed in red circle is our project coordinator, Prof. Zeng Linghai (on Dec 12, 2010)



Fig. 32 Opening ceremony of consultation activity for extending science and technology to countryside in Guangning county in May, 2011.



Fig. 33 Sending seedlings of precious tree and nontimber product tree species to villagers in May, 2011.



Fig. 34 Project backbone member Prof. He Boxiang was taking an on-spot communication with local farmers in May, 2011



Fig. 35 Project members were delivering seedlings of precious tree to local farmers in the villager in May, 2011



Fig. 36 Local farmers took active part in the activity in May, 2011



Fig. 37 local farmers took the seedlings one by one in May, 2011



Fig. 38 Project backbone member Prof. He Boxiang was sending the seedlings to the home of farmers in May, 2011



Fig. 39 Prof. Zeng Linghai was planted the trees in the village in May, 2011



Fig. 40 On-spot investigation by project members in summer, 2011



Fig. 41 On-spot investigation by project members in summer, 2011



Fig. 42 *Spatholobus suberectus*
(Recorded in summer, 2011)



Fig. 43 *Sapium discolor*
(Recorded in summer, 2011)



Fig. 44 *Litsea cubeba*
(Recorded in summer, 2011)



Fig. 45 *Amomum villosum*
(Recorded in summer, 2011)



Fig. 46 Rattan
(Recorded in summer, 2011)



Fig. 47 *Aphanamix grandifolia*
(Recorded in summer, 2011)



Fig. 48 Plot marker
(Recorded in summer, 2011)



Fig. 49 *Podocarpus nagi*
(Recorded in summer, 2011)

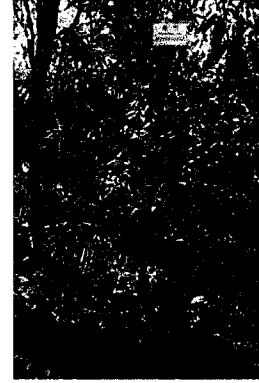


Fig. 50 Bamboo
(Recorded in summer, 2011)



Fig. 51 *Daibergia odorifera*
(Recorded in summer, 2011)



Fig. 52 *Heteropanax fragrans*
(Recorded in summer, 2011)



Fig. 53 *Elaeocarpus apiculatus*
(Recorded in summer, 2011)



Fig. 54 *Castanopsis fissa*
(Recorded in summer, 2011)



Fig. 55 *Eriobotrya japonica*
(Recorded in summer, 2011)



Fig. 56 *Elaeocarpus Chinese*
(Recorded in summer, 2011)



Fig. 57 *Cerbera manghas*
(Recorded in summer, 2011)



Fig. 58 *Broussonetia papyrifera*
(Recorded in summer, 2011)



Fig. 59 *Cinnamomum burmanii*
(Recorded in summer, 2011)

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