EX-POST EVALUATION REPORT

ITTO Project PD 10/00 Rev.2 (I,F)

Sustainable Management and Utilization of Sympodial Bamboos in South China

Prepared for the ITTO

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Acronyms

C&I	:	Criteria and Indicators
CAF	:	Chinese Academy of Forestry
HPSD	:	High Pressure Sap Displacement
IRR	:	Internal Rate of Return
ITTA	:	International Tropical Timber Agreement
ITTC	:	International Tropical Timber Council
ITTO	:	International Tropical Timber Organization
LFM	:	Logical Framework Matrix
ToR	:	Terms of Reference

PART I EXECUTIVE SUMMARY

1. BACKGROUND INFORMATION ABOUT THE PROJECT

The Project 10/00 Rev. 2 (I.F) **"Sustainable Management and Utilization of Sympodial Bamboos in South China"** was approved in the 28th Session of International Tropical Timber Council (ITTC) at Lima, Peru in 2000. The aim of the project was to develop technologies and superior planting materials for the sustainable management and effective utilization of sympodial bamboo resource in the southern region of China so as to ensure the sustainable socio-economic development of the region and the preservation of eco-system and biodiversity. The project proposal was planned to be concluded within 36 months.

The development objective of PD 10/00 Rev. 2 (I, F) was to develop the knowledge and technologies on sustainable management and improved utilization of sympodial bamboo resources, so as to contribute the socio-economic development of the rural communities, to ensure the conservation and preservation of southern-subtropical and tropical forest ecosystems and biodiversity in south China. The specific objectives include:

- To understand the ecological function of the bamboo stands and the biodiversity state in order to facilitate sustainable management system of sympodial bamboo.

- To promote efficient utilization of sympodial bamboo resources with the aim of promoting economic development and improving the living standard of rural poverty population.

The Intended direct beneficiaries of the project were the farmers of the sympodial bamboo areas. The management level and benefits were to increase the surplus labour's employment by the development of the product deep-processing enterprises leading towards more income to the farmers.

The intended situation after the project completion was:

- There will be sufficient information on the structure and function of the ecosystem
- Recovery of the function and long-term productivity
- Formulation of strategy of genetic resource
- By genetic improvement, superior planting materials will be provided for the development of sympodial bamboos
- Increase the benefits of bamboo industry through the demonstration and extension of technologies of sustainable management and high-efficient utilization.
- Promote sustainable utilization of forest resource
- Conservation of biodiversity

The total project budget was US$ 696,052 which was contributed by the Government of Japan (US$ 457,452), Government of Australia (US$ 15,000), Government of Korea (US$ 10,000) and Government of China (US$ 213,600).

2. PURPOSE OF EVALUATION

Recognizing the potential value of the lessons learnt from the project, the Committee on Economic and Market Intelligence and the Committee of Forest Industry at their 38th Session in May 2006 in **Mexico** decided that the Ex-Post Evaluation of the Project PD 10/00 Rev. 2 (I, F) should be conducted to determine how well the project served its purpose and to draw up lessons and recommendations to improve the implementation of future projects.

The evaluation was conducted in such a way as to answer the questions identified in the Ex-post evaluation checklist provided in the ITTO Manual for Project Monitoring, Review and Evaluation.

3. SCOPE OF EVALUATION

The Ex-Post Evaluation of Project PD 10/00 Rev. 2 (I, F) was undertaken in the 2nd fortnight of June, 2008. This report presents the findings of the evaluation done approximately two (2) years after the completion of the project. The evaluation was done using the combination of personal interviews, visits to experimental sites, visit to the Pilot factory and interaction with its owner and an exhaustive review of the project documents and publications. The visits to the experimental sites and pilot factory as well as discussions with some of the direct and indirect beneficiaries of the project further enhanced the consultants' understanding of the project details and deepened the analysis/ evaluation of the project.

The Ex-post evaluation was conducted as per the detailed Terms of Reference specified in the ITTO Manual for Project Monitoring, Review and Evaluation.

4. CONCLUSIONS OF THE EVALUATION

4.1 Project Design and Contribution to the Achievement of the General Objective

Proper designing of a project is key to its success. When a project is designed mainly on field activities, it is more challenging. Since bamboo is used in myriad ways from cradle to coffin, it is very significant for the socio-economic amelioration of the farmers on one hand and the ecological improvement of the soil conditions and the environment on the other hand. Rightly called as '**friend of the people'** by Chinese and **'Green Gold' or 'Poorman's timber'** by Indians, bamboo needs more focused attention for its sustainable management and utilization. Project has been executed successfully achieving almost all outputs except for few aspects.

The design of the project appears to be quite impressive but the planning is also an integral component of the overall success of the project. The duration of the project extended by 21 months and the reasons attributed to such an inordinate delay in the completion of the project are:

(a) Natural Disaster
(b) Publications of research results, and
(c) Additional works taken by the implementing agency or given by ITTO

Field projects need more focused attention for better research and the dissemination of good results.

4.2 Achievement of the Project Outputs and Specific Objectives

All the outputs designed to achieve the project objectives were substantially completed. Three collection areas of sympodial bamboo genetic resources and two bamboo species' garden have been established in Maoming City and Nanxiong City of Guangdong Province respectively. 139 sympodial bamboo species in Maoming Forestry Garden and 159 sympodial bamboo species in Nanxiong Bamboo Garden from 7 provinces in Southern China have been introduced. In this way, the knowledge of the ecological functions of various sympodial bamboo stands were implemented in the field for the maintenance of biodiversity of some bamboo species.

202 research plots were established for the study on sustainable management techniques of sympodial bamboo and 2390 ha. high-yield demonstration stands were established in six bamboo species' stands, which are distributed in Guangdong, Guangxi and Fujian provinces. The achievement was 390 ha. more than the actual target of 2000 ha. 16 surface runoff stations were established in Guangning, Guangdong province and Nanjing, Fujian province. Moreover, seven best cultivation models for sympodial bamboos have been developed by having high yield technical studies of sympodial bamboo timber stands and high yield technical study of bamboo shoot stands.

The technology was introduced in a pilot plant in Guangzhou of Guangdong province. A pilot plant was taken up for the production of tropical sympodial canned shoots in Pingxiang city of Guangxi Autonomous Region to promote the utilization of sympodial bamboo shoot resources in South-east Asian countries.

A number of technical reports and papers have been published to disseminate the research findings for wider awareness. Three training courses were organized for bamboo cultivation and ecological management at Nanjing of Fujian province in 2002 and Wuyishan city of Fujian province in 2003 respectively. Wide publicity was made through exhibitions, TV, newspapers, Radio and other communication media. Two technical manuals have been prepared on processing sympodial bamboo products and sympodial bamboo cultivation in Chinese version which are being translated into English now.

While most of the outputs and activities have been achieved and good research work has been done regarding the genetic diversity of Sympodial bamboo and good documentation of research findings, no data is available for ecological study or findings in respect of natural stands, mixed stands and agro-bamboo stands. The introduction of sympodial bamboo using the existing technology in the pilot plant is a good effort of demonstration but it is required to have a large impact through the transfer of technology for larger benefit of stakeholders. Bamboo charcoal plant in Guangning to use bamboo processing debris to bamboo charcoal was closed as price of raw-material increased. This was a great blow to the project.

4.3 Impact and Relevance of the Project

China is the largest bamboo growing country in the World. Bamboo stands cover 7 million ha. in 16 provinces of south China mainly in mountainous areas. There are more than 500 bamboo species in 39 genera in China. Moso Bamboo *(Phyllostachys heterocycla Var. pubescens)*, a monopodial species, is the most of economic importance which covers about 3 million ha. whereas more than 290 species in 20 genera of sympodial bamboo is widely distributed in the south sub-tropical and tropical region of southern China.

In spite of having a large quantity of sympodial bamboo, only monopodial bamboos are being utilized on a large scale by the industries. The project is very much relevant in providing the research support for increasing the productivity of sympodial bamboos and understanding the control measures for reducing soil and water erosion in bamboo plantation areas. The development of techniques in demonstration areas and its dissemination under the project was intended to establish the sympodial bamboo also an important species for the development of value added items by the industries.

The pilot factory namely Lida Bamboo Processing Co. Ltd. has started using sympodial bamboo from the last year for the production of bamboo flooring and the company is willing to go ahead with the diverse use of sympodial bamboo. Low price of sympodial bamboo in comparison to monopodial bamboo is also playing important role in this context.

4.4 Effectiveness of Technology Transfer to Local Communities

The experimental sites were taken on farmers' land and therefore, it was an on-farm research. The farmers witnessed the different experiments being conducted for increasing the productivity of their area through the increase in growth of bamboos. Since most of the farmers are poor, they found pest controlling and soil working more attractive than the use of fertilizers which is not so economical for them.

The transfer of technology through publication of research results, technical reports and technical bulletins and thereby creating awareness is excellent. But their translation into the field for the benefits of rural communities, poor people, farmers and growers has yet to take a reasonable shape.

The transfer of technology or concept of utilizing sympodial bamboo by pilot factory namely Lida Bamboo Processing Co. Ltd., have been very impressive as the company has started utilizing 10% of its raw material as sympodial bamboo. Transfer of technology is yet to take a proper shape at wider level but it has really changed the attitude of the pilot factory owner.

4.5 Over All Post-Project Situation and Sustainability

The project concluded two years ago. It has been observed that more funds have been invested by local Governments for conducting the project in their area smoothly and promote bamboo industry by using research results. Maoming and Nanxiong city

Government invested to the project more than one million Yuan RMB (US$ 150,000 approx.) and Fujian Forestry department gave around 200,000 Yuan RMB (US$ 30,000 approx.). It was also learnt that the Chinese Academy of Forestry has also provided some money for selection of clones of *D. latiflorus*.

This financial support and the maintenance of the facilities created are very encouraging for the sustainability of the project. It is also important to understand that the research results have been published but the necessary economically beneficial findings have to be disseminated to the farmers, growers and industry at much wider scale.

Training of farmers, local leaders and necessary awareness of stakeholders are necessary to carry forward the message of good research for the larger benefits of all stakeholders.

4.6 Unexpected Effects and Impacts

The project did not witnessed many unexpected effects and their impacts but natural disaster and publication of large number of papers, technical bulletins, and technical reports delayed the completion of the project. Moreover, additional works taken by the implementing agency and some given by the ITTO also delayed the completion of the project.

Bamboo charcoal plant in Guangning County was closed as prices of raw-material increased subsequently. This is the external factor which affected the closure of Charcoal plant which was opened with full enthusiasm under the project activities. Proper assessment of bamboo charcoal industry vis-à-vis market situation and price fluctuation of raw material could have avoided such an eventuality.

4.7 Implementation Efficiency

The project implementing agency with the Project Leader Mr. Fu Mayoi was found very much effective in its efforts. A number of publications of research results in the form of technical reports and papers are testament to their herculean efforts for the wider utility of the findings of the project.

One very important aspect regarding the successful and effective implementation of the project is that an excellent co-operation exists between the Project Leader, his staff, local Governments and all stakeholders, which is key to its success.

Whatever shortfalls were observed regarding non-conducting of ecological studies in natural stands, mixed stands and agro-bamboo stands, it was perhaps the result of taking too many activities together. The implementing agency tried to introduce agricultural crops and grasses in bamboo area (10 years' old) but all agricultural crops died.

5. RECOMMENDATIONS

5.1 Project Design and Outcomes

In Projects involving farmers and other stakeholders as a strategy for conservation and sustainability, the duration, scope and pilot site should be selected in consultation with the stakeholders. Multi-stakeholder's participation is critical during

project formulation and equally important is the involvement of experts on socio-economic aspects, business development and marketing in providing the balance towards achieving the intended outcomes. The active participation of Provincial Government, Scientists and other stakeholders in the implementation of the project with good co-ordination in a team spirit is significant for the success of the project.

5.2 Effective Technology Transfer

Besides providing the technological support, entrepreneurship and business skills development are vital component in enabling subsistence-oriented farmers / growers to progress into enterprise-oriented entities. The socio-economic benefits accruing to the farmers and the development of necessary mechanism for the demonstration of the technology transfer are critical for the success of such research oriented projects.

5.3 Follow-up Actions

The Executing Agency has the strength of good coordination with the scientists, provincial Governments and stakeholders. Therefore, the Executive Agency should immediately pursue an information and education campaign and coordinate with the appropriate stakeholders and the Government bodies for proper dissemination of research results for wider economic utility.

Likewise, the Executing Agency must take up economic and market analysis for the acceptance / transfer of technology to the farmers and other stakeholders. Opportunity exists for more practical research in the field of bamboo in continuity which is also the strength of the Executing Agency. The implementation of technology in more industries but emphasizing upon economic gains to farmers may lead to further expansion of industries for wider benefit of all the stakeholders.

The Executing Agency, in collaboration with other Provincial Governments and private industry partners can organize training programmes for the farmers, local leaders towards creating awareness among all the stakeholders. The opportunity also exists for wider potential of bamboo shoots' production with necessary marketing mechanism. The continuity of the project by way of new project proposal may also be taken up by the implementing agency for widening the scope of demonstration of technical findings. The actual benefit accruing to the people can lead to better demonstration / impact of the project.

The ITTO should continue to promote and support research and development studies on NTFPs including bamboo with a view to improve forest management as well as increase the capacity of forest-dependent communities to conserve and enhance forest values. This project has confirmed that bamboo is just part of a big group of sustainable non-wood resources that can generate income for a large forest-dependent rural population. For community based project proposals, community must be involved right from the beginning which can lead towards the successful practical project for the benefit of farmers / growers, industry and other stakeholders.

PART II MAIN TEXT

1. Project context

1.1 Background: Rationale and Objectives

This project was aimed to develop the technologies and superior planting materials for the sustainable management and effective utilization of sympodial bamboo resource in the southern region of China so as to ensure the sustainable socio-economic development of the region and the preservation of eco-system and biodiversity.

The project proposal focused on the need of sympodial bamboo development, researching and putting up the sustainable management and utilizing technologies of the priority species, and launching the technical demonstration and transfer, so as to promote the economic development and the improvement of human life of the region, protect the ecological environment and biodiversity.

This project was thus to promote sustainable bamboo management and utilization as a means of generating livelihoods and income for rural communities. It was expected to increase the benefits of bamboo industry through the demonstration and extension of technologies of sustainable management of high efficient utilization. The knowledge of the ecological functions of various sympodial bamboo stands and the bio-diversity maintenance of those species together with demonstration, pilot testing, training and exhibitions etc. were aimed to go a long way in creating awareness, increasing the sympodial bamboo plantations and thereby generation of income of all the stakeholders.

The project duration was 36 months but the project was completed in 57 months. The duration of the project was extended by 21 months. The actual cost of the project after completion was US$ 620,150. The implementing agency – The Research Institute of Sub-Tropical Forestry, Chinese Academy of Forestry (RISF-CAF) has got its expenditure audited and the audit report has been submitted to ITTO.

1.2 Outputs and Activities

Following are the most significant achievements of the project towards the sustainable development and utilization of sympodial bamboo resources in China. The planning of travel schedules lacked the time to cover all the experimental sites. However, the achievements of the activities as specified output-wise are given below:

1.2.1 Output No. 1: The knowledge of the ecological functions of various sympodial bamboo stands and the biodiversity maintenance of those species.

Achievements:-

(i) Two technical reports for development strategy for protecting sympodial bamboo genetic resources in Southern China and the current status of the sympodial bamboo biodiversity in Southern China have been finished / completed.

(ii) Three collection areas of sympodial bamboo genetic resources and two bamboo species garden have been established in Maoming City and Nanxiong City of Guangdong Province respectively.

(iii) 139 sympodial bamboo species in Maoming Forestry Garden and 159 sympodial bamboo species in Nanxiong Bamboo Garden from 7 provinces in Southern China have been introduced.

(iv) A research plot for the genetic improvement of sympodial bamboos has been established in the State Forestry Nursery in Nanjing County of Fujian Province.

(v) Completed the analysis on genetic pattern and diversity of priority bamboo species.

(vi) The hybridized seedlings from artificial pollination from 2001 to 2004 have been afforested in three sites after the nursery of seedling and certain fostering measure have been implemented. The progeny test is located in Nanxiong Bamboo Garden, Guangdong province. Selection of superior clones has been finished.

(vii) Completed the study on asexual reproduction techniques of bamboo and the techniques of vegetative propagation for sympodial bamboos.

(viii) Finished 6 (six) technical reports and five papers.

1.2.2 Output No. 2: Two demonstration regions for sustainable management models of priority sympodial bamboos with a total area of 2000 ha in Guangzhou city of Guangdong province and Pingxiang city of Guangxi Autonomous Region, which are useful for improving the economic situation of rural areas in South-East Asia.

Achievements:-

(i) Established 202 research plots for study on sustainable management techniques of sympodial bamboo and 2390 ha. high-yield demonstration stands in six bamboo species stands, which are distributed in Guangdong, Guangxi and Fujian provinces.

The area distribution of demonstration areas is shown in table below:

S. No.	Type	Location	Area/hm^2
1	D. brandisii (for shoots)	Guangning, Guangdong	120
2	D. latiflorus (for shoots)	Nanjing, Fujian	200
3	B. textilis (river bank)	Guangning, Guangdong	600
4	B. textilis (mountain)	Guangning, Guangdong	210
5	B. chungii	Cangwu, Guangxi	410
6	B. pervariabilis	Csngwu, Guangxi	650
7	Pseudosasa amabilis	Guangning, Guangdong	200
	Total		**2390**

(ii) Established total 16 surface runoff stations in Guangning, Guangdong province and Nanjing, Fujian province.

(iii) The Runoff coefficient order of different forest type and the sediment yield have been specified in order from the highest to lowest:
e.g.: Runoff coefficient order:
Dendrocalamus brandisii> Bamboo + pine Mixed > *Pseudosasa amabilis* > *Bambusa textilis* > Natural forest.

(iv) Seven best cultivation models for sympodial bamboos have been developed by having high yield technical studies of sympodial bamboo timber stands and high yield technical study of bamboo shoot stands.

(v) *Bambusa textiles* stands in river bank and in mountain, *Bambusa chungii, Bambusa pervariabilis* and *Pseudosasa amabilis* models for bamboo timber stands and *D. brandisii & D. latiflorus* models for bamboo shoot stands were developed with detailed data analysis and graphs.

(vi) Analysed the genetic variance of phenotypic traits and correlation between phenotypic traits and ecological factors.

(vii) Cost-Benefit Analysis was also done for each demonstration area.

(viii) Finished five technical reports.

1.2.3 Output No. 3: A pilot plant with improved high-value added technology for the production of ply-bamboo in Guangzhou of Guangdong province, which will benefit to the poverty alleviation of rural areas in developing tropical countries.

Achievements:-

(i) Improved the technology of bamboo flooring-processing for Lida Bamboo Concrete Forming Co. Ltd. in Fuyang City, Zhejiang province.

(ii) Finished study on preservation of bamboo culms.

(iii) Finished three technical reports.

Bamboo Experimental Site at Rogou, Guangning County Photo: Dr. Bipin Behari

**Pilot Factory - Lida Bamboo Processing Co. Ltd.
in Fuyang City, Zhejiang province Photo: Dr. Bipin Behari**

1.2.4 Output No. 4: A pilot plant for the production of tropical sympodial canned shoots in Pingxiang city of Guangxi Autonomous Region, which will give help of promoting the utilization of sympodial bamboo shoot resources in South-east Asian countries where it is usually not paid attention in this area except Thailand.

Achievements:-

(i) Improved the bamboo shoots processing technology for Nanjing Yilong Foods Co. Ltd., in Nanjing County, Fujian Province.

(ii) Developed preservation method for sympodial bamboo shoots.

(iii) Developed new soft-packed seasoning bamboo products.

(iv) Finished the experiments of antibiotic activities of the extractives from leaves and skins of *Phyllostachys glauca* McClure and *Indocalamus tessellates (*Munro) Keng f.

(v) Established the Good Manufacture Practice to ensure hygienic quality-control and food security of bamboo shoot products.

(vi) Finished three technical reports.

1.2.5 Output No. 5: A training and promotion program on the sustainable management and utilization of sympodial bamboos

Achievements:-

(i) Finished two technical manuals on processing sympodial bamboo products and sympodial bamboo cultivation in Chinese version. They are being translated into English now.

(ii) Compiled all sixteen technical reports into a book.

(iii) Conducted three training courses for bamboo cultivation and ecological management at Nanjing of Fujian province in 2002 and Wuyishan city of Fujian province in 2003 respectively. More than 280 plantations were benefitted from such trainings.

(iv) Organised two times exhibitions during Yong-an Bamboo Shoot Festival in Oct. 2002 and 2004 respectively.

(v) The wide publicity of the projects and its results has been done by TV, newspapers, Radio and other communication media.

Bamboo has over 1500 uses and has tremendous versatility. It is a valuable plant for wind- breaks. It is particularly useful for soil stabilization on slopes and for preventing erosion because of its interlaced root system (Liese, 1985). Bamboos are

one community that colonize disturbed lands in the tropics (Drew, 1974; Soderstrom and Vidal, 1975). The ecological benefits of bamboo are tremendous which make it a suitable afforestation species in degraded areas. Bamboo with its unique ability to stitch and repair damaged soils is ideal for use in rehabilitating degraded lands.

The ecological benefits of bamboo make it suitable for reforestation of degraded areas. Researches have shown that bamboo has the fastest growing canopy for the regreening of degraded areas. It generates plenty of oxygen, lowers light intensity and protects against ultraviolet rays, and is an atmospheric and soil purifier. Furthermore, it conserves water and greatly reduces soil erosion (Anneth, 1996). The increased permeability of the soil reduces water run-off, with the result that more water penetrates the soil. The impact of bamboo on water resources is highly positive. Thus, bamboo plantations prevent evaporation, allow better water penetration into the soil and increase the drainage capacity of the soil (Anon., 1994).

Both from the ecological and socio-economic point of view, cultivation of bamboo as a crop is very significant. Besides being the standing bank account for the farmers, it can cover large areas of degraded and waste lands and convert them into potential economic use.

1.2.6 Published Technical Reports and Papers:

Sixteen technical reports and five papers published in different Chinese periodicals are as follows:

1. Management Analysis and Development Strategies of Sympodial Bamboos in China
2. Market and Cost Analysis on Bamboo Charcoal Made from Sympodial Processing Residual
3. Current Status and Demand Potential of Market for Bamboo Shoot Products
4. Good Manufacturing Practice for Bamboo Shoots Factory
5. The Current Status of the Sympodial Bamboo biodiversity in Southern China
6. Bamboo ecosystem and carbon dioxide sequestration
7. Production Technologies, Properties, and Uses of Bamboo Charcoals
8. Development Strategy for Protecting Sympodial Bamboo Genetic Resources in China
9. Techniques of Vegetative Propagation for Sympodial Bamboos
10. China’s Criteria and Indicators (C&I) for Sustainable Management of Bamboo Forests
11. Environmental Role of Sympodial Bamboos
12. The sustainable high-yield and high-efficient management models of sympodial bamboo forests.
13. The processing technology of sympodial bamboo canned shoots and preservation

14. Testing for Chemical Utilization of Bamboos- Bacteriostasis Effect of the Extractive of Bamboos
15. The genetic variation patterns of main sympodial bamboo species and the selection of superior clones
16. A Case Study of Production-to-consumption System of bamboo weaving industry in Xinyi City

Published papers:

1. Study on Bamboo Resource in China and its Effective Utilization
2. High Pressure Sap Displacement (HPSD) Method for Treatment of Bamboo culms for Anti-spliting and Antimoth
3. Study on the optimization of RAPD condition of *Dendrocalamus latiflorus* McClure
4. RAPD analysis on genetic variation of *Bambusa pervariabilis* McClure
5. Studies on the sowing property of controlled pollinated seeds and the growth of young seedlings of *Dendrocalamus latiflorus* McClure

1.2.7 Training Courses:

Three training courses were organized for bamboo cultivation and ecological management in Nanjing of Fujian province in 2002, 2003 and Wuyishan City of Fujian province in 2003 respectively. The details are as follows:

1) Training Course 1: The course of cultivation and vegetative propagation techniques of sympodial bamboos was held in Nanjing county, Fujian Province, on Nov. 11 to 16, 2002, and 70 participants took part in this course.
2) Training Course 2: The course of biodiversity and ecological function of sympodial bamboo was held in Nanjing county, Fujian Province, on Oct. 8 to 15, 2003, and 60 participants took part in this course.
3) Training Course 3: The course of cultivation technology and improvement of bamboo land was held in Wuyishan City, Fujian Province, on Nov. 25 to 27, 2003, and 150 participants took part in this course.

1.2.8 Exhibition of Sympodial Bamboo Products:

Exhibitions were organized twice by relevant bamboo processing factories during Yong-an Bamboo Shoot Festival in October, 2002 and 2004. The products such as bamboo board, bamboo shoot and bamboo charcoal were exhibited and 500 copies of propagation material were distributed to visitors. These exhibitions were also covered by Television channels, Radio, Newspapers etc.

1.3 Compliance with the ITTO Objectives

The project contributed successfully towards achieving the following ITTO objectives as set out in Article 1 of the International Tropical Timber Agreement (ITTA, 1994):

(c) To contribute to the processing and sustainable development;

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

(i) To promote increased and further processing of tropical timber from sustainable sources in producing member countries with a view to promote their industrialization and thereby increasing their employment opportunities and export earnings;

(j) To encourage members to support and develop industrial tropical timber re-afforestation 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;

(l) To encourage members to develop National policies aimed at sustainable utilization and conservation of timber producing forests and their genetic resources and at maintaining the ecological balances in the regions concerned, in the context of tropical timber trade.

The research and development works taken at the experimental sites demonstrated the ways and means to increase the productivity of the forests through the high yield of bamboo. Since, it was an on-farm research, it disseminated the information and knowledge to farmers on a regular basis whereas their training could not be organized. The pilot testing of the technology using sympodial bamboo at Lida Bamboo Processing Co. Ltd. had a considerable demonstrative effect. This may go a long way in guiding the industries for utilizing sympodial bamboos for making value added items especially when they are available at cheaper rates than the monopodial bamboos. The increased utilization of sympodial bamboo will lead towards the large scale cultivation of bamboo, reducing the pressure on forests. All these are consistent with the National Policy of China leading towards the sustainable development of the communities and the stakeholders dependent on such resources. In this way, all the ITTO objectives as per ITTA, 1994 (c), (f), (i), (j) and (l) have been largely achieved except the export earnings from such an industrialization and the generation of effective timber trade. The project has successfully achieved ITTO Objectives 2000 also so far as sustainable management of forests especially the bamboo forests are concerned whereas its trade and transparency are the follow up actions.

1.4 Compliance with ITTO Criteria

The project was submitted in accordance with the criteria set in Article 23 of ITTA as follows: a) The project is related to the production and use of industrial forest products; b) It should yield benefits to the tropical timber economy as a whole and be relevant to both producing and consuming countries; c) It should be related to maintaining and expanding the international trade in tropical timber; d) it should offer reasonable prospects for positive economic returns in relation to cost; e) it shall make

maximum use of existing research institutions and avoid duplication of efforts to the maximum extent.

Except generating the export earnings and market and economic analysis of sustainable transfer of technology through the development of value added items of sympodial bamboos, all the above mentioned ITTO criteria were by and large achieved.

1.5 Relation to Action Plan and Priorities

This project was consistent with the organisation's priorities in the field of '**Reforestation and Forest Management'** and **'Forest Industry'** in the **ITTO Yokohama Action Plan (2002-2006)** as follows:-

Reforestation and Forest Management

Goal 1: Support activities to secure the tropical timber resources base

7. Encourage members and assist them, where appropriate, to:

- Assess the current and potential productivity of major tropical forest types, taking into account the need to promote future growth and effective regeneration;
- Develop innovative mechanisms and relevant legislative frameworks, including incentives and market-based instruments, to secure and expand, where appropriate, the forest resource base.

Goal 2: Promote sustainable management of tropical forest resources

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.
6. Monitor and assess the social, economic and environmental costs and benefits of sustainable management of natural forests.

10. Encourage members and assist them, where appropriate, to:

- Improve the productive capacity of natural forests, where appropriate, through intensified silviculture practices, better utilization of lesser-used species;

- Implement research and development activities in the management of secondary tropical forests, restoration of degraded tropical forests and rehabilitation of degraded forest land, taking into consideration ITTO guidelines.

Forest Industry

Goal 1: Promote increased and further processing of tropical timber from sustainable sources

5. Encourage members and assist them, where appropriate, to:

- Formulate research and development proposals which assist with the piloting and commercialization of new processing and manufacturing technologies;

- Organise workshops/seminars on the use of new and /or improved techniques and technology, including increased further processing;

- Undertaking sector-wide training needs analysis; development of training strategies, training facilities and course curricula; preparation of training manuals; and delivery of training courses.

Goal 2: Improve industry's efficiency of processing and utilization of tropical timber from sustainable sources

1. Develop, publish and disseminate information on increasing utilization efficiency and the reduction of losses and waste throughout the production chain.

2. Facilitate and encourage industrial demonstration projects addressing increased production and utilization efficiency, and the competitiveness of the tropical timber industry.

7. Promote increased awareness and utilization of existing information on wood properties and end-use requirements.

8. Encourage and assist Members, as appropriate, to:

- Formulate research and development of proposals that assist with the piloting and commercialization of improved and/or innovative utilization methodologies;
- Undertake research into wood properties and end-use requirements, paying particular attention to the properties and availability of lesser-used species and timber plantation species and the potential markets for them.

2. Evaluation Scope and Focus

The primary purpose of this evaluation was to provide a concise diagnosis to pinpoint the successful and unsuccessful outcomes, the reasons for successes and failures, and the project's contribution towards the achievement of ITTO's Objective 2000, and to draw lessons that could be used to improve future projects.

Following are the specific **Terms of Reference (ToR)** for the Ex-Post Evaluation that guided the evaluation of the project:

(i) To provide a concise diagnosis of the project so as to point out the successful and unsuccessful outcomes of the project, the reasons for successes and failures, and the contribution of the project towards the achievement of ITTO Objective 2000, and to draw lessons that can be used to improve similar projects in future.

(ii) To assess the project's design and contribution to the achievement of their respective objectives.

(iii) To assess the achievement of the project's outputs and specific objectives.

(iv) To evaluate the impact and relevance of the project, detailing their impact on development and specific objectives as stated in the project documents.

(v) To determine the effectiveness of technology transfer to target groups.

(vi) To assess the overall post-project situation for the project, including the conditions of their intended direct or indirect beneficiaries.

(vii) To define and assess unexpected effects and impacts, either harmful or beneficial, and present the reasons for their occurrences.

(viii) To analyze and assess implementation efficiency, including the technical, financial and managerial aspects.

(ix) To assess the overall sustainability of the project after completion, and include appropriate recommendations to safeguard the continuing of their positive impacts, and enhance utilization of the technologies and other results developed by the project.

(x) Taking into account the results of the evaluation, make an overall assessment of the project's relative success or failure, to summarize the key lessons learnt; and identify any issues or problems which should be taken into account in designing and implementing similar projects in future.

(xi) To asses the overall cost of the project with original budget provisions, and their respective linkage with the overall results.

(xii) To prepare the evaluation report in accordance with the references for the Project Evaluation Report, as contained in the ITTO Manual for Project Monitoring, Review and Evaluation.

(xiii) To assess the projects' contribution to the relevant ITTA objectives (1994) and relevant ITTO Action Plan.

3. Evaluation Methodology

The evaluation was carried out approximately two years after the completion of the project. As an initial step, familiarization with the project, logical framework and its picture of success was done by revisiting the project objectives, intended beneficiaries and outcomes, and how these linked with the higher order objectives of ITTO. The Logical Framework Matrix (LFM) was used to a reasonable extent in this evaluation.

The reference documents dispatched by ITTO included the proposal (or project document), monitoring reports, completion report and ITTO Manual for Project Evaluation, Review and Monitoring. This all helped in the evaluation. The necessary technical reports and publications etc. were provided by the executing agency on the first day of the evaluation meeting.

The evaluation was done using the combination of personal interviews, visits to experimental sites, visit to the Pilot factory and interaction with its owner and an exhaustive review of the project reports and publications. The visits to the experimental sites and pilot factory as well as discussions with some of the direct and indirect beneficiaries of the project further enhanced the consultants' understanding of the project details and deepened the analysis/ evaluation of the project. The detailed programme of the Ex-Post evaluation of the two ITTO projects taken together PD 10/00 Rev. 2 (I, F) and PD 69/01 Rev. 2 (I) is given in **Annexure**.

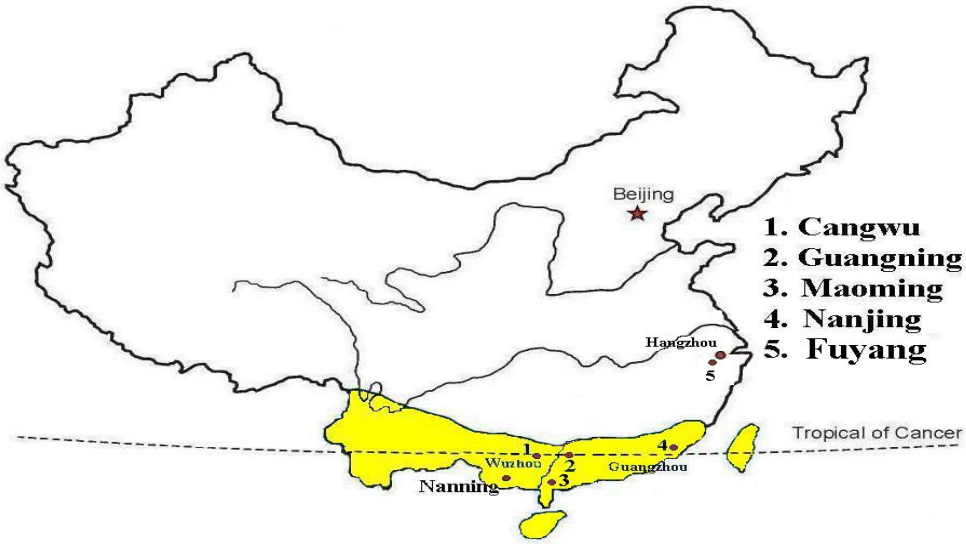
4. Findings and Lessons Learnt

4.1 Project Design and Contribution to the Achievement of General Objective

The framework of this project was built on the premise that forest communities empowered to manage their resource base and provided with enterprise options, can generate income and employment to reduce poverty while in turn providing incentives to conserve the resource.

The project was implemented on the experimental sites at Cangwu, Guangning, Maoming, Nanjing and Fuyang. The distribution of sympodial bamboo experimental sites are given in the following map:

Distribution of Sympodial bamboo experimental sites in China



The project helped the farmers in increasing their knowledge on management, utilization and improvement in volume production. The 'planning' in such a field research oriented project is very important. This becomes more challenging when such a research is done on farmers' land. The involvement of the stakeholders right from the beginning of the project formulation led to successful completion of the experiments on the farmers' field without any hindrance. This attracts more farmers for involvement in such research oriented experiments / activities for increasing the productivity of their area and thereby increasing economic gains, if visible. The proper designing of the project with active involvement of stakeholders is thus, a key to its success.

The organization of the project activities with the splendid coordination and effective management could yield useful results of ecological studies of 16 run-off stations and the development of 7 (seven) bamboo models and other research findings based on field experiments.

Since, the project activities were spread over a number of cities and counties under different provinces, development of good co-ordination and understanding with field staff, officers / officials from the Forest Bureau of concerned Provinces is very important and a key to the success of the project. The interaction with farmers, industries, field staff for the successful conducting of field experiments, recording of data and the dissemination of research results for their benefit are the main components of good organization and management of the project.

4.2 Achievement of the Project Outputs and Specific Objectives

Specific Objective 1: To understand the ecological function of the bamboo stands and the biodiversity state in order to facilitate sustainable management system of sympodial bamboo.

Specific Objective 2: To promote efficient utilization of sympodial bamboo resources with the aim of promoting economic development and improving the living standard of rural poverty population.

The following reported outputs were found completed and discussed with the Project staff in relation to the above two specific objectives:-

- The knowledge of the ecological functions of various sympodial bamboo stands and Conservation of the genetic diversity of sympodial bamboo, and hybridization and cultivation of superior clones.

- Sustainable management of sympodial bamboo stands, establishing two experimental sustainable management models of sympodial bamboo

- The processing and utilization of bamboo culms, including improvement of bamboo flooring-processing technology, establishment of bamboo charcoal-processing mill and preservation of bamboo culms

- Research and development of bamboo shoot products and doing some experiments for comprehensive chemical utilization of bamboos

- A training and promotion program on the sustainable management and utilization of sympodial bamboos

Involvement of the Provincial Governments, scientists and other stakeholders in the implementation of the Project proved quite useful as component activities under the above outputs could be shared with good co-ordination leading towards the success of the project.

All the research results and findings have been well documented in the form of technical reports, papers etc. Compilation of the research results in the form of Technical Manuals and books have also been done. The efforts made for documenting research results, their analysis and publications for creating awareness are remarkable. But only one thing less appreciated was that such documents should have crossed the limit of the country i.e. some research results and papers must have been published in international journals / periodicals also.

4.3 Impact and Relevance of the Project

The relevance of the project is further clear from its activities of creating awareness and dissemination of research results for the development of sympodial bamboo value-added items. A good research regarding genetic diversity of sympodial bamboo has been done. Similarly, the ecological study by having 16 run-off stations has also been completed successfully. The field experimental plots exhibited that the

use of fertilizers increased the growth of sympodial bamboos. Some farmers are poor and therefore, they are interested in pest control and soil working only. They are not interested in fertilizers' use. Whether the use of fertilizers is economically viable or not? Does the increase in bamboo yield compensate the cost of fertilizers? Studies and economic analysis are essential in this respect.

Though the impact of motivating efforts of utilizing sympodial bamboos for the value added items by the industry can be seen in the Lida Bamboo Processing Co. Ltd. but a reasonable impact has yet to take place. It's a good beginning. The owner of the Lida Bamboo Processing Co. Ltd. is interested in extending the use of sympodial bamboo. He has already done survey in India and is willing to establish a factory there to introduce the technology in view of cheaply available sympodial bamboos in India.

The economic and market research and analysis can guide the stakeholders for larger benefits easily and the impact of the project can be reasonably visible. The follow up actions to disseminate the knowledge, information and the research findings can go a long way in this context. Potential market available for bamboo based value added items locally and within the country can further support the project and may generate high potential for their exports in future.

4.4 Effectiveness of Technology Transfer

Technology transfer through publication of research results, technical reports and technical bulletins were quite significant but their translation in the field for the large benefits of the stakeholders has yet to take a reasonable shape. The project has been very much effective by making a good beginning but further awareness may carry forward the message of wider utilization of sympodial bamboo to the farmers, growers and industry which will also go a long way in conserving monopodial bamboos for shoots.

Use of sympodial bamboo for the manufacture of value added items in a pilot factory namely Lida Bamboo Processing Co. Ltd., was quite useful as it lead to future application of technology to develop value added items from sympodial bamboos available at cheaper rates. The owner of the Company was motivated to open a new factory in India by introducing the technology of sympodial bamboo as large quantity of sympodial bamboos are available in India at much cheaper rates.

Follow up activities for most project outputs must be conducted to develop viable and sustainable community-based livelihood activities.The technical interventions in this project have been successful to a reasonable extent in initiating livelihood activities in the pilot factory, but other interventions are needed to attain sustainable positive socio-economic outcomes. Aside from technical support, entrepreneurship and business skills development are vital components in enabling subsistence-oriented communities to progress into enterprise-oriented entities.

4.5 Overall Post-project Situation and Sustainability

The evaluation of the project was done two years after the completion of the project and it was found that the experiments conducted led to the increase in the girth of the bamboos at the experimental sites. Moreover, it also demonstrated that the application of fertilizers can sufficiently increase the girth and overall yield of the bamboo plantations. But the farmers preferred the pest control and soil working in comparison of fertilizers. The poor farmers will always prefer the economic viable applications in large plantations of bamboo.

The field experiments created a great awareness among the various stakeholders and demonstrated an excellent team co-ordination between Chinese Academy of Forestry (CAF), Provincial Governments, Industry and other stakeholders. The development of cultivation models for sympodial bamboos and the run-off experiments have also encouraged the farmers to have large scale plantations of bamboo as a crop especially on the slopes to reduce soil and water erosion.

The project document was not very clear on the proposed contribution of the funding from the Local Government but the project activities attracted them and they came forward for conducting the project in their area smoothly, mainly to promote bamboo industry by using research results. Maoming and Nanxiong city Government invested to the project more than one million Yuan RMB (US$ 150,000 approx.) and Fujian Forestry department gave around 200, 000 Yuan RMB (US$ 30,000 approx.).

The application of existing technology on sympodial bamboo to develop high value added items by the pilot factory, Lida Bamboo Processing Co. Ltd. has also created awareness and established the fact hat sympodial bamboos can also be used successfully for the development of value added items like Bamboo mats, Bamboo flooring etc.

The project has provided sufficient document in the form of technical reports and papers which will guide further in having similar experiments in other area and with much focused attention, detailed economic and market analysis.

4.6 Unexpected Effects and Impacts

Though the project did not face many unexpected effects but natural disaster and publication of large number of papers, technical bulletins, and technical reports delayed the completion of the project. Moreover, additional works taken subsequently in addition to the project activities also delayed the completion of the project:-

(a) Economic analysis of the demonstration model of sympodial bamboo stands
(b) Criteria and Indicators for sustainable management of bamboo forests

Bamboo charcoal plant in Guangning County was closed as prices of raw-material increased subsequently. This was a great blow to the project. Assessment of market price vis-à-vis the raw material requirements of the industry would have reduced the adverse effect of such external factor leading towards the closure of the plant.

Many people believe that bamboos have a flowering gene because in many instances bamboos from an original propagule that have been transplanted in different environments were observed to flower in unison. External factors such as weather conditions or the environment as a whole, pests and diseases, altitude, and soil condition differ, suggesting that flowering is not controlled by external factors.

4.7 Efficiency of Implementation

The Project management team was composed of the Project Director, Project Leader, Technical staff, Provincial Governments, Industry and farmers. The Project leader administered and managed the disbursement of funds, supervised the experiments and the implementation of various project activities in an excellent manner.

Though there was no formal monitoring and evaluation system installed but the project leader and his team having active coordination with the field staff, monitored the project leading towards successful completion of the activities under the project. Funds have been used efficiently as effectively gauging from the financial statements of the project.

The following activities were also taken up without any extra funding from ITTO:

- Development of 2390 ha. high-yield demonstration stands in six bamboo species distributed in Guangdong, Guangxi and Fujian provinces, whereas the target was only 2000 ha. i.e. additional 390 ha.
- Economic analysis of the demonstration model of sympodial bamboo stands
- Criteria and Indicators for sustainable management of bamboo forests

The development of the project with good research and financial planning was executed with an excellent co-ordination by the Project Leader. On operations' management front, the project leader supervised the implementation of project activities and conducted meeting regularly.

The continuity of the project by way of a new project proposal may be visualized on the sustainability of the project and especially when the project executed or demonstrated the technical and financial capacity to sustain the results and undertake or follow up the responsibilities.

PART III CONCLUSIONS AND RECOMMENDATIONS

1. Conclusions

1.1 Specific Observations

Some of the important specific observations in the whole evaluation of the outputs, activities and their achievements are as follows:

(i) Good research has been done regarding genetic diversity of sympodial bamboo and good documentation of research findings / results has been done.

(ii) No data is available for ecological study or findings in respect of natural stands, mixed stands and agro-bamboo stands i.e. a part of the activities under **1.2** could not be taken up. It is quite clear that too many activities were planned together which were too ambitious.

(iii) Publication of papers, technical reports and bulletins are very impressive but none of them have been published in any of the international journals or periodicals for wider utility.

(iv) The ecological studies have been conducted satisfactorily and there are good establishment of sympodial bamboo stands for demonstration.

(v) Experimental sites or demonstration areas were enlarged from targeted 2000 ha. to 2390 ha. in view of the demand from some of the provinces for the same.

(vi) Naoxing city of Guangdong Province and Nanjing County of Fujian Province were included subsequently. Demonstration areas need to be emphasized for focused management of research plots.

(vii) Good efforts in continuity are required for genetic biodiversity conservation of bamboos.

(viii) The following studies were taken subsequently in addition to the project activities:

(a) Economic analysis of the demonstration model of sympodial bamboo stands
(b) Criteria and Indicators for sustainable management of bamboo forests

Such studies could not be completed towards its logical conclusion.

(ix) Internal Rate of Return (IRR) has not been calculated to understand the economic viability of each of the model so established / developed.

(x) Technical papers may have more international references in discussion and analysis.

(xi) Bamboo charcoal plant in Guangning to use bamboo processing debris to bamboo charcoal was closed as price of raw-material increased (External factor not anticipated earlier)

(xii) The training and dissemination of research results are virtually an on-going process but the development of proper marketing network / mechanism is essential to stimulate the transfer of technology for larger benefits of stakeholders.

(xiii) Good awareness efforts have been done and the main beneficiaries are Government, scientists, farmers and industry. More focused management or attention / message to farmers is essential especially in such cases of on-farm research.

(xiv) There were no materials available on public relations or farmer – CAF dialogue.

(xv) The lessons learnt in the implementation of this project can lead to better potential replication of improved project in other provinces of China.

1.2 Strengths and Weaknesses

The major strengths of the project are:

(i) The implementing agency and the project leader have formed a very good team for conducting the field research.

(ii) The capacity exists for conducting research and publication of research results.

(iii) The capacity exists for conducting genetic and biodiversity research in respect of sympodial bamboos.

(iv) For sustainability, provincial Governments and the research institute are coming forward with necessary technological and financial support.

(v) The necessary infrastructure and field support are available for field oriented on-farm research.

(vi) Some of the industry owners are available for making experiments in consultation with the scientists.

(vii) Sympodial bamboo plantations are available for such research and dissemination of results.

(viii) Potential market is available for bamboo based value added items locally and within the country besides having a high potential for their exports in future.

(ix) A great market potential also exists for bamboo shoots.

The major weaknesses are:

(i) The project was enlarged without assessing the over all impact.

(ii) Some of the activities like ecological study in natural stands, mixed stands and agro-bamboo stands were planned with the similar study in plantations, which were too ambitious from the beginning itself.

(iii) Economic and market studies and analysis were not given adequate attention for the acceptance / transfer of technology to farmers and other stakeholders.

(iv) The proper training of farmers could not be arranged which is very much important for understanding the research on their fields for practical utility and accruing benefits.

(v) The necessary development of bamboo shoot preservation centres together with the marketing network / mechanism were required to translate the good research findings into practical utility.

(vi) The transfer of technology if taken in the areas where sympodial bamboos were locally available would have exhibited desired prompt impact.

1.3 Recommendations

Following are some of the most important lessons learnt from the implementation, outputs and from the outcomes of the project that must be carefully considered while planning and supporting similar projects in future:

1) Proper designing of the project is key to its success.

2) Project needs to be focused for better research and it's results dissemination.

3) For the success of a project, good cooperation between project manager, his staff and local Governments and stakeholders is highly essential.

4) Project of Forestry research type requires more time and three years' duration for field research projects is very less. It may be about 5 (Five) years to visualize the reasonable impact in the field.

5) New addition of studies and work subsequently after starting of the project (i.e. enlarging of project activities), need to be avoided as far as possible.

6) Good research findings need to be published in international journals also for wider utility.

7) Economic and market research and analysis in the project activities (such as demand and supply analysis, calculation of Internal Rate of Return etc.) need more attention for the acceptance/transfer of technology to the farmers and other stakeholders.

8) For sustainability, the necessary arrangement of funds after the completion of the project at the local level is encouraging and essential.

9) On-farm research must be encouraged for more transparent transfer of research results/technology to the users on day to day basis. It is challenging too.

10) Multi-stakeholder input in selection of research sites with clearly spelled out selection criteria can result in excellent cooperation, support and co-ordination. This may further take into account the farmer's acceptance, budgetary constraints, local staff availability, provincial and county authority commitment to support during the time of implementation of the project and after its completion.

11) Opportunity exists for more practical research in the field of bamboo in continuity but it needs to emphasize upon economic gains to farmers and expansion of industry for the same.

12) Training of farmers, local leaders and necessary awareness of other stakeholders are necessary to carry forward the message of good research for their benefit in particular and expansion of bamboo stands in general.

13) Opportunity exists for wider potential of bamboo shoots' production with necessary marketing mechanism.

14) The continuity of the project by way of a new project proposal may be visualized on the sustainability of the project and especially when the project executed or demonstrated the technical and financial capacity to sustain the results and undertake or follow up the responsibilities.

15) Where project beneficiaries are identified, it is also necessary to make clear as to how they would actual get the benefit. Sometimes, tangible benefits are not clearly visible to the local communities, which is not good for the project. The actual benefit accruing to the people can lead to better demonstrative effect / impact of the project.

16) While conducting a research project, detailed literature surveys from other countries need to be done, which helps in better analysis and dissemination of results. For community based project proposals, Community must be involved right from the beginning which only can lead towards a successful project.

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PROGRAMME OF EX-POST EVALUATION OF THE ITTO PROJECTS
PD 10/00 Rev. 2 (I, F) and PD 69/01 Rev. 1 (I) IN CHINA

Date	Place	Issue
16.6.2008 (Monday)	Beijing	Dr. Bipin Behari reached Xiangshan Hotel, Beijing, China. Brief awareness talk regarding programme and domestic visits
17.6.2008 (Tuesday)	CRIWI (Research Institute of Wood Industry), Beijing	(a) 9:00 open meeting in Room No. 315 of CRIWI Toastmaster: Prof. Dr. Lu Jianxiong, Deputy Director, CRIWI Exchange of views / remarks (b) Reviewed the draft schedule of ex-post evaluation Brief introduction through powerpoint presentation on completion of the ITTO PD 10/00 (I) project by Prof. Fu Maoyi, Project Leader (c) Brief introduction through powerpoint presentation on completion of the ITTO PD 69/01 (I) project by Prof. Jiang Xiaomei, Professor **(d) Afternoon** All achievements (outputs) including reports and published book & handbook were received and some issues were clarified. (e) Desk review of project information and documents for both projects and discussion
18.6.2008 (Wednesday)	RISF, Fuyang Zhejiang province, Guangning, Guangdong province	From Beijing to Fuyang (Flight No.CA 1509) Departure time: 8:00 Arrival time: 11:00 (Fuyang) **Afternoon:** visited LIDA Bamboo Processing Co. Ltd. (Hangzhou)
19.6.2008 (Thursday)		From Fuyang to Guangning: (Flight No. CA 1727) Departure time: 8:55 Arrival time: 11:00 (Guangzhou) 3-hour driving to Guangning Visited bamboo experimental sites at Gushui, Guangning. Discussions with project leader and his staff / team.
20.6.2008 (Friday)		Visited bamboo plantations (Experimental areas) at Rogou, Gunagning and near Guangning Forestry Research Institute. 3-hour driving back to Guangzhou in the afternoon From Guangzhou to Zhanjiang (Flight No.CZ 3325) Departure time: 17:10 Arrival time: 18:20

Date	Place	Issue
21.6.2008 (Saturday)	CERDC, Zhanjiang, Guangdong province	Visited to the ITTO PD 69/01 (I) project site (China Eucalyptus Research & Development Center) (CERDC), Zhanjiang, Guangdong, Field visit of Eucalyptus plantation forest and plant Visited: a) Nursery b) Eucalypt Plantation (1-6 year , including *E. grandis* X *urophylla*, *E. urophylla* and *E. torelliana*) in Zhanjiang-Southern Seedling Base, and c) Solid products produced by ITTO PD 69/01 (I) Project for exhibition d) Wood Cheeps Field of Leizhou Forest Bureau; e) Veneer plant and Plywood factory; and f) Eucalypt Plantation (1-6 year , including *E. grandis* X *urophylla*, *E. urophylla* and *E. pellita*)
22.6.2008 (Sunday)		Visited: (a) Veneer plant and flakeboard factory and (b) Mazhang furniture factory
23.6.2008 (Monday)		Come back to Beijing **From Zhanjiang to Guangzhou** Flight No. **CZ3324** Departure time: 07:50 Arrival time: 09:00 **From Guangzhou to Beijing** Flight No. **CZ345** Departure time: 10:00 Arrival time: 13:30
24.6.2008 (Tuesday)	CRIWI, Beijing	Preparation of draft evaluation report for ITTO PD 10/00 (I) project
25.6.2008 (Wednesday)	CRIWI , Beijing	(a) Preparation of draft evaluation report for ITTO PD 69/01 (I) project (b) Presentation of Ex-Post Evaluation observations regarding both the projects in Chinese Academy of Forestry and discussions
26.6.2008 (Thursday)	CRIWI, Beijing	(a) Review of the draft report by Dr. Bipin Behari and Mr. Dike Kari (b) Discussed and made comments on the draft report Prepared the draft outline for final report by Dr. Bipin Behari and Mr. Dike Kari
27.6.2008 (Friday)	Beijing	Finished the work of ex-post evaluation Departure from Beijing

MAP OF CHINA


Heilongjiang
Jilin
Liaoning
BEIJING
Tianjin
Hebei
Inner Mongolia
Xinjiang
Gansu
Ningxia
Shanxi
Shandong
Qinghai
Shaanxi
Henan
Jiangsu
Tibet
Sichuan
Anhui
Shanghai
Hubei
Zhejiang
Chongqing
Jiangxi
Hunan
Guizhou
Fujian
Yunnan
Guangxi
Taiwan
Guangdong
Hong Kong
Hainan
Islands of South China Sea
Islands of South China Sea