Document of
The World Bank

Report No: ICR00001827

IMPLEMENTATION COMPLETION AND RESULTS REPORT
(IBRD-46590; TF-50644)

ON A

LOAN

IN THE AMOUNT OF

US$ 93.9 MILLION

AND A GRANT FROM THE

GLOBAL ENVIRONMENTAL FACILITY TRUST FUND

IN THE AMOUNT OF

SDR12.8 MILLION

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR THE

SUSTAINABLE FORESTRY DEVELOPMENT PROJECT

June 27, 2011

China and Mongolia Sustainable Development Unit
Sustainable Development Department
East Asia and Pacific Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective October 2009)

Currency Unit = Yuan Renminbi
CNY 1 = US$0.1464
US$ 1.00 = Y6.8282

FISCAL YEAR
January 1 –December 31

ABBREVIATIONS AND ACRONYMS

CAS	Country Assistance Strategy
EA	Environment Assessment
ERR	Economic Rate of Return
ESIA	Environment and Social Assessment
EU	European Union
FRR	Financial Rate of Return
GEF	Global Environment Facility
GEO	Global Environment Objective
ICR	Implementation Completion and Results Report
IP	Implementation Progress
IPM	Integrated Pest Management
M&E	Monitoring and Evaluation
MTR	Mid-term Review
NFM	Natural Forest Management Component
NFPP	Natural Forests Protection Program
PAD	Project Appraisal Document
PAM	Protected Areas Component
PDO	Project Development Objective
PE	Plantations Establishment Component
PMC	Project Management Center, Beijing
PMO	Project Management Office, Provincial and County
QAG	Quality Assurance Group
SFA	State Forestry Administration
SFDP	Sustainable Forestry Development Project

Vice President:	James E. Adams EAPVP
Country Director:	Klaus Rohland, EACCF
Sector Manager:	Ede Ijjasz, EASCS, Magda Lovei, EASER
Project Team Leader:	Ulrich Schmitt, EASRE
ICR Team Leader	Ulrich Schmitt, EASRE

CHINA
Sustainable Forestry Development Project

CONTENTS

A. Basic Information			
Country:	China	Project Name:	Sustainable Forestry Development Project
Project ID:	P064729,P060029	L/C/TF Number(s):	IBRD-46590,TF-50644
ICR Date:	06/25/2011	ICR Type:	Core ICR
Lending Instrument:	SIL,SIL	Borrower:	PEOPLE'S REPUBLIC OF CHINA
Original Total Commitment:	USD 93.9M,USD 16.0M	Disbursed Amount:	USD 93.2M,USD 16.0M
Environmental Category: A,B		**Focal Area**: B	
Implementing Agencies: State Forestry Administration			
Cofinanciers and Other External Partners: European Union (EU)			

B. Key Dates

Sustainable Forestry Development Project - P064729

Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	01/10/2000	Effectiveness:	01/29/2003	01/29/2003
Appraisal:	02/09/2001	Restructuring(s):		
Approval:	04/16/2002	Mid-term Review:	10/24/2005	10/19/2005
		Closing:	08/31/2009	08/31/2009

Sustainable Forestry Development Project (Natural Forest Protection) - P060029

Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	01/10/2000	Effectiveness:		01/29/2003
Appraisal:	02/09/2001	Restructuring(s):	08/28/2009	08/28/2009
Approval:	04/16/2002	Mid-term Review:	10/24/2005	10/19/2005
		Closing:	08/31/2009	08/31/2010

C. Ratings Summary

C.1 Performance Rating by ICR

Outcomes	Satisfactory
GEO Outcomes	Satisfactory
Risk to Development Outcome	Low or Negligible
Risk to GEO Outcome	Low or Negligible
Bank Performance	Satisfactory
Borrower Performance	Highly Satisfactory

C.2 Detailed Ratings of Bank and Borrower Performance (by ICR)

Bank	Ratings	Borrower	Ratings
Quality at Entry	Satisfactory	Government:	Not Applicable
Quality of Supervision:	Satisfactory	Implementing Agency/Agencies:	Not Applicable
Overall Bank Performance	Satisfactory	Overall Borrower Performance	Highly Satisfactory

C.3 Quality at Entry and Implementation Performance Indicators

Sustainable Forestry Development Project - P064729

Implementation Performance	Indicators	QAG Assessments (if any)	Rating:
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA)	None
Problem Project at any time (Yes/No):	No	Quality of Supervision (QSA)	None
DO rating before Closing/Inactive status	Satisfactory		

Sustainable Forestry Development Project (Natural Forest Protection) - P060029

Implementation Performance	Indicators	QAG Assessments (if any)	Rating:
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA)	None
Problem Project at any time (Yes/No):	No	Quality of Supervision (QSA)	None
GEO rating before Closing/Inactive Status	Satisfactory		

D. Sector and Theme Codes

Sustainable Forestry Development Project - P064729		
	Original	Actual
Sector Code (as % of total Bank financing)		
Forestry	100	100
Theme Code (as % of total Bank financing)		
Biodiversity	34	34
Participation and civic engagement	33	33
Rural non-farm income generation	33	33

Sustainable Forestry Development Project (Natural Forest Protection) - P060029		
	Original	Actual
Sector Code (as % of total Bank financing)		
Forestry	100	100
Theme Code (as % of total Bank financing)		
Biodiversity	34	34
Participation and civic engagement	33	33
Rural non-farm income generation	33	33

E. Bank Staff		
Sustainable Forestry Development Project - P064729		
Positions	**At ICR**	**At Approval**
Vice President:	James W. Adams	Jemal-ud-din Kassum
Country Director:	Klaus Rohland	Yukon Huang
Sector Manager:	Ede Jorge Ijjasz-Vasquez	Mark D. Wilson
Project Team Leader:	Ulrich K. H. M. Schmitt	Mohamed Noureddine Benali
ICR Team Leader:	Ulrich K. H. M. Schmitt	
ICR Primary Author:	Ulrich K. H. M. Schmitt	
Sustainable Forestry Development Project (Natural Forest Protection) - P060029		
Positions	**At ICR**	**At Approval**
Vice President:	James W. Adams	Jemal-ud-din Kassum
Country Director:	Klaus Rohland	Yukon Huang
Sector Manager:	Ede Jorge Ijjasz-Vasquez	Mark D. Wilson
Project Team Leader:	Ulrich K. H. M. Schmitt	Mohamed Noureddine Benali
ICR Team Leader:	Ulrich K. H. M. Schmitt	
ICR Primary Author:	Ulrich K. H. M. Schmitt	

F. Results Framework Analysis

Project Development Objective

Ensure that viable, participatory and locally-managed systems for conservation, management, and sustainable use of forest resources and associated biodiversity are developed and adopted in SFDP project sites, to promote sustainable development management of forest resources and protect natural environments.

Revised Project Development Objectives

Not revised.

Global Environment Objectives

The global environmental objective is to foster improved conservation and sustainable management of biodiversity in remaining natural forest areas by ensuring effective in situ protection of threatened and globally important forest habitats and rare and endemic species.

Revised Global Environment Objectives

Not revised.

(a) PDO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Project generates 13.3 million m3 of timber and 2.73 million tons of bamboo by December 31, 2025. RMB 1.1 billion net income from fruit tree crops by year 2022.			
Value (quantitative or Qualitative)	zero	13.3 million m3 of timber and 2.73 million tons of bamboo.	not revised.	Output projected at target date to be around 29 million m3 of timber and 3.9 million ton of bamboo. Net income projected from tree crops by 2022 is RMB 6.6 billion.
Date achieved	04/16/2002	12/31/2025		08/31/2010
Comments (incl. % achievement)	The PAD target date was December 31, 2025. The System does not allow entering a date so far in the future so the closing is entered instead.			
Indicator 2 :	6,900 villages benefiting from participation in project activities by December 31, 2007			
Value (quantitative or Qualitative)	Zero	6,900 villages benefiting from project activities	not revised.	About 6,900 villages benefited from project activities.
Date achieved	04/16/2002	02/28/2009		12/31/2010
Comments (incl. % achievement)	Achieved.			
Indicator 3 :	13 nature reserves management improved by 1.5 points by end of project.			
Value (quantitative or Qualitative)	Baseline scores for each of the 13 nature reserves.	Increase of individual scores by 1.5 points	not revised.	Average score increased by more than 1.5 points.
Date achieved	04/16/2002	08/31/2010		08/31/2010
Comments (incl. % achievement)	Achieved. Scores are qualitative self-assessments. Project followed scoring system of World Commission on Protected Areas (WCPA) Framework.			
Indicator 4 :	6 natural forest management areas under effective management.			
Value (quantitative or Qualitative)	zero	6 natural forest management areas under effective management.	not revised.	Management plans for 4 natural forest management areas developed but not officially approved and only partially implemented.
Date achieved	04/16/2002	05/16/2002		06/30/2010
Comments	Only partially achieved in some locations.			

(incl. % achievement)	

(b) GEO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Over 1 million hectares of nature forests and protected areas brought under active management.			
Value (quantitative or Qualitative)	na	na	na	1 million ha of protection management achieved.
Date achieved	04/16/2002	05/16/2002	10/24/2005	08/31/2010
Comments (incl. % achievement)	No numerical baseline values were specified. The 1 million areas target represents the total size of the project's protected areas.			
Indicator 2 :	Substantial involvement and participation of local communities in forest management planning and implementation.			
Value (quantitative or Qualitative)	na	na	na	Participation reflected in preparation and implementation in 26 Community Resource Management Plans.
Date achieved	04/16/2002	05/16/2002	10/24/2005	08/31/2010
Comments (incl. % achievement)	No numerical baseline values were specified.			
Indicator 3 :	Reduction of community reliance on forest resources inside biodiversity important zones.			
Value (quantitative or Qualitative)	0	no numerical target value specified	na	Community resources reliance may have been reduced through project interventions.
Date achieved	04/16/2002	08/31/2010		08/31/2010
Comments (incl. % achievement)	This is a long-term impact which will only be quantifiable over time through implementing the biodiversity M&E system from which reduction of resource reliance may be inferred from.			
Indicator 4 :	Increase in local government's capacity to supervise, monitor, and implement conservation and sustainable resource use activities.			
Value	0	no numerical	na	Government

(quantitative or Qualitative)		target value specified		capacity increased through training and capacity building resulting in the capability to manage protected areas, implement budgets, and monitor and supervise biodiversity outcomes.
Date achieved	04/16/2002	08/31/2010		08/31/2010
Comments (incl. % achievement)	While no specific capacity indicator was defined, the project did provide more than 24,800 person time trainings for reserve staff, communities and local government staff.			

(c) Intermediate Outcome Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	13 technically sound and participatory nature reserve management plans developed and adopted by SFA and provincial authorities in the first 2 years of implementation.			
Value (quantitative or Qualitative)	Zero	13 nature reserve management plans developed and adopted by SFA and provincial authorities.	not revised	13 nature reserve management plans developed and adopted by SFA and provincial authorities
Date achieved	04/16/2002	08/31/2005		08/31/2005
Comments (incl. % achievement)	Fully achieved.			
Indicator 2 :	115,100 ha of commercial wood plantations established. 57,900 ha of economic trees crops established. 666,900 households participating in commercial wood, economic tree crop plantations and thinning.			
Value (quantitative or Qualitative)	Zero	115,100 ha of commercial wood plantations; 57,900 ha of economic trees crops; 666,900 households participating.	135,100 ha of commercial wood plantations; 42,000 ha of economic trees crops; 666,900 households participating.	201,700 ha of commercial wood plantations; 42,246 ha of economic trees crops; 706,087 households participating.
Date achieved	04/16/2002	12/31/2008	12/31/2008	12/31/2008
Comments (incl. % achievement)	Achieved with targets exceeded by 75% for plantation areas.			
Indicator 3 :	61,300 ha of pre-commercial thinning demonstrated by December 31, 2008.			
Value (quantitative or Qualitative)	zero	61,300 ha of pre-commercial thinning demonstrated.	82,850 ha of pre-commercial thinning demonstrated.	86,227 ha of pre-commercial thinning demonstrated.
Date achieved	04/16/2002	12/31/2008	12/31/2008	12/31/2008
Comments (incl. % achievement)	Achieved with targets exceeded by 40% for plantation areas.			
Indicator 4 :	265 million improved seedlings produced by December 31, 2008. 60,670 county			

	and provincial staff time and 1.33 million farmers training time by December 31, 2008			
Value (quantitative or Qualitative)	zero	265 million improved seedlings produced. 60,670 county and provincial staff time and 1.33 million farmers training time.	not revised.	392 million improved seedlings produced. 1.61 million farmers training time.
Date achieved	04/16/2002	12/31/2008		12/31/2008
Comments (incl. % achievement)	Achieved with target exceeded by 47%.			
Indicator 5 :	666,900 households participating in commercial wood, economic tree crop plantations and thinning by December 31, 2008.			
Value (quantitative or Qualitative)	0	666,900 households participating.	not revised	706,087 households participated.
Date achieved	04/16/2002	12/31/2008		12/31/2008
Comments (incl. % achievement)	Fully achieved with targets exceeded.			
Indicator 6 :	60,670 county and provincial staff time and 1.33 million farmer time training by December 31, 2008.			
Value (quantitative or Qualitative)	0	60,670 county and provincial staff time and 1.33 million farmer time training	not revised.	About 100,000 trainings days for county and provincial technical staff and farmers and 1.59 million training days to farmers provided;
Date achieved	04/16/2002	12/31/2008		12/31/2008
Comments (incl. % achievement)	Targets exceeded.			
Indicator 7 :	Small scale infrastructure valued at US$2.19 million built by December 31, 2008.			
Value (quantitative or Qualitative)	0	Infrastructure valued at US$2.19 built by December 31, 2008.	not revised.	Small scale infrastructure valued at US$1.4 million completed.
Date achieved	04/16/2002	12/31/2008		08/31/2009
Comments (incl. % achievement)	Infrastructure investments very slightly reduced because marketing infrastructure was deemed to be not necessary and funds w ere reallocated.			
Indicator 8 :	26 Community Reserve Management Plans adopted by local communities and			

	NRs and approved by county governments in the first 2 years of implementation.			
Value (quantitative or Qualitative)	0	26 Community Reserve Management Plans	Not revised	26 Community Reserve Management Plans developed and approved.
Date achieved	04/16/2002	10/24/2005		08/31/2010
Comments (incl. % achievement)	Fully achieved.			
Indicator 9 :	1491 person time training carried out at nature reserve-level.			
Value (quantitative or Qualitative)	0	1491 person time training carried out.	Not revised.	More than 24,800 person time trainings carried out for reserve staff, communities and local government staff.
Date achieved	04/16/2002	08/31/2010		08/31/2010
Comments (incl. % achievement)				
Indicator 10 :	6 natural forest management plans developed and approved by December 31, 2005.			
Value (quantitative or Qualitative)	0	6 natural forest management plans.	na	4 strategic forest management plans were completed.
Date achieved	04/16/2002	12/31/2005		06/30/2010
Comments (incl. % achievement)	This indicator refers to the EU financed component. Only 4 management plans were completed. However, these were not formally approved and implemented.			
Indicator 11 :	59 village co-management contracts signed by December 31, 2006.			
Value (quantitative or Qualitative)	0	59 village co-management contracts	na	No co-management contracts were signed.
Date achieved	04/16/2002	06/30/2010		06/30/2010
Comments (incl. % achievement)	Co-management remained at a level of demonstration and training but could not be formalized. See analysis in the text.			
Indicator 12 :	6 county training plans approved by December 31, 2003; 3,500 personnel trained by December 31, 2005; 15,000 villagers trained by December 31, 2005.			
Value (quantitative or Qualitative)	0	6 county training plans approved; 3,500 personnel trained, and 15,000 villagers trained	na	55 village level training courses implemented; 1657 villagers and 278 forest workers trained.
Date achieved	04/16/2002	06/30/2010		06/30/2010

Comments (incl. % achievement)	Training activities implemented did not fully reach the targeted number of training activities.			
Indicator 13 :	59 Participatory Village Development Plans developed and agreed upon by June 30, 2004 and implemented by December 31, 2008.			
Value (quantitative or Qualitative)	0	59 Participatory Village Development Plans developed and agreed upon and implemented		57 Village Development Plans were completed.
Date achieved	04/16/2002	06/30/2010		06/30/2010
Comments (incl. % achievement)				
Indicator 14 :	5,700 households receiving first project loan by December 31, 2008.			
Value (quantitative or Qualitative)	0	5,700 households receiving micro-loans.	na	More than 7,000 micro-loans were granted to more than 3,200 village households.
Date achieved	04/16/2002	06/30/2010		06/30/2010
Comments (incl. % achievement)	Institutional infrastructure for micro-loan management established. Original target value has not been fully achieved which may be due to demand-driven nature of the activity.			

G. Ratings of Project Performance in ISRs

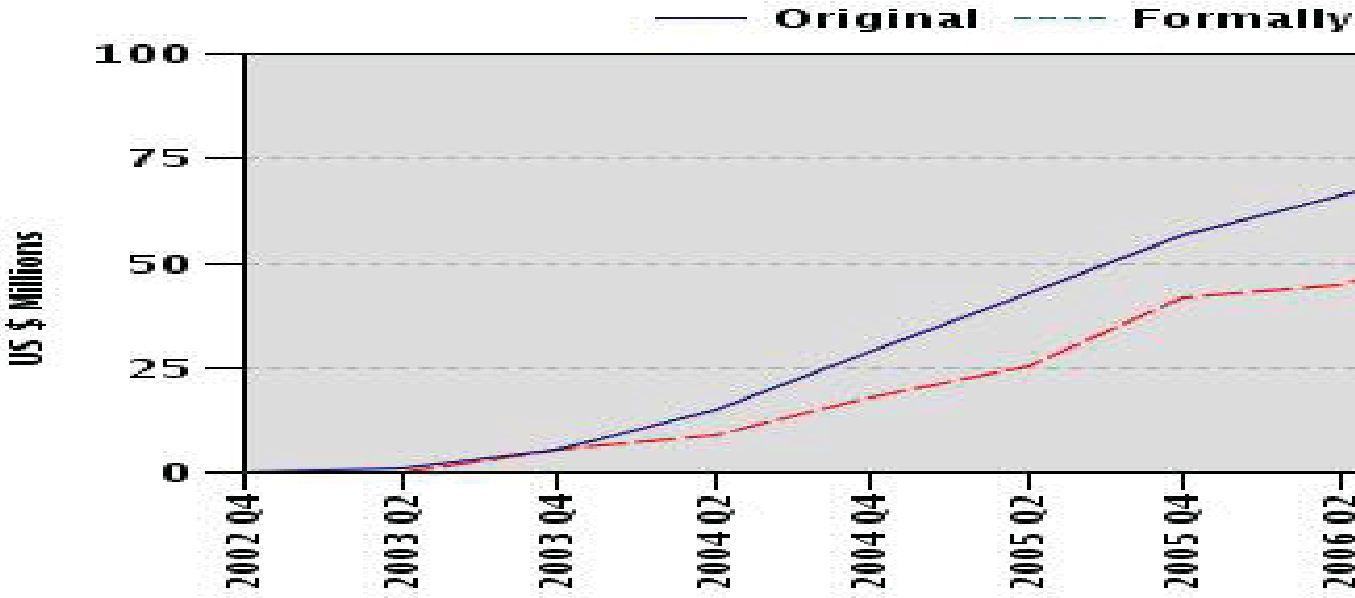
-						
No.	Date ISR Archived	DO	GEO	IP	Actual Disbursements (USD millions)	
					Project 1	Project 2
1	05/28/2002	S	S	S	0.00	0.00
2	12/02/2002	S	S	S	0.00	0.00
3	02/28/2003	S	S	S	0.94	0.00
4	09/05/2003	S	S	S	5.44	1.00
5	10/31/2003	S	S	S	5.44	1.00
6	05/07/2004	S	S	S	17.83	1.89
7	05/10/2004	S	S	S	17.83	1.89
8	12/02/2004	S	S	S	22.13	3.92
9	05/08/2005	S	S	S	37.21	4.55
10	11/15/2005	S	S	S	41.84	5.52
11	10/24/2006	S	S	S	57.16	7.99
12	04/25/2007	S	S	S	71.46	9.12
13	11/30/2007	S	S	S	73.76	11.41
14	12/27/2008	S	S	S	87.82	12.78
15	12/23/2009	S	S	S	93.21	14.98

H. Restructuring (if any)

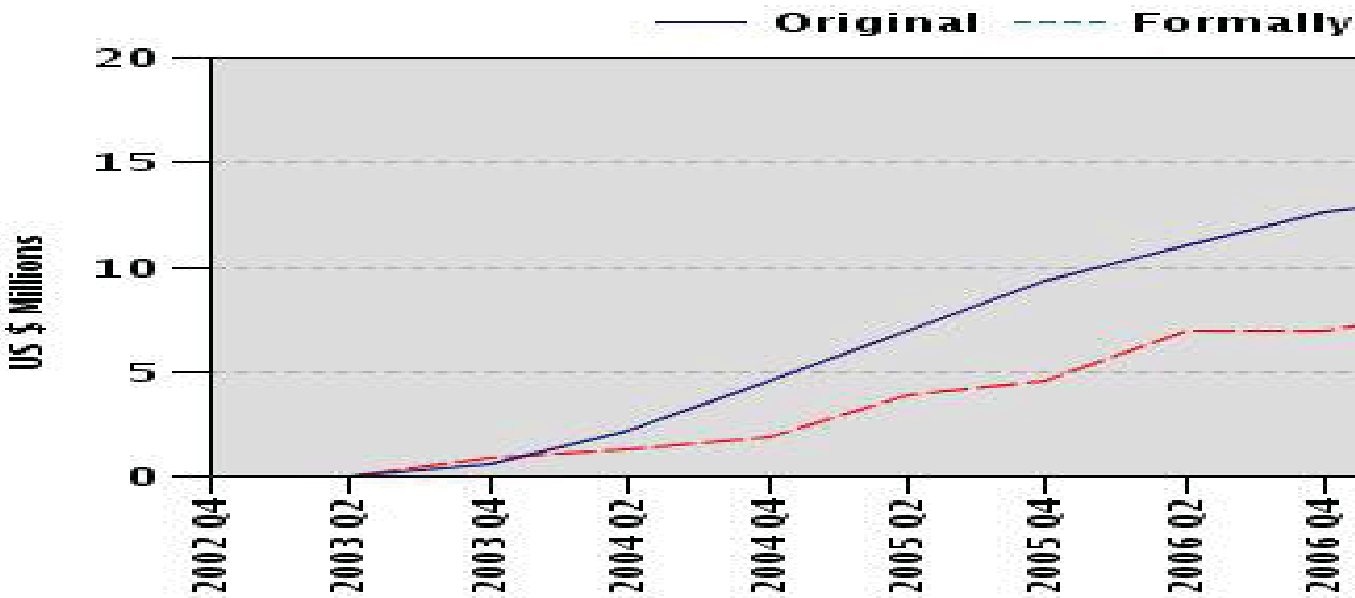
Not Applicable

I. Disbursement Profile

P064729



P060029



1. Project Context, Development and Global Environment Objectives Design

1.1 Context at Appraisal

The origins of the Sustainable Forestry Development Project go back to the disastrous floods in the upper and middle reaches of the Yangtze and Yellow rivers in 1998, an event which resulted in the Government's Natural Forest Protection Program (NFPP). The NFPP was a far-reaching and ambitious initiative, which, inter alia, banned commercial logging in natural forests in Southwest and Northeast China; expanded the protection and rehabilitation of natural forests and the retirement of economically marginal farmland to protect key watersheds in upland areas; and promoted afforestation to meet increasing industrial timber demand. It also included a restructuring program of state forest enterprises in key forestry regions, and the transfer of forest workers to alternative employment and livelihoods. While the NFPP helped promote environmental rehabilitation and reduce forest degradation, the exhaustion of timber resources from natural forests and the logging ban resulted in temporary wood shortages, higher wood prices, and surging timber imports. In response to this, the Government put specific emphasis on increasing wood supplies through afforestation.

The CAS embraced the NFPP by including protecting the environment and preserving productive natural forest and biodiversity of global importance, and by promoting sustainable natural resources management. The Project, which was launched in January 2003, was designed as a contribution to the implementation of the NFPP. The Bank, with its long involvement in the forestry sector, was well placed to help the Borrower implement a comprehensive forest sector intervention to advance reforms and help redress some of the economic hardships to communities brought about by logging restrictions and enterprise restructuring. In addition to providing IBRD-financing for the Project's Plantation Establishment (PE) component, the Bank was also well placed to attract other donors and funding sources. Specifically, the Bank mobilized grant funding from the Global Environment Facility (GEF) for the Project's Protected Area Management (PAM) Component, and facilitated the involvement and contribution of the European Union (EU) to the Project's Natural Forest Management (NFM) Component.

1.2 Original Project Development Objectives and Key Indicators

The Project Development Objective was *to ensure that viable, participatory, and locally managed systems for conservation, management, and sustainable use of forest resources and associated biodiversity were developed and adopted in project sites to promote sustainable development and management of forest resources and protect the natural environment*.[1] The practices developed under the Project and applied for the protection and sustainable management of natural forest resources in pilot areas in China would

[1]The ICR follows the PDO statement of the Project Appraisal Document. The PDO statement in the Loan Agreement is worded slightly differently but this does not constitute any material difference.

provide models for wider replication under the NFPP. The PDO was to be achieved through three components: (1) Natural Forest Management (EUR16.9 million, EU-financed); (2) Protected Area Management (US$16 million, GEF-financed); and (c) Plantation Establishment (US$93.9 million, IBRD-financed).

The Project's Key Performance Indicators were: (a) 6 natural forest management areas under effective management; (b) 13 nature reserves management improved by 1.5 points by end of Project; (c) Project generates 13.3 million m^3 of timber and 2.73 million metric tons of bamboo by December 31, 2025, and CNY 1.1 billion net income from tree crop production by December 31, 2022; and (d) 6,900 villages benefiting from participation in Project activities by end of February 28, 2009. Key Performance Indicators by component are listed in Table 1.

Table 1 – Key Output Indicators by Component

NFM component	***PAM component***	***PE component***
6 natural forest management plans developed and approved by December 31, 2005.	13 technically sound and participatory Natural Reserve Management Plans developed and adopted by SFA and relevant provincial authorities in the first 2 years of implementation.	115,100 ha of commercial wood plantations established by 31 December 2008.
59 village co-management contracts signed by December 31, 2006.	26 Community Reserve Management Plans adopted by local communities and NRs and approved by county governments in the first 2 years of implementation.	57,900 ha of economic tree crops established by 31 December 2008.
6 county training plans approved by December 31, 2003.	1491 person time training carried out at nature reserve-level.	666,900 households participating in commercial wood, economic tree crop plantations and thinning by 31 December 2008.
3,500 personnel trained by December 31, 2005.	147 person time for OWPP level, and 694 person time for local community level by December 31, 2008.	61,300 ha of pre-commercial thinning demonstrated by 31 December 2008.
59 Participatory Village Development Plans developed and agreed upon by June 30, 2004 and implemented by December 31, 2008.		265 million seedlings of improved planting stock developed by 31 December 2008.
15,000 villagers trained by December 31, 2005.		60,670 county and provincial staff time and 1.33 million farmer time training by 31 December 2008.
5,700 households receiving first project loan by December 31, 2008.		Small scale infrastructure valued at US$2.19 million built by 31 December 2008.

1.3 Original Global Environment Objectives and Key Indicators

The Global Environment Objective (GEO) was to *foster improved conservation and sustainable management of biodiversity in remaining natural forest areas by ensuring effective in situ protection of threatened and globally important forest habitats and rare and endemic species*. Indicators included: (a) over 1 million hectares of important biodiversity areas brought under improved management; (b) substantial involvement and participation of local communities in nature reserve management planning and implementation; (c) reduction of community reliance on forest resources inside biodiversity important zones; and (d) increase in local government's capacity to supervise, monitor, and implement conservation and sustainable resource use activities.

1.4 Revised PDO and Key Indicators, and reasons/justification

The PDO and indicators as approved remained unchanged.

1.5 Revised GEO and Key Indicators, and reasons/justification

The GEO and indicators as approved remained unchanged.

1.6 Main Beneficiaries,

At appraisal, the total number of beneficiaries was estimated to include 687,500 households or approximately 2.75 million individuals. The beneficiary groups included a large share of women and ethnic minorities. Of the 55 recognized ethnic minority groups a total of 18 resided in Project counties and sites. Project activities and benefits were to accrue to collective forest farms and local communities with social and economic dependency on natural resource extraction.

Approximately 29,000 beneficiaries were to benefit from the *NFM component* of which most were dependent on forest resources and belonged to ethnic minorities. Under the *PAM component*, support was to be provided to 13 nature reserves of international biodiversity significance located in Sichuan (5 sites), Hunan (2 sites) and Hainan (1 site). Under the *PE component*, primary beneficiaries were estimated to comprise 666,900 small farmers and displaced forestry workers in either single households, groups of small households with shareholding arrangements, and those in collective farms. These were to benefit from on-farm employment and loans to create new plantations, economic tree crops and small primary processing facilities. Training was also to be provided to improve the quality and sustainable productivity of planted areas through best practice, and to upgrade both post-harvesting facilities and marketing arrangements. Secondary beneficiaries were staff of the provincial, county and township forestry departments, which were to benefit from training and exposure to best forestry practice/innovation.

1.7 Original Components

The Sustainable Forestry Development Project was designed along three complementary components.

The *NFM component* would support the development and dissemination of new sustainable management techniques in natural forest areas protected under the NFPP and community development and livelihood enhancement activities targeting selected rural communities. The component would be implemented in Hainan, Hunan, and Sichuan Province, covering six pilot counties with approximately 203,000 hectares of natural forest representing major ecological forests types in the respective provinces.

It originally included sub-components on: (a) *natural forest management*, including the development of forest management plans through resource assessment, zoning, and forest classification; yield regulation and control; policy studies relating to opportunities for forest ecological benefit compensation systems, marketing, and market intelligence systems; implementation of forest management plan through demonstrations, non-timber forest products domestication, establishment of yield plots to model growth and yield and assessment of biodiversity change; and monitoring and evaluation; (b) c*ommunity development*, including small household loans, household training, implementation of small village infrastructure based on village development plans developed by the Project communities and associated technical studies (e.g., rural energy, animal grazing, and so on); (c) *training and dissemination* directed at forest administration staff and the broader public; and (d) *forest management training* to employees and vocational training to laid-off workers of State Forest Enterprises in the Project areas to upgrade their skills and assist efforts to find alternative employment.

The *PAM component* would support conservation and improved management of biodiversity of global importance in selected, high priority nature reserves. The component was to be implemented in Gansu, Sichuan, Hubei, Yunnan, Guizhou and Hainan, covering 13 national and provincial nature reserves with globally important biodiversity.

Sub-components would include: (a) *participatory nature reserve planning and management* (GEF US$5.4 million), including management plan development and implementation, ecological baseline mapping, strengthening of field-level management, targeted applied research, and biodiversity surveys of Western Sichuan; (b) *community-based nature conservation* (GEF US$5.1 million) including co-management activities that link biodiversity conservation with sustainable income generation, energy conservation demonstration, wildlife management to reduce damage to local community livelihoods, community conservation education and awareness, and delivery of sustainable alternatives and enhancement of community skills; (c) *training and capacity building* (GEF US$2.1 million) to strengthen institutions responsible for biodiversity conservation and management at the provincial and nature reserve levels; and (d) *project*

management, monitoring and evaluation (GEF US$3.4 million), including training in support of Project implementation, policy studies, and monitoring and evaluation.

The *PE component*, the largest investment component, would support the production of wood to meet the growing gap between domestic supply and demand, generate new employment and income for forestry farms and rural households and improve environmental management. The component covered 107 counties in 10 provinces, these being key NFPP provinces were the potential for plantation forestry and economic tree crops was greatest, and where institutional capacity was adequate because of previous experience in Bank-financed forestry projects. Participating provinces included Sichuan, Hunan, Henan, Shanxi, Hebei, Hubei, Anhui, Shandong, Liaoning, and Gansu. Hainan province withdrew from the plantation program during preparation.

The *PE component* included the following sub-components:

(a) Establishment of timber plantations (US$48.71 million) to reduce pressure on natural forests by increasing wood supplies from sustainable plantations. Specifically, the sub-component would finance the establishment of 115,100 ha of new plantations; create new standards for sustainable plantation forestry; provide models of best practice; raise plantation productivity by adopting optimal management regimes; promote the use of genetically superior planting stock, raise rural incomes; and improve prospects for sustainability through best environmental practice.

(b) Establishment of economic tree crops **(**US$63.95 million) to provide alternative incomes for retrenched workers and farmers and to diversify the rural economy by establishing 57,900 ha of horticultural crops, including apple, apricot, pear, plum, pomegranate, prickly ash, Chinese date, grape, chestnut, walnut, and tea based on farmer preference, proven performance, market demand, and site suitability. Large areas of monocultures were discouraged to favor biodiversity, reduce pest outbreak, and avoid supply gluts.

(c) *Pre-commercial thinning* (US$13.33 million) to improve quality and health of 61,300 ha of existing 8-10 year old plantations which had not been thinned because of low returns and a lack of farmer know-how. This included both farmer and state forest enterprise plantations with the purpose to demonstrate best practice, and provide information on optimum thinning intensity. Main species included were Chinese Fir (*Cunninghamia lanceolata*), Bamboo, Masson Pine (*Pinus massoniana*), Poplar (*Populus spec*.), Slash pine (*P. elliottii*), Loblolly Pine (*P. contorta*), and Larch (*Larix* spec).

(d) *Technical Support Services* (US$60.80 million) to enhance sustainability, raise productivity, and improve environmental protection by strengthening technical support programs for afforestation and horticulture. Activities to be financed under this sub-component included:

(i) Planting Stock Development to raise nursery and plantation productivity through the use of genetically superior planting stock and the adoption of advanced

nursery practice. Support was provided to existing and new nurseries belonging to both collective and state forest farm nurseries. Sixty four nurseries were provided for, and 265 million genetically superior seedlings were to be produced. Nurseries were also to be used to train government staff and farmers in best silvicultural and environmental practice. The Project funded nursery infrastructure, seedling production, and training.

(ii) Training and Extension, using existing forestry and agriculture extension networks to disseminate project experience, promote best silvicultural practice, and strengthen environmental safeguards.

(iii) Rural Infrastructure for both township and village levels including: the construction of forest trails, sheds, wells, and access paths; and the provision of small sub loans for post-harvest treatment, transport and, in the last two years of the project, marketing of horticulture crops.

(iv) Monitoring and Evaluation to be carried out by the PMC and provincial and county PMOs. Monitoring and reporting procedures were put in place to track physical progress, assess quality and confirm compliance with environmental and social safeguards, such as pest incidence, pesticide use, site selection and participation.

1.8 Revised Components

The *NFM component* was implemented by the EU under a separate implementation arrangement through the SFA's Natural Forest Protection Center and was not under the supervision responsibility of the World Bank. The specific rationale for these separate supervision arrangements are not documented in World Bank Aide Memoires. The *NFM component* was extended by two years in 2008 to account for long start-up delays of implementation. For a further discussion see Annexes 2 and 8.

At the request of Government, the *PAM component* was extended by one year from its original closing date of August 31, 2009 to August 31, 2010. The purpose of this extension was to accommodate for unexpected implementation delays caused by the May 2008 earthquake that affected all Project-supported nature reserves in Sichuan and Gansu provinces. A reallocation of GEF grant proceeds between disbursement categories took place with the purpose to reallocate some savings and provide some additional support to those earthquake-affected reserves that had lost building infrastructure and equipment.

Some minor changes under the *PE component* included the following: an even more positive attitude of farmers towards timber plantations resulted from the introduction of longer term (70 years) tenure for forest land; a sharp rise in wood prices; and the higher risks which farmers associated with economic tree crops. To cater to this change in preference, the MTR decreased targets for economic tree crops from 57,938 ha to 42,000 ha, and increased targets for timber plantations from 115,100 ha to 135,100 ha, and pre-commercial thinning from 61,300 ha to 82,850 ha along with reallocations of funds from sub-component 2 to sub-component 1. Sub-component 1 also benefited from funds being switched from the purchase of goods and vehicles, marketing infrastructure, nursery development, study tours and technical assistance.

1.9 Other significant changes

No other significant changes were made to the Project.

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design and Quality at Entry

Preparation took three years, but this is not considered excessive given the size, complexity and coverage of the Project. Preparation also took place when the Bank was updating its policy for forestry (approved in 2002), and when Bank forestry projects were coming under intense scrutiny both inside and outside the Bank. An Environmental Category A rating also meant that a full Environmental and Social Impact Assessment (ESIA) was needed, and an initially differing opinion between the World Bank and the Government over the appropriate environmental rating of the Project took time to resolve and temporarily delayed negotiations. The Project background analysis, however, was sound, the sector issues were clearly identified, institutional absorptive capacity was correctly assessed, lessons learned from previous Bank project were taken into account, and the ESIA was detailed and thorough.

Design of the Project was sound in that it supported the implementation of the NFPP through a comprehensive sector approach by: (a) creating viable and sustainable supplies of wood products to relieve pressure on native forests; (b) providing alternative incomes through diversification into timber plantations and economic tree crops; (c) developing and piloting models for the commercial sustainable forest management of natural forest resources; and (d) improving management capacity and in-situ conservation in key forest biodiversity areas through best practice. The Project was also careful to focus in areas where the need was greatest, where markets existed and where conditions were favorable for timber plantations and economic tree crops. The subcomponents chosen under each component to achieve the PDO were effective in that they provided the appropriate blend of interventions and safeguards.

Government commitment and the capacity of implementing agencies were correctly assessed, and a strong sense of ownership was fostered by adopting a community based approach. Ownership was further strengthened by having a Project Leading Group at the county level, and by having the County Forestry Bureaus, Townships and farmers responsible for implementation. Project launch workshops and staff training in procurement also facilitated implementation.

The Project was designed as an integrated project to promote natural forest management, biodiversity conservation, and timber resource development. It had a single overarching PDO and M&E framework described in the PAD. The Project involved three financiers, IBRD, GEF, and the EU, each of which financed one component of the Project. As envisaged at appraisal, the EU financed Component 1-Natural Forest Management in its entirety with a total grant contribution of EUR16.9 million, which was provided in form of parallel financing.

One weakness in the Project's design was that due to this parallel financing arrangement, the *NFM component* was conceived and implemented as a free-standing project, titled '*EU-China Natural Forest Management Project (NFMP)*', separate from the main Project. This arrangement and the implementation of the *NFM component* through the SFA's Natural Forest Protection Center resulted in different supervision arrangements and modalities between the Bank-supervised and EU-financed components and precluded the effective coordination and exchange between components during implementation and completion. A second weakness detected in the design was the choice of some of the impact indicators. Indicators, which cannot be measured before the years 2022 and 2025, are of limited usefulness, as is the use of monetary values so far in the future.

The risk analysis was thorough. Only two risks identified during preparation proved to be real, that is, a possible shortage of counterpart funds, and an over-supply of economic tree products (fruits etc). Both events occurred, but flexibility in design was able to cater for this, and neither had a deleterious effect on the project.

The QAG did not carry out a Quality at Entry, but the Project was subject to a rigorous review which helped ensure quality at entry. The absence of any significant structural changes in the Project and its overall good performance is evidence of this.

2.2 Implementation

Very few problems were encountered during implementation of the PAM and PE components, with supervision missions having rated the Project as Satisfactory throughout. Only two minor problems emerged, one being that Bank procurement procedures (bidding) delayed fertilizer purchases which caused some start-up delays, and, in 2006, some poorer counties (mainly in Sichuan Province) had difficulties mobilizing counterpart funds. The logging ban imposed by the NFPP deprived many poor counties of revenue, and this may explain why some (especially those in Sichuan) had difficulties in meeting their counterpart commitments in 2006. However, these problems were addressed promptly and had no lasting effect on progress and performance of the implementation.

The global economic boom from the late 1990s to 2008, and high rates of economic growth in China favored implementation of the project, specifically the PE component. Wages and purchasing power increased, the demand for wood increased and this stimulated farmer interest in tree planting, and helped ensure that sufficient counterpart funds were, in most cases, available on time. The impact of urban migration is difficult to assess, on the one hand it exerted an upward pressure on wages in some areas, but it has also been said (anecdotal) that farmers turned to tree planting as a way of securing possession of their land in their absence.

The Forest Tenure Reform Program whereby farmers could obtain a 70 year lease over their land had a positive influence. It provided security of tenure and encouraged longer-term investments such as tree planting. The abolition of the Agricultural Tax served as an incentive to invest in plantations and tree crops. The policy framework (NFPP) was

favorable in that it restricted wood supplies from native forests and this stimulated demand for plantation produce.

2.3 Monitoring and Evaluation (M&E) Design, Implementation and Utilization:

Under the *PE component*, the PMC, the PMOs and County Forestry Bureaus were responsible for M&E. Under the PAM component similar M&E arrangements were in place with the PMC taking overall responsibility and local PMOs and nature reserves being in charge of day-to-day M&E. M&E arrangements under the NFM component were not subject to Bank supervision.

The PAD identified clear parameters to be measured for both components. The main tasks undertaken were: (a) tracking the progress and quality of implementation, (b) checking the quality of newly planted and thinned areas, (c) monitoring environmental (control of pests and diseases) and social impacts and benefits (number of participating households, impact on income and assessment of benefits), (d) financial controls, and (e) case studies and research. The key monitoring indicators in the PAD were used to help in this regard.

The M&E system worked effectively, with the PMC preparing detailed, high quality and timely accounts of progress for supervision missions and the ICR mission. In some cases, the PMOs identified sub-standard field operations under the PE component which did not qualify for reimbursement, and instructed county staff and farmers to take the necessary remedial action. The environmental aspects of pest and disease management received special attention under the Pest Management Plan to ensure that Integrated Pest Management was being used in place of chemicals. Financial control was satisfactory, PMC and provincial PMOs were able to explain or rectify any discrepancies highlighted during supervision.

The M&E system also included a score card to monitor effectiveness of project areas management effectiveness that was used at different stages of implementation. A detailed biodiversity monitoring system of key species in nature reserves was developed and put in place and provided M&E information on key species. However, such a system to measure biodiversity trends will only develop to its full usefulness over longer periods of time, as trends in biodiversity are medium to long-term in nature.

An area which might have been strengthened is farmer and community feedback on project interventions. While there is much anecdotal evidence on farmer and community attitudes, a more statistically valid and better structured approach to recording attitudes would have been desirable under both the PE and PAM components. Similarly, no systematic approach was put in place to monitor annual price fluctuations for economic tree crop products, so it is difficult to say what impact this sub-component had on prices.

2.4 Safeguard and Fiduciary Compliance

The Project complied with the Bank's safeguards and fiduciary requirements, and Bank staff worked closely with the PMC during supervision to ensure that there were no deviations. The main safeguard and fiduciary issues were as follows:

(a) Environmental Assessment (OP4.01). A full ESIA, including a Social Assessment, was carried out by international and national consultants during preparation. The main risk identified was possible disturbance to local habitats during site clearing and tree planting. Environmental Protection Guidelines were followed and supplementary site screening measures were included.
(b) Natural Habitats (OP4.04). No conversion of natural habitats took place and the project was in full compliance.
(c) Forestry (OP 4.36) was fully complied with. There were no interventions of the plantation program in native forests, the intention being to relieve pressure on these. Rigorous site selection for plantation establishment as laid out in the Environmental Management Plan ensured that plantations did not impair either ecology or biodiversity or triggered the conversion of natural forests.
(d) Pest Management (OP4.09). Risks from pests existed and control measures were envisaged. A Pest Management Plan was prepared which stipulated the use of Integrated Pest Management and biological control as the preferred method of control, with chemicals being used a last resort. Training of farmers and staff on low intensity chemical application was also provided for. These measures helped reduce chemical control to only 50% of outbreaks.
(e) Cultural Property (OP11.03). No risks were foreseen, and no incidents occurred, but site screening measures were in place to cater for this.
(f) Indigenous Peoples (OD4.20). No indigenous people participated in the PE component but an Ethnic Minorities Development Plan, applicable to the PE and PAM components was prepared as a safeguard.
(g) Involuntary Resettlement (OP4.12). This did not occur, but a Policy Framework for Resettlement and Land Acquisition, and a Process Framework for Mitigating Potential Adverse Livelihood Impacts were prepared.
(h) Fiduciary Safeguards. Financial management was satisfactory throughout implementation, with Project staff having gained the necessary experience through previously financed Bank forestry projects. A procurement assessment carried out during preparation concluded that the organization, structure, skills and control systems at central and provincial levels were adequate. At county level, staff were provided with the necessary training to fill any skills gaps. No significant fiduciary issues arose during implementation.

2.5 Post-Completion Operation/Next Phase

Under the PAM component, major capacity building investments were undertaken with GEF and Government funds during the initial years of implementation. Sufficient recurrent and investment government budgetary sources are available to cover the continuation and even expansion of management planning and implementation in national and provincial-level nature reserves.

For the PE component, full cost recovery in form of on-lending to beneficiaries and repayment responsibility was prescribed to ensure sustainability of the investments and implementation supervision responsibility was devolved to local institutions. Over-dependence on Bank financing was avoided by having the counterpart contribution set at

50 percent. Provinces, counties, nature reserve administrations, and farmers were to assume responsibility for Project activities after closure, and Project design ensured that maintenance obligations would be small and diminishing at that time. Only 37,800 ha of timber plantations were to be established under the PE component in the last two years of implementation, so that only these would require tending in the 3 years following Project closure. Thereafter, tree crops would be beyond the tending stage. The budgetary impact of maintenance was therefore to be low and within the capacity of counties (mainly extension) and farmers to manage. Similarly, most economic tree crops were to be productive and self sustaining by the time of Project closure.

3. Assessment of Outcomes

3.1 Relevance of Objectives, Design and Implementation

The PDO was highly relevant to the sector's needs at both appraisal and Project closure. It was strongly supportive of the government's policies, including the NFPP, collective forest tenure reform, and abolition of agricultural taxes to promote rural development. It was also consistent with the CAS and with the then (1989) Bank's policy on forestry, and the updated policy of 2003. In addition, it was supportive of the global and national objectives of management of high-value biodiversity resources inside and outside of protected areas, and of poverty alleviation initiatives by generating alternative employment and income opportunities in rural areas.

The design of the PAM component built on the GEF-financed Nature Reserves Management Project (1995-2002) and proved to be effective in improving management capacity of key nature reserves and community involvement in reserve management as well as in strengthening overall institutional capacity in reserve management.

The NFM component was a highly innovative component in the area of sustainable natural forest management previously not part of GEF or Bank-financed projects.

The design of the PE component built on the Bank's substantial previous involvement in plantation forestry. It was responsive to farmers' preferences and proved effective in increasing areas under timber plantations and tree crops in priority areas with high potential. It was also effective in providing alternative incomes to displaced forestry workers in rural areas, and in raising productivity and profitability of plantations and tree crops through the adoption of advanced technology, training, and the promotion of best practice. It enhanced sustainability of plantation management through adherence to the Environmental Protection Guidelines, improved site selection criteria, better land preparation and the application of the Pest Management Plan. The design also served effectively to strengthen local level institutions, foster local ownership, encourage participation and strengthen farmer and community involvement in sustainable forestry, horticulture and biodiversity conservation.

Implementation arrangements proved robust and stable, with chains of command being clear and effective, and lines of communication good. National and provincial level

institutions proved effective at financial management and monitoring, and having counties, townships, and local forestry institutions and farmers responsible for implementation created a strong sense of involvement and local ownership, and improved prospects for sustainability.

3.2 Achievement of Project Development Objectives and Global Environment Objectives

The PDO and GEO were achieved. The SFDP developed viable and participatory models for forest resource management that were adopted in project sites. Overall rating of PDO and GEO achievement is satisfactory.

For 13 nature reserves, covering more than 1,000,000 hectares, the project introduced systematic nature reserve management planning and prioritization of investments in protected areas, which resulted in measurable improvements in reserve management capacity (based on scorecards using the World Commission on Protected Areas Framework). Reserve management plans were developed, approved, and implemented for all nature reserves. The project involved communities through participatory community resources management plans (all 26 community reserve management plans were developed and adopted) that helped to demonstrate alternative income sources for resource dependent communities. It built stronger capacity of local governments' to implement biodiversity conservation as demonstrated by the continuation and expansion of management planning across nature reserves originally not included in the project. Finally, more than 24,800 person time training were implemented at nature reserve, community and local government levels.

While direct human pressure on nature reserves may have been reduced during implementation, it is not possible to assess long-term reduction of such pressure and, if occurring, this may be more driven by demographic changes and out-migration rather than direct Project interventions. Systems for in-situ monitoring of key biodiversity resources have been put in place and M&E results on key threatened species is being made available.

The project was also highly successful in forest resources development and management under the PE component. Tree planting targets were exceeded by 75%, whereas areas tended and thinned surpassed targets by 40%. The production of improved seedlings (97% classified as Grade 1) exceeded targets by 47%, household participation exceeded targets by 5%, and the number of farmer training courses delivered exceeded targets by 21%.

Newly planted areas, which have incorporated improved technology, will produce around 29 million m^3 of additional wood and 3.9 million tons of bamboo. The project generated around 65 million person-days of new employment and improved income opportunities (RMB 6.6 Billion) in forestry farms and rural households. The rigorous application of Environmental Protection Guidelines, site screening, IPM, and PMPs greatly improved environmental management. Prospects for sustainability look promising for the following reasons: (a) component activities have been main-streamed into county level operations; (b) institutional capacity has been strengthened at all levels; (c) a Post-Project

Management Plan has been prepared; (d) the component shows a highly positive ERR and IRR (with all crops established and thinned showing positive IRRs); and (e) the demand outlook for products being produced under the component look favorable. Detailed outputs are discussed in Annex 2.

In the field of natural forest management (NFM component), four strategic management plans were prepared; 57 Village Development Plans were prepared and implemented; over 3,200 households benefited from micro-loans; and a substantial amount of training in forest management, community development and micro-finance was implemented. Detailed outputs are discussed in Annex 2.

3.3 Efficiency

China's low wage rates (RMB15-30 per day at the time of appraisal) made it very competitive in plantation forestry and tree crops. Growth rates of bamboo and poplar are also high, whereas those for slash pine and masson pine are good-to-moderate. Establishment costs in most developing countries vary between U$1,000 and U$1,500/ha, whereas in China they average U$600/ha.

Economic benefits were quantified for the PE component. Total component cost was US$196 million. If one were to charge this entire amount to sub-component 1, Timber Plantations, the cost would be U$$975/ha of plantation established, well below international norms. If one includes economic tree crops, then the cost falls to U$806/ha. Given that wood products are very sensitive to transport costs and that fruits are highly susceptible to post-harvest degradation, locally produced goods should prove very competitive in domestic markets.

Thirty nine crop models were used to determine an ERR and IRR, the evaluation results by Subcomponent (weighted by main species) planted, and individually for the main species planted are shown below. The ERR and IRR for the PE component as a whole are slightly above those forecast at appraisal. The ERR and IRR for Timber plantations and Pre Commercial Thinning compare favorably with appraisal, but for economic tree crops they are substantially higher, possibly due to the impact of soaring food prices after 2006.

Table 2: Component ERR and IRR Estimate %

	Appraisal	ICR
ERR	25	28
IRR	22	24

Table 3: Subcomponent ERR and IRR % (weighted by areas planted)

	Appraisal		ICR	
	ERR	IRR	ERR	IRR
Timber Plantations	30	24	27	23
Economic Tree Crops	26	14	37	35

Thinning	22	19	26	21

It should be noted that the labor rate used in these calculations is 15 RMB per day, which is representative for remote rural areas. However, in other areas substantially higher rates apply, and rates of return in such areas would be lower.

Table 4: IRR and ERR For Main Species Planted

Species	% Planted	IRR%	ERR%
Poplar	66	23	27
Bamboo	18	24	28
Slash Pine	5	15	17
Jujube	16	39	40
Peach	15	39	43
Pear	14	47	49
Apricot	13	27	28
Chestnut	8	11	13

In addition to economic and financial benefits, benefits would accrue to reduced pressure on natural forest, poverty alleviation, and strengthened institutions.

3.4 Justification of Overall Outcome and Global Environment Outcome Rating

Rating: Satisfactory

The overall outcome and Global Environment Outcome are considered satisfactory. This rating is based on the fact that the project achieved its PDO and GEO, exceeded most of its planned outputs within budget, showed better-than-predicted returns for the economic components, fully disbursed loan and grant funds, and appears to be sustainable in its interventions. The rating is further justified by the fact that the objectives of the project remain as relevant today as they were at time of preparation, prospects for sustainability look promising, and the project generated social and environmental benefits additional to those anticipated at time of appraisal.

The rating of this project is not considered highly satisfactory despite the numerous significant achievements of the project because of some implementation shortcomings in the NFM component. Particularly, the formal introduction of forest management plans as well as community co-management contracts for natural forest areas, which both were new and unknown approaches at the time of design of the project, did not materialize to the extent originally envisaged and formal approval of such new approaches by the Chinese authorities was too ambitious and could not be achieved as stated in the project indicators.

3.5 Overarching Themes, Other Outcomes and Impacts

Increased Plantation Wood Output and Reduced Pressure on Native Forests. Having established an additional 201,700 ha of plantations capable of producing 29 million m^3 of timber and 3.9 million tons of bamboo, pressure on native forests (which would require around 1 million ha to produce the same quantity), and its associated biodiversity will be much reduced. Soil erosion risks will also be reduced, as will flooding.

Alternative Incomes for Displaced Workers. Most plantation tree crops show high FRRs, with the principal species planted, poplar (66% of total), Bamboo (18%) and Slash Pine (5%) showing IRRs of around 23%, 24% and 15%, respectively. The main Economic Tree Crops also show attractive rates of return with Jujube (16% of total), Peach (15%), and Pear (14%) showing IRRs of 39%, 39% and 47% respectively. Such returns should greatly improve alternative income generation potential in rural areas where under-employment is high and wages rates low. In some poorer rural areas in Gansu Province, case studies show that the project was able to more than double per capita income from RMB 1,003 (c. US$150) per year to RMB 2,159. Some 263,800 people were also provided with employment through the component and some RMB989 million (U$145 million) was spent on labor.

*Environmental Management and Sustainability***.** Environmental management was improved through adherence to Environmental Protection Guidelines for plantations. It was further strengthened by the implementation of the IPM which reduced chemical use (during implementation chemical usage was confined to about 50 percent of pest outbreaks). Site screening prior to planting helped to safeguard habitats and biodiversity. Low impact site preparation, road construction, and harvesting reduced soil disturbance. A case study in Majiadong, Hubei Province demonstrated that the application of improved management practice in bamboo plantations was able to reduce sediment loads in streams by 35%. If this gain were to be realized over the entire area planted, some 730,000 tons of soil loss could be prevented.

Increasing Plantation Productivity and Promoting Best Practice. The use of improved seed and the promotion of best practice at nursery and field levels raised the productivity of tree plantations and economic tree crops. It also helped improve land productivity which is an important consideration in China where pressure on land is intense. Experience in other countries has shown that these measures can result in a 20% gain in productivity.

*Improved Wood Quality***.** Thinning 86,228 hectares of existing plantations and training farmers and staff in best practice improved the quality and value of existing plantations by removing poor quality trees and by concentrating growth on the better quality, final crop trees. This should greatly increase the quality and value of the latter.

*Institutional Change/ Strengthening***.** Substantial investment in the training of farmers and staff of implementing agencies resulted in efficiency gains, while the involvement of county and local level institutions in implementation has improved prospects for sustainability.

Impacts on Biodiversity Conservation and Reserves Management. With combined project investments in both conservation-related and community development activities, the relationship between protected area administrations and neighboring communities improved significantly, and local partnerships for biodiversity conservation and management developed in the form of community patrols and biodiversity monitoring and reporting. Detailed ecological surveys and baseline mapping have been implemented and this data is now managed in the form of Geographical Information Systems for administration and government decision making. These systems are expected to support more focused and effective conservation activities and protection of species and habitats through identification of hotspots and priority sites.

Demonstration impact of GEF-funded activities. The reserves supported by the project are playing an important demonstration role for improving nature reserves management across China. Reserve management and participatory community resources management planning procedures have been standardized, and state-of-the-art training materials for reserve management, law enforcement and applied research, and a participation and community management are now available and are being applied by SFA across the country.

Other Unintended Outcomes and Impacts (positive or negative)

Social and environmental benefits. Through the plantation development, the project provided employment opportunity for about 263,800 people in the project areas. The average income of labor has increased by RMB3,800. The project also generated environmental benefits, which increased vegetation coverage in the project areas has increased by 1.4% on average. In 2013, carbon sequestration of plantation would reach to its maximum value when 9.201 million tons of CO2 is fixed, which would contribute actively to improving ecological environment of project areas and coping with global climate change.

Other benefits include the human resource strengthening and knowledge and skill improvement. The project provided a very large training program for the project management staff and the farmers in the project areas. In total, about 1.5 million people attended the training courses (total about 10,000) in various topics (e.g., plantation management and improvement, thinning technique, pest management) and technical assistance through the forest extension system. This is the foundation for plantation sustainable development for the farmers, who have learned the new techniques for managing tree plantation and would apply them in the production practice, especially after the project completion.

Climate Change. While not included in the DO, the PE component will sequester a significant amount of carbon dioxide. Using a mean annual increment of 15m/ha/year for the 201,700 ha planted, and a figure of 1.83 tons of carbon sequestered per m3 of wood produced, around 5.5 million tons of carbon will be sequestered each year over tree crop rotations of between 8 and 30 years. With a market value of U$5.00 per ton, this could generate additional financial benefits of around U$25 million per year.

Poverty Alleviation. Forty of the 109 counties included in the component were regarded as impoverished, with poverty being most severe in remote rural areas. By providing employment and income generating opportunities, the component was able to help address this issue. The component created the equivalent of 263,800 jobs, and through credit, assisted rural people to produce wood and economic tree crop products such as fruits which could double their income. The multiplier effect of this could be considerable.

4. Assessment of Risk to Development Outcome and Global Environment Outcome

Rating: *Low*

The only risks foreseen were: (a) additional output from economic tree crops could create oversupply situations and this could cause price collapses; (b) pest and disease attacks could increase in large areas of monocultures, such as poplar and fruit trees; (c) fire could damage plantations; (d) counties might not be able to fund plantation maintenance; and (e) farmers may not be able to repay loans.

On the first, a mixture of economic tree crops has been planted by farmers to reduce the risk of supply gluts, and market surveys preceded the planting of new economic crops of over 1000 ha at provincial level. This, together with increased purchasing power in rural areas, should reduce risks somewhat, but the risk of periodic supply gluts still exists. On the second, at least three clones of poplar, and mixed stands of tree crops have been used to mitigate the risk of disease. Routine pest monitoring by County Forestry Bureaus and the State Forestry Administration under their Post Project Management Plan should also help mitigate this risk. So far losses from pests and diseases have been low, at around 5%. Fire is an ever present risk, but adequate fire protection, detection and suppression measures are in place to combat this risk, and these will be strengthened under the Post Project Management Plan. Losses have been very low during project implementation. To mitigate against a possible shortage of county funds for crop tending after project closure, areas planted in the last two years of the project were kept low, so tending requirements will be limited, and disappear altogether three years after closure. Finally, previous experience shows that the risk of farmers defaulting on loan repayments is low, and it is only in cases of genuine hardship, like bad weather, that they have difficulty in repaying; in such cases the loan repayment period can be extended.

5. Assessment of Bank and Borrower Performance

5.1 Bank Performance

(a) Bank Performance in Ensuring Quality at Entry

Rating: Satisfactory

Preparation took 3 years, which is reasonable for such a large, complex and potentially controversial forestry project with a Category A Rating for environmental issues.

Despite its complexity, the proposal was well prepared and rigorously reviewed. The PDO and design of the component were appropriate, safeguard policies were meticulously formulated and applied; lessons learned from previous projects were incorporated, cost estimates were accurate, institutional arrangements proved robust; environmental, social and sustainability issues were well covered, and no major weaknesses emerged. Minor shortcomings include the use of impact indicators which can only be verified over the long term.

(b) Quality of Supervision

Rating: Satisfactory

The Project was regularly supervised, and when issues emerged, such as the late arrival of counterpart funds, slow reimbursements, and the need to reassign funds from infrastructure to tree planting, prompt remedial action was taken by Bank staff. Good long-term working relations between Bank staff and the Borrower and continuity of task team members during the supervision period also helped ensure that implementation went smoothly. A more frequent and close interaction between the Bank and the EU during supervision may have helped to strengthen the link between the three project components but such coordination was partly outside of the control of the Bank because the EU-funded component was implemented by a different department in SFA, which with the Bank had no formal interaction.

(c) Justification of Rating for Overall Bank Performance

Rating*:* Satisfactory

The SFDP was relevant to country needs, supportive of Bank and Country policies and strategies, and contained all the necessary safeguards. PDO, component objectives and outputs were realistic and preparation was sufficiently detailed. Supervision was timely, with the necessary corrective measures being identified and followed upon.

5.2 Borrower Performance

(a) Government Performance

Rating: Highly Satisfactory

The PMC of the SFA at the national level showed diligence and commitment to the Project throughout. The PMC was proactive in management, kept implementation on-track, attended to issues promptly, and contributed greatly to the component's success. It carefully and comprehensively monitored progress, compliance with safeguards and quality, and submitted the necessary reports on time. To ensure sustainability, it initiated the preparation of a Post Project Management Plan.

(b) Implementing Agency or Agencies Performance

Rating: Highly Satisfactory

The PMOs at provincial, county, and nature reserve level worked tirelessly to ensure that the Project succeeded. Even though a few counties were late in providing counterpart funds in 2006, most component targets were met/exceeded on time, the quality of work was good and reporting was satisfactory. Supervision missions rated implementation of the PE and PAM components as satisfactory throughout.

(c) Justification of Rating for Overall Borrower Performance

Rating: Highly Satisfactory

Borrower performance is rated as Highly Satisfactory because: the PDO and component Dos were achieved; most of the measurable targets were exceeded; the quality of work was good; implementation was timely; sufficient counterpart funds (50%) were made available; safeguard measures and best practice were applied; fiduciary compliance was good; and a sustainability plan was put in place.

6. Lessons Learned

(both project-specific and of wide general application)

The main lessons learned are:

(a) security of forest land tenure is an important pre requisite for investments in tree planting;
(b) large and complex Bank supported forestry projects can be successful when implemented by sound and disciplined institutions which have developed strong partnerships between national and local levels, and between local levels and beneficiaries;
(c) embedding projects in local level institutions fosters ownership (and success);
(d) a supportive policy framework facilitates successful implementation;
(e) despite the longer term pay-back from tree planting and the challenges that this poses for resource poor farmers, they will plant trees in preference to shorter term crops if markets for wood exist;
(f) prospects for success in forestry projects are enhanced when the Bank has had a long term involvement in the sector;
(g) appropriate training greatly assists smooth implementation;
(h) if local level institutions (counties) are expected to provide counterpart funds, their capacity to do so needs careful assessment;
(i) Bank procurement procedures (in this case for fertilizer) need to be looked at carefully to ensure that they do not cause implementation delays; and
(j) when farmers take credit, the possibility of providing debt relief to those stricken by severe weather or natural disasters needs to be considered.

7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners

(a) Borrower/implementing agencies

A summary of the borrower/recipient completion report is included in this ICR in Annex 7. The borrower/recipient has rated the design and implementation and outcomes as fully satisfactory.

(b) Cofinanciers

A summary of the EU's completion report is included in Annex 8.

Annex 1. Project Costs and Financing

(a) Project Cost by Component (in USD Million equivalent)

Sustainable Forestry Development Project - P064729			
Components	**Appraisal Estimate (USD millions)**	**Actual/Latest Estimate (USD millions)**	**Percentage of Appraisal**
NATURAL FOREST MANAGEMENT*	**20.00**	**22.00**	**110%**
PLANTATION ESTABLISHMENT	**93.00**	**92.30**	**99%**
PROTECTED AREAS MANAGEMENT**	**16.00**	**16.00**	**100%**
Total Baseline Cost			
Physical Contingencies	-	-	-
Price Contingencies	-	-	-
Total Project Costs			
PPF	-	-	-
Front-end fee IBRD	0.93	0.93	100%
Total Financing Required	**129.9**	**129.2**	99.5%

*The Natural Forest Management Component was financed by EU in parallel.
** The Protected Areas Management Component was financed by the GEF (P060029)

(b) Financing

P064729 - Sustainable Forestry Development Project				
Source of Funds	**Type of Financing**	**Appraisal Estimate (USD millions)**	**Actual/Latest Estimate (USD millions)**	**Percentage of Appraisal**
Borrower	Counterpart Funds	92.96	123.48	132%
European Commission	Grant	20.00	22.00	110%
International Bank for Reconstruction and Development	Loan	93.90	93.20	99%
P060029 - Sustainable Forestry Development Project (Natural Forest Protection)				
Source of Funds	**Type of Financing**	**Appraisal Estimate (USD millions)**	**Actual/Latest Estimate (USD millions)**	**Percentage of Appraisal**
Borrower		as above	as above	as above
Global Environment Facility (GEF)	Grant	16.00	16.00	100%

Annex 2. Outputs by Component

1. Natural Forest Management Component

The EU financed the NFM component in parallel and implemented the component in form of a separate project. This is reflected in its title '*EU-China Natural Forest Management Project (NFMP)*'. The overall thrust of the NFM component/project remained as originally designed by the Bank and only relatively minor revisions and specifications to the scope of sub-components and activities were made. The NFMP was implemented during 2003-2010, including a two-year extension by the Natural Forest Protection Center of SFA with direct implementation support through an external technical assistance team. Implementation arrangements were thus separate from those of the Bank/GEF-financed components, which were under implementation responsibility of the Project Management Center of SFA.

The NFMP aimed at developing improved sustainable management techniques in natural forest areas which were protected under the NFPP and with the intent to decrease rural communities' dependency on forests in the areas most affected by the NFPP restrictions. This partnership project was funded by a EUR16.9 million grant and a GoC contribution of EUR 6 million. The project was supplemented by an IBRD US$93.9 million loan for establishment of plantations and a US$16 million grant from the Global Environment Facility (GEF) for the management of protected areas.

NFMP was implemented over a period of seven years (2003-2010) by the NFPPC with the support of an EU technical assistance team (led by GTZ IS). It worked through three main components: (i) a natural forest management component for the testing of improved sustainable forest management techniques; (ii) a community development component for supporting rural communities in diversifying their livelihood base and replace traditional activities not longer possible because of the logging ban; and (iii) an information training and dissemination component for capacity building and dissemination activities in support of the other two components.

Fields activities were undertaken in Sichuan (Baoxing, Pingwu and Songpan counties), Hunan (Yanling and Yongshun counties), and Hainan (Changjiang county) covering 58 Administrative Villages (comprised of almost 300 Natural Villages), and six state forest enterprises or forest farms.

This summary report (provided by the EU) provides an insight of major achievements attaint in these three components.

Sub-component 1: Natural Forest Management (NFM)

The natural forest management activities were all directed towards increasing local capacity in forest management in the areas where the logging ban was active and towards

piloting new techniques to improve the quality of forest management planning, implementation and monitoring. The activities were implemented in natural forest areas outside nature reserves and outside the main areas of plantation forest. In this component the project piloted and demonstrated actions in the following areas:

Forest Management Planning. The project piloted actions to improve technical aspects of resource inventory and planning methodologies. The approach attempted to vertically integrate planning activities from broader "land-use" and "strategic" level plans to field level operational plans (township/village). Attempts were also made to introduce "ecosystem modeling" into this sequence–though this, in most respects, involved upgrading local capacities and technical inputs beyond a level that the project could effectively support. Using participatory methodologies, NFMP tested:

Forest Maps. As a first step for forest planning NFMP prepared forest maps for all 11 townships. The maps were based on interpretation of satellite images and their projection of existing topographic maps. The classification system used was very similar to the classification of the national forest inventory.

Multi-forest resource inventories (MRFI). MRFI were conducted for areas where the project intended to support the formulation of a plan. These inventories also included the identification and assessment of resources generally not tallied during traditional forest inventories, typically Non-Timber Forest Resources (such as medicinal plants, fodder, etc.). MRFI were produced with the participation of local stakeholders, like local government agencies and the villagers and showed therefore potential for transparency and conflict resolution in determining borders between state and collective forests. They also raised local awareness on the extent and type of the forest resources. NFMP completed and demonstrated the MRFI in 7 townships, developed an EDP program for data processing (FRIDAP) and a manual to guide the assessment process.

Demonstrations on eco-system modeling. Demonstrations on ecosystem modeling were completed in 11 townships to determine structures and dynamics of a given ecosystem for further planning procedures. A guide for ecosystem modeling was prepared and used to produce ecosystem modeling reports for each township. This experience represents a valuable input for the current Chinese forest management planning system where ecosystem modeling is not included and is lacking any guidelines for its implementation.

Land Use Plans (LUP). LUP aimed at zoning different types of ecological and commercial forests and represent a further step in the forest planning process. Land use strategy maps were prepared for 12 townships (available in a GIS data base). NFMP-LUPs represent a valuable test in the current forestry system. They were produced in a participatory manner and thus have the potential to be more accepted by local stakeholders than the LUPs carried out by the land management bureaus. A manual to guide this planning exercise was also prepared by the project.

Strategic Forest Management Plans (SFMP). SFMP represented the main planning document providing information of the forest resource base's potential and indicating the

strategy for different forest types and the silvicultural objectives. It was realized through participatory methodologies. It reflects a new approach in the Chinese forest management planning procedure mostly for this reason and also because considers the multiple services provided by the forest (timber, recreation, non timber forest products). The SFMP is based on information provided by MRFI, LUP and Eco-system Modeling. 4 SFMP were completed at the township level together with a planning manual.

Operational Participatory Village Management Plans (OVFMPs). The OVFMPs proposed by the NFMP intended to cover the area of an administrative village. OVFMP is an integrated plan defining silviculture treatments and harvestable amounts for forest management types on a per ha basis, which is then applied for individual forest user right owners lots. It is an integrated plan because incorporates not only the direct use of timber and firewood, but also NTFPs, the use of forest land as recreation area, touristic uses and grazing for domestic animals. The basis for the OVFMP is the SFMP, where the strategy for the different forest zones already was defined and the silvicultural objectives formulated for forest management types. OVFMPs gain particular importance in the framework of the ongoing collective forest reform, where the forest farmers are granted long term user rights of forest resources. In fact these plans have the potential to guarantee better protection of forest resources and at the same time generate income due to modern silviculture techniques. NFMP has developed 4 OVFMPs.

The plans produced by NFMP could not unfortunately received final official approval and could not be implemented as they not constitute legally recognized planning documents under the existing Chinese forest management planning framework. These key project outputs coupled with the project Manuals covering ecosystem modelling, land use planning, and strategic forest planning, form however a cohesive knowledge package to guide local and central forest planning officials in the application of advanced forest and forest resource planning approaches and techniques.

Silviculture Demonstrations (STDs). The project implemented several studies to provide and initiate management of selected forest types applying close to nature silviculture model approaches and techniques. It piloted 25 STDs with the intent of introducing techniques to obtain desired stand characteristics at the time of harvest and be then used in OVFMPs. STDs consisted primarily of release thinnings, stand improvement thinnings, fuel-wood thinning, and sanitation thinnings. Selective harvest cutting and enrichment planting were also supported by the project. 15 demonstrations of other natural forest management technologies were also implemented under STDs, like demonstration on bamboo management, grafting of walnut or chestnut, showing negative effects on grazing in forest vegetation or applications of border line survey with GPS. NFMP accomplished a manual and quite a number of comprehensive technical reports in the field of silviculture.

Evaluations of the Project’s STDs unfortunately revealed weaknesses in implementation particularly in proper "base-line" measurement of stand characteristics prior to treatment prescription and implementation and "post-project" systematic periodic "re-sampling" of a treated stand.

Forest co-management. Aside from using participatory approaches in most aspects of the implementation of its various "planning" activities, the Project also introduced specific "co-management" approaches in an attempt to institutionalize or embed such approaches into not only forest management planning activities, but also forest management "implementation" and "monitoring" activities. The project facilitated several activities to demonstrate and pilot Forest Co-Management (FCM) approaches in Songpan County, established two township start up teams and co-management committees in all the 11 villages of the pilot area. The Project's efforts to demonstrate and pilot FCM approaches were difficult to implement. This seems to have been primarily because these efforts were generally resisted by participants (especially by forestry officials when planning involved the management of state forests and by villagers where the planning involved collective forests). But it is also apparent that the NFMP's intentions for Forest Co-Management may have been over-ambitious and that the efforts required to prepare and support forestry officials and village participants in these activities was underestimated. A key output of this activity has been a manual to guide FCM.

Sub-component 2: Community development (CD)

The CD component aimed at supporting the diversification of rural communities' livelihood base in the areas most affected by the NFPP restrictions and at introducing more sustainable land use practices. The component allowed for various types of community development activities that were based on participatory exercises, training and other capacity building activities targeted to villagers, forest staff and local government.

It has to be noted that by the time NFMP has started delivering CD activities, most rural households already initiated alternative activities to support income, mostly through migration labour or other support from the local government. CD activities therefore contributed to further diversify these strategies and improve livelihood opportunities.

Village Development Plans (VDP). VDPs represented the planning instruments to assess needs and implement community development actions. They were prepared using Participatory Resource Appraisal methodologies that allowed better understanding of the linkages between livelihoods, policy, institutions and the environment. 57 VDP were completed.

Community Entry Point activities (EPA) and Micro-infrastructure Projects (MIP). These included village roads or trails, canals for field irrigation, household water supply or sanitation systems and other community infrastructure. 58 EPAs and 271 MIPs were completed. These interventions not only had very positive impacts on the villages' livelihood base, but were also very effective in generating people's interest in NFMP activities and improving the ability of communities to plan, implement and manage their own resources. The largest benefits were achieved with the construction of new roads or bridges particularly in remote areas. These have opened up new areas for access and potentially created additional income earning opportunities for community members.

Alternative Livelihood Demonstrations (ALD). ALD included support to household based practices such as beekeeping, bamboo management/processing, orchard management/processing of products for consumption or traditional medicine, livestock and poultry rising. New techniques were introduced or local ones improved. 76 ALD were implemented. Overall ALD created an interest among beneficiaries in expanding production possibilities and introducing innovative schemes to improve income. A series of weaknesses have however been identified on the way these activities were implemented particularly with respect to household targeting and or household financial capacity to replicate these activities.

Thematic Demonstration Projects (TDP). Thematic Demonstration Projects were often similar to ALD but were implemented by community organizations or groups of proponents. They included: bamboo management & production, community-based ecotourism, livestock and fodder management, non-timber forest products processing (particularly improved drying techniques for medicinal plants), bio-gas, solar cookers, solar water heaters, fuel-saving stoves, sustainable rural building design, traditional beekeeping. 9 TDP were implemented in 11 villages. TDP were highly appreciated by the beneficiaries and some of the actions (particularly community based eco-tourism) show very good sustainability prospects and represent valuable experiences to be replicated. TDP has also shown a great potential to contribute to gender equality and sustainable natural forest management.

Micro-credit Fund (MCF). The MCF was intended to provide small loans for income generating activities to village households and State Forest Enterprises (SFEs) workers who had insufficient access to formal bank loans due to insufficient collateral or that lived in rural areas not reached by financial institutions. The MCF was implemented in 29 Administrative villages and 4 State Forest Enterprises (SFEs) or Forest Farms in the project area and was managed and operated by 24 Micro-credit Units (MCUs) set-up by the project. The MCUs operated according to three management models and included, 1 MCU managed by China Foundation for Poverty Alleviation (CFPA) in Changjiang County, Hainan (NGO model); 19 MCUs managed by respective Community Natural Forest Management Associations (Community Fund Model); and 4 MCUs managed by respective State Forest Enterprises (SFE model). The MCF granted over 7000 loans to over 3200 village households or SFE employees. These loans have been invested by the borrowing villagers in income generating activities, typically animal husbandry, cropping activities and small trade/service businesses. The MCUs have proven capable of disbursing and recovering loans in a cost effective manner and with very few exemptions, the loan conditions and procedures have been adhered to. This has been a valid achievement and a vital input to rural development in the targeted areas. The MCF has been handed over to the NFPCC of the SFA at the closure of the project. The ownership of the fund now stands with the various MCUs and the NFPCC of the SFA insures their coordination, monitoring and supervision.

Despite the project could not ensure a clear integration of CD and NFM activities, several CD activities were almost entirely forestry related (i.e. reading livestock or crops under

forest canopies, bamboo management, bio-gas, etc.) and many of them have heightened villager's awareness on the impact of livelihood practices on forest resources. The CD activities that had a direct positive impact on livelihood may have also had an indirect positive impact on natural forests. It has to be noted also that forestry staff in all 6 counties and 11 townships have become active in community development.

The analysis of impacts of NFMP on gender showed that the project had a positive impact on gender equality through its gender sensitive approach in recruiting villager link workers and implementing micro-credit, micro infrastructure construction and livelihood improvement activities.

Sub-component 3: Information Training and Dissemination (ITD).

A total of 366 ITD events and activities have been carried out by the project to support the implementation of the activities under the CD and NFM components, which collectively have included: 55 village level training courses / study tours; training of 1,657 villagers in SFM practices; training 278 SFE workers; 16 awareness raising events; monitoring 27% of ITD training courses; 2 dissemination study tours; 1 film produced and televised with NFMP support (done, though focused chiefly on NFPPC); 1 project closing conference.

The project also produced a number of awareness raising and visibility items and set up a 'training M&E system' to monitor and evaluate training.

NFMP capacity building events have increased the awareness of NFPP staff, village link workers and villagers in subjects related to participatory approaches and sustainable forest management, and to a certain extent also have increased the related knowledge and skills.

2. Protected Areas Management Component

Overall outcomes and outputs under the PAM component are summarized in Table 2-1 and discussed by sub-component below.

Table 2-1 Outputs Achieved for the PAM Component

Participatory approaches for conservation and sustainable use of biodiversity in nature reserves developed and demonstrated in selected areas.		
Hierarchy of Objectives as per PAD	Original Outputs	Achieved Outputs
Nature Reserve Management Plans developed and implemented with participation of local communities;	13 technically sound and participatory NRMPs developed and adopted by SFA and relevant provincial authorities	All reserves developed/implemented technically advanced management plans to improve management capacity and ensure in-situ biodiversity conservation. Plans were formally reviewed / adopted by Government. Updated management plans for a 5-year follow-on period are in place.
Community Resource Management Plans developed and implemented	26 CRMPs developed and adopted by local communities and NRs and approved by county government in the first	26 community co-management pilot villages set up and community resources management plans developed and implemented; benefitting about 4,500 farmer households in vicinity of nature reserves.
Capacity of staff at 13 NRs, 7 provincial ONRs, and community representatives strengthened	1,491 person time training carried out at nature reserve-level, 147 person time for OWPP level, and 694 person time for local community-level	In total, more 24,800 person time training were implemented for reserve staff, communities, and local government staff.

Sub-component 1: Participatory Planning and Management of Nature Reserves

Developing Management Plans. This activity supported the preparation and implementation of comprehensive management plans for 13 protected areas supported under the project. Working groups and leading groups for management planning, ecological surveys, community-co-management, and training were set up at provincial and protected area levels which were supported by international and national consultants. By 2005, all management plans had been completed and approved by local authorities and SFA. The plans specified 477 investment and capacity building activities to be implemented under the project. Despite some delays caused by the 2008 earthquake in Sichuan, all of these activities were completed before project closure. In 2010, management plans were reviewed, revised and updated for the next 5-year period for all 13 protected areas. Participatory nature reserve planning and management has now become an integral part of biodiversity conservation efforts at the grassroots level as a result of the project.

Developing and updating Bio-system Baseline Maps. By 2006, all 13 protected areas had completed ecological baseline surveys, data collection and entry, printing, and distribution of various thematic ecological baseline maps. About 190 persons participated in technical trainings on ecological mapping. Significant capacity in GIS applications has been developed in all reserves. Overall management capacity of reserve staff has improved with the development and application of such baseline maps. Regularly updated baseline data feeds into decision making at reserve and local government levels.

Improving Nature Reserve Management System. To enhance overall effectiveness of reserve management, boundary surveys and demarcation, and identification of conservation core zones were finished in 2004. About 3,000 kilometers of boundaries were surveyed and settled. Large amounts of equipment were purchased to facilitate implementation of conservation activities in the field, including 34 vehicles, 71 motorcycles, 2,778 sets of computer systems, office equipment, telecommunication equipment, outdoor equipment, and fire control tools. In addition, 59 patrol stations, 28 inspection stations and 26 management stations were built and in operation by 2010.

Western Sichuan Biodiversity Survey. A series biodiversity surveys was completed in Sichuan in 2008. These surveys generated important new biodiversity knowledge, including the discovery of some new plant species and new information on critical habitats, which had previously not been known and could now be identified for protection activities. A comprehensive report on this survey, including an overview of the overall socio-economic conditions and biodiversity threats in Western Sichuan, were prepared for Government consultations on conservation and sustainable resources planning and zoning.

Sub-component 2 - Community-based Nature Conservation

Conducting PRA Survey and Selection of Demonstration Village. PRA surveys were conducted and results documented for 187 villages out of which 26 villages were selected for reserve co-management demonstration activities, 36 villages for energy saving demonstrations, 10 villages for wild animal damage control demonstration activities. More than 150 villages were part of a follow-up PRA survey.

Developing Community Resources Management Plan. 26 community resources management plans were developed and implemented.

County Co-Management Leading Group Activities. More than 150 meetings of county-level co-management leading groups were held covering all reserves of the project. The purpose of these meetings was to share information and experiences in co-management and provide direction for improvement. In addition, village-level co-management committees were put in place. Altogether, 236 meetings (5,394 person times, of which 20 % were women) were organized to discuss natural resource management initiatives at the community-level.

Establishing and Managing Community Conservation Fund. The control of the Community Conservation Fund rested with the demonstration villages. In total, RMB 4.1 million were invested under the fund, of which RMB3.1 million were allocated to conservation activities and RMB 1.1 million were channeled as small credits to improve livelihoods of the poor. GEF contributed about 60 percent of such funds while 40 percent were provided through government counterpart funds. In total, 129 different activities were funded and about 4,500 people benefited from the fund.

Community Conservation Education and Publicity. Activities included village forums, community bulletins, household visits, field visits, knowledge contest, summer camps, skill development and religious service events. Activities covered nearly 250,000 person/times across the 13 protected areas.

Energy Saving Demonstration. 5,273 wood-saving stoves were introduced in 4,390 households in 109 demonstration villages. On average, the fuel wood saving rate is 50 percent of previous (pre-project) consumption.

Wild Animal Management System. Various measures to reduce negative impacts and damages from wildlife were tested and introduced benefitting 1,431 households. Measures included loud speakers, biological and wire fences, protection wall, change in cropping, installation of alarm devices, and others.

Scaling up Improved Sustainable Techniques and Upgrading Community Skills. Project training workshops on livelihood improvement covered about 12,900 person/times.

Sub-component 3 - Training and Capacity Building.

Local training and capacity building. Training modules for nature reserves management, biodiversity conservation, monitoring of nature reserve, community-based observation method, outdoor research techniques and patrol methods for nature reserves, and law enforcement practice were developed. Seven provincial training coordinators and 45 trainers were selected and trained. Extensive training materials were compiled, which included publications on Management of Nature Reserves, Biodiversity Conservation and Monitoring for Nature Reserves, Participatory Community Management for Nature Reserve, Outdoor Research and Patrol Techniques for Nature Reserve, Regulation of Nature Reserve, and Law Enforcement Practice for Nature Reserves. Farmer manuals were drafted, such as crop growing and animal raising handbooks.

Regular Staff Training. Training on financial management, procurement and equipment maintenance were held and involved 477 persons in 14 workshops. About 8,500 person/time training for mid-level management, researchers, technicians, community workers, village committee members, patrol and monitoring staff, and project management officers were conducted. More than 3,012 person/time of training for partrol and monitoring staff were implemented and more than 12,000 person/time

training on productive skill development were conducted. About 169 staff finished their degree education, 84 staff got higher professional titles and 29 staffs were promoted.

Overseas Study Tour and Training. International study tours to Canada, France, South Africa and Germany took place and 62 management-level staff and technicians participated in these study tours.

Handbook for Nature Reserve Management in China. A Management Handbook Series for Nature Reserves in China was prepared under the project. This series includes handbooks for Nature Reserve Management, Patrolling and Law Enforcement, Applied Research, and Participatory Community Management in Natural Reserves. 1,500 copies of these handbooks were distributed to 31 forestry bureaus across China and 207 national forest nature reserve authorities.

Institutional Strengthening. As a result of the project, staffing levels were increased in all nature reserve management offices. For example, 35 additional staff were recruited for the Nature Conservation Unit of the Yunnan Provincial Forestry Bureau. Additional 20 patrol staff were hired for Jianfengling Nature Reserve in Hainan. A GEF project office was established in all seven provincial forestry bureaus working with the project.

3. Plantation Establishment Component

Overall outcomes and outputs under the PE component are summarized in Table 2-2 and discussed by sub-component below.

Table 2-2: Projected Outcomes of the PE Component

Component Objective	Impact Indicator	*Actual or Projected Outputs
Increase the production of wood to meet increasing gap between domestic supply and demand, to generate new employment and income for forestry farms and rural households affected by the logging ban and to improve environmental management	Project generates 13.3 million m3 of timber by 31 December 2025. Project generates 2.73 million tones of bamboo by 31 December 2025. RMB 1.1 billion net income from tree crop production by 31 December 2022.	Output projected to be around 29 million m3 by 31 December 2025 Bamboo output projected to be around 3.9 million MT by 31 December 2025. Net income projected to be RMB 6.6 billion from tree crop production by 31 December 2022.

Establishment of Tree Plantations. The subcomponent aimed to plant 115,085 but surpassed this by 75% and planted 201,700 ha. The main species planted were Poplar (66%), Bamboo (18%), Slash Pine (5%), Chinese Fir (4%) and Larch (2%).

To enhance environmental conservation and prospects for sustainability, the project developed Environmental Protection Guidelines (EPG) and a Pest Management Plan (PMP). The EPG included screening procedures (cultural, edaphic, ecological, biological and social) to guide appropriate site selection, as well as species selection, site preparation, tending the appropriate use of fertilizers and herbicides, and selective cutting. Training on EPG implementation was provided through 813 training courses (160,205 person days) for provincial staff, county staff and farmers. Compliance with the EPG requirements was monitored by the PMOs. Similarly, the PMP provided the legal and regulatory framework for pest monitoring, pest control and biodiversity protection. It also included rules and methodologies for species selection, pest monitoring and forecasting, the control of the most common pests ion economic crops, and the use of low toxic pesticides.

The main pests encountered were poplar canker, blight and die back and these were treated with a combination of integrated and chemical control. In total, pest damage occurred in only 5% of tree plantations, and chemical control was used in only 51% of cases.

To underpin PMP implementation combined courses for tree plantations and economic tree crops were used. In all, 1,615 training courses, or 213,738 person days of training were provided to farmers (93% of total person days), provincial and county staff, the rest being dealt with by physical or biological methods.

The use of superior seed stock and clonal material was monitored by the National Seed Bureau, the use of which resulted in 76% of areas established meeting the criteria (growth rates and form) for Class 1 status.

Establishment of Economic Tree Crops. The sub component aimed to plant 57, 938 ha of economic tree crops, including chestnut, walnut ginkgo, apricot, apple, pear, plum, Chinese date, prickly ash, pomegranate, tea and others, but in fact only 42,246 ha were established. The shortfall was due farmer preference for timber trees where prices were rising sharply and uncertainties over demand for horticultural products (fruits nuts, dates etc). The main species planted were Jujube (16%), Peach (15%), Pear (14%), Apricot (13%), and Chestnut (8%).

As with tree plantations, EPGs and PMPs (see above) were rigorously applied so that the environmental of impact of planting was reduced to a minimum. Some pest damage was recorded such as peach leaf curl, pear scab, apple leaf spot and rust, apple and pear canker, walnut canker and blight but the judicious use of pesticides as per the PMPs limited damage to five percent of the area planted. Training for PMP implementation for economic tree cops was combined with that for tree plantations. For the two, 1,615 courses were provided, and 213, 738 person days of training received, 93% of which was received by farmers.

Pre Commercial Thinning. The target of 61,333 ha to be thinned was exceeded by 40%, with a total of 86,227 ha being thinned. Thinning was concentrated on 8-12 year old stands and the main species thinned were Chinese Fir (60%), Larch (16%), Mason Pine (13%) and Slash Pine (11%). Individual tree selection was used to remove suppressed or badly formed trees to improve the health and quality of the stand, and to concentrate increment on the final crop trees. Not only did this serve to improve stand quality, but it also served to identify the optimum regimes for thinning, and to train farmers and workers in best practice. Even though most logs extracted were of small diameter and low quality, they found an outlet as pit props, fuelwood and, in some areas, as veneer logs.

Technical Support Services. This was a key activity in that it aimed to promote best practice and disseminate project information beyond the project area through the Planting Stock Development Program and the Training and Extension Program. It also provided additional support through the Rural Infrastructure Program and the Monitoring and Evaluation Program.

Planting Stock Development Program: The target of producing 265 million improved seedlings to raise plantation productivity was exceeded, with 392 million having been produced. This was achieved despite reducing the original number of nurseries from 64 to 50. All 50 nurseries are now producing genetically superior seedlings, and have become self financing through seedling sales, which are being sold at a small profit. Given experience in other countries, this could improve plantation yields by 20%. The nurseries are also being used to promote best nursery practice outside the project area.

Technical Extension and Training (TET): The TET program played a key role in achieving the goal of promoting best practice and in disseminating information on the project. Sixteen central training courses were organized, with the target of 2,075 person days of technical and managerial training being exceeded by 5%. In addition, the target of 18,966 person days of technical and managerial training at county level was exceeded by 25%, and the target of 1.37 million person days of training for technical staff and farmers at county level was exceed by 16% (1.59 million person days), 1.49 million of whom comprised farmers. Five thousand copies of Technical Notes on five priority technical themes were distributed to staff and farmers, and project activities were highlighted in a newsletter and the project website. In addition, project information was distributed to provincial and county level staff and beneficiaries through the distribution of over 865,000 CDs. To help provide field training for staff and beneficiaries, 5,821 ha of demonstration plantations were established in 10 provinces, covering the 6 most important tree species, and the 17 most important economic tree species. Technical and managerial staff also went on overseas study tours to seven countries to study such subjects as project management, information management, plantation establishment and management, environmental protection, and timber processing. The services of an international specialist were also obtained to provide recommendations on poplar management, and local consultancies were contracted from time-to-time to provide guidance on project related issues.

Rural Infrastructure Program: Support under this program comprised mainly the construction of forest trails, simple sheds, new or expanded nurseries, nursery equipment the provision of bore holes, and sub loans for marketing of mainly economic tree products (fruits, nuts etc). All the required trails and sheds were constructed. Of the 64 nurseries planned for during preparation, 51 were considered adequate, with the savings being allocated to tree planting. Similarly, of the 670 bore holes planned, 523 were considered sufficient. Assistance for the marketing of economic tree crop products turned out to be unnecessary as most products were familiar to Chinese consumers, and existing arrangements for marketing were thought to be adequate. The activity was therefore canceled and the money allocated to tree planting.

Table 2-3: Outputs Achieved for the PE Component

Hierarchy of Objectives as per PAD	***Original Outputs***	***Revised Outputs at MTR***	***Achieved Outputs***
Plantations to relieve pressure on natural forest established in selected areas	*115,100 ha of commercial plantations established by 31 December 2008;*	*135,100 ha of commercial plantations established by 31 December 2008*	*201,700 ha planted by 31 December 2008*
	57,900 ha of economic tree crops established by 31 December 2008	*reduced to 42,000 ha of economic tree crops to be established by 31 December*	*42,246 ha planted by 31 December 2008*
Commercial wood and economic tree crop plantations established with community participation	*666,900 households participating in commercial wood, economic tree crops plantations and thinning by 31 December 2008*	*No change*	*706,087 households participating by 31 December 2008*
Pre-commercial thinning to enhance productivity demonstrated	*61,300 ha of pre commercial thinning demonstrated by 31 December 2008*	*82,850 ha of pre commercial thinnings demonstrated by 31 December 2008*	*86,227 ha of pre commercial thinnings demonstrated by 31 December 2008*
Training, technical support and inputs are provided	*265 million improved seedlings produced by 31 December 2008; 60,670 county and provincial staff time and 1.33 million farmer training time by 31 December 2008.*	*No change*	*392 million improved seedlings produced by 31 December 2008; 1.59 million farmer training time provided by 31 December 2008*
	Small scale infrastructure valued at $2.19 million built by 31 December 2008	*Reduced to U$1.4 million*	*Small scale infrastructure (nurseries and marketing) valued at U$1.4 million established*

** Mean Annual Increment (MAI) and rotations taken from Forestry Bureau records. Net income based on roadside prices.*

Annex 3. Economic and Financial Analysis

The SFDP's PDO was to *ensure that viable, participatory, and locally-managed system for conservation, management, and sustainable use of forest resources and associated biodiversity are developed and adopted in project sites to promote sustainable development and management of forest resources and protect the natural environment. These practices developed and applied for the protection and sustainable management of natural forest resources in pilot areas in China would provide models for wider replication under the government NFPP*. The SFDP had three components: (1) Natural Forest Management; (2) Protected Area Management; and (3) Plantation Establishment.

During preparation, a comprehensive financial and economic analysis was carried out for the PE Component. The estimation of the technical coefficients, such as yield, in puts and output prices, tree growth cycle, etc., was based on the existing plantations and models of timber and economic trees. At completion, the economic and financial analysis was repeated following the same format and based on the same tree/ plantation models and cash flows used at appraisal. Economic benefits of the PE component were quantified at completion using actual data (at completion) of costs and yields and economic (ERR) and financial rate (FRR) of returns were estimated.

Economic Benefits

The PE component aimed to increase wood production to meet the growing gap between domestic supply and demand, to generate new employment and income for forest farms and rural households affected by the logging ban and other restrictions on forest land use, and to improve environmental management. At completion, the PE component reached far beyond of its original plantation establishment targets.

Project output. A total area of 163,800 ha of timber plantations (as compared to 115,090 ha at appraisal, or 142% of the original target) was established. It is estimated that 29.85 million m3 of timbers will be produced (as compared to 13.31 million m3, or 224% of the original target). A total area of 37,900 ha of bamboo plantations were established producing an estimated 3.9 million kg of bamboo. A total area of 42,200 ha of economic tree was established (as compared to 57,940 ha, or 72.8% of the original). About 2.8 million tons of fruits and other products are estimated to be harvested (as compared to 452,682 tons, or 618% of the original target). In addition, 53,200 m3 of Eucommia timber is expected to be produced. Pre-commercial thinning was carried out in an area of 86,200 ha of existing plantations (as compared to 61,330, or 141% of the original target). Incremental revenue of pre-commercial thinning was calculated (based on 'with/without project scenario') to amount to 3.12 million m3, while incremental timber growth on remaining stocking volume would amount to 1.96 million m3.

Economic revenue. Economic revenue would be generated from (1) timber and resin production from plantations and pre-commercial thinning activities; (2) bamboo timber and bamboo shoots production; and (iii) economic (fruit) tree crops.

Total project revenues is estimated to be CNY20.698 billion (or US$3.03 billion equivalent, using an exchange rate of US$1=CNY6.8282(2010)), including CNY9.83 billion from timber/ resin production, CNY2.637 billion from bamboo products, and CNY6.64 billion from fruit production. Revenue of timber and resin generated from pre-commercial thinning is estimated to be CNY1.61 billion (US$235.6 million equivalent).

Project costs. Project costs included investment costs and plantation management costs. Final investment costs at completion were calculated at CNY1.530.2 billion (US$187.7 million equivalent) or 96% of originally planned costs. Plantation management costs were at CNY5.032 billion of which CNY989 million were spent on labor (CNY15/day), and CNY541 million were spent on material, representing 64.65% and 35.35% of the total, respectively. Post-completion costs include maintenance costs of plantations, and the harvest costs for the final cutting timber, and collecting fruits of economic tree crops. Recurrent costs of plantation management include direct plantation maintenance costs: labor, materials (fertilizer, pesticides), irrigation charges (for fruit trees) and harvesting costs. Indirect costs, such as extension, training, site survey except environmental monitoring cost, which occurs every year, are only included in the first year of investment, but were not included in the recurrent costs of the following years. Because of the continuous depreciation of the US Dollar against the CNY, the actual amount of the IBRD loan decreased by an estimated CNY51.83 million (of 6.7% of the original amount), which required the provision of additional counterpart funds of about CNY30.97 million (or 4.01%) .

Methodology and Data Sources Applied in the Analysis

Cash flow crop models were used for estimating the net present value (NPV) and internal rate of returns (IRR). The methodology applied at completion was identical to that at appraisal, except for the fact that estimation at appraisal was based on existing model parameters and price at appraisal while this post-analysis is based on the actual data collected from the field after project completion. Price data for inputs and outputs was collected from the project provinces. A weighted average of 2005 market prices was used, which may not reflect 2010 prices. Especially, the labor cost of CNY15/day used in the post-analysis may underestimate the current opportunity cost of labor. The Bank team discussed this issue in detail with the Borrower which maintained that labor cost in the remote areas of the project were still very low because of the absence of alternative employment opportunities for forest farmer and therefore insisted on applying the same labor cost estimate used at appraisal.

Main Assumptions for the Models

A one-hectare model is applied for financial and economic analysis for each of the 39 species. Three species have been omitted because these models were not applied or areas planted were negligible. IRR and NPV were estimated through cash flow calculation. Incremental cost and revenue analysis (focusing on with and without-project scenarios) was used to assess investment in plantation rehabilitation, and full cost-benefit analysis was used to assess new plantation development. The model does not include the revenue

derived from inter-cropping revenue and any such benefits directly increase the income of beneficiary farmers. The hectare model for calculating the rate of return include: (1) the investment costs of materials and equipment, such as seeds and seedlings, fertilizers and pesticides, manure, equipment hire and tools; (2) labor costs for site clearing, preparation, planting, tending, road maintenance, guard house construction, and harvesting; (c) indirect costs such as site surveying and design work, management and quality monitoring, training and extension; (d) accompanying irrigation costs for tree species were applied; and (e) all relevant provincial and national taxes and fees. A discount rate of 12% was used for estimation. The assumptions are identical to those made at appraisal.

The cost-benefit analysis for all timber species (17) is based on: (1) a single rotation, which implies that none of the costs and benefits of replanting a site has been considered; (2) a 20-year time period, which captured the full rotation of all timber species financed under the Project; (3) complete production and harvesting costs; and (4) thinning and tending assumptions for all relevant species and the revenue generated from the sale of thinned wood. The cost-benefit analysis for all economic tree crops is based on: (1) a single planting cycle which assumes natural attrition; (2) a 16-year time period which directly corresponds to the loan period and includes the 7-year grace period; (3) complete production and harvesting costs; (4) complete investment costs; and (5) pruning assumptions for all relevant species. The cost-benefit analysis for five species of pre-commercial thinning is based on: (1) existing timber plantation; (2) investment costs in the first project year include indirect costs (survey and design, training and extension, and management and monitoring) and direct costs (tending and thinning, and road maintenance); (3) recurrent costs include management and monitoring, and final cutting; and (4) incremental revenue includes twice cutting of small dimension (less than 12 cm) timber, fuelwood, and final timber.

Input and Output Prices

Actual financial prices of inputs and outputs are used in the models for the implementation years (2003-2009) and projected prices for the rest of years. Financial prices are the prevailing market prices for purchasing inputs and marketing outputs. Standard economic conversion factors are used in the economic analysis to convert the financial costs of specific investments to economic costs, and to convert financial prices of key inputs to economic prices. The economic output prices are based on actual border prices for comparable imported timber, fruits and nuts, and adjusted for transport and processing costs. The economic input prices of seedlings, pesticides, manure, fertilizers, equipment rental and tools were assumed the same as the financial prices. The farm gate output prices for thinned wood (in term of the timber crops) and fruit and nuts (in terms of economic tree crops) were calculated on the basis of the actual prices the famers received plus transportation and handling costs. In addition, a shadow wage of CNY12 per day is used in the economic analysis to reflect the invisible surplus of agricultural workers with little alternative employment opportunities in the project areas, leading to a marginal product of labor below the prevailing market wage.

Economic Analysis

The economic analysis was carried out to evaluate the viability of each tree species in the plantations developed. There were some adjustments, which some original proposed species to be planted were not planted, while some new species were added to the project plantations. A few timber tree species were dropped (Loblolly Pine, White Poplar, Pinus simonii, Abrus, and Phyllostachys), and some additional species were included (Casuarine equisetifolia, Red Bamboo) were planted. Within the economic trees, four species (Prickly Ash, Rubber, Chinese Yew, and Hackberry) were not planted, while Chinese Red Pepper was added. Pre-commercial thinning also had some adjustments that the plantation of Loblolly Pine was not selected, while two species (Chinese Fir and Slash Pine) were selected to be included into pre-commercial thinning.

In the cash flow for estimated economic IRR and NPV, the total investment costs include plantation construction (field works), institutional strengthening, training, and technical extension. The plantation maintenance costs include all physical inputs and labor costs. All the prices as mentioned above are the 2005 constant boarder prices. Taxes, fees and interest payment are excluded, which are, however, reflected in the financial analysis.

Timber species planted have different growth cycles, which result in the generation of revenue at different periods of time. Under the Project, the maturity period varies from 6 to 25 years. For timber species with longer growth periods, the first and second thinning would generate minor income from small-diameter timber and fuel wood. For economic trees, revenue generation would start in different years, which affects the rate of return. Most of the fruit trees would generate revenue from year 3 to 5 and reach full production in year 7 to 8 (fruits) and year 14 (nuts). In practice, during the initial growth period of year 1-4, the income could be derived from intercrops, but the analysis excluded such income generation.

Overall, the project yielded an ERR of 29% (compared to 25% estimated at appraisal) and a NPV of US$356 million (compared to US$216 million at appraisal) at a 12% discount rate over 20 years. At subcomponent level, investment in timber species yielded an ERR of 28% (compared to 30% at appraisal) and NPV of US$172 million. Economic tree crops yielded an ERR of 33 percent (as compared to 22 percent at appraisal) and NPV of US$142 million. The ERR for pre-harvest thinning was estimated based at 26 (as compared to 22% at appraisal).

The results of the ERR calculation for timber trees and economic trees show that each model was economically viable. The ERRs for timber species range from 14-32%. Overall, ERRs at completion are somewhat higher than estimated at appraisal. ERRs above 30% are bamboo plantation because of multiple products and short maturity of such plantations. For economic trees, the ERRs range from 13-49%. Detailed results of the analysis for each species as shown in the Tables 3-1 and 3-2.

Financial Analysis

One-hectare models were used to evaluate the financial viability of the project's 17 timber trees species, 17 economic tree crop species, and 5 pre-thinning models using the same assumptions applied above. Benefits are derived from the products (timber, resin, fruits) and by-products (e.g., fuelwood). Incremental costs and benefits are used for rehabilitation and pre-commercial thinning and full costs and benefits are used for newly established plantations. The model employs prevailing market prices, farm gate price for output and actual occurred costs for inputs. Farm labor is valued at CNY15/person day as discussed above. The investment period for timber was three years and four years for economic tree crops. Maintenance costs (recurrent costs) included thinning, irrigation water charges, fertilizer for some species, and harvesting. The Government exempted economic tree crops (fresh fruits and nuts) from taxes, but taxes on timber species remained in place.

The analysis shows that all timber species models were financially viable with FRR ranging from 15-27%. FRRs of all timber species, except for Paulownia, are higher than appraisal estimates. The highest FRRs are calculated for bamboo. For economic tree crops, FRRs range from 11-47% which is different from the estimation during the appraisal. The FRRs of most of economic trees are much higher than appraisal estimates. Citrus and chestnuts did not prove to be financially viable due to long time to reach maturity and high maintenance costs.

The FRR of the project is estimated at 26% versus the appraisal estimate of 22%. The FRR for timber plantation is estimated at 26% before tax and 24% after tax. The NPV is calculated at US$174 million before tax and US$137 after tax. The FRR for economic tree crops is estimated at 32% and the NPV at US$157 million. The FRR for pre-commercial thinning is estimated at 23% before tax and 21% after tax, and the NPV of US$37 million before tax and US$28 million after tax.

Table 3-1: Summary of Cost Benefit Analysis

	Financial Analysis				Economic Analysis			
Species	**NPV (RMB '000)**		**FIRR (%)**		**NPV (RMB'000)**		**EIRR (%)**	
Timber	**ICR**	**Appraisal**	**ICR**	**Appraisal**	**ICR**	**Appraisal**	**ICR**	**Appraisal**
Masson 14 F	723	1,116	17	14	1,195	6,178	18	18
Masson 16 F	1,111	1,052	16	14	1,314	4,263	17	18
Slash pine 14 F	1,886	1,233	16	15	4,274	10,576	20	20
Slash pine16C	14,592	675	15	13	4,520	3,142	14	16
Loblolly	903	339	16	13	2,095	1,748	21	18
Chinese Fir 14C	4,115	2,064	15	15	14,089	15,959	20	19
Chinese Fir 16C	24,972	3,184	19	16	34,899	11,330	22	20
Larch 16P	10,980	205	16	12	20,304	6,429	19	16
W. Poplar F	9,991	1,775	19	18	20,241	25,621	26	36
It. Poplar PW	463,788	5,315	25	21	522,232	280,071	27	30
It. Poplar F	234,379	1,856	25	18	317,900	127,808	29	32
Black Locust	1,955	1,905	19	16	1,974	15,780	20	22
Paulownia PW	739	6,080	24	31	928	26,129	28	34
Horsetail beefwood	8,689		22		11,480		25	
R. shell bamboo	33,483		27		47,361		32	
Moso Bamboo	20,808	1,019	21	14	29,187	22,939	25	18
Moso Bamboo (reh.)	167,267	1,711	25	16	240,263	93,278	31	23
Economic Tree Crops								
Walnut	26,600	37,115	21	28	25,573	70,099	21	34
Chestnut	-2,094	9,606	11	21	1,827	16,740	13	26
Eucommia	1,462	375	15	13	1,450	1,955	15	18
Gingko	1,726	9,631	18	21	2,771	10,230	21	29
Jujube	233,055	12,649	39	23	217,527	237,562	40	29
Pear	258,388	19,151	47	23	242,417	215,403	49	29
Tea	18,001	5,119	31	18	17,752	17,452	33	30
Apricot	106,501	10,449	27	19	102,079	156,814	28	27
Citrus	-331	1,783	11	14	243	1,513	13	19
Peach	134,490	5,595	39	18	140,208	83,905	43	26
Chinese Pepper	23,482		46		23,422		49	
Apple	25,016	8,118	35	19	25,639	15,364	37	48
Pomegranate	41,725	38,739	39	33	38,310	48,907	39	24
Grape	99,468	10,811	28	17	91,438	64,081	28	21
Oil tea	10,425	3,698	21	18	12,403	5,455	24	23
Willow	939	2,635	32	16	943	3,068	35	23
Hickory	49,482	40,776	30	28	37,580	71,924	30	31
Pre-commercial Thinning								
Chinese Fir 16	7,823		22		10,807		33	
Chinese Fir 14	109,330	457	21	16	147,434	47,944	27	26
Masson pine	1,435	428	13	16	23,355	8,026	27	32
Slash pine	26,284		23		32,352		30	
Larch	48,758	1,532	21	18	96,823	15,889	26	21

Table 3-2: Summary of Financial and Economic Analysis

	Financial Analysis			**Economic Analysis**		
	NPV (RMB)	**NPV (US$)**	**FRR (%)**	**NPV (RMB)**	**NPV (US$)**	**ERR (%)**
Economic Tree	1,027,112,156	150,602,955	32	971,649,184	142,470,555	33
Timber (before tax)	1,188,031,931	174,198,230	26	1,175,564,453	172,370,155	28
Timber (after tax)	937,508,560	137,464,598	24	-	-	
Thinning (before tax)	253,776,859	37,210,683	23	256,826,344	37,657,822	26
Thinning (after tax)	193,630,047	28,391,503	21	-	-	
Total Project	2,158,250,762	316,459,056	**26**	2,429,517,464	356,234,232	**29**

Annex 4. Bank Lending and Implementation Support/Supervision Processes

(a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
Lending			
Susan Shen	Principal Ecologist,	EASRD	TTL
Mohamed N.Benali	Lead Agriculturalist	EASRD	TTL
Pawan Patil	Environmental Economist	EASRD	GEF component
Louise Scura	Senior Natural Resources Economist	EASRD	Safeguards
Guzman Garcia-Rivero	Sector Manager	EASRD	Sector Manager
Jin Liu	Agriculture Specialist	EASCS	Plantation
Tong Zhong	Agricultural Economist	EASCS	Economist
Zong-cheng Lin	Social Development Specialist	EASCS	Safeguards
Chu Junxue	Disbursement Specialist		Disbursement
Jinan Shi	Senior Procurement Specialist	EAPPR	Procurement
Rob Crooks	Environmental Specialist		Environment
Chau-Ching Shen	Senior Financial Management Specialist		FM
Zhang Chaohu	Resettlement Specialist	EASCS	Resettlement, IP
Dan Gibson	Social Development Specialist	EASRD	Resettlement, IP
Clifford Garstang	Country Lawyer	LEG	Lawyer
Evelyn Cowan	Team Assistant	EASRD	
Louisa Huang	Team Assistant	EASRD	
Cecilia Belita	Team Assistant	EASRD	
Supervision/ICR			
Mohamed N.Benali	Lead Agriculturalist	EASRD	TTL
Oliver Braedt	Sr. Natural Resources Mgmt. Spec.	EASRD	GEF component
Ulrich Schmitt	Sr. Natural Resources Economist	EASRD	TTL
Jin Liu	Sr. Agriculture Specialist	EASCS	Plantation
Tong Zhong	Agricultural Economist	EASCS	Economist
Jinan Shi	Sr/ Procurement Specialist	EAPPR	Procurement
Yi Dong	Financial Management Specialist	EAPFM	FM
Yiren Feng	Environmental Spec.	EASCS	Environment
Zong-Cheng Lin	Senior Social Development Spec	EASCS	Social
Andres Liebenthal	Lead Environment Specialist	EASCS	Environment

(b) Staff Time and Cost

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of staff weeks	USD Thousands (including travel and consultant costs)
Lending		
FY99	0	183,800
FY00	107	497,300
FY01	74	492,000
FY02	17	81,300
FY03	0	5,000
FY04	1	15,200
Total:	199	1,274,600
Supervision/ICR		
FY03	19	85,300
FY04	27	143,500
FY05	18.4	107,900
FY06	15	93,000
FY07	23	141,900
FY08	17.2	95,800
FY09	15.4	74,800
FY09	9.5	118,200
Total:	144.5	860,400

*figures include BBGEF resources

Annex 7. Summary of Borrower's ICR and/or Comments on Draft ICR

Protected Areas Management

Beneficiaries: Executive Agency is the State Forestry Administration of the People's Republic of China. Project management offices were affiliated with the World Bank Loan Projects Management Center of the State Forestry Administration (PMC) , the 7 provincial forestry bureaus of Hubei, Hunan, Sichuan, Yunnan, Guizhou, Hainan and Gansu, the 9 national nature reserves of Houhe, Badagongshan, Hupingshan, Xuebaoding, Tanjiahe, Baishuijiang, Jianfengling, Fanjingshan and Bamaxueshan, and the 4 provincial nature reserves of Piankou, Xiaozhaizigou, Baiyang and Nujiang.

Total Cost: The planned project cost is US$22.85 million, of which domestic counterpart fund amounts to US$6.85 million (equivalent to 56.86 million RMB), and GEF grant contributes US$16 million. Due to the appreciation of the RMB, by August 31, 2010, the actual cost was US$20.17 million of which GEF disbursements accounted for US$16 million and domestic counterpart fund accounted for US$4.17 million (equivalent to RMB 29.2 million.)

Implementation Period: It was planned to be implemented for 6 years (January 2003 to August 2009), as it was extended for one year, the project was completed by August 2010.

Project Objectives: By managing nature reserves of global significance and adopting innovative approaches for developing protected areas management plans, upgrading skills and improving staff quality, and by involving local communities into management of protected areas, the project improved the protected areas management level, strengthened biodiversity conservation and played a demonstration role for China's protected areas.

Project Activities: Participatory planning and management of nature reserves; Community-base nature conservation; Training and capacity building; and Management, Monitoring and Evaluation.

Effectiveness: The project achieved multiple goals, which are summarized as follows: Through the participation of all the stakeholders in developing management plans and community resources management plan, the 13 project protected areas accomplished scientific and participatory decision making and standardized and systematic management in nature conservation and biodiversity management, which has promoted biodiversity conservation of the protected areas. With support provided by the project, the 13 protected areas developed 7 sets of GIS-based ecological baseline maps for the first time, established and improved outdoor patrol and monitoring system, which has reduced threats to the areas' biodiversity. Community co-management mechanism were developed, which promoted co-development of nature conservation and communities,

raised public awareness of conservation and gradually altered the traditional use of natural resources and the environmentally unsustainable production practices. 484 training workshops and study tours with 24,269 person/times participating and equipment investments allowed the 7 provinces and the 13 protected areas to strengthen their institutional capacity. This can be exemplified by a large number of staff with modern management and knowledge for protected areas and upgraded management level of protected areas.

Plantation Establishment Component

Project name: The World Bank financed "Sustainable Forestry Development Project" (Plantation Establishment Component)

Implementation period: From January 29, 2003 to August 31, 2009, 6.5 years in total.

Project objectives: The project of this component are to support increasing wood production to meet the increasing gap between domestic wood supply and demand; generate new employment and incomes for forestry farms and rural households; and improve environmental management.

The borrowers: The project borrowers are of 4 levels. The first level is the Ministry of Finance, P. R. China (on behalf of the Chinese government). The second level is the Peoples' Governments of 11 project provinces (regions) of Hebei, Shanxi, Liaoning, Anhui, Shandong, Henan, Hubei, Hunan, Hainan and Sichuan. The third level is the Peoples' Governments of the 109 counties (cites) of the above-mentioned 11 provinces (regions). The fourth level is the 770,903 farmers, household groups, shareholding forestry farms, collective forestry farms or state-owned forestry farms of the above 109 project counties (cites).

Total investment: The planned total project investment is RMB1.55102 billion (equivalent to USD187.73 million (in 2003)), including the loan offered by IBRD of USD93.90 million, (equivalent to RMB 779.37 million) and counterpart fund of RMB 771.65 million (equivalent to 92.96 million USD). As of August 31, 2009, the total project investment of USD196.03 million (equivalent to RMB 1.53016 billion) has been disbursed, including the World Bank loan of USD93.21 million and the actual counterpart fund of RMB 802.62 million.

Loan terms: (1) The loan period is 16 years including 7 years of grace period; (2) When the World Bank loan become effective, a fee in an amount equal to 1% of the loan amount shall be paid to the World Bank. The World Bank shall withdraw from the Loan Account of the project and pay to itself the amount of said fee; (3) A commitment charge shall be paid at the rate of 0.75% per annum on the principal amount of the Loan not withdrawn from time to time; (4) Interest shall be paid on the principal amount of the Loan withdrawn and outstanding from time to time, at a rate for each Interest Period equal to LIBOR Base Rate, which shall be determined reasonably by the World Bank semiannually.

Main achievements: (1) 163,800 ha of high-standard timber plantation has been established, also served as the demonstration base for development of fast-growing and high-yield plantation in China's pivot areas, which has increased forest resource in the project areas; (2) 42,200 ha of economic tree crops and 37,900 ha of bamboo plantation have been planted under the project, which has contributed to farmers' efforts to become rich in forest and mountain areas, and to construction of new socialist countryside. (3) The World Bank Loan has been used for the first time to demonstrate improved forest management approach where pre-commercial thinning of 86,200 ha of existing plantations has been accomplished and useful experiences accumulated; (4) The design approach of participatory community forestry appraisal has been implemented and promoted, which has created 65.95 million persons-day of employment opportunities to local farmers. With 770,000 farmers taking part in the project, farmers' recent incomes and overall knowledge attainments have been improved; (5) Forest coverage rate of project counties has grown by 1.41% on the average. In 2013, carbon sequestration of plantation in the project will reach to its maximum value when 9.201 million tons of nitrogen is fixed, which will contribute actively to improving ecological environment of project areas and coping with global climate change.

Main benefits: It has been calculated that 163,800 ha of project timber plantation will produce a total stand volume of 29.8478 million cubic meters, including 19.5788 million cubic meters of standard timber, 924,500 cubic meters of non-standard timber, 2.4285 million tons of firewood and 37.7882 million kg of resin. Meanwhile, 37,900 ha of newly-established bamboo plantation will produce 3.943 billion kg of bamboo timber and bamboo shoots, and 42,200 ha of project economic tree crops will be able to produce 2.798 billion of fruits, leaves and bark. Furthermore, 86,200 ha of pre-commercial thinning of existing plantations have been implemented, bringing about an increase of 3.1966 million cubic meters to the total stand volume, an increase of 1.9622 million cubic meters of timber and 14.3544 million kg of resin. The After-tax NPV of the whole project is 1.840 billion Yuan and the after-tax financial internal rate of return is 24.6%.

Important experiences: (1) On a basis of learning implementation experiences from former World Bank loan forest projects, forestry sector of China has been keeping up with the times, and established strong organizations and the technology guarantee system; (2) Economical rules and natural rules have been complied with, and willingness of beneficiaries groups been respected; (3) Technical extension services have been strengthened; (4) More attention has been given to planting material development.

Suggestions: (1) The proportion of investment composition of this project should be properly adjusted to facilitate the implementation of this project; (2) More consideration should be put into resistance against risks of natural disasters and relevant countermeasures in the stage of project appraisal and design.

Follow-up plans: (1) The follow-up management responsibilities will be further clarified; (2) Follow-up management plans will be developed; (3) More efforts will be inserted to loan repayment.

Annex 8. Comments of Co-financiers and Other Partners/Stakeholders

Summary of Evaluation Findings of Final EU Report:

Relevance

The project is of central relevance to high level EU and China cooperation in that it contributes to China's reform process supported by greater friendship, stronger trade, and further human resource development relationships in natural forest related business with emphasis on profit linked to carbon fixation by 2010.

Design

The design was not achieved through normal processes of problem identification and consideration of many solutions. It came out of a 1999 World Bank programme process. Luckily the financing agreement contained features that would allow for flexibility but the profile of the European Co-Director proposed in the service contract was inappropriate. In simple terms a director profile useful to the Chinese forestry reform process was replaced by an administrator profile. This coupled with considerable delays caused by the factors beyond the control of the project have limited achievements. Limited monitoring and a weak MTR meant that design weaknesses were not properly identified or corrected. The very late start of a practical approach from the European consultants within the Project Management and Institution Building (PMIB) component has also meant that new design problems have been added. These are mentioned in the following sections.

Efficiency

The efficiency of the natural forest management (NFM) component was good. This led to excellent reports, well characterised case studies, and motivated forest bureau management teams and villagers. The Project provides a good base for follow-on projects by member states. The efficiency of the community development component was very good. The number of people whose lives have been enriched by the credit livelihood and infrastructure inputs is in excess of 40,000. Some excellent forest friendly livelihood improvements have come about eg. improved bee keeping. The efficiency of the information training and dissemination component was also good, with thousands of people trained and forestry manuals disseminated. This occurred despite the absence of a component leader for much of the Project. The component was also constrained by the late production of forestry wisdom to be disseminated. The design of the PMIB component and the resulting lack of clarity on the best use of EU procedures, prevented a result that would support and integrate the other components to the full. It did however raise awareness in the excellent Chinese Co-Director and County forest bureau staff of what kind of mistakes to avoid in follow on projects.

Effectiveness

The NFM result was effective; it showed villagers how to reduce damage to forest and how forest protection can be profitable e.g. by using bamboo. The CD component was very effective in improving asset and income levels. The ITD component was also very effective in changing attitudes. The PMIB component did not establish the systems for helping the other components to be more effective so as to keep positive biodiversity effects as a target. It did not help allocate duties in relation to management, direction and fund leverage. The management information system did not work in terms of keeping an instantly available accurate record on assets such as the length of road etc. It introduced an inappropriate micro-proposal system for villagers' ideas that marginalized provincial actors and gave rise to frustration in the village. It doggedly stuck to the 1999 World Bank village list instead of being flexible in response to clear problems that would provide valuable insights for China, identify champion villages for others to learn from and play one area against another to maximize lessons learned. This lack of effectiveness has a positive outcome in terms of showing others how to avoid pitfalls in the future. This in itself is an important impact pathway.

Impact

The impact of the Project is good. It managed to spread (1) interest in forest tourism, (2) improved beekeeping practice, (3) optimized firewood practice and (4) developed use of participatory approaches in forestry. It has also created a demand for GIS and strategic forest management manuals that will spread the word after Project closure. There has been little impact on forest policy and procedures.

Sustainability

There are good prospects for sustainability of some Project elements such as credit groups, cooperatives and profitable side-lines which will remain and flourish. Biogas will carry on in areas with sufficient animals. However the lack of forest policy and procedures is a serious impediment to more widespread take-up.

Annex 9. List of Supporting Documents

Implementation Completion and Results Report (Plantation Establishment Component), World Bank Loan Project Management Center of the State Forest Administration, P. R. China, January 2010 (plus technical annexes).

Project Completion Report (Protected Areas Management Component, World Bank Loan Project Management Center of the State Forest Administration, P. R. China, August 2010 (plus technical annexes).

Project Final Completion Report, EU-China Natural Forest Management Project, undated.

World Bank Preparation and Supervision Aide Memoires 1999-2011.

World Bank Project Appraisal Document, 2002.

MAP

I N S E R T

M A P

H E R E

AFTER APPROVAL BY COUNTRY DIRECTOR

AN ORIGINAL MAP OBTAINED FROM GSD MAP DESIGN UNIT

SHOULD BE INSERTED

MANUALLY IN HARD COPY

BEFORE SENDING A FINAL ICR TO THE PRINT SHOP.

NOTE: To obtain a map, please contact

the GSD Map Design Unit (Ext. 31482)

A minimum of a one week turnaround is required