

INTERNATIONAL TROPICAL TIMBER ORGANIZATION

ITTO

PROJECT DOCUMENT

TITLE	PROMOTING THE UTILIZATION OF PLANTATION TIMBER RESOURCES BY EXTENDING ENVIRONMENTALLY SOUND PRESERVATION TECHNOLOGY
SERIAL NUMBER	PD 398/06 Rev.2 (I)
COMMITTEE	FOREST INDUSTRY
SUBMITTED BY	GOVERNMENT OF THE PEOPLE'S REPUBLIC OF CHINA
ORIGINAL	ENGLISH

SUMMARY

This project will continue the previous ITTO project, Development and Extension of Preservation Technology of Tropical Plantation Timber [PD 52/99 Rev.2 (I)].

The project PD 52/99 Rev.2 (I) has proved to be successful and reached its original objectives. By virtue of the activities of and outputs from the project, a preliminary foundation in terms of knowledge and technology for the development of wood preservation industry in the Southern Tropical China region had been established. Wood preservation industry was recognized by many as a booming industry in the near future because it was based on the use of the increasing plantation timber resources. Over one hundred of treating plants have been set up all over the country ever since which is a proof of the above outlook.

The objective of this project is to promote the use of plantation timber resources by further development and extension of preservation technology so as to strengthen the momentum of the development of plantation forest in the South China area.

This project will coordinate its activities with the local forestry sector and agricultural aspects and make contribution to the sustainable economic development in this area.

EXECUTING AGENCY	GUANGDONG FOREST RESEARCH INSTITUTE (GDFRI)	
COOPERATING AGENCY	THE PEOPLE'S REPUBLIC OF CHINA	
DURATION	36 MONTHS	
APPROXIMATE STARTING DATE	UPON APPROVAL	
PROPOSED BUDGET AND OTHER FUNDING SOURCES	Source	Contribution in US\$
	ITTO	291,060
	Govn't of China	122,500
	TOTAL	413,560

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PART I CONTEXT

1. Origin

There is over 7 million hectares of commercial forests in Guangdong. Among them, 1.23 million hectares are fast-growing tropical species plantations for timber and 418 thousand hectares of bamboo plantation. The main species for plantation in Guangdong are *Eucalyptus urophylla* and its hybrids, *Acacia magium*, *Pinus mansoniana*, *Pinus elliottii* and *Cunihemia lancialata* etc. This is an increasing timber resource being available to meet the future growing demand. More and more small diameter timber from plantations is now readily available. But one of the constraints to the further development of forest plantations is the low value of timber and limited use, which in some cases prevents the further investment from entering. The value-added timber processing technologies to enhance the efficiency of plantation is therefore one of the approaches to solve the problems faced.

The use of wood preservative treating technology used to be, if any, in small scale in southern China and there was by no means wood preservation industry before the execution of the ITTO project, Development and Extension of Preservation Technology of Tropical Plantation Timber (PD 52/99 Rev 2(I)) launched in 2000. Since then, a timber preservation laboratory and a pilot treating plant have been set up. Some treating plants are now in operation using technologies derived from this project. Progress has been made towards the establishment of a firm foundation for this vigorous and viable industry in the Southern Tropical China. It is vital that the initiative and momentum created by this project be maintained.

Demonstrations set up in the previous project, including 7 demonstration sites setting up in the main agricultural areas of Guangdong Province and many other uses such as landscaping, outdoor furniture making and public facilities construction, proved to be an effective way to convince timber producers, consumers, investors and authorities of the significance of preservative treated timber. The activities of and the demonstrations established by the project have given a promise way to a potentially high value use for the large volumes of this renewable resource from plantations. Getting aware of the technology through the seminars, workshops and media, Investors, those from the private sector in particular, are now paying high attention to wood preservation industry and forest plantation as well because of the huge potential market of treated timber products.

The aim of this project is therefore firstly to improve and enhance the existed technical foundation for wood preservation development, putting emphasis upon environmentally sound technology. Secondly, to establish a product quality monitoring system for industry. There is no doubt that the output from this project will make contribution to the sustainable forestry development as well in Guangdong and the South China area.

2. Sectoral Policies

This project conforms to the Chinese policies about forestry and forestry products industry.

- The National Tenth-Five-Year Plan (2001-2005) for Forestry and the General Ideology of the Long-term planning to the Year 2010.

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- China's Agenda 21, Forestry Action Plan: Sustainable Development Policy of Forest Industry.
 - Six key forestry projects approved by the State Council. Among them one is construction of commercial forest bases by planting fast growing species.
 - Chinese Government's Policies and Measures: to Improve Wood Utilization Efficiency and Output Value of Forest Industry.
 - Guangdong Province Forestry Development Plan (March 1998), to further develop plantation forests and to improve wood processing industry.
 - Act No 44, July 2000, Guangdong Government, To Improve the Afforestation and to Increase the Efficiency of Forestry,

3. Programs and Operational Activities

- One of the China's national Six Key Forestry Programs, Establishment of the Fast-grow and High-Yield Forest Plantation Bases, launched in 2000.
- Twice of national Timber Preservation Industry Development Conference held in 2002,2004.
- Preparatory of the Chinese Timber Preservation Association began in 2002.
- two national standards, Timber Preservatives Standard and Classifications of Hazard Standard, was established in 2005.
- A provincial program of Guangdong , Agriculture Standardization Demonstration Region Program was launched in 2002, which covers forestry and forest products.

PART II THE PROJECT

1. Project Objectives

1.1 Development Objective

The objective of this project is to promote the use of plantation timber resources by further develop and extension of environmentally sound preservation technology to contribute to the sustainable development of plantation forest in the South China region.

1.2 Specific objectives

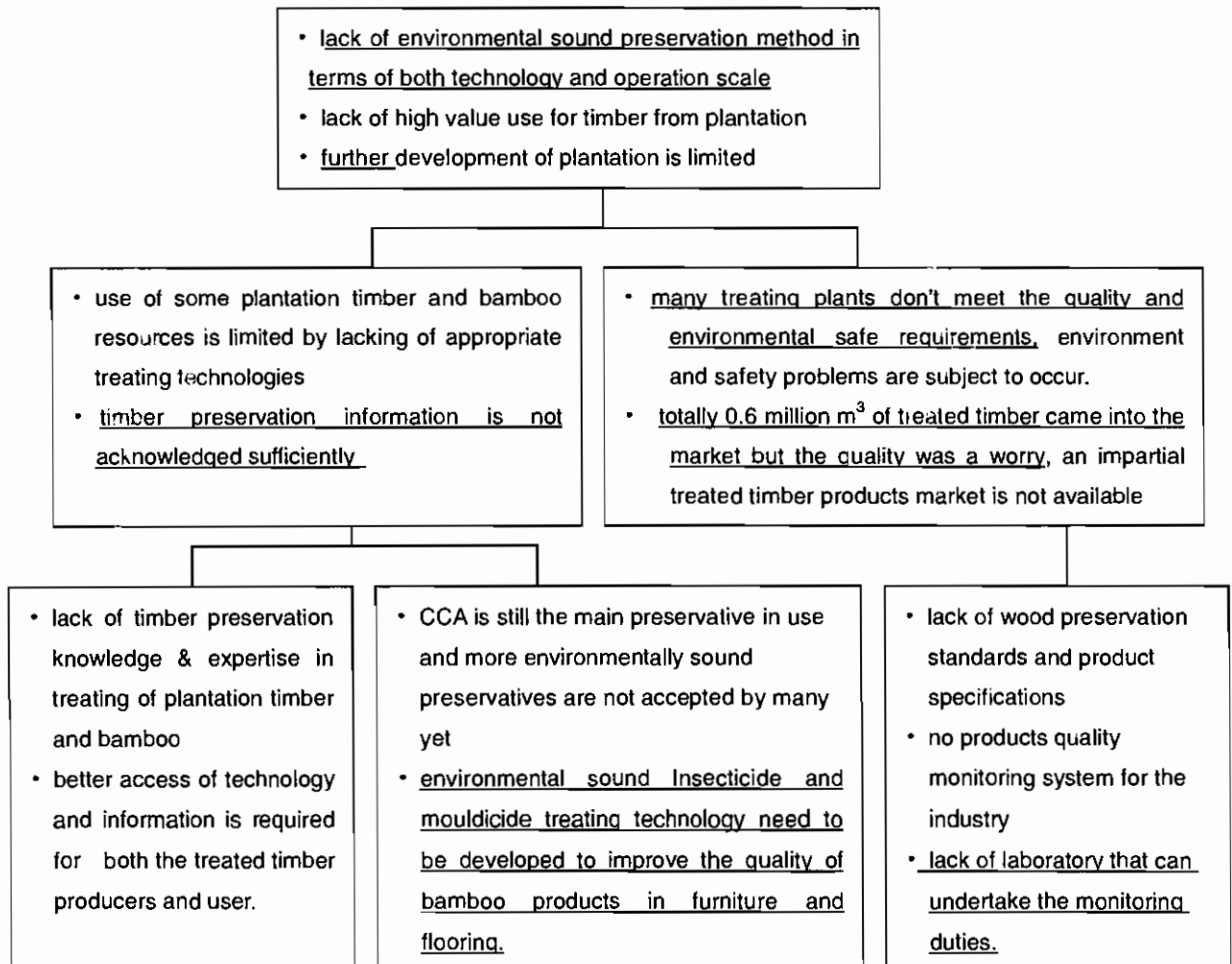
1.2.1 To develop environmentally sound timber preservative technologies and establish treated timber products monitoring system to ensure the efficient use of the plantation timber resources.

1.2.2 To continue and further expand the on-going demonstrations programs commenced in PD 52/99 Rev 2(I), and to establish a demonstration treating plant playing as a leading sample in products quality control, safety and environment protection.

2. Project Justification

2.1 Problems to be addressed

Figure1: Problem Tree



- A great deal of emphasis had been placed on the need for the government to pay attention to the problem of the shortage of forest resources in the past two decades. It was correct for the government to encourage the development of forest plantation and this policy has resulted in an increasing amount of timber from plantation available. But it also leads to a new problem arising that the timber can't be well used and the motivation of further development is weakened. Projects planned have been made to build pulp and paper mills in South China region using this resource. But it is much more complex than it first appeared and there is obviously a long way to go.

The timber production of Guangdong Province in the past two decades, as the following figure, indicates the above mentioned problems. It decreased in the middle of 1980's because of shortage of natural forest resources and timber harvesting was restricted. In 1990's, the timber production was changed to rely upon the plantation forest and increased continuously before 1995. But it stopped growing later due to the lower demand. The gap between the consumption and production was becoming bigger and bigger. Situations are similar in the provinces in tropical and subtropical regions such as Guangxi, Hainan.

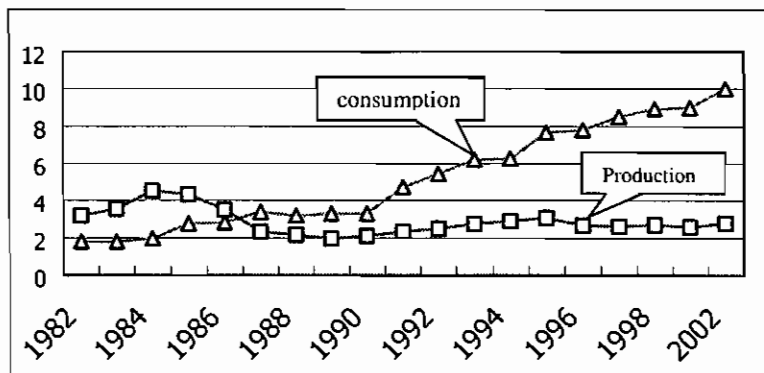


Figure 2: Timber production of Guangdong Province (million cubic meters)

- In the previous project, PD 52/99 Rev 2(1), treated timber from plantation proved to be much improved in its durability and useful in agriculture and landscape construction. This add-value technology greatly enhances the utilization of plantation timber. To meet the demand of posts from 100 thousand hectares banana in Guangdong, 500 thousand cubic meters treating timber is needed. Considering the requirement from other fields, such as landscaping, furniture making and industry packaging etc., the requirement of 1 million cubic meters of treated timber a year is predicted.
- Although the uses of some preservatives had been proved to be safe by experiments in the previous project, but CCA, the preservative currently used in China, is now banned in Europe, Japan and strictly control in North America because arsenic involved. Arsenic free preservative, ACQ, LOSP for example, haven't been well adapted in China. Further improve and/or develop the more environmentally sound preservatives is needed.
- Since the completion of the former project, the number of timber preserve treating plants have been increased from 2 to over 10 in Guangdong. Their products enter the market without

certifying and no doubt it will create problems in many aspects including environmental safe, waste of resources and the lost to the treated timber user. Establishment of specification standards and a monitoring system for the growing wood preservation industry is necessary to ensure a regular timber market.

2.2 Intended situation after project completion

At the end of the project:

- A products quality monitoring system for industry is established and in functioning. A framework between the government and industry sector is in operation to supervise and coordinate the quality of products in the market and the treating plants' operation.

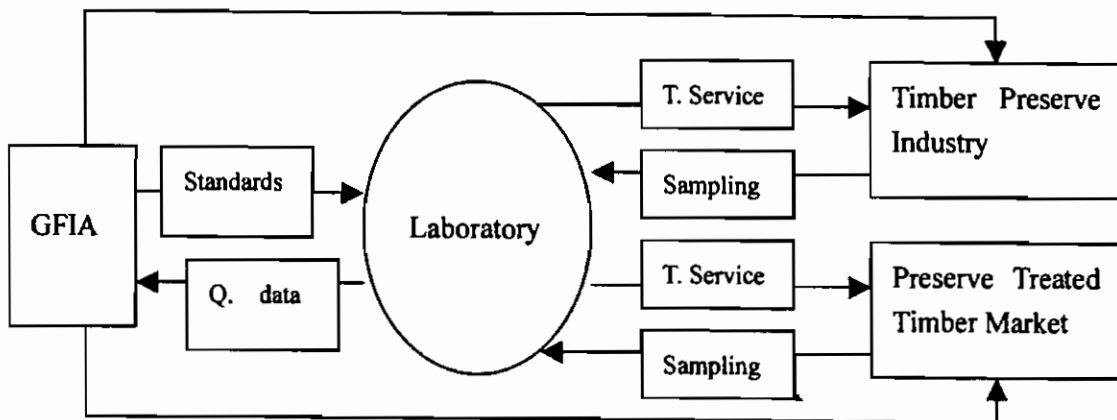


Figure 3: Operation of the monitoring system

Q. data (Quality data and information)

T. Service (Technical service)

- Guangdong province, Guangdong Forestry Industry Association (GFIA) will be in charge of the monitoring system.
- The laboratories will act as a key entity technically support this system. It can also serve national wide because of its special location with the tropical weather and biological resources.
- the laboratories will have the functions as the followings:
 1. biological laboratory
 - fungus and insects tests on durability of timber species
 - fungus and insects tests on the efficacy of timber preservatives
 - fungus and insects tests on durability of treated timber
 2. chemical analysis laboratory
 - analysis of timber preservatives
 - analysis of elements in treated timber
 - analysis of chemicals in the environment in which treated timber used
- The products quality monitoring are based on both the National Standards and the Industry Standards. The former, The National Standards are mandatory legislation and the latter voluntary for the industry sector.
- GDFRI, with the laboratory and RD resources, will also service the industry, playing as the regional technical center in terms of technology and information by means of demonstration,

training, seminar/workshop, publications and internet etc.

- wood preservation will be steadily expanded to a certain scale and become a vigorous industry, so that plantation timber can be well used in producing good value products.
- Technologies derived from this project such as environmental sound preservatives and bamboo treatment, for example, will be disseminated into industry.

2.3 Project strategy

- Wood preservation is now received more and more attention. As a new industry, it needs technical support and good market environment. This project is designed to meet this requirement so that to reach the final objective: to promote the development of wood preservation industry so that the plantation timber can be used more efficiently in the South China region.
- GDFRI, through its D/R activities in timber preservation, especially the implementation of the Project PD 52/99 Rev 2(I), jointly support by ITTO and Chinese Government, has been enhanced itself towards a technological foundation in terms of timber preservation and it is currently the only institution engaged in this field in the South China. Some technologies derived have been transferred to industries. Further strengthen of its resources and mobility through the execution of this project, GDFRI will be able to play an important role in serving the industry technically.
- A products monitoring system is a necessity for maintaining an impartial and competitive market. The executive body of a monitoring system of an industry should be firstly staying in between the industry and the administration, not being involved in commercial activities. Secondly, the body should be authorized and supported by the Government so that, thirdly, it can be able to catching up with the industrial development in terms of technology. GDFRI meets all these requirements. As an alternative, to establish a body independently for monitoring is not necessary and its operation will be technically constrained and costly.
- GFIA set up in 2003, is an organization under which activities, such as information extension, education and training, quality monitoring system operation, can be organized and pushed forward. Preservation companies and forest plantation owners, as members of GFIA, will be involved in this project.

2.4 Target beneficiaries

- The plantation owners, forest administrative agencies and also the rural communities in the region engaged in plantation management in South China will be benefited for the increasing demand for timber from plantation.
- The end users of the treated timber products such as fruit and vegetable farmers, houses and landscape constructors will have a new material to opt and save in cost.
- The wood preservation industry in South China will be able to gain appropriate technical support and get access adequate information service from this project. It will be also benefited from a more regular market environment due to the facilitation of the monitoring system established by the project.

2.5 Technical and scientific aspects

- The development of wood preservation currently is towards the use more environmental friendly preservatives instead of the traditional ones, in which some toxic elements are u

existed . The use of the most popular preservative, CCA, is banned in Europe and Japan. In North America, CCA is confined in outdoor use in industry and agriculture. At the same time no arsenic preservatives such like ACQ, LOSP are becoming popular. But in China CCA is still the main formulation in use. To develop new environmentally sound preservatives and technology for plantation timber treatment will ensure the use of this resources effectively and safely in the future.

- In the previous project, tests on more environmentally sound preservatives such like CC, ACQ and others have commenced. It is worth to continue and maintain these works in the coming project. Technology of treating tropical timber with ACQ,CC combined with mold resistant and water repellent chemicals will also be developed.
- Boron based preservative is more environmentally sound and has been widely used in some countries especially in construction and ornament. In this project, boron based preservative and related technology will be developed. Demonstration of these kind of environmentally sound preservatives used in landscaping, agriculture, construction and ornament will be commenced in this project.
- There are 500 hm² bamboo forest in south china, the output of bamboo culm is as high as 1800 tons every year. Because of lack of environmental sound preserving technology, the use of bamboo is retarded. It was found in the previous project that the treating characteristics of bamboo were quite different from timber. As one of the main components of technical development in this project, some pre-experiments have been done especially the bamboo wood properties tests. Australian scientists showed their interests in the preservation of bamboo and they have done some preliminary research on bamboo treatment. International technical cooperation in this field is possible.
In this project, tests and demonstration of treating bamboo use in agriculture and gardening with environmental sound preservative such as ACQ, CC started in previous project will be continued and expanded. Technologies of treating bamboo use in furniture and flooring with environmental sound insecticide, mouldicide will be developed to extend the use of this large and renewable resources.
- The following papers/documents are used for reference in the design of this project:
 - a) AWPA 2000, Wood Preservation Standard
 - b) The ABC system of TUMA sampling
 - c) Li Yudong(2003), The Status, Problems and Measures of China Wood Preservation Industry, Proceedings of The First Chinese National Timber Preservation Industry Development Conference, 6-15
 - d) Li Zhaobang(2003), Standardization and the Development of Timber Preservation Industry in China, Proceedings of The First Chinese National Timber Preservation Industry Development Conference, 74-79
 - e) Jack Norton & Robert Prydon(2001-2003), International Expert Reports, ITTO Project PD 52/99.

2.6 Economic aspects

- The timber from plantation is currently only in low value used such as for packaging,

scaffolding in construction. Taking into account of the increasing resource, it is no doubt that a value-added process, such as wood preservation treatment, will make economic, social and environmental benefits to this region.

- Plantation forests will be more attractive to the investor because of the raise in demand for timber. It will be a positive factor for the development of plantation and the economic grow in this region.
- As mentioned in the project PD52/99 Rev 2(l) that only in Guangdong 150 million supporting posts are needed for the total 100,000 hectares of banana and the annual consumption is over 50 million posts. The economic evaluation, conducted by the Australian consultants of this project by construction of a financial model, concluded that “ If all bamboo banana poles were replaced by the CCA treated alternative, very significant savings could be made” for the user, “A saving of 3.8 RMB per pole, leads to a potential saving in the order of RMB 106 million over the six year life of the treated product.” The treated posts in demonstration sites shows that the use life is more likely 8 to 10 years and more saving can be expected.
- Wood preservation as a new industry will grow rapidly in the near future, as many estimated. It will produce more valuable products for construction and landscaping and it will make significant contribution to the social economy by increasing GDP and employment.

2.7 Environmental aspects

- Better utilization of the potential plantation forest resource will lesson the pressure from the demand for wood material and has positive affect to ecological environment.
- The tests in PD 52/99 Rev 2(l) indicated that the use of treated timber in agriculture didn't affected the quality of crops related and the contamination impact on environment was not significant.
- It has been approved by experiments in the former project that the preservative CCA used now in Guangdong are safe in agriculture and tests in many countries also revealed that no strong evidences indicated that the arsenic in the properly used CCA treated timber really affected the human health. Despite of the argument is on going, the use of CCA in some countries will be constricted to industrial use.
- The development of preservative components with less toxic chemicals for the future is in fact commenced in PD 52/99 Rev 2(l) and will be continued in this project and some of them showed promising. New environmentally sound preservatives will be tested and used for demonstration.
- The deposit of used treated wood material has been a most concern of environmental issue. Researches on low toxic preservatives such as copper citrate (CC) showed promising for using in agriculture. Researches on both more environmental friendly preservatives and better depositing method are taking progress to solve this problem.

2.8 Social aspects

- Demonstration has proven in PD 52/99 to be a very effective mean to convince and a good approach of information for every aspects related. For example, in Gaozhou, estimated 80% of the banana farmers, about 100 thousand, got aware of the treated banana post technique through local TV and many farmers including those from the adjacent region came and observed the demonstrations. An integrated demonstration program, “Treated-timber Used in

Agriculture Demonstration-region" (TUAD), in which preserved timber, from its production to the end-use, will be presented and producers and users are involved, is emphasized in this project. The support from local authorities and communities are critical in application of TUAD. To coordinate every aspect, including administration, industrial, agricultural and forestry in the program's planning and execution, is important.

- Since the potential positive affect of timber preservation to economy has been confirmed by the economic evaluation of the last project, this project is expected to make contribution to the development of the local society.

2.9 Risks

- The coordination of every aspects related in establishment of a monitoring system can be a challenge and time taken issue. The approval by the Government departments concerned is essential. Since the Chinese government is now paying high attention to the standardization, the risk of this program is not high.
- The chose of suitable sites for exposure test yards maybe influent by the availability of land and its use cost.
- There is little risk related to the technical development issues.

3. Outputs

For the specific objectives 1: To develop environmentally sound timber preservative technologies and establish treated timber products monitoring system to ensure the efficient use of the plantation timber resources.

Output 1.1: A biological laboratory, a chemical analysis laboratory and 2 timber exposure yards, are set up and a treated timber product monitoring system is in operation.

Output 1.2: The improved technologies, including new developed environmentally sound preservatives are available and used in industry.

Output 1.3: The bamboo classification is established and some preserved treatment techniques are developed.

For the specific objective 2: to continue and further expand the on-going demonstrations programs commenced in PD 52/99 Rev 2(I), and to establish a demonstration treating plant playing as a leading sample in products quality control, safety and environment protection.

Output 2.1: A demonstration treating plant is set up. Information can be accessed through seminars/workshops, training courses, publications and internet.

Output 2.2: TUAD is established.

4. Activities

Output 1.1
Activity 1.1.1 establishment of the biological laboratory
Activity 1.1.2 establishment of the chemical analysis laboratory
Activity 1.1.3 establishment of 2 timber exposure yards
Activity 1.1.4 establishment of monitoring system for treated timber product
Output 1.2
Activity 1.2.1 development & tests of environmental sound preservatives
Activity 1.2.2 the on-going tests maintaining & data collection
Activity 1.2.3 demonstration of environmentally sound preserved timber products
Output 1.3
Activity 1.3.1 development of preservative technology for bamboo
Activity 1.3.2 treating experiments of bamboo
Activity 1.3.3 laboratory & field exposure tests of bamboo species
Activity 1.3.4 international consultancy and cooperation
Output 2.1
Activity 2.1.1 establishment of regulations for the treatment plant
Activity 2.1.2 courses & training for the plant managers and workers
Activity 2.1.3 seminar/workshop and attending international meetings
Output 2.2
Activity 2.2.1 TUAD program planning
Activity 2.2.2 organization of the Implementation of TUAD plan

5. Logical Framework worksheets

Project elements	Indicators	Means of verification	Important assumptions
<p>Development objectives</p> <p>The objective of this project is to promote the use of plantation timber resources by further develop and extension of environmentally sound preservation technology to contribute to the sustainable development of plantation forest in the South China region.</p>	<ul style="list-style-type: none"> the monitoring system is in operation in Guangdong number of plants accept the technical support and service new-developed preservatives used in industry increase the use of plantation timber 	<ul style="list-style-type: none"> monitoring and inspection reports to ITTO data collected and feedback from industry to evaluate the output of the project evaluation report on the effect of the industry to plantation timber production 	<ul style="list-style-type: none"> plantation timber is recognized as an important resources. timber preservation is a new industry and supported by the government policy.
<p>Specific objectives 1</p> <p>To develop environmentally sound timber preservative technologies and establish</p>	<ul style="list-style-type: none"> low toxic preservatives being used in industry completed the laboratory with the targeted functions 	<ul style="list-style-type: none"> inspection and evaluation reports papers on the new developed preservatives and 	<ul style="list-style-type: none"> a technical team with appropriated skill and experience is important.

treated timber products monitoring system to ensure the efficient use of the plantation timber resources.		technologies	
Specific objectives 2 To continue and further expand the on-going demonstrations programs commenced in PD 52/99 Rev 2(l), and to establish a demonstration treating plant playing as a leading sample in products quality control, safety and environment protection.	<ul style="list-style-type: none"> • specifications and standards are set up • treated bamboo products in production • TUAD is completed • demonstration plant is well managed and play an important role in dissemination of plant management 	<ul style="list-style-type: none"> • specifications standards are available • inspection and interview by ITTO officials • seminars/workshops on TUAD & plant 	<ul style="list-style-type: none"> • Standards, specifications and monitoring system can be approved by the government department concerned.
Output 1.1 A biological laboratory, a chemical analysis laboratory and 2 timber exposure yards, are set up and a treated timber product monitoring system is in operation.	<ul style="list-style-type: none"> • laboratory and exposure yards are in function • the monitoring system is in operation 	<ul style="list-style-type: none"> • inspection by ITTO officials 	<ul style="list-style-type: none"> • premises for lab. and yards can be obtained.
Output 1.2 The improved technologies, including new developed environmentally sound preservatives are available and used in industry.	<ul style="list-style-type: none"> • information on the new technologies derived available • demonstration of environmentally sound preserved timber product 	<ul style="list-style-type: none"> • technical reports on environmental sound preservative and related technology inspections by ITTO officials 	<ul style="list-style-type: none"> • environment and safe concern to the timber preservation is an important issue
Output 1.3 The bamboo classification is established and some preserved treatment techniques are developed.	<ul style="list-style-type: none"> • information on bamboo treating technologies available • training courses on bamboo treating 	<ul style="list-style-type: none"> • technical reports on bamboo treating 	<ul style="list-style-type: none"> • bamboo is an important plantation species
Output 2.1 A demonstration treating plant is set up. Information can be accessed through seminars/workshops, training courses, publications and internet.	<ul style="list-style-type: none"> • information on plant management available in media • seminars/workshops for industry 	<ul style="list-style-type: none"> • inspections by ITTO officials 	<ul style="list-style-type: none"> • investors from the private sector are willing to have information accessed in plant management
Output 2.2 TUAD is established.	<ul style="list-style-type: none"> • training courses and workshops on use of treated timber 	<ul style="list-style-type: none"> • inspections by ITTO officials 	<ul style="list-style-type: none"> • the support from local authorities is critical

6. Work Plan

Activities	SCHEDULE(36 months)																																						
	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	26	27	28	29	30	31	32	33	34	35	36			
1.1.1 establish. of the biological room																																							
1.1.2 establish. of chemical analysis laboratory																																							
1.1.3 establish. of 2 timber exposure yards																																							
1.1.4 establish. of monitoring system																																							
1.2.1 new preservatives development & tests																																							
1.2.2 on-going tests maintain & data collection																																							
1.2.3 demon. of environ. sound preserved product																																							
1.3.1 development of preservatives for bamboo																																							
1.3.2 treating experiment of bamboo																																							
1.3.3 lab. & exposure tests of bamboo species																																							
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2.1.1 establish. of regulations for treatment plant																																							
2.1.2 courses & training																																							
2.1.3 seminar/workshop & attending int. meetings																																							
2.2.1 TUAD planning																																							
2.2.2 organization of the implementing of TUAD																																							

7. Budget

7.1 CONSOLIDATED TOTAL AND YEARLY PROJECT BUDGET

Budget Components		Total	Year1	Year2	Year3
10	Project Personnel				
	11.National Experts	70,000	25,000	23,000	22,000
	12.National Consultants	12,000	4,000	4,000	4,000
	13.Other Labor	15,000	5,000	5,000	5,000
	14.Scholarship And Training				
	15..International Consultant	15,000	5,000	5,000	5,000
	19.Component Total	112,000	39,000	37,000	36,000
20	Sub□Contracts				
	21. Treating Plant Demonstration	35,000	1,000	34,000	
	29.Component Total	35,000	1,000	34,000	
30	Duty Travel				
	31.Daily Subsistence Allowance	11,000	4,000	3,700	3,300
	32.International Travel	8,500	2,900	2,800	2,800
	33.Transport Costs	10,000	4,000	4,000	2,000
	39.Component Total	29,500	10,900	10,500	8,100
40	Capital Items				
	41.Premises				
	42.Land				
	43vehicles				
	44.Laboratory Equipment	106,500	106,500		
	49.Component Total	106,500	106,500		
50	Consumable Items				
	51.Raw Materials & Chemical	47,700	20,600	19,000	8,100
	52.Spares	2,500	2,500		
	53. Fuel And Utilities	14,500	6,500	4,000	4,000
	55.Office Supplies & Stationary	10,000	4,300	3,200	2,500
	59.Component Total	74,700	33,900	26,200	14,600
60	Miscellaneous				
	61.Sundry	3,300	1,100	1,100	1,100
	62.Auditing	4,000			4,000
	69.Component Total	7,300	1,100	1,100	5,100
70	Management				
	79. Component Total				
	SUBTOTAL	365,000	192,400	108,800	63,800
80	80.ITTO Moni, Evalu. And Admi.				
	81.Monitoring And Review Costs		17,000		
	82.Evaluation Costs		10,000		
	83.Program Support Costs		<u>21,560</u>		
	89.Component Total		<u>48,560</u>		
90	GRAND TOTALS		<u>413,560</u>		

7.2 Overall Project Budget by Activity(US\$)

OUTPUT/ACTIVITY	BUDGET COMPONENTS														GRAND TOTAL	
	PROJECT		SUB		DUTY		CAPITAL ITEMS		CONSUMABLE		MISCEL.		ITTO			
	ITTO	Chinese	ITTO	Chinese	ITTO	Chinese	ITTO	Chinese	ITTO	Chinese	ITTO	Chinese	ITTO	Chinese		
Output 1.1																
1.1.1 establish. of the biological laboratory	500	2,700			400			8,000	1,300			200			2,400	10,700
1.1.2 establish. of chemical analysis laboratory	500	2,700			400		73,000	19,500	1,500			200			75,600	22,200
1.1.3 establish. of 2 timber exposure yards	800	4,000			750			6,000	2,000			100			3,650	10,000
1.1.4 establish. of the monitoring system	200	1,100			100				500						800	1,100
Output 1.2																
1.2.1 new preservatives development & tests		5,000			1,500				600			100			2,200	5,000
1.2.2 on-going tests maintain & data collection		9,000			2,400				800			200			3,400	9,000
1.2.3 demon. of environ. sound preserved product		5,000			2,000				7,700			300			10,000	5,000
Output 1.3																
1.3.1 develop. of preservatives for bamboo	3,000	12,800			1,000				1,800			300			6,100	12,800
1.3.2 treating experiment of bamboo		11,600			500				4,500			300			5,300	11,600
1.3.3 lab. & exposure tests of bamboo sp.		5,400			650				8,500			200			9,350	5,400
1.3.4 international consultancy	15,000	2,800			12,500				300			100			27,900	2,800
Output 2.1																
2.1.1 establish. of regulations for treatment plant	2,000	2,800			600				2,500			300			5,400	2,800
2.1.2 courses & training	1,500	2,400			1,200				1,200			200			4,100	2,400
2.1.3 seminar/workshop for industry	1,000	2,100			800				1,000			200			3,000	2,100
Output 2.2																
2.2.1 TUAD program planning	1,500	4,200	1,000		1,200				2,500			100			6,300	4,200
2.2.2 implementation of the TUAD plan	1,000	11,400	34,000		3,500				38,000			500			77,000	11,400
Administration & monitoring, auditing													4,000	48,560	48,560	4,000
Grand Total	27,000	85,000	35,000		29,500		73,000	33,500	74,700			3,300		4,000	48,560	122,500

7.3 YEARLY PROJECT BUDGET BY SOURCE----ITTO

Budget Components		Total	Year1	Year2	Year3
10	Project Personnel				
	11.National Experts				
	12.National Consultants	12,000	4,000	4,000	4,000
	13.Other Labor				
	14.Scholarship And Training				
	15..International Consultant	15,000	5,000	5,000	5,000
	19.Component Total	27,000	9,000	9,000	9,000
20	Sub- Contracts				
	21. Treating Plant Demonstration	35,000	1,000	34,000	
	29.Component Total	35,000	1,000	34,000	
30	Duty Travel				
	31.Daily Subsistence Allowance	11,000	4,000	3,700	3,300
	32.International Travel	8,500	2,900	2,800	2,800
	33.Transport Costs	10,000	4,000	4,000	2,000
	39.Component Total	29,500	10,900	10,500	8,100
40	Capital Items				
	41.Premises				
	42.Land				
	43vehicles				
	44.Laboratory Equipment	73,000	73,000		
	49.Component Total	73,000	73,000		
50	Consumable Items				
	51.Raw Materials & Chemical	47,700	20,600	19,000	8,100
	52.Spares	2,500	2,500		
	53. Fuel And Utilities	14,500	6,500	4,000	4,000
	55.Office Supplies & Stationary	10,000	4,300	3,200	2,500
	59.Component Total	74,700	33,900	26,200	14,600
60	Miscellaneous				
	61.Sundry	3,300	1,100	1,100	1,100
	62.Auditing				
	69.Component Total	3,300	1,100	1,100	1,100
70	Management				
	79. Component Total				
	SUBTOTAL	242,500	128,900	80,800	32,800
80	ITTO Moni, Evalu. And Admi.				
	81.Monitoring And Review Costs		17,000		
	82.Evaluation Costs		10,000		
	83.Program Support Costs		21,560		
	89.Component Total		48,560		
90	GRAND TOTALS		291,060		

7.4 —YEARLY PROJECT BUDGET BY SOURCE-----CHINESE GOVERMETN

Budget Components		Total	Year1	Year2	Year3
10	Project Personnel				
	11.National Experts	70,000	25,000	23,000	22,000
	12.National Consultants				
	13.Other Labor	15,000	5,000	5,000	5,000
	14.Scholarship And Training				
	15..International Consultant				
	19.Component Total	85,000	30,000	28,000	27,000
20	Sub-Contracts				
	21. Treating Plant Demonstration				
	29.Component Total				
30	Duty Travel				
	31.Daily Subsistence Allowance				
	32.International Travel				
	33.Transport Costs				
	39.Component Total				
40	Capital Items				
	41.Premises				
	42.Land				
	43vehicles				
	44.Laboratory Equipment	33,500	33,500		
	49.Component Total	33,500	33,500		
50	Consumable Items				
	51.Raw Materials & Chemical				
	52. Spares				
	53. Fuel And Utilities				
	55.Office Supplies & Stationary				
	59.Component Total				
60	Miscellaneous				
	61.Sundry				
	62.Auditing	4,000			4,000
	69.Component Total	4,000			4,000
70	Management				
	79. Component Total				
	SUBTOTAL	122,500	63,500	28,000	31,000
80	80.ITTO Moni, Evalu. And Admi.				
	81.Monitoring And Review Costs				
	82.Evaluation Costs				
	83.Program Support Costs				
	89.Component Total				
90	GRAND TOTALS		122,500		

7.5 PERSONNEL INPUTS (USD)

Budget Item	Output And activities	Input		Unit Cost	ITTO	Chinese Gov.	Total
		Unit & quality	Quant.				
11.National Experts	Project proposition, implementation, report to ITTO	1 project leader, unit: month	36	500		18,000	70,000
12.National Consultants	Responsible for advising on the project strategy, designing of plan, implementation, process control and self evaluation.	4 key staff, unit: month	130	400		52,000	
		1 national consultant, unit: month	12	1000	12,000		12,000
13.Other Labor	Output 1.1 activity1.1.3 establish. of exposure yards output 1.2 activity1.2.3 demon. of environ. sound preserved produc output 1.3 activity1.3.2 treating experiment of bamboo	2 person, unit: month	36	200		7,200	
		2 person, unit :month	30	200		6,000	15,000
		1person, unit: month	9	200		1,800	
15..International Consultant	Output 1.3 Activity1.3.4 international consultancy	1 international consultant, unit:day	30	500	15,000		15,000
Total					27,000	85,000	112,000

PART III OPERATIONAL ARRANGEMENTS

1. Management Structure

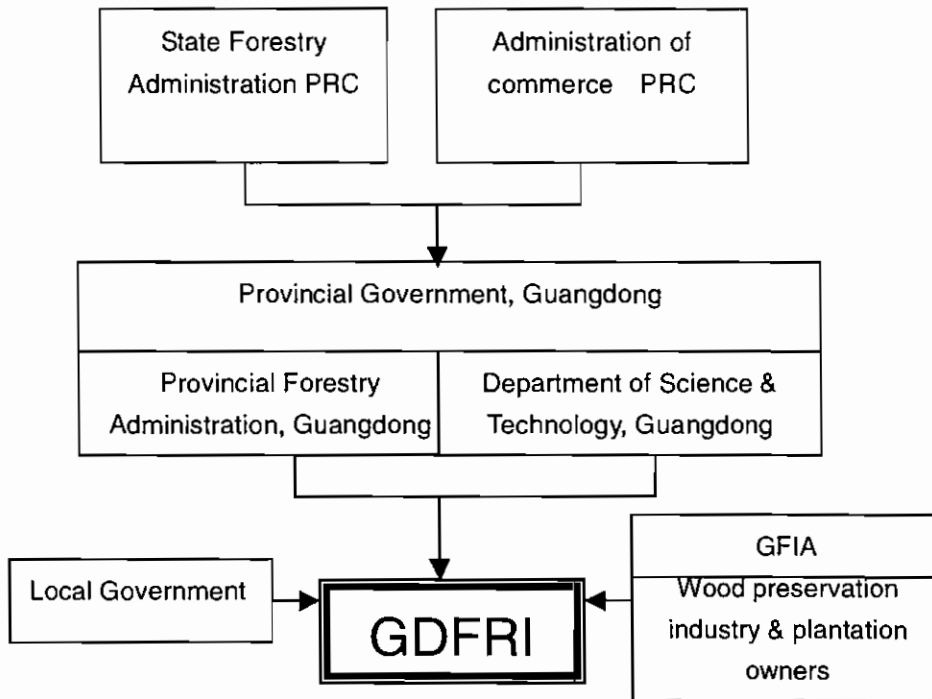


Figure 4: Management system

2. Monitoring, Reporting and Evaluation

- (a) The provincial government, through the Forestry Bureau and Science and Technology Department, will take the responsibility of the project monitoring. The project is also under the monitoring of the ITTO.
- (b) GDFRI will coordinate the ITTO officials to inspect and evaluate the implementation of the project.
- (c) The Executive Agency, GDFRI, will submit the progress reports to ITTO in six months interval.
- (d) The completion report will submit to ITTO 3 months after the completion of the project.

3. Future Operation and Management

- The laboratory established in this project will be, authorized by the authority, the main component body of the product monitoring system. It will be also a R/D center focusing on tropical plantation timber utilization in the South China area.
- The demonstration elements, including the treating plant and TUAD, will be evolved into a permanent wood preservation technological extension base and continue its role playing in the industry promotion.

PART IV TROPICAL TIMBER FRAMEWORK

1. Compliance with ITTO 1994 Objectives

- To contribute to the process of sustainable development
- To promote and support research and development with a view to improving forest

management and efficiency of wood utilization as well as increasing the capacity to conserve and enhance other forest value in timber producing tropical forests.

- To develop and contribute towards mechanism for the provision of new and additional financial resources and expertise needed to enhance the capacity of producing member to attain the objectives of this Agreement.
- To promote increased and further processing of tropical timber from sustainable sources in producing member countries with a view to promoting their industrialization and thereby increasing their employment opportunities and export earnings.

2. Compliance with ITTO YOKOHAMA Action Plan 2002-2006

Forest Industry

GOAL 1: Promote increased and further processing of tropical timber from sustainable resources

Actions:

1. Promote private investment through facilitating information exchange on investment opportunities
3. Study and promote policies and other measures to increase timber industry competitiveness.

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

Actions

1. Develop, publish and disseminate information on increasing utilization efficiency and the reduction of losses and waste through the production chain
2. Facilitate and encourage industrial demonstration projects addressing increased production and utilization efficiency, and the competitiveness of the tropical timber industry.
6. Promote increased awareness and utilization of existing information on wood properties and end-use requirements.
8. Encourage members and assist them, where appropriate, to
 - 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.

ANNEXES

Annexes A: Location of TUAD

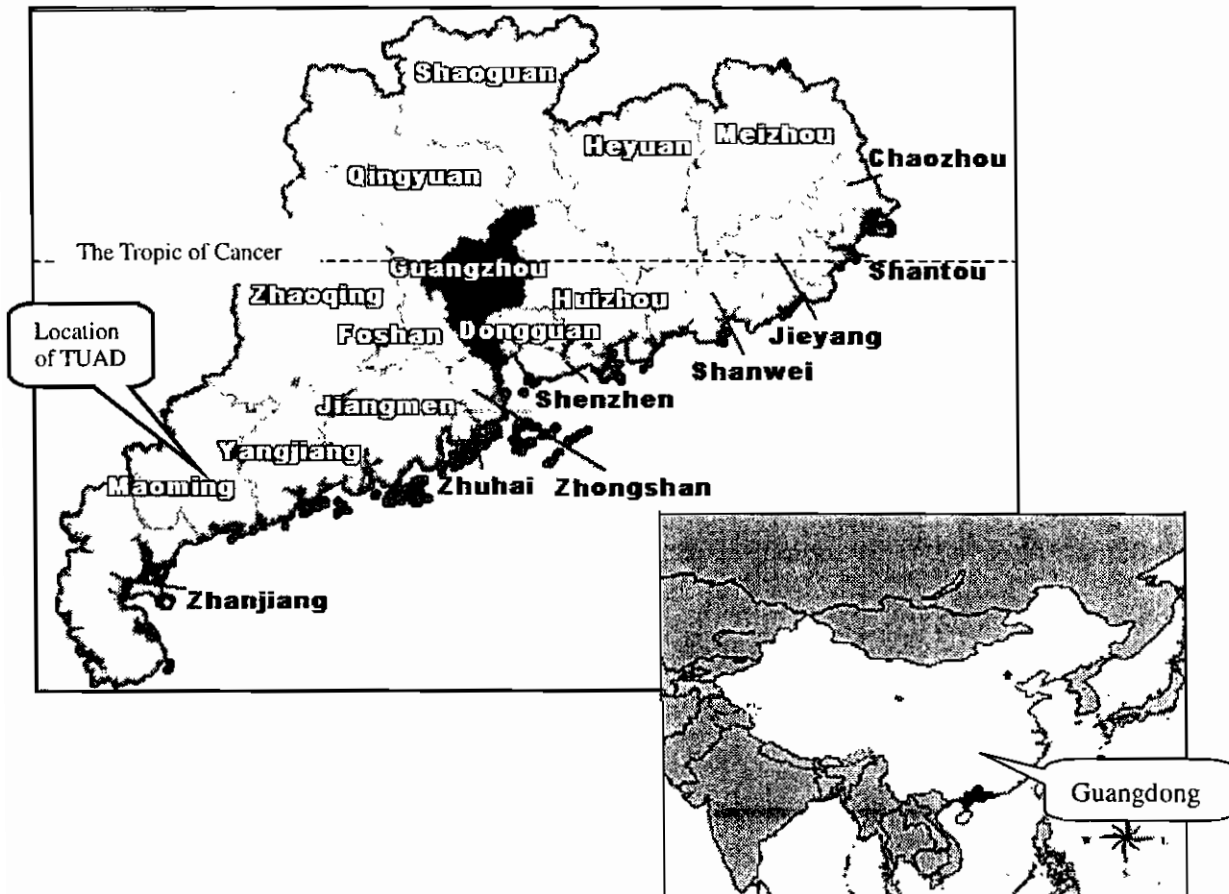


Figure 5: Map of the Guangdong Province

Annexes B: Profile of the Executing Agency: Guangdong Forest Research Institute

Guangdong Forest Research Institute (GDFRI) is located on the outskirts of Guangzhou city. Since its establishment in 1959, GDFRI has steadily grown up to be the forestry science and technology center of the province and has been playing a key role in the development of the local forest industry.

Research in GDFRI covers a range of scientific and technological fields of forestry, from tree breeding, propagation techniques, growing and management, forest protection to forest products development. *Pinus manssoniana*, *Cunninghamia lanceolata*, bamboo, some exotic pines and tropical species such as eucalypts and acacia are the species the research focused on.

150 scientists and technicians are working on the campus. Among them 37 are senior scientists. Many of them have been awarded for their contribution to the forestry through their research performance. Inside the campus, which is totally 50 hectares in area, there is a well managed arboretum with 1041 tree species in 113 families and 450 genera. There is also a wood collection with nearly 3000 domestic and foreign wood specimens. The herbarium has

8344 specimens in 214 families, 977 genera and 2362 species. These are the valuable resources not only to support the research but to service the education and industry sectors as well.

A project founded by the World Bank to improve the facilities and to train the staff of the institute finished in 1987. A laboratory for forest protection research was established in 1994 as a national key laboratory. A timber preservation laboratory and a pilot timber treating plant, funded jointly by the International Tropical Timber Organization (ITTO) and Chinese government, have been put into work since 2000. GDFRI is now among the top institutes in forest sector in the country and making contribution to the development of sustainable forestry especially in the tropical and subtropical southern China.

Annexes C: Curricula of the Key Staff

SU HAITAO

Family name: Su
First name: Haitao
Date of birth: September 29th, 1949
Nationality: China
Sex : Male
Marital status: Married

Education background

1. Graduated from Guangdong radio-television college majoring in electronic technology, 1982,
2. Graduated from Guangdong leisure-time college, majoring in chemical analysis, 1979

Training

English language diploma ,South China agricultural university, 1989

Professional experience

1997- Present, Director, Forest Industry Division, GDFRI, Senior engineer of forest science

1996-1997, Director Assistant, GDFRI

1990-1996, Researcher and compute software compiling, Wood Industry Division, Engineer,

1986-1989, Director, Guangdong Forestry Science And Technology Inspection Center, GDFRI, Engineer,

Assistant Project Leader, Sub-Project, Guangdong Forestry Science Research, World Bank Project

1982-1986, Researcher, Forest Chemistry Product Division, Computer Software Technician,

Professional Organization

Member, Guangdong Forestry Science Committee

Member, Wood Protection Committee, Wood Industry Branch, Chinese Forest Science Committee

Publications

1. Forestry Scientific And Technical Management Information System(FSTMIS) Of Guangdong Province, Establishment And Operation", Guangdong Forest Science And

Technology ,2001(3)

2. Field Trials Of Preservatives Treated Timber For Agriculture Guangdong Forest Science And Technology ,2000(4)
3. A MIS Computer System For Tissue Culture Production Line,Guangdong Forest Science And Technology ,2001(3) 1996(4)
4. Suggestion About Development Of Timber Drying Industry In Our Province Guangdong Forest Science And Technology ,1995(3)

Language Chinese/English

Contact detail

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E-mail:haitaosu2002@163.com

LIU LEI

Family name: Liu

First name: Lei

Date of birth: September 13,1974

Nationality: China

Sex : Male

Marital status: Married

Education background

1. M.Tech., Wood science, Northwest Forestry College, Research field: wood modification, September1995-July1998.
2. B.Sc., Forestry science, Northwest Forestry College, September1991-July 1995

Professional experience

- July 2002-present, Engineer, Forestry Industry Department, GDFRI, Research Focus On Wood Preservation
- July 1998-June 2002, Assistant Engineer, Forestry Industry Department, GDFRI, Research Focus On Wood Preservation

Current and completed research project

1. Guangdong Provincial Natural Science Foundation Project: Wood Preservation Monitoring System Of Guangdong Province Form 2003-2006
 2. International Tropical Timber Organization (ITTO) Project :Development And Extension Of Preservation Technology Of Tropical Plantation Timber From 2000-2003
 3. Guangdong Forest Bureau Project : Building Of Standardization Of Agricultural Preserved Timber .From 2002-2005
 4. Gungdong Agricultural Committee Project :Development And Extension Of Agricultural Timber Preservation Technique. From 1997-1999
- Guangdong Forest Bureau Project: Comprehensive Utilization Of Acacia Mongium . From 1998-1999

Publications

1. Laboratory Test Of *Eucalyptus urophylla*, *Pinus Elliottii*, *Pinus Massoniana* Treated By Several Preservatives ,Guangdong Forest Science And Technology,2002(2)
2. Premium Research on Treatment Process Of Poplars /Inorganic Silica Composition, Wood Industry ,2001,15(3):8-11

Language Chinese/English

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E-mail: Lei-Liu2002@163.com

ZHANG YANJUN

Family name: Zhang

First name: Yanjun

Date of birth: November 26, 1960

Nationality: China

Sex : Female

Marital status: Married

Education background

B.Sc. chemistry of forest product, Nanjing Forestry University, 1982,

Professional experience

1986-present, chemist of GDFRI, research focus on chemistry of forest product and wood preservation

1982-1986, technician, Kunming shell-lac factory, research and product monitoring of natural pigment and turpentine product,

Professional Organization

1. Project leader, Development Of Systematic Attractant Of Pine Brown Long Horn Beetle ,From 2002-2004
2. Researcher, Study Of Distillation And Utilization Of The Essential Oil Of Melaleuca Alternifolia, From1995-1998

Publications

1. Study On Chemical Components Of Essential Oil From Melaleuca Alternifolia , Chemistry And Industry Of Forest Product , 1999(3)
2. Study Of Distillation And Utilization Of The Essential Oil Of Melaleuca Alternifolia , Guangdong Forest Science And Technology ,1999(4)
3. Research On The Relationship Among Distillation ,Main Chemical Constituents And Yield Of The Essential Oil Of Melaleuca Alternifolia,Chemistry And Industry Of Forest ,2002(3)

Language Chinese/English

Contact detail

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HE XUEXIANG

Family name: He

First name: Xuexiang

Date of birth: September 6, 1964

Nationality: China

Sex : Female

Marital status: Married

Education background

1. Graduated from the South China Forestry University, majored in Forestry; 1985,
2. M. Sc. University of Queensland, Australia, majored in Entomology, 1999,

Professional Experience

- 2001-present, Head of two research projects, GDFRI, Senior engineer,
1997-1999, Master degree study in the University of Queensland, Australia;
1985present, Researcher, Forestry protection division, GDFRI;

Main Experience in Scientific Research

- Biological control of Forest Insect Pests

During 1985 to 1996, involved in two state key research projects about the mass production of fungal pathogens and the application of bio-agents in the controlling of caterpillars infested on pine trees; involved in one provincial key research project about the production of insect virus and its application in the controlling caterpillars on pine trees;

From 1999 to present, involved in one state key research project about the introduction of fine strains of fungal pathogen (*Metarhizium* spp.) and their production techniques for the controlling of locusts and termites in China; in charge of one research project, a Sino-US cooperation project, about the survey on the pathogens of Asian Longhorned Beetles;

- The exploitation of Botanical insecticides

From October, 2001 to present, in charge of one provincial key research project, about the introduction of elite neem species for the establishment of high-yield insecticides neem plantation in Guangdong province, in order to develop the neem insecticides industry in Guangdong province.

Professional Organization

1. Members, Chinese Forestry Society; Chinese Entomological Society
2. Representative, the 10th Guangdong Provincial People's Representative conference;
3. Committee member, Rural and Agricultural Committee of Guangdong Province;

Publications

1. The Artificial Rearing Technique of Host Insects of Cytoplasmic Polyhedrosis Virus of Masson's Pine Caterpillars. Forestry Science and Technology of Guangdong Province, No.2, 1997.
2. The Factors Influenced on the Propagation of Cytoplasmic Polyhedrosis Virus of Masson's Pine Caterpillars in *Helicoverpa armigera*, Virologica Sinica, vol. 15, Special Issue, Nov.2000
3. The Invasion and Development of *Nomuraea rileyi* in Larvae of *Helicoverpa armigera*, Virologica Sinica, vol. 15, Special Issue, Nov.2000.
4. Survey on Infestation and Pathogens of *Anoplophora chinensis* (Forster) in Guangdong Province, Proceedings in China-US Workshop on Asian Longhorned Beetle, *Anoplophora glabripennis*, June 18-21, 2002.

Language Chinese/English

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Fax: 86-20-87031245
E-mail: hxx6496@sti.gd.cn

XIE GUIJUN

Family name: Xie

First name: Guijun

Date of birth: October 16, 1980

Nationality: China

Sex: male

Marital status: spinsterhood

Education background

Technology master of wood science and technology, South China Agriculture University, 2005

Bachelor of wood science and technology, South China Agriculture University, 2002

Professional experience

2005-present, application of GDFRI, research focus on wood preservation

2002-2005, majoring in master of wood science and technology in South China Agriculture University, research focus on wood-based panel

Professional Organization

Researcher, Study on producing panels by Radiata Pinus compounding with Breakingfruit Chinkapin and its construction, from 2003-2004

Publications

Research on making medium density fiberboard by Breakingfruit Chinkapin, Woodworking machinery, 2004(6)

Illustrated handbook of wood in South China (I), Chinese forestry publishing house, 2004

Language: Chinese/English

Contact detail

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510520

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Annexes D: List of Capital Items (US\$)

No.	ITEM	QUAN.	UNIT COST	TOTAL	
				ITTO	Chinese Gov.
1	High performance liquid chromatography(HPLC)	1	30,000	30,000	
2	ASOMA X-Ray Fluorescence Spectroscopy Analyzer	1	43,000	43,000	
3	Timber digestion facilities	1	7,000		7,000
4	Temperature & Humidity Control System	1	26,500		26,500
	Total			73,000	33,500
				106,500	

Annexes E: the items of the sub-contract, treating plant demonstration.

No.	ITEM	QUAN.	UNIT COST	TOTAL
1	Instruments and equipment for quality control	1	5,500	5,500
2	Training courses and workshops	5	4,500	22,500
3	Raw materials and chemical for demonstration	1	4,000	4,000
4	Booklets and printed matter	1	2,500	2,500
5	Miscellaneous	1	500	500
	Total			35,000

Annexes F: Terms of Reference

1. Project Leader

Missions

1. To design the implementation strategies to ensure the effective execution of the project;
2. To organize and manage the project activities and programs and controls the project funds in accordance with the project plan;
3. To coordinate with every aspects related and therefore the provision of support from authorities, local communities and organizations is well realized;
4. In the event that any modification of the project plan be considered to be necessary, it is the responsibility of the project leader to make amendment proposal to the Chinese Government department concerned and ITTO for approval;
5. To present whilst project review, monitoring and evaluation;
6. To submit project reports, in accordance with the project agreement, to ITTO.

Qualification

1. Experience in organizing and managing technical development projects/programs,

-
- international projects preferable;
 2. At least educated in university level, in the fields of forestry related, wood processing preferable;
 3. Experience in timber preservation research or technical programs at least 3 years;
 4. Good command of both Chinese and English.

2. International Consultants

Missions

1. To assist in establishment of specifications and standards of timber preservation and INDUSTRY monitoring system;
2. To assist in developing of preservatives for the target species, bamboo for example;
3. To design the programs for developing of techniques in treating bamboo species;
4. To review and evaluate the project during its implementation and make recommendations for carrying out the project objectives.

Qualification

1. Experiences in preservative treatment technology development;
2. Familiar with the timber preservation industry monitoring;
3. Experience in organizing and management research programs;
4. At least M Sc. In the field related to timber preservation related;
5. English speaking.

3. National Consultants

Missions

1. To assist in implementation strategies designing and activities planning;
2. To review the progress of the project and make recommendations during the life of the project;
3. To assist in the establishment of specifications and standards of timber preservation;
4. To assist in organizing and make input into the seminars and training/courses;

Qualification

1. Experience in organizing and management of project/programs in forestry research;
2. University graduated in the timber preservation related fields;
3. With expertise of timber preservation;
4. Chinese nationality;
5. Good in English is preferable.

1. Background Information About the Project

- This project, PD 52/99 Rev. 2(I), was proposed by GDFRI, China in December, 1998 and approved by ITTO in the 28th session May, 2000, Lima. The total budget of the project is US\$ 309,190. The awarded ITTO funding was US\$ 166,690 and the Chinese Government fund the matching part of US\$ 142,500. The planned duration of the project was 30 months.
- The project started on October 26, 2000 and finished in June 2003. The actual duration was 33 months. The actual project cost (US\$) was 378,295 (including the ITTO administration fee US\$ 13,690)

2. Project objectives

- The development objective of the project was to develop and extend the processing and utilization technology, especially preservation treatment, of timber from tropical plantation in South China. Dissemination of the technologies through demonstration and training for better utilization of this renewable forest resource will relieve the pressure on tropical forest for timber supply and contribute to the sustainable forestry development.
- The specific objectives of the project were:
 - a) To establish preservation standards and procedures related for timber from plantation, mainly focus on some tropical hardwood such as eucalyptus and acacia species.
 - b) To promote the wood preservation industry in Southern China by demonstration and training.

3. Activities and its completion situation

Planned Activities

Activities	Comple. Situ.	Outputs
1.1 Pilot test of stain control	Completed	2 papers for IRG
1.2 Establish of pilot test facilities (plant & lab)	Completed ahead of schedule	The plant and lab. are in operation
1.3 Vacuum pressure tests.	Completed	
1.4 Lab. tests (soilblock culture)	Basically fulfilled	1 paper
1.5 Standard and schedule	Completed	1 standard and 1 schedule
2.1 Demonstrations	Over fulfilled	Banana post demon. 13 ha & landscaping
2.2 Training & courses	Fulfilled	Training for industries, courses for students
2.3 Seminar/workshops	Over fulfilled	6 seminars. Organization of a national conference
2.4 International consultancy	Fulfilled	4 consultant trips. Reports and papers
2.5 IRG/WP meeting	Basically fulfilled	Attended 1 meeting and 3 papers

Unplanned Activities

Activities	Compleat.Situ.	Outputs
1.Exposure test yard	Completed	2500 M ² in area, 600 specimen in tested
2. Technically support the establishment of a treatment plant in Gaozhou	Completed	Gaozhou plant is in trial operation
3.Contamination test	Completed	1 paper for IRG 34th meeting
4.More wood species tested	Completed	Pines, bamboo, Chinese fir etc
5.Cooperation in products development	Completed	Landscaping and outdoor furniture
6. Termite tests on several preservatives treated timber	Completed	1 paper in preparing

4. Conclusion

The project PD 52/99 Rev 2(I) is well completed according to the schedule and the guideline of ITTO. The objectives of the project have been reached.

- a) Progress has been made towards a sound technical foundation to meet the requirement of the developing timber preservation industry. Currently adequate information is accessible for the potential investors and timber consumers. The technologies derived from this project are adopted by industry.
- b) Demonstration plots and structures established by the project have been playing an important role in dissemination the knowledge of high value use of plantation timber. No doubt this will encourage the further development of forest plantation in the tropical area and in someway affect the timber supply pattern in future.
- c) The contribution to the local economic will be very significant in the future. For example, according to the evaluation made by economist Mr. Robert Prydon, the project's international consultant, with an economic model, "Comparing the use of treated and untreated banana posts, there is a maximum potential saving of up to RMB 749,000,000 over a six year period." This is only the direct benefit obtained by the banana farmers in Guangdong.

Annexes H: Amendments follow the comments and recommendations of the Panel

<p>1. Improve the problem tree by demonstrating a key problem, its underlying causes and effects. The key problem to be addressed would be lack of environmental sound preservation methods tailored for specific timber species at an operation scale, including a quality monitoring system;</p>	<p>Problem tree has replenished (see p3).</p>
<p>2. Elaborate the functions of a biological laboratory and a chemical analysis laboratory which will be set up under Output 1.1;</p>	<p>The laboratory functions are given (see p5)</p>
<p>3. Explain who is in charge of the products quality monitoring system to be established at the end of the project, what are the techniques applied for monitoring and what is the basis for monitoring (legislation, voluntary agreements). Provide more explanation on the organization and functioning of the framework between the government and industry sector to supervise the quality of products;</p>	<p>The monitoring system was explained in more details (see p5 and p6).</p>
<p>4. Justify the project work relating to the development of preserved treatment techniques for bamboo in relation to the development objective of the project;</p>	<p>The importance of bamboo as one of the tropical plantation resources are given by data, The use of this large and renewable resources by developing new preserved technologies will meet the development objective of this project. (p7)</p>
<p>5. Adjust the ITTO's Programme Support Costs to 8% of the ITTO total contribution.</p>	<p>The ITTO's Programme Support Costs is added (p13-p15)</p>