Document of
The World Bank

Report No: ICR2660

IMPLEMENTATION COMPLETION AND RESULTS REPORT
(IBRD-48440; TF-57753)

ON A

LOAN
IN THE AMOUNT OF US$100 MILLION

AND A

GLOBAL ENVIRONMENTAL FACILITY GRANT
IN THE AMOUNT OF US$ 5.25 MILLION

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR A

GUANGXI INTEGRATED FORESTRY DEVELOPMENT AND CONSERVATION PROJECT

June 17 , 2013

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

CURRENCY EQUIVALENTS

(Exchange Rate Effective February 2013)

Currency Unit = Yuan Renminbi
Y 1 = US$ 0.16
US$ 1.00 = Y6.23

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

BO	Biodiversity Office
CCC	Conservation Coordination Committee
CDM	Clean Development Mechanism
CER	Carbon Emission Reduction
CFB	County Forestry Bureau
GoC	Government of China
CPS	Country Partnership Strategy
PDO	Project Development Objective
EA	Environment Assessment
FF	Forest Farm
EMDP	Ethnic Minority Development Plan
EMP	Environment Management Plan
EPG	Environment Protection Guidelines
ETP	Expanding Timber Plantations
ERR	Economic Rate of Return
FCC	Forest Conservation Committee
GEF	Global Environment Facility
GEO	Global Environment Objective
GFB	Guangxi Forestry Bureau
GZAR	Guangxi Zhuang Autonomous Region
GIFDCP	Guangxi Integrated Forestry Development and Conservation Project
ICR	Implementation Completion and Results Report
IP	Implementation Progress
IMNR	Improving Management of Nature Reserves
KPI	Key Performance Indicators
LA	Loan Agreement
M&E	Monitoring and Evaluation
METT	Management Effectiveness Tracking Tool
MTR	Mid-term Review
NFPP	National Forests Protection Program
NR	Nature Reserve
PAD	Project Appraisal Document

PDO	Project Development Objective
PFB	Provincial Forestry Bureau
PFRLA	Policy Framework for Resettlement and Land Acquisition
PLG	Project Leading Group
PMO	Project Management Office
PMP	Pest Management Plan
QSA	Quality of Supervision Assessment
RPF	Resettlement Policy Framework
SFA	State Forestry Administration
SFDS	Sustainable Forestry Development Strategy

Vice President: Axel van Trotsenburg, EAPVP
Country Director: Klaus Rohland, EACCF
Sector Manager: Mark Lundell, EASCS
Project Team Leader: Liu Jin, EASCS
ICR Team Leader: Liu Jin, EASCS

CHINA

Guangxi Integrated Forestry Development and Conservation Project

CONTENTS

A. Basic Information			
Country:	China	Project Name:	Guangxi Integrated Forestry Development and Conservation Project
Project ID:	P088964, P087318	L/C/TF Number(s):	IBRD-48440,TF-57753
ICR Date:	06/17/2013	ICR Type:	Core ICR
Lending Instrument:	SIL,SIL	Borrower:	People's Republic of China
Original Total Commitment:	USD 100.00M,USD 5.25M	Disbursed Amount:	USD 100.00M,USD 5.25M
Environmental Category: B		**Focal Area**: B	
Implementing Agencies: Guangxi Regional Forestry Department			
Cofinanciers and Other External Partners: N/A			

B. Key Dates				
Guangxi Integrated Forestry Development and Conservation Project - P088964				
Process	**Date**	**Process**	**Original Date**	**Revised / Actual Date(s)**
Concept Review:	08/25/2004	Effectiveness:	04/30/2007	04/30/2007
Appraisal:	06/07/2006	Restructuring(s):		
Approval:	12/14/2006	Mid-term Review:	06/30/2010	06/07/2010
		Closing:	12/31/2012	12/31/2012

Guangxi Integrated Forestry Development and Conservation Project - P087318				
Process	**Date**	**Process**	**Original Date**	**Revised / Actual Date(s)**
Concept Review:	08/25/2004	Effectiveness:	04/30/2007	04/30/2007
Appraisal:	06/07/2006	Restructuring(s):		
Approval:	12/14/2006	Mid-term Review:	06/30/2010	06/07/2010
		Closing:	12/31/2012	12/31/2012

C. Ratings Summary	
C.1 Performance Rating by ICR	
Outcomes	Highly Satisfactory
GEO Outcomes	Highly 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:	Highly Satisfactory
Quality of Supervision:	Satisfactory	Implementing Agency/Agencies:	Highly Satisfactory
Overall Bank Performance	Satisfactory	Overall Borrower Performance	Highly Satisfactory

C.3 Quality at Entry and Implementation Performance Indicators

Guangxi Integrated Forestry Development and Conservation Project - P088964

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)	Satisfactory
DO rating before Closing/Inactive status	Satisfactory		

Guangxi Integrated Forestry Development and Conservation Project - P087318

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)	Satisfactory
GEO rating before Closing/Inactive Status	Satisfactory		

D. Sector and Theme Codes		
Guangxi Integrated Forestry Development and Conservation Project - P088964		
	Original	**Actual**
Sector Code (as % of total Bank financing)		
Forestry	94	94
Sub-national government administration	6	6

Theme Code (as % of total Bank financing)		
Environmental policies and institutions	17	17
Land administration and management	16	16
Other environment and natural resources management	33	33
Rural markets	17	17
Rural services and infrastructure	17	17

Guangxi Integrated Forestry Development and Conservation Project - P087318		
	Original	**Actual**
Sector Code (as % of total Bank financing)		
General agriculture, fishing and forestry sector	29	29
Other social services	12	12
Sub-national government administration	59	59

Theme Code (as % of total Bank financing)		
Biodiversity	29	29
Climate change	14	14
Environmental policies and institutions	29	29
Land administration and management	14	14
Participation and civic engagement	14	14

E. Bank Staff		
Guangxi Integrated Forestry Development and Conservation Project - P088964		
Positions	**At ICR**	**At Approval**
Vice President:	Axel van Trotsenburg	James W. Adams
Country Director:	Klaus Rohland	David R. Dollar
Sector Manager:	Mark R. Lundell	Rahul Raturi
Project Team Leader:	Jin Liu	Jin Liu
ICR Team Leader:	Jin Liu	
ICR Primary Author:	Richard A. Owen	
	Random Dubois	
	Xiaoquan Zhang	
	Xueming Liu	

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	Random Dubois	

F. Results Framework Analysis

Project Development Objectives
The overall project development objective is to improve the effectiveness of forest management and institutional arrangements in timber production, watershed protection and nature reserves management in selected areas of the Guangxi Zhuang Autonomous Region (GZAR).

Revised Project Development Objectives

Not revised.

Global Environment Objectives
The global development objective of the project is to improve the conservation of the globally significant biodiversity of the GZAR 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 :	Relative productivity of timber plantations under the project compared to non-project areas increases as measured by annual timber volume growth per hectare			
Value (quantitative or Qualitative)	N/A	25%	Not revised	33.7%
Date achieved	12/14/2006	12/31/2012		12/31/2012
Comments (incl. % achievement)	Achieved. It demonstrated the improved effectiveness of timber plantation management, as well as improving institutional capacity by improving planting stock quality, introducing new silvilcultural technologies, providing intensive training and extension, actively engaging land owners in project planning and execution and by introducing appropriate operational arrangements for execution. These activities combined increased the forest productivity.			
Indicator 2 :	Number of employees of participating FFs no longer on payroll			
Value (quantitative or Qualitative)	0	1600	Not revised	2452
Date achieved	12/14/2006	12/31/2012		12/31/2012
Comments (incl. % achievement)	Achieved. Reducing the number of employees, who used to rely on the payroll from forest farms (FFs), by contracting forest land to their employees from FFs for long-term plantation establishment and management. It was an important part of the FF reform process, aiming to increase FF's efficiency. Under the project, around 2,450 employees of FFs are no longer on payroll, which exceeded the target of 53%, and around US$ 10 million budget was saved by the FFs each year.			
Indicator 3 :	Percent of increase in vegetation cover in targeted watersheds			
Value (quantitative or Qualitative)	38%	48%	Not revised	50%
Date achieved	12/14/2006	12/31/2012		12/31/2012
Comments (incl. % achievement)	Achieved. The increased vegetation cover in the targeted watersheds will contribute to a reduction of water runoff and soil erosion in the Pearl River Basin, promoting the diversification of forest ecosystems, and the control of rocky desertification in degraded karst areas.			

(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 :	Number of nature reserves within which key indicator species of limestone forest areas remain stable or increase			
Value (quantitative or	0	4	Not revised	5

Qualitative)				
Date achieved	12/14/2006	12/31/2012		12/31/2012
Comments (incl. % achievement)	Achieved. It indicated that the project effectively protected threatened and globally important forest habitats and rare and endemic species, which contributed to the achievement of the GEO of improving the conservation of the globally significant biodiversity of the GZAR.			

(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 :	Afforested area in ha with a tree survival rate above 90% ('000ha)			
Value (quantitative or Qualitative)	0	200	Not revised	214
Date achieved	12/14/2006	12/31/2012		12/31/2012
Comments (incl. % achievement)	Achieved. The improved genetic planting material used raised seedling quality and improve disease resistance, and the better silvicultural practice reduced the mortality in the field, which resulted in high survive rate (92% in average) and good growth (33.7% more than non-project plantations) of the established plantations.			
Indicator 2 :	Number of participating farm households reached ('000HH)			
Value (quantitative or Qualitative)	0	112	Not revised	118
Date achieved	12/14/2006	12/31/2012		12/31/2012
Comments (incl. % achievement)	Achieved. The community consultation was taken in each of the project villages and the households participated in the project was fully on a voluntary basis.			
Indicator 3 :	Monitor and report on sub-loan appraisal and performance per Para. 15 of Annex 17			
Value (quantitative or Qualitative)	N/A	relevant monitoring and reporting on a regular basis	Not revised	relevant monitoring and reporting on a regular basis
Date achieved	12/14/2006	12/31/2012		12/31/2012
Comments (incl. % achievement)	Achieved. The monitoring on sub-loan assessment and management was on a regular basis.			
Indicator 4 :	Number of ha of multiple protection forest established ('000hs)			
Value (quantitative or Qualitative)	0	18	Not revised	18
Date achieved	12/14/2006	12/31/2012		12/31/2012

Comments (incl. % achievement)	Achieved. Improving the effectiveness of watershed management was achieved by developing and implementing viable and community-friendly approaches (models) to rehabilitate watersheds through afforesting bare areas. Quality check confirmed that the quality of the plantations met the project's technical standards with a survival rate of over 90%.			
Indicator 5 :	Carbon Sequestered ('000/ton carbon or '000/ ton CO_2)			
Value (quantitative or Qualitative)	0	30 tons carbon or 110 ton CO_2	Not revised	167.7 ton CO_2
Date achieved	12/14/2006	12/31/2012		12/31/2012
Comments (incl. % achievement)	Achieved. The targeted carbon sequestration was exceeded by combining two CDM afforestation operations, for which, the second one was developed during the project implementation period.			
Indicator 6 :	Management effectiveness of five targeted nature reserves measured by average incremental scores on scorecard			
Value (quantitative or Qualitative)	Base score of 43	Score of 70	Not revised	Score of 76
Date achieved	12/14/2006	12/31/2012		12/31/2012
Comments (incl. % achievement)	Achieved. A number of innovative approaches were introduced to the project nature reserve management, which enhanced the nature reserves (NR) management; increased management capacity and knowledge of biodiversity resources, particularly in the little-known limestone ecosystems; and strengthened cooperation between local communities and NRs to address areas of mutual interest, resulting in the improvement of the nature reserves management effectiveness.			
Indicator 7 :	Project-supported nature reserves maintain a higher METT score than a sample of comparable non-project nature reserves			
Value (quantitative or Qualitative)	0% difference	15% higher	Not revised	48% higher
Date achieved	12/14/2006	12/31/2012		12/31/2012
Comments (incl. % achievement)	Achieved. The GEF's Management Effectiveness Tracking Tool (METT) was also used to compare the project and non-project NRs' effectiveness. It indicated that the project NRs management (with higher score) is much improved compared with non-project NRs.			
Indicator 8 :	Number of new sites with high biodiversity value identified and protection initiated			
Value (quantitative or Qualitative)	0	1	Not revised	1
Date achieved	12/14/2006	12/31/2012		12/31/2012
Comments (incl. % achievement)	Achieved. A rapid biodiversity assessment in south-west Guangxi karst area, resulted in the identification of the black crested gibbon (*Nomascus nasutus*) in Banliang forest areas of Jingxi County, which justified and led to the establishment of a provincial level Banliang NR to protect the identified rare species and its habitat.			
Indicator 9 :	Forest dependency score for birds in Damingshan Nature Reserve			

Value (quantitative or Qualitative)	3	4+	Not revised	8.4
Date achieved	12/14/2006	12/31/2012		12/31/2012
Comments (incl. % achievement)	Achieved.			
Indicator 10 :	Kilometric abundance score for four forest-dependent pheasants in Maoershan Nature Reserve			
Value (quantitative or Qualitative)	0.47	1+	Not revised	1.01
Date achieved	12/14/2006	12/31/2012		12/31/2012
Comments (incl. % achievement)	Achieved.			
Indicator 11 :	Number of Francoisi leaf monkeys in Nong Gang Nature Reserve			
Value (quantitative or Qualitative)	66	80	Revised	98
Date achieved	07/01/2010	12/31/2012	12/31/2012	12/31/2012
Comments (incl. % achievement)	Achieved. At the time of mid-term review, the original indicator was revised from area utilized by Francoisi leaf monkeys in Nong Gang NR to the number of Francoisi leaf monkeys in Nong Gang NR. This was because the boundary of the area utilized by Francoisi leaf monkeys was difficult to identify. So the revised indicator can accurately represent the changes of the biodiversity status of the NR.			
Indicator 12 :	Number of Slipper orchids along 19 fixed transects in Mulun Nature Reserve			
Value (quantitative or Qualitative)	849	No decline from previous year	Not revised	918
Date achieved	12/14/2006	12/31/2012		12/31/2012
Comments (incl. % achievement)	Achieved.			
Indicator 13 :	Area affected by fires in Longshan Nature Reserve Donghong Section			
Value (quantitative or Qualitative)	19.7 ha	Less than 3ha affected by fire since 2010	Not revised	0
Date achieved	12/14/2006	12/31/2012		12/31/2012
Comments (incl. % achievement)	Achieved.			
Indicator 14 :	Provincial forest strategy formulated and adopted by Guangxi authorities			
Value (quantitative or Qualitative)	N/A	Strategy adopted	Not revised	Strategy adopted
Date achieved	12/14/2006	12/31/2012		12/31/2012

Comments (incl. % achievement)	Achieved. While recognizing the productive potential which forestry has in growing the provincial economy, the strategy placed ecological stability, social welfare and sustainability squarely at the heart of the strategy. It provided the guidance to the integrated forest resources management and identified clear priorities to the Guangxi Forestry Sector development by the year 2020.			
Indicator 15 :	Number of forest staff and households trained			
Value (quantitative or Qualitative)	0	190	Not revised	204
Date achieved	12/14/2006	12/31/2012		12/31/2012
Comments (incl. % achievement)	Achieved. The training covered all aspects of the project implementation, such as nursery management, silvilcultural technologies (in particular on new technology extension), monitoring system operation, environmental protection guidelines and pest management, forest certification, CDM afforestation program management, financial management and disbursement, procurement and community consultation process. The training relevant to nature reserve management is included in component 3 separately. The implementation of the intensive training program made great contributions to the capacity building of the project agencies and households.			
Indicator 16 :	Number of guidelines and technical advisory bulletins developed			
Value (quantitative or Qualitative)	0	20	Not revised	41
Date achieved	12/14/2006	12/31/2012		12/31/2012
Comments (incl. % achievement)	Achieved. Developing various guidance and technical materials helped implement the project technical design and effective management. For instance, 28 sets of improved silvicultural technologies to various species such as masson pine, eucalyptus and ranges of local broadleaf species contributed to transferring 13 new technologies to the project areas.			
Indicator 17 :	Monitoring and evaluation system performance evaluated periodically and improved			
Value (quantitative or Qualitative)	N/A	qualitative assessment	Not revised	relevant monitoring and reporting on a regular basis
Date achieved	12/14/2006	12/31/2012		12/31/2012
Comments (incl. % achievement)	Achieved. The project monitoring plan was fully implemented and the project progress, performance and impacts were monitored on a regular basis, with a computerized monitoring system in place, which improved the information system and data base management efficiency.			

G. Ratings of Project Performance in ISRs

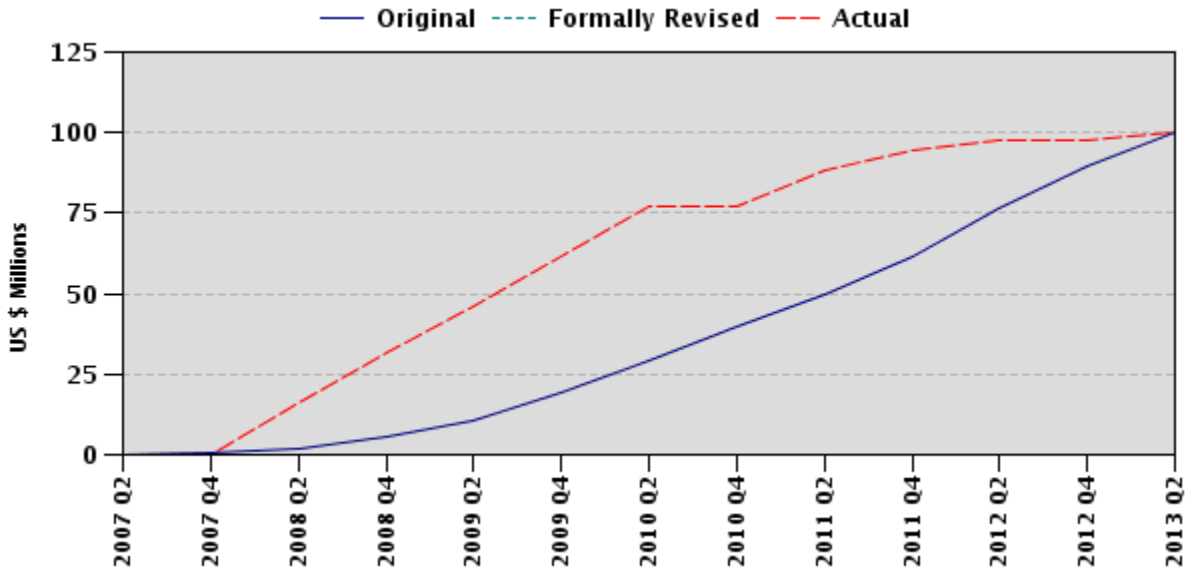
-						
No.	**Date ISR Archived**	**DO**	**GEO**	**IP**	**Actual Disbursements (USD millions)**	
					Project 1	**Project 2**
1	06/26/2007	S	S	S	0.00	0.00
2	02/02/2008	S	S	S	23.89	0.60
3	04/07/2009	S	S	S	61.68	1.10
4	02/11/2010	S	S	S	76.82	1.67
5	04/10/2011	S	S	S	94.30	2.78
6	05/07/2012	S	S	S	97.63	3.94
7	12/23/2012	S	S	S	100.00	5.25

H. Restructuring (if any)

Not Applicable

I. Disbursement Profile

P088964



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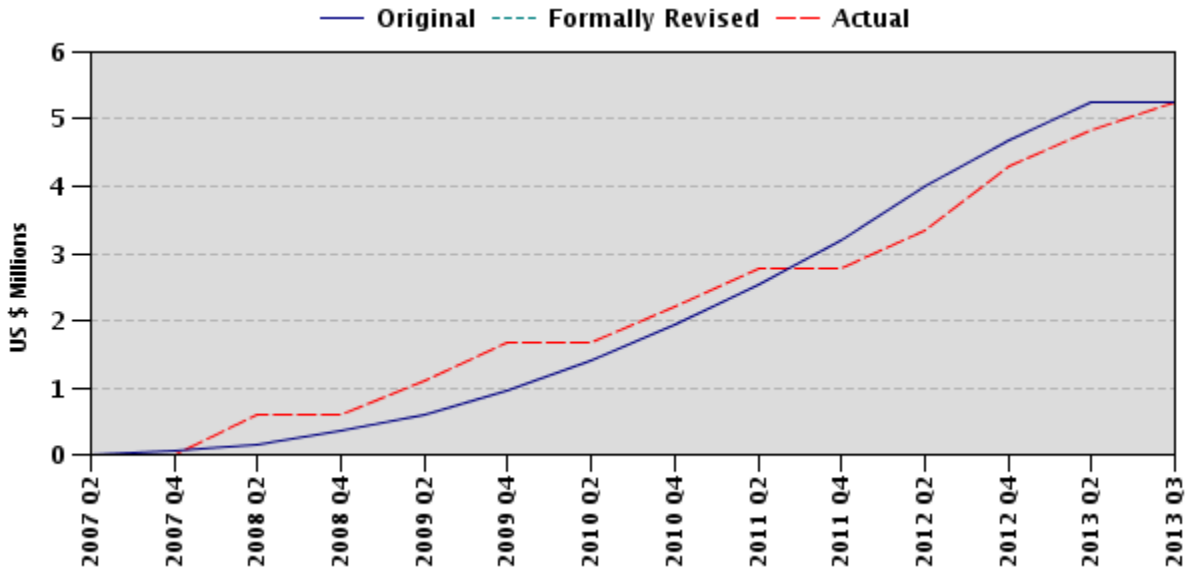
Original
Formally Revised
Actual
US $ Millions
6
5
4
3
2
1
0
2007 Q2
2007 Q4
2008 Q2
2008 Q4
2009 Q2
2009 Q4
2010 Q2
2010 Q4
2011 Q2
2011 Q4
2012 Q2
2012 Q4
2013 Q2
2013 Q3

1. Project Context, Development and Global Environment Objectives Design

1.1 Context at Appraisal

1. At the time of appraisal, China's forest resources and biodiversity were coming under intense pressure due to the increased demand for forest products, mainly timber and pulpwood. This increase in demand - a result of rapid economic expansion - manifested itself in forest degradation, soil erosion, and loss of biodiversity. To address these problems, the Government of China (GoC) launched a number of initiatives. The Natural Forest Protection Program (NFPP) which was launched in 1998 was a far-reaching and ambitious initiative which, *inter alia*, banned commercial logging in natural forests in many areas, intensified the protection and rehabilitation of natural forests, promoted afforestation, and returned steep slop cultivated land to forestry. While the NFPP was a positive initiative in favor of environmental rehabilitation and forest protection, the logging ban accentuated wood shortages, increased wood prices and widened the already significant trade-gap in forest products. The GoC' response to this was embodied in the Sustainable Forestry Development Strategy (SFDS-2002) which aimed to further protect the environment by relieving pressure on natural forests and the environment through tree planting. Tree planting was also to be used to rehabilitate slopes, extend areas under ecological forestry, and promote private sector actively participating in forest resources development. These policy shifts had far reaching implications for the Guangxi Zhang Autonomous Region (GZAR) which was designated as one of key four areas where plantation forestry should be developed, mainly because of its favourable tree growing conditions (soils and climate), its rapidly expanding forest industry, and its strategic location in the Pearl River Watershed.

2. The GoC was also positioning itself on the conservation and climate change fronts to complement these forestry initiatives. Recognizing that the environment and biodiversity were coming under increasing pressure, the GoC' 11th Five Year Plan (2006-2010) identified protecting the environment and biodiversity as key priorities, and this paved the way for the preparation of the China Biodiversity and Framework for Action in 2007. With the GZAR being located in the Indo-Burma biodiversity hotspot and having a rich and unique biodiversity, including one of the largest and most important representatives of karst ecosystems in the world, the expansion of commercial forestry required a redoubling of efforts to protect biodiversity. As a consequence, the CZAR took the decision to intensify the protection of biodiversity and improve the management of its extensive network of nature reserves.

3. During the same period, China was becoming increasingly conscious of its position as the world's largest emitter of GHG and recognized that its role would become crucial in the global effort to mitigate and adapt to climate change. In 2009 it therefore committed to a voluntary 40-45% carbon intensity reduction and 15% non-fossil energy consumption in the total primary energy consumption. Carbon sequestration through afforestation and reforestation was to become the one of main instruments to achieve this

goal, and the GoC committed to increasing the forest area by 40 million ha by the year 2020, as compared to the year 2005.

4. The project objective and design were strongly supportive of these higher level policy objectives of expanding plantations, protecting ecosystems, and conserving biodiversity.

1.2 Original Project Development Objectives (PDO) and Key Indicators

5. The overall project development objective is to improve the effectiveness of forest management and institutional arrangements in timber production, watershed protection and nature reserves management in selected areas of the GZAR.

6. Progress towards the attainment of this objective would be measured by monitoring: (a) timber production efficiency such as planting survival and plantation growth rates under various institutional and partnership arrangements between forest farms and communities/households, as well as individual households; and (b) the increase in the vegetation cover in targeted watershed areas. More detailed results and outcome indicators for each component are included in Annex 2 of the ICR.

1.3 Original Global Environment Objectives (GEO) and Key Indicators

7. The global development objective of the project is to improve the conservation of the globally significant biodiversity of the GZAR by ensuring effective *in-situ* protection of threatened and globally important forest habitats and rare and endemic species. Progress towards the achievement of these objectives would be measured by monitoring how well the five project nature reserves are being managed, how well biodiversity conservation is taken into consideration outside of nature reserve, and how institutional capacity to deal with biodiversity conservation is improved. Detailed relevant intermediate results and outcome indicators appear in Annex 2 of the ICR.

1.4 Revised PDO (as approved by original approving authority) and Key Indicators, and reasons/justification

8. The PDO and its indicators remained unchanged throughout the project.

1.5 Revised GEO and Key Indicators, and reasons/justification

9. The GEO and its indicators remained unchanged throughout the project.

1.6 Main Beneficiaries

10. Around 118,020 households participated in and benefited/would benefit from the project under Component 1 (Expanding Timber Plantations), which was 105% of the targets of 112,000 households estimated in PAD as primary project beneficiaries. The main benefit would be in the form of employment in tree planting and additional income

from higher productivity plantations on the land for which they own the management right. The project has also create social benefits to an additional 10,1500 households, through planting in degraded watersheds, piloting carbon emission reduction (CER) trade, providing training and grants to communities around nature reserves to develop alternative livelihoods. Similarly, the staff at provincial, county/city and nature reserve levels would also benefit from training aimed at improving the quality and sustainable outputs of forest products and services (protection, conservation, and carbon sequestration).

1.7 Original Components

11. The project comprised the following components:

Component 1–**Expanding Timber Plantations** (Total cost: US$171.10 million; IBRD: US$97.95 million)

12. The component aimed to: (a) establish 200,000 ha of high yield-timber plantations; and (b) improve nursery management, including the establishment of four central nurseries and facilities to produce high quality planting material for the introduction of superior genetic materials. These activities were intended to enhance productivity of forest resources and increase the supply of timber products, thereby reducing pressure on natural forests and biodiversity as well as increasing household incomes and generating job opportunities for local farmers. Planting was designed to be carried out using existing modalities, that is, either through loans to householders or through various types of contractual agreements to be arranged between forest farms and householders.

13. Activities focused in 33 counties and 13 state forest farms, including around 22,400 sites. The plantation establishment was to be carried out in accordance with provincial level master plans which would based on beneficiary preferences, prescribe species to be planted and silvicultural and management systems to be followed. The proven research results, improved nursery management and silvilcultural technologies would be adopted by the project to improve the forest land productivities and plantation management.

Component 2 – Increasing Ecological Forest Cover (Total Government cost: US$18.67 million)

14. The component aimed at developing demonstration models under the GoC's Pearl River Protection Program. It included (a) the establishment of 18,000 ha of multiple use protection forests; and (b) the promotion of forest regeneration and vegetation rehabilitation on 100,000 ha through hill closure and partial replanting in open areas in critical watersheds and karst areas in 25 counties. The main focus of protection forest establishment and management was environmental conservation. Sixteen species, most of them are native species, such as Oak sp. Mason Pine, Maple, Schima, Chinese Fir, Magnolia, Chun, Japanese Cedar, Cinnamon, Chinese Aniseed, Chinese cedar and various species of bamboo were to be used so as to diversify forest structure and improve

biodiversity and soil conservation. Site selection was based on the degree of erosion hazard, the importance of the site to the hydrology of the Pearl River Basin, and the value of the site to conserving karst ecosystems.

15. The component also included one of the Bank's first BioCarbon pilots aimed at demonstrating the viability of community and householder forest carbon sequester program. This was referred to as the Facilitating Reforestation for Guangxi Watershed Management in Pearl River Basin program-CDM I. The intervention was designed to demonstrate technical and methodological approaches to using reforestation of degraded barren lands to sequester carbon, test and pilot carbon trading, enhance biodiversity conservation, control soil erosion and generate income for local communities.

Component 3–Improving Nature Reserves Management (Total cost: US$7.02 million; GEF: US$4.81 million)

16. The aim of this component is to enhance the management of existing nature reserves; increase management capacity and knowledge of biodiversity conservation (particularly in the little-known limestone ecosystems); and strengthen cooperation between local communities and nature reserve to address areas of mutual interest. Specifically, the component would finance: (a) the development and implementation of management plans for five globally significant, high priority nature reserves for demonstration purposes including staff training and capacity building; (b) targeted biodiversity survey and research to increase knowledge, particularly of karst biodiversity (outside the nature reserves), to better integrate biodiversity conservation into the broader landscape; (c) activities which strengthen collaboration between nature reserves and local communities; and (d) development and implementation of a simple participatory monitoring and evaluation system focused on the nature reserves and building on the experiences of previous GEF-financed biodiversity projects in China.

Component 4–Enhancing Institutional and Management Capacity (Total cost: US$5.06 million; IBRD US$ 2.05 million; GEF: US$ 0.44 million)

17. This component aimed at implementing an integrated institutional and management capacity-building program that would: (a) strengthen the capacity of the provincial forestry bureau to develop and implement a sustainable provincial forest sector development strategy and support priority policy studies, guidelines, and regulations revision; (b) implement applied research programs to generate operationally usable technologies to improve commercial forestry development, ecological forest protection, and biodiversity conservation; (c) disseminate research results, technical guidelines and lessons learned to project agencies, entities and beneficiaries; and (d) establishment a simple project monitoring and evaluation system to monitor project performance towards the achievement of its development objectives and assess the project's environmental and socio-economic impacts.

1.8 Revised Components

18. The original components remained unchanged throughout the project implementation period. However, changing conditions during implementation required minor changes such as financing arrangements for selected activities (see section 1.9).

1.9 Other significant changes

19. **The following summarizes the changes during project implementation:**

(a) The disbursement rate of Grant in Works Category under GEF Grant financing component was increased to 100% from 50%. Meanwhile, the government fully financed the remaining relevant project civil work. This adjustment facilitated the project procurement process, which avoided the longer review processes by both Bank and Government agency for one single small civil work that was financed by both Bank Loan and Government counterpart funding.

(b) At the time of mid-term review, a minor change was made to the results indicators to better monitor biodiversity conservation in Long Gang NRs. Indicator 3.5 under Improving Management of Nature Reserve Component was modified by replacing *area utilized* by Francoisi leaf monkeys to *number of leaf monkeys*. This was done because the boundary of areas utilized by Francoisi leaf monkeys was difficult to identify. The revised indicator was considered more effective to measure the changes in biodiversity status in Long Gang NR.

(c) The US$ 1.34 million from IBRD loan, allocated to small guard/storage sheds for patrolling and storage of planting materials in the fields, was reallocated to plantation establishment activities to fill the financing gap caused by an increase in planting unit costs and the depreciation of US$ against RMB. This is because that rural public transportation was improved dramatically during the project period which enabled planting entities and households to easily travel to planting sites with seedlings and fertilizers etc, so the guard/storage sheds were no longer needed.

(d) The financing percentage of IBRD Loan for Consultants' Service, Training and Study Tour Category was revised from 70% to 100%, and the remaining loan funds were transferred to plantation establishment. This was made possible by the Government financing a large number of the project consultant's services and the training program with its own funds.

(e) Some project counties mobilized other sources of funding for their plantation programs during the project implementation. This led to a reduction of the number of project counties undertaking plantation establishment and watershed management from 33 to 30, while, at the same time, maintaining the original project targets.

(f) Building on the success of the first CDM pilot, a second CDM operation - Reforestation on Degraded Lands in Northwest Guangxi Project (CDMII) was developed and registered during project implementation (2009). The main aim of

the CDM II was to demonstrate a new international CCB standard (Climate Change, Community Development and Biodiversity conservation). Under the CDM II, around 8760 ha plantations were planned to be established under the Component 2.

(g) Due to increased labor and materials costs, project costs rose significantly and the financing gap was fulfilled through increased counterpart findings from Government and project entities including households.

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design and Quality at Entry

20. Project Preparation took two years, which was sufficiently analytical and detailed. A thorough background analysis was conducted and the main sector issues were highlighted. The project built on the experience of several successful national forestry sector operations in China. Forward looking and innovative interventions were developed to: (a) make significant advances over previous operations by, for the first time in China, integrating production forestry, ecological forest management and biodiversity conservation into a single project as part of a more holistic and integrated approach to forest resources management; (b) focus, also for the first time in China, on the sub-national (provincial and county) level where primary responsibility for implementation of national forestry policy lies; (c) tap Global Environment Facility (GEF) resources to introduce innovative biodiversity conservation approaches, and (d) incorporate the world's first CDM afforestation/reforestation operation, which was registered by United Nation.

21. The design and structure of the project were appropriate to sector priorities. They were supportive of higher level policies such as the nation-wide NFPP, the SFDS, and the Central Committee Forestry Resolution of 2003 (to speed up the development of forestry). All the above aimed to relieve pressure on natural forests, expand plantations and intensify efforts to conserve watersheds and biodiversity.

22. The rational for Bank intervention was strong. While the proposed project would contribute to supporting forest resources management priorities of China, it was also highly relevant to the Bank's Country Partnership Strategy (2006-2010) for China (CPS of May 23, 2006) and fits well within its goals of : (a) Improving efficiency and sustainability of the use of natural resources; and (b) Managing resource scarcity and environmental challenges.

23. The project supported its goals by providing an appropriate blend of complementary interventions in its design. The project also incorporated a clear geographical focus, ensured that plantations were located near centers of wood consumption, and that watersheds and hills rehabilitation areas were linked both to the Pearl River Protection Program hydrology areas and to the GEF financed five nature reserves. It also included karst areas outside reserves (caves and areas adjacent to protected areas in Vietnam) where endangered species such as gibbons and orchids were known to occur.

Sustainability was to be safeguarded by increasing productivity (and profitability) in plantations and by engaging communities and villagers in productive forestry, watershed management, carbon sequestration and conservation of biodiversity. Clearly targeted training programs for project staff and villagers combined with outreach programs also served to enhance sustainability.

24. Government commitment and stakeholder involvement were carefully assessed. A strong sense of ownership was fostered by introducing participatory and "bottom-up" approaches to involving local communities and households early in project design to better respond to communities' preferences and interests in planting and forest management. Ownership was further strengthened by having project leading groups (PLGs) and project management offices (PMOs) at provincial and county levels to provide leadership, coordination, mobilizing counterpart funding and technical services and other necessary resources to the project implementation.

25. The main risks to the project were identified and appropriately rated as moderate, and appropriate mitigation measures were incorporated into project design. These were mainly institutional in nature such as possible low stakeholder interest in conservation and tree planting, forest farm contracts with farmers not reflecting farmer interest and lacking in transparency, and institutional capacity being inadequate. As it turned out, none of these risks materialized due to the mitigations measures have been adopted appropriately. However, extreme weather events that occurred during project implementation posed a significant risk to plantation establishment. The prompt remedial action taken by the GZAR Government and project entities ensured that this did not affect the achievement of project objectives.

26. **Quality at Entry** The QAG did not carry out a Quality at Entry assessment to the project, but the review process during the project preparation proved an effective quality control instrument and this helped to improve quality at entry. An absence of significant changes to the project coupled with its successful outcome provides further evidence that quality at entry was good.

2.2 Implementation

27. Project implementation was affected by a number of positive and adverse factors. As the project agencies took effective measures to address the issues and difficulties during the lifetime of the project, project implementation progressed well throughout and all output targets were either achieved or exceeded, and the project closed on time.

28. Implementation of components 1 and 2 was completed in December 2010 - two years ahead of schedule (see Annex 2). The only slow progress occurred under Component 3 - Improving Management of Nature Reserves (IMNR) in the first years of the project, but the management of the component was improved and it was completed on schedule in December 2012. The Bank supervision missions paid special attentions to the detailed progress reviews under the Component and identified the main issues to be addressed and agreed with the Guangxi Forestry Bureau (GFB) on actions being taken.

The exceptional efforts made by the Biodiversity Office (BO), in particular in late stage of the project implementation, enabled the component to be completed on time with satisfactory results. In addition, some delay was experienced with the implementation of the CDM pilots mainly because of a prolonged drought in the project areas and rigid operational procedures under the CDM program which did not allow the adjustments of project site boundaries.

29. More specifically, positive and negative impacts are detailed below:

(a) High rates of economic growth in China in the last decade favored the project by stimulating interest in commercial tree planting, raising farmer disposable income and increasing government revenues. All these factors favored the project in increasing farmers' interest in plantation establishment and the capacity of local government and planting entities to meet additional counterpart funding requirements.

(b) The project design was consistent and supportive of national and provincial forestry development policy framework embodied in the NFPP and the SFDS, and this provided a solid basis for project implementation. For example, the Government's ban on wood supplies from natural forests stimulated demand of timber from plantation. In watershed areas, an increase in Government budget for water and soil conservation (ecological forests) ensures the project financing in place.

(c) Strong government commitment, reflected in Guangxi Government's decision to increase its counterpart contribution rather than reduce the scope of the project in responding to the depreciation of US Dollar and significantly increased labor and material costs, as well as, to mobilize the required resources to restore the ice-storm and drought damaged plantations so as to meet plantation quality requirements and targets.

(d) Project management and structure at the provincial and county levels were strong and indispensable to successful implementation and sustainability. To facilitate efficient inter institutional communication, a PLG was established at provincial level. Within the GFB a project coordination group was created to ensure good communication between the various divisions of the GFB to manage the project in a more integrated approach. The only implementation problem encountered was in the Nature Reserves Management Component, where a frequent change of staff in the BO was the main cause of delay of the implementation of GEF financed component, which was caught up in the late period.

(e) Successful implementation was further aided by the presence of skilled, high-level advisory groups at provincial level, as well as by extensive training and consultant services which brought technical innovation and up-to-date know-how to the project. The Bank's technical assistances were also crucial to ensure the

project demonstration functions. However, the staff turnover of the BO and did adversely affect the implementation of nature reserve management component.

(f) On the down-side, wages increased by over 100% during the project period, which led to sharp increases in costs. During the same period, the RMB appreciated against the US Dollar by 17% and this reduced the amount of local currency available under the loan. Together with an increase in fertilizer and transport costs, it led to a rise of 84% in plantation establishment costs, around 51% rise in watershed management costs, and around 49% in nature reserve management costs. Despite the increased project cost, the commendable achievement was made possible by hefty increases in counterpart contributions from the Guangxi Government, the GFB and forest farms, as well as from householders who absorbed the increased labor costs of plantations established in their managed land.

(g) Severe weather conditions were encountered between 2008 and 2010. In 2008 severe ice storms damaged 26,330 ha of project plantations, of which 12,980 ha were severely damaged, with the rest suffering moderate to light damage. Remedial work in damaged areas cost US$ 48 million, and by the end of 2012 all affected areas were reported to be fully recovered. The ice storms also damaged 1,024 ha of plantations established under CDM programs, which was replanted too. In addition, in 2009 and 2011 a severe drought damaged a further 842 ha (they were replanted). The continuous 3-years extreme drought was one of the main reasons for delaying plantation progress under the CDM reforestation program.

(h) Regarding to the CDM operations, demanding site selection criteria of the CDM interventions, complex administrative procedures, and a lack of flexibility in adjusting the project sites made the work under this activity very challenging and difficult to adapt to changing conditions experienced during the project implementation. These contributed to the slow start and for the shortfall in CDM planting targets (not for PAD targets) of around 27% for each of the CDM I and CDM II respectively. For instance, (a) the site selection criteria under the CDM resulted in poor quality, high elevation, exposed sites with shallow, infertile soils being selected. As a result the sites were hit by drought and snow more easily and caused low growth in a few sites; and (b) the Government Forest Tenure Reform Program, which allocates the collective owned forest land to the individual households resulted in adjustments to property boundaries and this created land tenure disputes in some areas where were already selected for CDM programs. In areas where land conflicts could not be resolved, there was no flexibility to replace those sites with other sites outside the approved program boundary.

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

30. Project design included a sound project monitoring and results framework. Provincial and county PMOs, the BO, Nature Reserve staff, the Guangxi Forestry

Academy, the Guangxi Forestry Inventory and Planning Institute were responsible for M&E. Communities adjacent to nature reserves also participated in the monitoring process. The project monitoring plan was fully implemented to monitor project implementation progress, quality and impacts. The PAD identified key parameters to be measured and methodologies to be used. All set indicators were monitored and evaluated carefully during the project implementation. In addition to other indicators, the Management Effectiveness Tracking Tool (METT) was also used to monitor the nature reserve management.

31. Implementation of the M&E system went smoothly, with all necessary information being gathered on a timely basis. Planting quality and project impacts monitoring were conducted by forestry professionals. In addition, the PMO and BO regularly monitored physical progress, contractual arrangements with farmers, the number of beneficiaries involved, pest outbreaks, costs and expenditure, as well as the implementation of the Bank safeguards and fiduciary policies. However, the establishment of the computerized M&E platform was delayed due to the relevant technical issues in running this system was not appropriately solved on time. As a result, the computer system was put into use in all PMOs late in the project period. The GFB will use this computerized M&S system to monitor afforestation and reforestation activities in the forestry sector in the future.

32. All information gathered generated quantitative information appropriate for measuring the realization of project objectives. At field level, quality monitoring enabled the provincial PMO to identify plantation operations which fell short of that required to qualify for reimbursement, with planting entities being required to either replant or exclude such areas. Similarly, monitoring the adherence to project safeguards and fiduciary policies ensured that the project was fully compliant with financial management and procurement requirements and social and environmental safeguard policies.

33. Monitoring carbon stock changes was based mainly on tree survival, growth and area, and this was done by the PMOs. The validations and verifications by an international independent third party (DOE) were also conducted, which were fully satisfactory to the DOEs. Monitoring reports were verified by the DOEs who confirmed that methodologies for M&E were sound and that data collected was of a high standard.

34. Involving householders and communities around nature reserves in monitoring was innovative and effective, and contributed greatly to raising public awareness of biodiversity conservation in critical areas, engendering ownership in nature reserve management, and improving prospects for sustainability. The project supported community monitoring approaches which will now be extended to other nature reserves in Guangxi.

2.4 Safeguard and Fiduciary Compliance

35. The project complied satisfactorily with the Bank's safeguards and fiduciary requirements. The project was classified as a Category B project. During preparation an Environmental Assessment was carried out, and an Environmental Management Plan

(EMP), including Environmental Protection Guidelines (EPG) for Plantation Establishment and Management and Pest Management Plan (PMP), was prepared. In addition, a Social Assessment was conducted, and a Policy Framework for Resettlement and Land Acquisition (PFRLA) and Ethnic Minorities Development Plan (EMDP) was prepared. Most social and environmental concerns were integrated into the project design and were implemented appropriately. The Bank supervision missions worked closely with the provincial PMO on the relevant monitoring to ensure that there were no deviations.

36. **Environmental Safeguards** There were no interventions in native forests and rigorous site selection ensured that plantations did not impair either forest ecology functions or biodiversity. The potential environmental issues associated with plantation management, including short-term localized site disturbance at temporary planting activities, short-term impacts on native fauna, waste management at planting sites and large scale plantation development with exotics were fully addressed. Mitigation measures included strict site selection criteria, the use of small planting blocks, planting mixed clones, no use of invasive species, and the adoption of an EMP, institutional strengthening, and training. The EPG provided the necessary environmental safeguards to mitigate the risks associated with planting exotics and monocultures, whereas the PMP ensured that pest and disease outbreaks were tightly controlled and that, wherever possible, Integrated Pest Management was used in place of chemicals.

37. **Social Safeguards.** A PFRLA was put in place to address possible adverse impacts on people's livelihoods of restricting access to forest resources in NRs or in areas under hill closure. Several mitigation measures were put in place and conducted under the PFRLA, namely: (a) extending biogas schemes to villages and households so as to substitute for the use of wood fuels - During the project period, by closely linking with Government biogas program, around 26,510 biogas digesters were installed in the project areas to provide heating and cooking needs of the households; (b) investments in alternative economic activities with seed grants, together with other Government funds to generate alternative incomes; and (c) providing skills training to affected communities to build local capacity for sustainable development. For instance, RMB 2.1 million of Seed Funds were allocated to village communities adjacent to NRs to support biogas projects, fuel-saving ovens, forage cropping and animal breeding activities. Around 2,550 farm households benefitted from these programs.

38. The EMDP was also well implemented. Participatory design procedures were adopted in all project villages, either during project preparation or implementation. Villagers were provided information on the project and participation was strictly voluntary. A Participatory Design Manual (PDM) was developed and used to guide the consultation process. Through extensive consultation on the ground, the communities and households, most of whom are ethnic minority people, participated in the project on a fully informed and voluntary basis. Ethnic minority peoples' preference on species selection and management arrangements were taken into account during project design and implementation. Women were also actively participated in the project consultation process, as well as trainings and planting activities during the project period, by sharing

equal rights and opportunities with male. In addition to regular monitoring, social specialists conducted assessments on EMDP compliance and possible impacts, and these resulted in very positive conclusions.

39. A project beneficiary survey conducted by the project PMOs at the end of the project showed that 210,370 farm households participated in the project plantation establishment. Of which around 132,720 households were ethnic minorities, (63.1 % of the total), around 95,440 of whom were classified as poor (45.4 % in total). For plantation establishment, ethnic minority groups, such as Zhuang, Miao, Yao, Dong, Yi, Maonan, and Shui, enjoyed equal opportunities to participate in and benefit from the project. By the end of project implementation, it was estimated that, from 2007 to 2012, an additional RMB 15,000 per ha could earned from tree planting. In addition, farmers have earned about RMB 2000/per person month from employment in the planting season during the project period. Meanwhile, through skills training and capacity building under the EMDP, local ethnic minority communities developed stronger capabilities and resources for their socio-economic development.

40. Resettlement Policy Framework (RPF). A RPF was prepared to guide project activities in the event that the voluntary acquisition of land might take place during project implementation. However no such acquisition occurred in the project period.

41. **Fiduciary Requirements.** A procurement assessment and a financial management assessment carried out during preparation concluded that the organization, structure, skills and control systems at provincial, county and forest farm levels were adequate. The financial management guidelines and procurement guidelines were developed to guide the implementation of project fiduciary safeguards; relevant training was provided to staff of provincial and county PMOs staff, as well as project entities, on an annual basis, and financial management was satisfactory throughout the project period. Bank supervision missions reviewed those aspects and confirmed that the Fiduciary Safeguards compliance was insured at all level in general. Supervision missions occasionally noticed that counterpart funding was not always in place on time, and/or not recorded in an appropriate way, as well as some week financial management was found in some project counties and nature reserves, but these weaknesses were rectified with the help of Bank missions.

2.5 Post-completion Operation/Next Phase

42. After closure, project management responsibilities were transferred to project entities, as well as local forestry bureaus. Project design ensured that the maintenance phase of existing project activities is small and adequate capacity is in place.

43. Householders, communities and forest farms will assume responsibility for plantations established on the land they own its management right after project closure, and given that project maintenance obligations would be small and diminishing at that time, no follow-up issues are anticipated. In fact, fast growing species like eucalypts, which grow on a six year rotation, were not only beyond the tending stage at closure but

were ready for harvesting. After harvesting, a coppice rotation of eucalypts can be expected.

44. The plantation maintenance mainly includes pest management and fire prevention and control. The existing forestry management, organization and structure has ensured that the project activities including pest and fire management, technical assistance have been integrated into the county government forest management system and become their operational routine. In addition, for watershed management, the provincial government has already put in place an annual grant of 75 RMB/ha for ecological forests' management which will ensure the continuity of the program. Access to the CDM program will also provide an additional incentive to villagers to continue with the long-term forest management.

45. All entities and forest farms involved in the activity under carbon finance operation have committed to continue with forest management and measuring CERs at five year intervals until the end of the crediting period (up to 30 years). A monitoring plan is in place and the provincial and relevant county PMOs will be responsible for program management, mainly monitoring established plantation management, CERs verification, as well as the payment of credits to beneficiaries. From the Bank side, according to the Emission Reduction Purchase Agreements (ERPAs), which was signed between the Bank and project entities, the CERs purchased from CDM I and CDMII will end by June 31, 2018 and December 31, 2016 respectively. It is expected that the responsibilities of the project monitoring will be transferred to the Carbon Finance Unit by July 31, 2013.

46. Under the nature reserve management component, major capacity building investment was undertaken during project implementation with GEF and Government funds. Sufficient recurrent and investment government budgetary source are available to cover the continuation and even expansion of management planning and implementation in all the project nature reserves.

3. Assessment of Outcomes

3.1 Relevance of Objectives, Design and Implementation

47. The PDO and GEO were highly relevant to the GoC's policies on natural resources management and to the needs of the GZAR both at the time of appraisal and project closure. The project was strongly supportive of the government's policy on forestry development, watershed management, climate change and biodiversity conservation. On forestry, it complemented the NFPP, the SFDS, the Forestry 11^{th} Five Year Plan （2005-2010） and 12^{th} Five Year Plan (2010-2015). It is also consistent with Government commitment on climate change mitigation.

48. The nature reserve management component was supportive of the global and national objectives of management of high-value biodiversity resources inside and outside of protected areas. The GEO also provided impetus to the GoC's Wildlife

Conservation and Nature Reserve Development Strategy. It proved to be forward looking in that it became congruent to the GoC's desire to better control desertification in rocky landscapes - the Rocky Diversification in SW Karst Region initiative - which emerged from the 2012 session of the National People's Congress (NPC).

49. The PDO, project design and implementation was also consistent with the World Bank's Country Partnership Strategies (CPS 2006-2010 of May 23, 2006 and CPS 2013-2016 of November 6, 2012) for China, which focus on improving efficiency and sustainability of use of natural resource and demonstrating better ecosystem management and biodiversity conservation.

50. The four project components were appropriate and well designed and collectively contributed towards meeting the PDO. Overall rating of PDO and GEO achievement is highly satisfactory. In contrast to other Bank forestry projects in China, an integrated approach was used to improve forest resources management and biodiversity conservation. It proved to be very effective in enhancing timber production, watershed management, biodiversity conservation, climate mitigation, and institutional capacity; and in demonstrating effective and sustainable forestry resource management practice. The project introduced innovative natural resource management and mainstreamed biodiversity landscapes management. It also piloted two carbon finance operations, of which one is the world's first reforestation CDM program in forestry sector.

3.2 Achievement of Project Development Objectives and Global Environment Objectives

51. The project achieved its PDO of improving the effectiveness of forest management and institutional arrangements in timber production, watershed management and nature reserves management in selected areas of the GZAR. It also achieved its GEO of improving the conservation of the globally significant biodiversity of the GZAR by ensuring effective *in-situ* protection of threatened and globally important forest habitats and rare and endemic species.

52. All project targets that were set in the PAD were either fulfilled or exceeded and project implementation was very successful. The project also provided employment and alternative livelihoods to poor households in rural areas at a time when the GoC was becoming increasingly concerned about social inequality in China, especially in rural areas.

53. Project experience and lessons learned have been disseminated broadly. Many delegations/agencies from more than 12 provinces of China and from 10 other counties visited project areas to learn the experience and lessons learned in particular the CDM reforestation and cave and karst ecosystem biodiversity conservation. The project was also selected to showcase innovative approaches and successful project implementation in the event of Innovation Day held by Bank HQ in June 2011. The project has strong potential for replication both in other provinces in China and in other developing countries.

54. The achievement of project objectives is summarized below:

Project Development Objectives	**Impact Indicator**	**Projected (PAD)**	**Actual (ICR)**
To improve effectiveness of forest management and institutional arrangements in timber production, watershed protection and nature reserve management in selected areas of the GZAR	Project supports timber plantations achieve higher timber volume growth per ha than non- project plantations	25% increase	33.7%
	Forest Farm employees are able to engage in self employment	1,600	2,452
	Increase in vegetation cover in targeted watersheds at project completion	10%	12%
GEO is to improve the conservation of the globally significant biodiversity of the GZAR	Populations of key indicator species (e.g. primates and turtles) or areas of limestone forest in at least 4 out of 5 nature reserves remain stable or increase	4NRs	5NRs

55. The table above shows that all targets were either achieved in full or exceeded, as were project outcomes (Annex 2). More specifically, project achievements are briefed below.

56. Sustainable plantation productivity. A key indicator to effectively manage timber plantation, which accounted for more the 85% of total project cost, shows that the project supported timber plantations achieved higher timber volume growth than non- project plantations (more than 33% compared with the project target of 25%). The effectiveness of timber plantations was improved mainly through the use of improved planting stock, by extending the use of tissue culture techniques, using only improved seeds in nurseries, introducing smaller and biodegradable seedling containers, optimizing seedling spacing; the extension of 13 new technologies to improve the silvicultural practice such as appropriate fertilizer application in plantations, reducing pest damage through the use of pest resistant clone and provenance, and rigorous field quality monitoring; as well as extensive training and technical services to local project staff and households. Research and experience gained from Guangxi has shown that improved seeds and tissue culture can deliver a 20% gain in plantation productivity. These practice combined with better field practice and efficient pest management is likely to deliver even higher gains. In addition, plantation environmental sustainability was improved through the application of EPG, site screening, and the adoption of IPM and PMP.

57. The efficiency of the FFs has been improved not only by the increase of their forest land productivity, but also institutional management enhancement. Reducing the number of employees, who used to rely on the payroll from forest farms (FFs) is an important part of the FF reform process, aiming to increase FF's efficiency. Under the

project, around 2,450 employees of FFs are no longer on payroll, by contracting forest land to their employees from FFs for long-term plantation establishment and management, which exceeded the PAD target of 53%. Around US$ 10 million budget was saved by the FFs each year.

58. Watershed management. Improving the effectiveness of watershed management was achieved by developing viable and community-friendly approaches (models) to rehabilitating watersheds through afforesting 18,100 ha bare areas and enriching degraded forest and promoting forest management through closing hills in 109,580 ha karst areas for the forest and other vegetation to recover. The forest restoration target was achieved in full and hill closure target was exceeded by 10% compared with PAD target. At project completion, the vegetative cover had increased by 12% in targeted watersheds, compared with the baseline at appraisal, which is 20% higher than the PAD target. The monitoring results from the watershed management demonstration sites showed that water erosion control capacity was increased by 23% to 40% from the project intervention. The project succeeded in developing demonstration areas of multipurpose mixed species stands mainly with native species to form ecological forests. This proved to be an effective way to create a diverse forest ecosystem and generate better forest environmental functions. Allowing limited harvesting of forest products in these forests (as opposed to total protection) was pragmatic in that it provided householders with a stake in the benefits, and an incentive to participate. Similarly, allowing planting mulberry in hill closure areas and linking this initiative to the biogas program proved to be a very effective way of engaging householders, and in achieving the PDO. Householder participation in the watershed management was on a strictly voluntary basis.

59. Carbon Finance Operation. After CDM I putting into operation, the second BioCarbon operation CDM II was developed during the project implementation. It aims to meet new international standards (the Climate, Community and Biodiversity Project Design Standard, or CCB). In addition to being registered as a CDM project, it also won a Gold Medal as a CCB standard Project. Both interventions successfully achieved their objectives of demonstrating technical and methodological approaches, as well as institutional mechanisms (partnerships between forest farms and householders and communities) of CDM afforestation/reforestation program by undertaking afforestation and reforestation in degraded barren lands to sequester carbon, test and pilot carbon trading, enhance biodiversity conservation, control soil erosion and generate income for local communities. Essentially, the CDM program served as a pre-financing mechanism to make early payments to householders for carbon sequestered in young plantations for the long-run sustainable forest management. Compared with targets set in PAD, both targets of planting area and carbon sequestration were exceeded, in that 167,700 tons of carbon dioxide were sequestered (153% of the target) by planting 9,858 ha of trees (246% of target). The income of US$ 636,868 from selling CERs over the past years has been delivered to the project households and forest farms.

60. In spite of the fact that the CDM programs were launched in the very early developmental stages of carbon markets, the project not only successfully demonstrated innovative approaches to carbon trading with small farmers and investors, but has also

provided valuable experience and lessons learned on CDM reforestation design, on how to deal with issues and difficulties which arise during project implementation.

61. Nature reserve management. The project GEO was fully achieved. The project considerably improved the conservation of the globally significant biodiversity of the GZAR by increasing the effective protection of threatened and globally important forest habitats and rare and endemic species. The populations of key indicator species and areas of limestone forest of 5 nature reserves remain stable or are increasing. The GEF's Management Effectiveness Tracking Tool (METT), which was used to compare the project and non-project NRs' effectiveness, indicated that the project NRs management (with higher score of 76) is much improved compared with non-project NRs of score of 51.5 with 48.5% increase rate. All other outcome targets were met or surpassed, as demonstrated through (a) the richness of globally significant biodiversity of each project nature reserve increased; (b) technical viable, community oriented approaches to conserving biodiversity were developed; (c) sound technical foundations were laid to improve the management of nature reserves; (d) critical areas outside nature reserves meriting protection were identified, and sustainable and; (e) cost effective approaches to their conservation were put in place. Details see Annex 2.

62. The design of biodiversity conservation interventions was innovative and clearly focused on areas where the greatest dangers to biodiversity were perceived (five nature reserves and karst landscapes). Household and community engagement in project implementation and conservation through, for example, Forestry Conservation Committees (FCC) and Community Conservation Committees (CCC), proved to be popular and successful. Linking conservation to alternative livelihoods (tourism etc) and the biogas program also proved to be an effective incentive for householder participation.

63. A very significant outcome of the component has been the change in the culture of management of nature reserves (NR) in the five project reserves. There appears to be broad recognition both within the participating NRs and the GFB Wildlife Management Station on the positive and relative impacts associated with this innovative approach supported under the component. Furthermore, establishing linkages between key institutional stakeholders through the FCCs and becoming partners with local communities through the CCCs provided a broader and firmer foundation to base the future management of the NRs.

64. The project also made a great contribution to discovering a new Global Hotspot by recognizing that Guangxi has extremely rich cave biodiversity. From the cave biodiversity surveys, 164 new species were identified. Around 537 species found are unknown outside of Guangxi. Based on the project results, the scientists first pointed out that the cave fauna of Guangxi has the richest cave fauna anywhere in China and continental Southeast Asia. Many relevant papers have been published internationally. This discovery of 164 new species and the extension of range of known species also provided the basis for taking a number of new management measures in support of improved conservation of biodiversity in nature reserves, informing local peoples on the significance and needs to conserve animal and plant species. A workshop on cave

biodiversity in Guangxi with international and national participants was also held and provided additional opportunities for learning, and for publicizing the conservation work being done in the GZAR.

65. In addition, the rapid biodiversity assessment of the south-west Guangxi karst areas conducted outside of the nature reserve identified the rare black crested gibbon (*Nomascus nasutus*) in Banliang forest areas, and it led to the establishment of a provincial level Banliang nature reserve during the project period.

66. Capacity building. The capacity and efficiency of institutions was improved through implementing a institutional and management capacity building program, which included: (a) the development of sector studies to promote the adoption of a sector-wide, integrative and comprehensive approach to sustainable forest resource management; (b) the successfully implementation of research and extension programs; and (c) training and technical services to make adequate provision for information generation, dissemination and skills upgrading of both project staff and householders. These activities greatly assisted project implementation and increased the prospects for sustainability. Around 13 new technologies were transferred to farmers and forest farms, such as the used of improved, higher productivity and disease resistant planting stock of pines and eucalypts; around 41 technical bulletins and guidelines (exceeding the project by 100%) with over 52,000 copies were distributed to local technicians and householders; an intensive program of training was carried out, and a total of 204,090 local forest staff and households participated in the trainings –exceeding the project target by 8%. In addition, the research and extension results have been broadly disseminated through many publications which include 59 technical papers, 11 technical notes, and 4 technical instructions. The above combined efforts made significantly contribution to improving effectiveness of forest management, watershed management and biodiversity conservation, as well as forestry program management efficiency.

67. The activities developed under this component also helped foster partnerships, encourage participation and strengthened community involvement in sustainable forest resources management. For details see Annex 2.

3.3 Efficiency

68. An economic analysis has been done at project level at the project closing in end of 2012. The major quantifiable benefits for the economic analysis were derived from (a) incremental wood and timber products which are in high demand in the project area; and (b) the incremental sequestration of carbon. In addition, the project also generated significant downstream and global benefits, such as the impact on soil and water conservation and on biodiversity conservation, which are difficult to quantify and therefore not included in the economic analysis. The economic benefit flows are built up, in line with the physical achievements by year of various plantation models, while the cost flows are based on actually investments/expenses by year. As such, the Economic Rate of Return (ERR) of the project is calculated at 25% (without carbon sequestration)

and at 33% (with carbon sequestration)，which is higher than the targets set in PAD of 16% and 24% respectively.

69. The financial analysis was carried out for all individual plantation activities under component 1 (timber production), totaling some 214,000 ha. The financial cash flow analysis for individual plantation activities indicated a significant difference between faster-growing species like eucalyptus plantations and slow-growing timber plantations. From a financial cash flow point of view, most eucalyptus plantation models are substantially more profitable than slow-growing timber species. This explains why project participants, in particular the households, prefer faster-growing species which provide an earlier return from which a loan can be repaid. Overall, all timber plantation models implemented are financially attractive with FIRR ranged from 14% to 43%, which are higher than the targets set in PAD from 11% to 31%. However, for plantations under component 2 (ecological forest), this is not the case for all of the watershed plantations as the ecological benefits have a higher importance.

70. On efficiency gains, plantation productivity was improved through the use of improved planting stock to accelerate growth, better nursery practice to reduce costs and quicken seedling maturity, better field practice (new technology use, optimum spacing, less intensive site preparation, water retention measures), to reduce losses and reduce establishment costs and better technical services. Raising efficiency in watershed management was attained by developing and demonstrating approaches which are not only cost-effective but also acceptable to householders and communities. Moreover, the management efficiency of the nature reserve management has been largely improved. While the resources are growing for biodiversity conservation in Guangxi, the strengthened management in the reserves improved their ability to use additional resources in a more effective manner for conservation objectives.

3.4 Justification of Overall Outcome and Global Environment Outcome Rating

Rating: Highly Satisfactory

71. The overall outcome of the project is rated as Highly Satisfactory because the project design was highly relevant, it met or exceeded all its planned outputs, achieving its PDO and GEO, and did so at a high rate of efficiency.

72. The project successfully piloted innovation in carbon finance operation and biodiversity conservation; demonstrated effective approaches to watershed management; improved the effectiveness of timber plantations management, which was proved by better-than-predicted returns and resilience to the rapidly rising costs of labor and materials; project IBRD Loan funds and GEF Grant funds were fully disbursed; and the project closed on time and is expected to be managed in a sustainable way in the future. In addition, it undertook ground breaking work on karst cave ecology management and protection by identifying a global hotspot of cave biodiversity of remarkable significance.

73. The project innovated by developing a comprehensives financing mechanism which encompassed the benefits accruing from the three separate instruments: IBRD loans, GEF grants and CF financing. Therefore, the project represents a significant advance by integrating production forestry and protected area management to achieve a more holistic approach to forest management.

3.5 Overarching Themes, Other Outcomes and Impacts

Overarching Themes, Other Outcomes and Impacts

74. **Reduced Pressure on Nature Forests.** The establishment of an additional 214, 000 ha of high productivity plantations is capable to produce around 32.7 million m^3 timber, will reduce the pressure on nature forests and its associated biodiversity in Guangxi, to promote the sustainable forest resources management and biodiversity conservation.

75. **Ecological Stability, Sustainability and Certification in Plantation Forestry.** Ecological balance in plantations will be improved through adherence to EPG and PMP. The use of site screening prior to planting will also help safeguard habitats and biodiversity, while lower impact site preparation will reduce soil disturbance, all of which will favor environmental sustainability. Compliance with these norms has meant that three project forest farms have obtained the Forestry Stewardship Council (FSC) certification and an additional one is in the final stages of receiving such certification. This will also allow timber products from these farms to reach EU and North American markets where certification enjoys a price premium of between RMB 60 to 100 per m^3.

76. **Carbon Trading Readiness.** The experience gained from implementing the BioCarbon Fund supported CDM subcomponent has put the GZAR (especially the Guangxi Forestry Bureau, the Forest farms and householders) in an advantageous position *vis-à-vis* carbon trading. Not only it now has in place workable institutional mechanisms for carbon trading, but also institutions and householders are now in a very strong position to enter the carbon trading market, and to pass on this experience to others.

77. **Restoring Ecological and Hydrological Balance in the Pearl River Basin.** The project has demonstrated that technically viable models exist, and that hill closure partnerships with villagers, whereby households enjoy limited harvesting rights to forest produce, is a feasible approach to restoring ecological balance in critical watersheds. This approach, combined with incentives for ecological forestry, has considerable potential to be scaled up and replicated over large areas of the Pearl River Basin, and elsewhere in China.

78. **New Approaches to Conserving Biodiversity.** Past approaches to conserving biodiversity in China have been largely technical and top-down, with most emphasis being placed on protecting biodiversity inside reserves through human exclusion. In addition to introducing new technical approaches to improving conservation, the project has introduced a far-reaching culture change whereby community engagement has been

institutionalized, and householders and communities have become partners in biodiversity conservation. The project also contributed greatly to improving the lives of people living around reserves by linking conservation to alternative sources of energy (biogas) and funding the development of alternative livelihoods. This approach can be replicated elsewhere in the country.

79. **Employment, Alternative Livelihoods and Rural Poverty Alleviation.** The project areas are largely located in mountainous areas (2/3 of project counties are national and provincial poverty counties) and the majority of plantations (around 83%) were established on communities and households lands, for which they have the land use rights. Around 118,000 households participated in and benefited from the project timber plantation activities, of which, around 38% of them were classified as poor, around 46.7% of which belong to ethnic minorities. In addition, households who participated in watershed management, carbon finance operations and nature reserve management activities have also benefited from the project. The CDM programs generated an income of around US$ 636,868, by the end of 2012, which was delivered to participating households (60% of total) and planting entities (40% of total). The Management of Nature Reserves component distributed to households around NRs seed grants totaling US$ 369,180 to help develop new livelihoods.

80. These interventions contributed to poverty alleviation by providing income through employment, or by enabling householders to engage in commercial forestry, carbon trading and conservation related activities. In addition, the intensive training programs provided to local farmers on afforestation, silvicultural technologies and forest management, as well as on farming and other livelihood skills. More than 171,290 farmers participated in the trainings, which have contributed greatly to capacity building in sustainable development.

4. Assessment of Risk to Development Outcome

Rating: Low

81. The project successfully implemented a comprehensive program of forest resource management, which has proven to be effective in promoting sustainable forest management. The risks foreseen are (a) pest and disease attacks could increase in monoculture plantations, (b) fire could damage plantations, (c) carbon prices could remain low and forest farms and villagers lose interest in the program, and (d) climate change might increase the incidence of storms and snow, which could reduce plantation yields. The first risk has been mitigated by having planting blocks of less than 8 ha in most cases and by having at least three clones in one single site. Forest fire and pest monitoring and control have been included into the local government forest management system. Routine forest pest and fire monitoring will be conducted by county forestry bureaus. As CDM reforestation needs much less inputs for their maintenance, the current low carbon prices should not have a significant impact on the CDM project and it does have the potential for replication, though it may be difficult to be extended under current carbon market conditions. No significant risks are foreseen to maintaining the

management of nature reserves given the level of political commitment to retain government budget inputs and the installed the community engagement in nature resource management and protection.

82. In summary, the prospects for sustainability look promising because: (a) component activities have been main-streamed into county level and entity operations; (b) partnerships with householders and communities will strengthen ownership and help share development and conservation costs and risks; (c) institutional capacity has been strengthened at all levels; (d) a shared strategic vision exists for forestry development, watershed management and biodiversity conservation over the medium term; (e) plantations show a highly positive ERR and IRR (all tree crops show a positive IRR); and (f) continued economic growth in China, combined with a growth in domestic consumption, will stimulate the demand for forest products and favor the ecological forest and biodiversity conservation.

5. Assessment of Bank and Borrower Performance

5.1 Bank Performance

(a) Bank Performance in Ensuring Quality at Entry

Rating: Satisfactory

83. Despite the complex and innovative nature of the project, the proposal was well prepared and thoroughly reviewed. The PDO, the GEO and design of the project were appropriate and realistic, safeguard policies were meticulously applied; consultation was widespread, training was provided where necessary; lessons learned from previous projects were incorporated, institutional arrangements proved sound; environmental, social and sustainability issues were well covered, and no major weaknesses emerged.

(b) Quality of Supervision

Rating: Satisfactory

84. The project was regularly supervised, and missions were thorough and constructive. Issues were promptly identified and sound advice was given on how to address problems such as delays with the implementation of the INRM Component, the financing gap caused by increased labor and material, the need to resolve land tenure issues and accelerate planting under the CDM operations. The Bank supervision missions paid attention to reviewing compliance with project design and Bank safeguards and fiduciary requirements. The supervision also focused on capacity issues, especially those related to the more innovative GEF and carbon finance operation challenges. Advice provided reflects a good balance of global knowledge with China/Guangxi-specific experience and conditions on the ground. Due to the innovative nature of the nature reserve management and carbon finance operation, great efforts had been made by the Bank team to bring top international and national experts to provide guidance and

intensive technical assistance to the project agencies to ensure sound project preparation and implementation.

(c) Justification of Rating for Overall Bank Performance

Rating: Satisfactory

85. The Bank team brought much innovation to project design, and the achievement of the PDOs and GEO confirms that these were realistic and achievable. Bank supervision focused on capacity building, not just physical progress and the realization of objectives. Supervision was also timely, with the necessary corrective measures being identified and followed up on.

86. A project supervision quality review by Quality Assurance Group (QALP-2) was conducted in May 2010 and it was rated as satisfactory.

5.2 Borrower Performance

(a) Government Performance

Rating: Highly Satisfactory

87. The Guangxi Government demonstrated strong ownership of the project and provided effective leadership to the project implementation. Firm commitments and strong support to the project were reflected in the Government's decision to increase its counterpart funding contribution rather than reducing the scope of the project in the face of a depreciating US$ and an increase in labor and material costs. It also put great efforts into overcoming difficulties caused by destructive snowstorms (2008) and prolonged drought (2010), by providing funds to re-plant damaged areas.

(b) Implementing Agency or Agencies Performance

Rating: Highly Satisfactory

88. Guangxi Forestry Bureau of the GZAR set up an effective project coordination team, which ensured that all the relevant provincial divisions and institutions, including forest resource development, forest protection, biodiversity conservation, the legal and regulatory division, the forest design institution and the forest academy, worked together to achieve the PDO and GEO; the PMO and BO were equipped with skilled dedicated staff who proved open-minded, innovative and hard working; responsible agencies responded to issues promptly, and helped ensure that additional counterpart funds were mobilized on time; the GFB made special efforts to improving the nature reserve management component and CDM operation to ensure innovative approaches to biodiversity conservation were adopted, and the challenging of CDM program could be appropriately dealt with.

(c) Justification of Rating for Overall Borrower Performance

Rating: Highly Satisfactory

89. Borrower performance is rated as Highly Satisfactory because of the strong political commitment shown by the Guangxi Government and the dedication demonstrated by implementing agencies, all of which contributed to the achievement of the PDO and GEO. It was especially successful in demonstrating innovative forestry management approaches, and showed determination in overcoming the difficulties caused by the depreciation of the US dollar, rising prices and inclement weather. It also persevered with the challenges faced by pioneering the CDM reforestation program.

6. Lessons Learned

90. The main lessons learned are:

- **Integrating production forestry and protected area management is a more holistic approach to forest resources management.** As the Bank's earliest example of a forestry triple win in China (using IBRD, GEF and carbon finance together for the first time to achieve a sector-wide impact), the project demonstrated that taking an integrated and comprehensive approach to forest resources management by balancing timber production, ecological protection, biodiversity conservation and carbon sequestration in the context of sustainable forest management, as well as providing institutional support, is the most effective approach to achieving the sustainable development of the forestry sector.

- **Participation of communities and households in the project planning process is an effective tool to generate ownership and project sustainability.** The project introduced participatory and "bottom-up" approaches to forest resources planning and management by consulting local communities, planting entities and households early in project design, by involving them in project implementation, and by being responsive to communities' preferences and needs. This approach greatly enhanced stakeholder ownership in long-term forest management. The more active involvement of local communities will not only lead to better adherence to management prescriptions and effective management, but it will also ensure that the project's social objective is achieved.

- **Building an appropriate mechanism to promote community participation in nature resource management and win-win relationships between the nature reserve and surrounding community is crucial for the sustainability of the biodiversity conservation.** The project was instrumental in setting-up CCCs between the nature reserve staff and surrounding communities to enable the communities to participate in regular consultations on nature reserve management and jointly address issues of common concern with NRs. In addition, conducting community conservation education and public awareness, community skills enhancement/training programs and seed program to build on capacities of the

households to explore livelihood alternative to reduce the dependence on the nature resources would strengthen collaboration between NRs and local communities, promoting the sustainable biodiversity conservation.

- **A strong research-extension-training linkage was fundamental to new technologies and best practice transfer.** A highly qualified senior consultancy and research group helped ensure that appropriate technical advice, information, and superior planting materials were provided to local forest agencies, participating households and FFs. This helped ensure that the new technologies and best practice were transferred to and demonstrated in the project areas.

- **For innovative projects, there is a need to provide additional orientation to leaders and staff during preparation, followed by more comprehensive training during implementation.** Some of the project components were very innovative. In these cases of the nature reserve management component and CDM afforestation program, the significant changes of perspective of managers and staff were requested. Despite provision of significant training, the staff of PMOs, BO and NRs was able to fully understand the component activities as part of a comprehensive effort until the MTR. This highlighted the need to provide the necessary training during preparation and at the onset of implementation to facilitate smooth implementation.

- **Developing and putting in place an afforestation carbon sequestration trade mechanism like the CDM program enables the carbon sequestered by the trees to serve as a "virtual cash crop" to promote sustainable forestry management.** Communities would benefit from the direct income from the sale of carbon credits for around 20 to 30 years, this income will be additional to that from forest products; this creates an additional incentive to local communities to engage in sustainable forest resources management and sustainable livelihood.

- **The challenges of using current afforestation/reforestation methodologies under the clean development mechanism are complex and this makes replication difficult.** The project CDM programs experienced formidable challenges during implementation. The project agencies had to put great efforts to ensure the success of the CDM program. Firstly, transaction and start-up costs of carbon forestry projects are high, and this situation is unlikely to proof attractive to householders/communities unless a pre-payment mechanism such as the BioCarbon Fund is made available; secondly, a lack of flexibility which prevents projects from adapting to changing conditions limits the effectiveness of program operations. Thirdly, site selection criteria for carbon forestry projects results in the use of very degraded areas, and this increases the risk of natural disasters and increases costs. As a result, though there is potential to replicate the similar operation, the current afforestation/reforestation CDM program management roles/methodologies make the replication difficult, which need to be more flexible and streamlined.

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

(a) Borrower/implementing agencies

91. We reviewed the project ICR and consider that it objectively and explicitly summarized and evaluated the project progress, outputs and achievements. The overall assessment and rating on the project performance were fully acceptable. A summary of Borrower's ICR is included in Annex 5.

(b) Cofinanciers

n/a

(c) Other partners and stakeholders
(e.g. NGOs/private sector/civil society)

n/a

8. Justification for Carbon Finance Operation Moving to Monitoring Phase

92. *Compliance with safeguards and implementation challenges in the first phase - supervision phase.* The project complied fully with the Bank's safeguards. Regarding afforestation activities, an EMP, including EPGs and PMP, and an EMDP were implemented, and the potential social and environmental concerns were appropriately addressed. The Bank supervision missions worked closely with the provincial and county PMOs to monitor the implementation of the Bank safeguards policies and ensured that there were no deviations. As it turned out, the project generated significant social and environmental benefits.

93. *Project entity's capacity to carry out project management and key functions related to safeguard requirements.* The project entities under the CDM programs were staffed with staff considerable experienced in forest management, project implementation, emission reduction monitoring, and financial management. They have also accumulated excellent experience through the successful implementation of the programs. The provincial and relevant county PMOs have committed to provide assistance on plantation management, monitoring and verification. They are also committed to monitor safeguard compliance, particularly the implementation of contracts signed between households and forest farmers (in particular on payment distributions to households), as well as on the forest fire and pest management. Guangxi Forestry Inventory and Planning Institute will continue to measure and monitor CERs with the finding provided by GFB. The monitoring plan and standard operation procedures and management structures have been put in place, and the monitoring group is fully conversant with CDM practices and project monitoring requirements.

94. *Potential issues in post completion operation, including project entity's capacity and ability of the project to deliver the contracted emission reductions.* The potential

issues included inclement weather, such as heavy snow in 2008 and the drought in 2009-2011. Such events, if repeated, may reduce growth, and damage established forests, and impair the capacity to deliver the contractual CERs. There is no issue with regard to entities' capacity and ability.

95. *Justification for moving to the second phase - carbon finance monitoring phase.* Both CDM I and CDM II have been successfully implemented during the project period including project preparation, validation, registration, forest establishment, and the first verification. All management structures and technical protocols have been put in place and were well implemented, though the established forest area and associated CERs are less than expected due to the reasons outlined above. Therefore, the justification exists to move the project management to the second phase – monitoring stage.

96. *Recommendations and guidance for project monitoring in the second phase - carbon finance monitoring phase.* Strata may be added or removed and the number of sampling plots might need to be re-calculated where there is any changes in forest management practice (e.g., time and intensity of thinning and harvesting) and unexpected natural disturbances (fire, pest insect and disease, and extreme climate), which could affect different parts of a homogeneous stratum.

97. In addition, methodologies and methodological tools used may need to be updated by UNFCCC from time to time. Guidance/guidelines/procedures may need to be added, removed or updated. It is important that the latest methodologies, tools, guidance, guidelines and procedures to monitor project implementation are followed.

Annex 1. Project Costs and Financing

1. Total project costs at ICR were estimated at US$359.52 million, which are significantly higher than the PAD estimate of US$ 201.85 million. The increased project costs were mainly caused by (a) increased plantation establishment costs resulting from steep hikes of labor cost and fertilizers; (b) increased plantation area against PAD target; and (c) natural disaster (extreme cold winter and drought), which led to the death of the young plantation and thus increased replanting costs; and (d) the depreciation of US dollar against RMB (1$=8.07 Yuan at Appraisal while the weighted exchange rate during implementation is 1$=6.87 Yuan).

Table 1(a) Project Cost by Component (US$ Million)

Component	PAD	ICR	ICR/ PAD
A. Expanding Timber Plantations	171.1	314.41	184%
B. Increasing Ecological Forest Cover	18.67	28.18	151%
C. Improving Management of Nature Reserves	7.02	10.44	149%
D. Enhancing Inst. and Management Capacity	5.06	6.5	128%
Total Project Cost	201.85	359.52	178%

2. Both the World Bank proceeds and GEF grants have been fully disbursed. Counterpart funds by the borrower (including governments at various levels and beneficiaries) were significantly increased to account for (a) much greater total project costs as shown above against PAD estimation; and (b) financing gap caused by depreciation of US dollar against RMB.

Table 1(b) Project Financing(in US$ million)

Fund Sources	**PAD**	**ICR**	**ICR/PAD**
Borrower	**96.60**	**254.27**	**265%**
IBRD	**100.00**	**100.00**	**100%**
GEF	**5.25**	**5.25**	**100%**
Total	**201.85**	**359.52**	**178%**

Annex 2. Outputs by Component

1. Overall project outputs are summarized below:

Component	Original Target	Revised Target at MTR	Achieved
Expanding timber plantations:			
Afforested area with 90% survival	200,000 ha	None	214,000 ha
Participating households (under component one)	112,000	None	118,000
Increasing Ecological Forest Cover			
Multiple use protection forest established	18,000 ha	None	18.000 ha
Carbon sequestered	30,000 tons carbon or 110,000 ton CO_2	None	169,000 ton CO_2
Improving Management of Nature Reserves			
Management of effectiveness of 5 targeted nature reserves as measured by scorecard	Score 70	None	76
Targeted nature reserves maintain a higher METT score than non- project reserves	15%	None	48%
Number of sites of high biodiversity identified and protection initiated	1	None	1
Forest dependence score for birds in Damingshan NR	4	None	8.4
Kilometric abundance score for four forest-dependent pheasants in Maoershan NR	1.0	None	1.01
Number of Francoisi leaf monkey in Nong Gang NR	80	Revised in MTR	98
Number of slipper orchids along 19 fixed transects in Mulun NR	849	None	918
Area affected by fires in Longshan NR	Less than 3 ha	None	0
Enhancing Institutional capacity			

Provincial Forestry Strategy Formulated and Adopted	Formulate and adopted in year 6	None	Done
Forest staff and households trained	190,000	None	204,000
Guidelines and technical bulletins prepared and disseminated	20	None	41

2. **Component 1 - Expanding Timber Plantations**. Tree planting targets in the component, which comprised 85% of project funding, were exceeded by 7%. By December 31, 2010, around 214,000 ha of timber plantations had been established in the project areas. The species planted mainly were eucalypts, Masson Pine, Slash Pine and Chinese Fir, Bamboo, Birch, Acacia and Oak. Improved genetic material was used to raise seedling quality and improve disease resistance, whereas better field practice (spacing and pest monitoring/control) reduced mortality in the field to only 8% and increased the tree growth (volume) of 33.7% by compared with non-project plantation. Yields are likely to exceed expectations and returns to growers are likely to be high. The target 112,000 householders in tree planting were exceeded by 5%. Under the nursery improvement program, four Forest Farm nurseries were expanded and others were upgraded, which enabled them to produce 92 million improved, high quality seedlings per year. The introduction of advanced techniques for tissue culture propagation had excellent results by raising seedling quality and reducing nursery cycles for eucalypts to three months. The growth in project planting sites was good, with average survival rates of more than 92%. The project entities are now focusing on tending newly established plantations. Low level insect pest outbreaks occurred in pines, but good monitoring identified them promptly and they were brought under control through the application of both biological and chemical control.

3. **Component 2 - Increasing Ecological Forest Cover.** All forest restoration targets were achieved in full and hill closure targets were exceeded by 10%. The component aimed at creating protection forests and restoring forests and ground vegetation by hill closure in watershed areas of Pearl River Basin and degraded karst areas (either by protecting existing forest or planting denuded areas). An extensive outreach and consultation program was undertaken during preparation to ensure that households would participate in the project fully on voluntary basis, and to mitigate the possible negative effects of hill closure on forest dependent communities. Alternative fuels (biogas, solar panels) were made available to participants and limited non consumptive use of forest products such as grass, mulberry leaves and sticks was allowed. All planting and closure targets were fulfilled on time, that is, 18,070 ha of multipurpose protection plantations were established, reaching the PAD target by 101%. In addition, around 109,580 ha of existing watershed forest cover restoration and protection activities were completed, or 110% of the PAD target. Inspections by county and provincial PMOs confirmed that the quality of the plantations met the project's technical standards with a survival rate of over 90%. The watershed management models have been developed and demonstrated to similar areas in Guangxi as well as in China.

4. Under this component, two CDM reforestation pilot programs have been developed, registered and implemented. As part of PAD, during the project preparation, the first CDM pilot CDM I)--Facilitating Reforestation for Guangxi Watershed Management in Pearl River Basin Project- was prepared as part of the project design, which aims to establish 4,000 ha plantation in barren land, aiming to sequester Carbon 30,000 tons/or Carbon dioxide 110,000 ton of carbon during the project period. The CDM I was the first reforestation project to be registered in the world under the United Nations Framework Convention on Climate Change (UNFCCC). Around 3009 ha Plantations have been established in watershed areas to protect soil and water erosion. It succeeded in earning 131,960 ton CO_2 Certified Emission Reductions (CERs) from 2007 to 2011. The second CDM pilot (CDM II) - Reforestation on Degraded Lands in Northwest Guangxi aims to sequester 320,000 tons carbon dioxide by planting 8,670 ha of trees on barren land during the period of 2009 to 2017. During the project period, around 6,850 ha plantations have been established and around 35,740 ton CO_2 CERs were issued. Compared with targets set in PAD, both targets of planting area and carbon sequestration were exceeded, in that 167,700 tons of carbon dioxide were sequestered by planting 9,857 ha of trees.

5. Both pilots present extremely innovative approaches by using trees to sequester carbon, much like a "virtual cash crop". Communities benefitted from the sale of the carbon credits to the World Bank's BioCarbon Fund and from products such as resin that the trees provide. The pilot operation succeeded in demonstrating the promising ways of involving small farmers in tree planting for carbon sequestration and trading under the Clean Development Mechanism.

6. However, despite their best efforts, each of the CDMs could only achieve 75% and 77% of their respective targets. This is because: (a) ice and snow damaged 1,024 ha of plantations in 2008 and between 2009-2011 a further 842 ha were damaged by draught. The continuous extreme draught also delayed the planting process for CDM II; (b) inflexibility in CDM procedures limited scope for adjusting site boundaries which became necessary because of land tenure conflicts arising under the forest land tenure reform process; (c) contracts with householders had to be re-signed due to the land tenure reform process; and (d) site selection criteria set for the CDM operation resulted in infertile sites being selected, parts of which could not be planted, or needed special planting techniques. Given that this was a pilot operation at the developmental stages of carbon markets, it served its purpose well by successfully demonstrating the relevant methodology and innovative approaches to carbon trading with small farmers and investors. It also provided invaluable experience on how to work with CDM forest procedures and methodologies, as well as how to overcome the difficulties occurred during the project implementation.

Component 3 - Improving the Management of Nature Reserves

7. The component met or surpassed all of its outcome targets and the global environment objective was achieved. The GEF grant of US$ 5.25 million was fully utilized and its disbursement was completed. This was a considerable achievement for such an innovative component. A brief quantitative summary of outputs of the

component includes: (i) 4 baseline maps supported by substantial training and on-going preparation of ecological (thematic) maps; (ii) the development and implementation of 4 NR Management Plans (covering 5 NRs) that have subsequently been updated to cover the next 5 year planning period (2013 – 2018); (iii) completion of a training needs assessment and follow up training totaling 202 training courses for both NR staff and households living in the villages adjacent to the project NRs involving 6,581 person/times; (iv) completion of a cave biodiversity survey of Guangxi cave biodiversity with 164 new species identified; (v) completion of guidelines for cave biodiversity conservation; (vi) sponsoring of an international seminar of karst and biodiversity protection; (vii) completion of 3 small watershed biodiversity monitoring programs in proximity to project NRs; (viii) establishment of 8 FCCs and 22 CCCs in the 5 NRs; (ix) completion of 70 environmental education and public awareness activities benefiting some 350,000 participants supported by complementary dissemination materials; (x) 152 practical skills training events benefiting 11,046 participant times; (xi) disbursing 52 seed grants totaling US$ 369,180 benefiting 2,554 households in 46 villages (some grant was used for rotating use) for the support of biodiversity conservation and households livelihood alternatives; (xii) 59 research grants approved; and (xiii) completion of an M&E program comprised of METT scorecard supported by supplementary biodiversity indicators and village participatory monitoring.

8. A couple of comprehensive biodiversity surveys of in limestone karst areas were also conducted. A rapid biodiversity assessment of the south-west Guangxi karst area, resulted in the identification of the black crested gibbon (*Nomascus nasutus*) in Banliang forest areas of Jingxi County, and justified and let to the establishment of a provincial level Banliang NR. The same survey also provided the basis for making a number of changes leading to the strengthening of 14 other NRs in Southwest Guangxi karst region (e.g., boundary adjustments, merging of NRs etc.). Another series of Guangxi cave surveys comprising 5 expeditions to 117 caves, collected over 35,000 specimens from 537 samples. From these 509 species were found in caves and 164 of these were new to science. This was the largest-ever effort for documenting a tropical/sub-tropical karst fauna, and as a result, the cave biodiversity of Mulun NR rose remarkably from 'unknown' to 'the richest in China and continental SE Asia'. The project thus revealed that the caves of Guangxi are a true global hotspot of cave biodiversity of remarkable significance. By the end of the project the Guidelines for the Conservation of Karst Caves of Guangxi was finalized. Similarly a Strategic Action Plan for Biodiversity Conservation in the Karst Areas of Southwest Guangxi was prepared.

Component 4 – Enhancing Institutional Capacity

9. All planned outputs under the Enhancing Institutional Capacity component were achieved or exceeded with the exception of overseas study tours and training where central government imposed a nation-wide quota which, in effect, blocked any possibility of completing the activity. Funds for this were subsequently transferred to domestic training and consulting services.

10. A collaborative effort resulted in the production of a Forestry Sector Strategy for the GZAR. While recognizing the productive potential which forestry had in growing the provincial economy, the strategy placed ecological stability, social welfare and sustainability squarely at the heart of the strategy. In addition to identifying clear priorities to the year 2020, it highlighted the issues to be addressed, and the budget implications of implementing the strategy. In support to the Strategy development, a number of studies were concluded.

11. Good progress was made with research and technology transfer with a great deal of project related information being generated and disseminated. As a result, improved, higher productivity and disease resistant planting stock (pines, eucalypts) were produced, and information on the dynamics of growth of mixed stands (such as eucalyptus/mytilaria, eucalyptus/castanopsis, acacia/quercus) was circulated. Ways of controlling pests such as the virus Buzura in eucalypts and fruit borers in Pines were examined with promising results. Furthermore, trials were carried out in a variety of plantation models on fertilizer application regimes, water infiltration and retention, plantation biodiversity, wood properties, wood density and growth rates, the results of which were published.

12. In addition, 15 demonstration models were established to monitor vegetation, soil quality and water quality in plantation areas and to demonstrate sustainable productivity gains to farmers. 13 new technologies were disseminated to farmers and 41 technical guidelines and bulletins with over 52,000 copies were distributed to technicians and householders, both of which will contribute significantly to improving effectiveness of forest management, watershed management and biodiversity conservation. An computerized information system was also installed in the Forestry Bureau which will contribute to improve the effectiveness objective of the project, whereas the creation of a webpage will help project disseminate information to a wider audience. The System will be also used to information management of the Guangxi government forestry program.

13. An intensive program of training was also carried out, and a total of 204,090 persons participated – exceeding the project target by 8%. At provincial level, 22, 800 persons received training, and at town and city level the figure was 181,290 persons. At provincial level, 16,530 persons received formal instruction in best practice, 157 participated in domestic study tours and 133 went on overseas study tours. At city level, participants received informal teaching and instruction. Out of the total number of participants, 37, 180 were women and 30,350 came from ethnic minorities. In support of the training program, 43 international specialists visited the project to lecture on project related issues, and as did numerous domestic specialists. Related to this the following project related publications were produced: 59 technical papers, 11 technical notes, and 4 technical instructions. 4 forestry patents were also obtained and 1,538 ha of demonstration plantations were established in support of extension and training.

Annex 3. Economic and Financial Analysis

A. Introduction

1. This annex reanalyzes the project financial and economic rates of return (FRRs and ERRs), using updated prices, actual project costs and latest projections of future benefits. Although the methodology used, by and largely, follows that at appraisal, the accuracy of estimation has been improved by using actual data and better projections of benefits compared to those at appraisal. In the analysis, actual project costs were derived from PMO records while future projections were based on performance of current operations. Although the project costs have been significantly increased, the improved yields of the production models (eucalyptus in particular as the original models in PAD only accounted for one harvesting, ignoring the second generation benefits which are significant) and higher output prices have more than offset the negative impact on both financial and economic rates of return.

B. Project Benefits

2. The major quantifiable benefits (on an incremental basis) of the project are derived from (a) the incremental wood and timber products, which are in high demand in the project area; and (b) the incremental sequestration of carbon.

3. The quantification of carbon sequestration benefit follows the methodology as adopted at PAD. The 'Kyoto Protocol' makes provisions for direct human-induced land-use change and vegetation recovering activities to be considered in relation to each country's Greenhouse Gases reduction target. The incremental biomass per hectare, which will be generated over the next 20 years, is estimated to be between 100 and 450 tons of dry matter. This is expected to lead to an incremental carbon sequestration equivalent to 180 to 800 ton CO_2-e. Provisional estimates of global warming damage under a scenario of doubling CO_2 concentration show estimated damage ranging from 0.25 to 2 per cent of the world's GNP for the year 2030. Using 1 percent of GNP and discounting this damage back to present values results in global warming damage of US$7 to US$18 per ton of fixed carbon. For the analysis, a low value of US$ 5 per ton is used as a shadow price for fixed carbon. This price is close to the current value for emission trading rights and it was used to the project CDM reforestation pilot program.

4. In addition, the project has also generated significant downstream and global benefits, such as the impact on soil and water conservation and on biodiversity conservation, which are difficult to quantify and therefore not included in the analysis. These benefits were summarized below:

- Biodiversity. Not only Component 3, which is directly aimed to protect biodiversity, but also the Component 2 would contribute to protect, restore or increase biodiversity in watershed areas. In particular, the protection of watershed areas or natural re-

vegetation is expected to contribute to a restoration of biodiversity and habitat for plants and wildlife.

- Long-term Impact on Climate and Rainfall. A restored vegetative cover in barren limestone areas could have a positive impact on the climate in the region, particularly a more moderate temperature distribution, increased air humidity and more evenly distributed rainfall. While such an impact is likely to be positive, this effect would be very difficult to quantify.

- Downstream Benefits. In addition to incremental production benefits in the project areas, the project have generated benefits in the downstream areas of the Pearl River watershed resulting from the re-establishment of a higher degree of tree and other vegetative cover. These downstream benefits would be far reaching including: (a) lower variability in water flows through the year and hence reduced severity of down-stream floods, reducing flood damage, and lowering the need for investment in flood protection works; (b) reduced sediment load in the river system, which would increase the operational life and efficiency of downstream reservoirs and irrigations systems. Lower sediment would also reduce the rate of rise in river beds in the delta areas and hence the need for flood protection measures; and (c) a potentially higher future-use value for the watershed in terms of drinking water, hydro-power and new irrigation schemes. While it is difficult to quantify these benefits, the economic analysis uses the value of the standing timber as a lower reference value of the true economic value. This is a conservative estimate, based on the assumption that, if the society decides against harvesting a forest, the forest's other function (e.g., watershed protection or biodiversity value) is considered of higher value than the value of the harvested timber.

C. Project Costs

5. Total project costs at ICR were US$359.52 million, which are significantly higher than the PAD estimate of US$ 201.85 million. The increased project costs were mainly caused by (a) increased plantation establishment costs resulting from the increased price of labor cost and fertilizers; (b) increased plantation against PAD target; and (c) natural disaster (extreme cold winter and drought) , which led to the death of the young plantation and thus increased replanting costs; and (d) the depreciation of US dollar against RMB (1$=8.07 Yuan at Appraisal while the weighted exchange rate during implementation is 1$=6.87 Yuan).

D. Assumptions

6. **Input/output Prices**. The economic analysis is based on the use of market prices for all tradable products. For most commodities, economic prices are well reflected by the prevailing financial prices. The economy of China is relatively open and integrated in the world markets, and market prices are a good indication of opportunity costs. For future market prices for timber and industrial wood process, a conservative estimate the

lowest price prediction scenario is used (average prices of previous years) in the economic analysis.

7. **Labor.** A large proportion of project investment was in the form of unskilled labor. A cost of RMB 25 per labor day was used in the financial analysis and a conversion factor of 0.8 applied to convert financial price to economic price at appraisal. However, the actual labor cost turned out to be much higher (from 30 – 80 Yuan per labor day during the implementation). At ICR, the labor cost of RMB 50 Yuan has been use and the opportunity cost for unskilled labor is estimated same as the prevailing financial costs.

8. **Land.** It is assumed that most of the plantations would be developed on existing marginal lands with low agricultural productivity or with underutilized shrub- and bush-land. The economic opportunity costs are low and in some cases close to zero. In the economic analysis the average market value of RMB 450 per ha per year is used as a proxy for the economic opportunity cost.

E. Project Economic Rate of Return (ERR) Calculations

9. Based on the above, the economic analysis has been done at project level. The major quantifiable benefits for economic analysis are derived from (1) the incremental wood and timber products, which are in high demand in the project area; and (2) the incremental sequestration of carbon. In addition, the project has also generated significant downstream and global benefits, such as the impact on soil and water conservation and on biodiversity conservation, which are difficult to quantify and therefore not included in the economic analysis. The economic benefit flows are built up, in line with the physical achievements by year of various plantation models, while the cost flows are based on actually investments/expenses by year. As such, the Economic Rate of Return (ERR) of the project is calculated at 25% (without carbon sequestration,) and at 33% (with carbon sequestration).

10. In comparison with the PAD results (ERR at 24% with carbon sequestration, and 16% without), the noticeably increase of ERR was due to much higher returns from forest production and increased growth of species due to the introduction of the improved the seedling and silvicultural technologies, and the fact that the original eucalyptus models (with exception of 10 year model) in PAD ignored the significant benefits. Although the project costs have been significantly increased, the revised eucalyptus production, together with higher output prices, has more than offset the negative impact on both financial and economic rates of return.

11. No sensitivity analysis has been conducted as the output prices for forestry products are likely to be on an upward trend and the significant unquantifiable benefits are not accounted for in the ERR calculations.

F. Financial Rate of Return of Plantation Models

12. The financial analysis has been carried out for all individual plantation activities under component 1(timber production), totaling 214,000 ha. The financial cash flow analysis for individual plantation activities indicates a significant difference between faster-growing species like eucalyptus plantations and slow-growing timber plantations. This explains why the project participants, in particular the households prefer to choose faster-growing species, which have an earlier return to repay the loan. However, overall, all timber plantations implemented are financially attractive. For plantations under component 2 (ecological forestry), this is not the case for all of the watershed plantations as the ecological benefits have a higher importance. Summary tables of the financial analysis results are shown below:

Financial Rate of Returns – by Plantation Models

	FRR %(PAD)	FRR %(ICR)
Timber plantation		
Eucalyptus		
Y-4 Eucalyptus (one cycle at PAD, 2 at ICR)	20.1	32.6
Y-5 Eucalyptus (one cycle at PAD, 2 at ICR)	17.8	30.16
Y-6 Eucalyptus+Acacia	14.4	22.5
Y-9 New Eucalyptus disaster inflicted model	*N.A*	*22.95*
Other timber		
Y-1 Pinus Massoniana	13.6	15.02
Y-2 Chinese Fir	11.0	14.33
Y-3 Betula alnoides Hamilt	14.4	15.89
Average other timber	*11.2*	*18.6*
Bamboo type		
Y-12 Phyllostachys pubescens new	17.3	24.5
Y-15 Phyllostachys pubescens improv.	21.1	33.5
Y-13 Hybrid Bamboo	18.3	22.7
Y-14 Sinocalamus latiflorus	31.5	43.5
Average bamboo type	*22.1*	*31.1*
Watershed protection		
BioCarbon		
F-1 Pinus+Quercus (BC)	9.3	11.52
F-2 Pinus+Schima (BC)	9.7	13.64
F-3 Liquidambar+Pinus (BC)	8.4	10.67
F-4 Liquidambar+Fir (BC)	5.4	8.40
F-5 Eucalyptus (BC)	18.3	28.66
Other Watershed protection		
F-1-1 Pinus+Quercus (WS)	11.5	14.55
F-2-1 Pinus+Schima (WS)	11.4	15.09
F-6 Zenia+Dendrocalamus	6.7	7.33
F-7 Cryptomeria	7.2	11.83
F-8 Zenia+Liquidambar	11.3	13.81
F-9 Illicium verum	13.4	21.47
F-10 Cinnamomum cassia	8.7	12.34
F-11 Magnolia officinalis	21.1	33.75
F-12 Hybrid Bamboo	16.1	7.3
F-13 Dendrocalamus minor	10.8	0.99

Annex 4. Bank Lending and Implementation Support/Supervision Processes

(a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
Lending			
Jin Liu	Sr. Rural Development Specialist	EASCS	TTL
Anthony J. Whitten	Sr. Biodiversity/Environmental Specialist	EASCS	Environment/Safeguard
Hongwei Zhao	Program Assistant	EACCF	Program assistant
Nuyi Tao	Sr. Carbon Finance Specialist	CPFCF	Deal Manager
Jinan Shi	Sr. Procurement Specialist	EASR1	Procurement
Mei Wang	Sr. Counsel	LEGAM	Lawyer
Mohamed N. Benali	Lead Agriculturalist	EASRD	Co-TTL
Oliver Braedt	Sr. Natural Resources Mgmt. Spec.	AFTA1	Nature Reserve Management
Robert Leonard O'Leary	Sr. Finance Officer	CTRLD	Disbursement
Susan S. Shen	Manager, Operations	WBIRP	GEF component
Weiguo Zhou	Sr. Economist	EASER	Economist
Yi Dong	Sr. Financial Management Specialist	EASFM	Financial Management
Zong-Cheng Lin	Sr. Social Development Spec	EASCS	Social/safeguards
Xiaoquan Zhang	Sr. Forestry Carbon Specialist	EASCS	CDM programs
Supervision/ICR			
Jin Liu	Sr. Rural Development Specialist	EASCS	TTL
Richard Owen	Sr. Forestry Specialist/Consultant	EASCS	Forestry
Random Dubois	Sr. Nature Reserve Management Specialist/Consultant	EASCS	Nature reserve management
Anthony J. Whitten	Sr. Biodiversity Specialist/Consultant	EASCS	Biodiversity/ Environment
Nuyi Tao	Sr. Carbon Finance Specialist	CPFCF	Deal Manager
Jinan Shi	Sr. Procurement Specialist	EASR1	Procurement
Xiaolan Wang	Sr. Operations Officer	ECSUW	Lending
Rama Chandra Reddy	Sr. Carbon Finance Specialist	CPFCF	CDM methodology
Mohamed N. Benali	Sr. Program Management Specialist/Consultant	EASCS	Program management
Susan S. Shen	Manager, Operations	WBIRP	GEF component
Yi Dong	Sr. Financial Management Specialisti8	EASFM	Financial management
Zong-Cheng Lin	Sr. Social Development Spec	EASCS	Social/safeguards
Xin Ren	Environmental Specialist	EASCS	Environment/safeguards
Zhang Xiaoquang	Sr. Forestry Carbon Specialist	EASCS	CDM Programs
Yunqing Tian	Program Assistant	EASCS	Team assistant

(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		
FY04	12.5	35.41
FY05	49.9	166.59
FY06	61.9	323.68
Total:	**154.3**	**679.59**
Supervision/ICR		
FY07	1.43	16.67
FY08	22.91	80.64
FY09	20.53	54.88
FY10	17.66	89.24
FY11	10.23	37.15
FY12	10.88	74.52
FY13	5	56.35
Total:	**88.64**	**409.45**

*Figures include BBGEF resources.

Annex 5. Summary of Borrower's ICR and/or Comments on Draft ICR

I. PROJECT DEVELOPMENT OBJECTIVES AND CONPONENTS

1. **Project Objectives.** The overall project development objective is to improve the effectiveness of forest management and institutional arrangements in timber production, watershed protection and nature reserves management in selected areas of the Guangxi Zhuang Autonomous Region. The global development objective of the project is to improve the conservation of the globally significant biodiversity of the GZAR by ensuring effective in-situ protection of threatened and globally important forest habitats and rare and endemic species.

2. **Project Components.** The project include four components, which are:

(a) Expanding Timber Plantations -- Establishing 200,000 ha timber plantations and enlarging 4 central nurseries including setting up tissue culture plant, seedling shed and irrigation system.
(b) Increasing Ecological Forest Cover – Establishing 18,000 ha of multiple function ecological plantation and promoting forest regeneration and vegetation rehabilitation on 100,000 ha through hill closure in watershed and karst areas in 25 counties, including a BioCarbon pilot.
(c) Improving Management of Nature Reserves – Enhancing the management of existing nature reserves; increasing management capacity and knowledge of biodiversity conservation; and strengthening cooperation between local communities and nature reserve to address areas of mutual interest.
(d) Enhancing Institutional and Management Capacity – Implementing institutional and management capacity; implementing applied research and extension, training and technical service program to disseminate research results, technical guidelines and lessons learned to project agencies, entities and beneficiaries; and establishing and implementing a project monitoring and evaluation system.

II. KEY FACTORS AFFECTING PROJECT DESIGN AND IMPLEMENTATION

3. During the project preparation, the proposed project drew the experience of other Bank forestry projects in China and other counties, and the key lessons learned were incorporated to the project design. Building on this, the improved technologies and new forestry management approaches were introduced to the project, such as: (a) the development and use of new technologies such as the use of high performance species, high quality seedlings and more efficient planting practices; (b) making linkages between silvicultural research and afforestation institutions to facilitating technology transfer; (c) promoting stakeholders' participation in project design through consultation process; (d) provision of benefits to local stakeholders to protect ecological forest, such as the

BioCarbon pilot; (e) substantive local participation in protected areas management (including development of mechanisms to ensure that local communities benefit from protected areas); and (f) building capacity for the provincial and county forestry agencies as well as planting entities and farmers, which would promote the institutional sustainability.

4. Guangxi Government made strong commitment to the project implementation. A project leading group was set up at provincial level, with the vice governor in charge of forestry was the head. It ensured timely delivery of counterpart funds, sound organizational institution engagement and strong support of technical services, which provided strong guarantee to the success of the project implementation.

5. The ice and snow disaster happened in early 2008 and the drought disaster happened in 2009 and 2010 impacted the project to some extent and project seedlings and young plantations were damaged in different levels, but with the government support, project implementation units replanted the damaged sites in time and the project plantations got better recovery. As the result, the total outputs of the project were not significantly affected by the nature disaster. .

6. The exchange rate between US dollar and RMB depreciated from 1:8.07 (in the time of project appraisal) to 1:6.23 (in the time of project completion), which caused around 17% loss of the available funding to project IBRD loan and GEF grant. In addition, the increased labor and planting material price has also increased the project cost. However, the efforts have been made by the government and planting entities to increase their budget inputs. As a result, with the increased counterpart funds to offset the financing gap, it did not bring substantial negative impact to the project implementation.

7. The national and provincial forestry development policies are in favor of project implementation. According to the Decision on the Accelerating the Development of Forestry, which was issued by State Council, the SFDS and the Guangxi Forestry Eleventh Five-year and Medium and Long Term Development Plan, Guangxi is one of key timber production bases of China and crucial karst conservation and Peal River Basin ecological protection areas. Those policies stipulated both local government and planting entities including farmers' actively participating in timber plantation and watershed management, as well as ensured the needed budget was in place.

8. The project has established high-effective management organizations. Project Coordination Group (PCG), Provincial Project Management Office (PPMO), Biodiversity Office (BO) were set in Forestry Bureau of GZAR; County PMO set in each of the project counties. In addition, a Technical Support Panel (TSP) was also established to provide the technical support to the project implementation. Those institutional arrangements and great efforts made by the project agencies ensured the completion of the project activities on time and the achievement of project objectives.

III. PROJECT OUTCOMES AND ACHIEVEMENTS

9. Compared with the project objectives and outputs set in PAD, all project outcome and output targets have been reached or exceeded, and the project development objective and global environment objective have been achieved. The experience and lessons learned would be dissimilated to broad areas.

A. Expanding Timber Plantation component

10. Up to the end of December 2012, totally 214,000 ha timber plantations were established, accounting for 107% of the proposed objective. As the results of the utilization of new technologies including superior seeds, improved seedling, breeding with container and light quality media as well as the improved silvicultural practice, the project plantation quality has been largely improved compared with the traditional plantations. According to the quality check, within 26 project counties and 13 provincial forest farms, the average survival rate of project plantation is 92.5%, and average growth rate exceeded the set standard rate as 124.8%.

11. According to the comparison data sample plots, which were set in project counties/forest farms, compared to non-project plantation, the average tree volume increases 33.7%, which greatly exceeds the proposed target value of 25%.

12. There were totally 118,020 farmer households participated in planting activities under this component, which includes 44,880 poverty households, accounting for 38.03% of total, and 55,130 ethnic groups, accounting for 46.72% of total. The actual number of participating farmer households exceed the target values (112,000 households) set in PAD. Farmer households participated in the project in various ways of either establishing plantation by individual households or in the cooperated arrangements with forest farms or companies in the land that the households have the land use right. In addition, some farmers have benefited from providing labor forces to the planting activities. Through participating in the project, farmer households not only increase their income but also obtain forest management skill through various trainings held by the project.

13. Employees of 13 provincial forest farms participated in the project have mastered their planting and tending skills. According to the statistic, 2,452 of farm employees no longer rely on payroll from the forest farms by contracting forest land with forest farms as well as cooperated with local households for long-team plantation establishment and management, which exceeds the target value of 1,600. This effort, has saved RMB 63.52 million salary for the forest farms every year and improved the forest farm management efficient. The forest farms have also provided large numbers of improved seedlings and demonstrated best practice of the plantation establishment and management to local farmers.

14. Central nursery upgrading. The project invests RMB 24.788 million (including RMB 17.85 million of government budget and RMB 6.938 million self-raised funds by project units) to upgrade four central nurseries. Through seedling production sites expansion, introducing advanced seedling breeding technology, such as the use of biodegradable container and light quality container media, increasing raising more

indigenous tree species seedlings, the annual seedling production capacity of these four nurseries increased from 20 million plants to 65 million plants. And the quality of the seedling has been largely improved. The seedlings produced by the Nurseries have been provided to the project plantation establishment as well as local farmers' non-project planting.

B. Increasing Ecological Forest Cover component

15. Up to the end of June 2012, 18,060 ha of multiple-function forests have been established, accounting for 100% of the proposed objective; 109,580 ha of highly degraded watershed and karst areas have been closed for natural regeneration, accounting for 110% of the proposed objective. According to the quality check, the quality of planting and existing forest land management complies with the project technical standards. Through planting, replanting and mountain closure, the percent of vegetation cover in targeted watersheds is increased about 12%, exceeding the target value of 10%. The developed and implemented watershed management technical models have demonstrated the effective watershed management and they will be extended to the other project areas in Guangxi.

16. There are altogether 197 townships, 925 villages and 100,580 households participated in and benefited from this component, among which, 56,219 are poverty households and 77,580 are ethnic minorities.

17. Under this component, two BioCarbon Fund supported CDM programs were developed and implemented, the CDM I (*Facilitating Reforestation for Guangxi Watershed Management Project in Pearl River Basin*) is the first CDM project registered in United Nations CDM Executive Board in the world and attracts great attention world-wide. Two CDM programs have made great progress, of which, CDM I has established 3,009 ha plantation, and the CDM II (*Reforestation on Degraded Land in Northwest Guangxi*) has established 6,849 ha plantation. Total net GHG removal by sink of these two projects is 168,464 ton CO_2 and exceeds project designed target value of 30,000 ton Carbon/113,000 ton CO_2. For CDM I, CER of 131,964 ton CO_2 was issued and US$518,927 carbon income was paid by BioCarbon Fund; for CDM II, CER of 35,742 ton CO_2 was issued and US$117,941 carbon income was received. The carbon revenue has been circulated to participated 6,690 households and project forest farms. The CDM program explored the additional finance resources to attract households and planting entities, by generating early revenue from carbon emission reduction credit trade, to contribute to plantation establishment and degraded land management,

C. Improving Nature Reserves Management component

18. The new approaches were introduced to the nature reserve management. After six-year's implementation, all biodiversity monitoring indicators of this component exceed the target values; biodiversities of 5 project-supported nature reserves have been effectively protected. The management effectiveness of the nature reserves has been significantly improved. A summary of accumulative outputs includes: (a) the

development and implementation of 4 NR Management Plans (covering 5 NRs); (b) completion of a training needs assessment and the development and implementation of a training plan comprised of a total of 202 training events (e.g., management plan development, PRA, NR forest law, technical monitoring etc.); (c) completion of a survey of Guangxi cave biodiversity; (d) preparation of a Guidelines for Biodiversity Conservation of Karst Caves in Guangxi; (e) a survey leading to the establishment of a provincial level NR; (f) the publishing of the Biodiversity Conservation Strategic Action Plan for Biodiversity Conservation in the Karst Areas of Southwest Guangxi; (g) completion of 3 small watershed biodiversity monitoring programs in proximity to project NRs; (h) establishment of 8 FCCs and 22 CCCs in the 5 NRs; (i) completion of 70 environmental education and public awareness activities benefiting some 357,000 participants supported by complementary dissemination materials; (j) implements seed grants program; (k) conduct research program; and (l) establishment of a component webpage and publication of a monthly newsletter.

19. Some highlights among these outputs include the following:

(a) Under the Conservation Management at Sites Outside the Existing NR System sub-component a survey resulting in the identification of the black crested gibbon (*Nomascus nasutus*) in Banliang forest areas of Jingxi County led to the establishment of a provincial level Banliang NR in June 2009 for the black crested gibbon (*Nomascus nasutus*) in Banliang forest areas. Promoting by the survey, Chongzuo White-headed Langur Nature Reserve was also upgraded from provincial level into national level in early 2012.

(b) A second series of Guangxi cave surveys comprising 5 expeditions to 117 caves, collected over 35,000 specimens from 537 samples. From these 509 species were found in caves, 164 of these were new to science. This was the largest-ever effort for documenting a tropical/sub-tropical karst *fauna. As a res*ult, the cave biodiversity of Mulun NR rose remarkably from 'unknown' to 'the richest in China and continental SE Asia'. The project thus revealed that the caves of Guangxi are a true global hotspot of cave biodiversity of remarkable significance.

(c) As part of outside NR biodiversity conservation efforts, the 3 small watershed biodiversity monitoring programs was to promote the integration of biodiversity considerations into the broader forest landscape in areas in proximity to three of the component supported NRs to promote a more comprehensive approach to sustainable forest management and biodiversity conservation in these areas.

(d) Under the Community Relationships with Project Nature Reserves sub-component 152 seed grants totaling 2.1 million RMB were disbursed (divided into one time and rotating grants) benefiting in 2,554 households in 46 villages; these grants appear to have left an impact on the ground both in terms of increased economic wellbeing and a reduction of impact on the NRs mainly through reductions in fuel wood use and other extractive activities. The use of seed grants in support of biodiversity conservation and livelihoods improvement resulted in a

broad and diverse set of experiences and results that should contribute to a "best practices" study. Similarly, the establishment of 8 FCCs and 22 CCCs in the 5 NRs under this component provided substantial growing evidence of the value of the FCCs in terms of leveraging additional funding to the NRs and surrounding communities (e.g., roads in proximity to Mulun NR), resolving boundary conflicts (e.g., Moershan).

(e) Under the Monitoring and Replication sub-component, after 6 years project implementation, the biodiversity monitoring indicators of the GEF component reached or exceed the target values and achieve the intended objectives of the project, which indicated that the biodiversity has been effectively protected. More specifically, in the time of the project close in December 2012:

- Forest dependence score for birds in Damingshan NR reached 8.4, exceeding the target value of 4.0;
- Kilometric abundance score for four forest-dependent pheasants in Maoershan NR reached 1.01, achieving the target value of 1.0+;
- Number of Francoisi leaf monkey in Nong Gang NR, reached to 98, exceeding the target of 80;
- Number of slipper orchids along 19 fixed transects in Mulun NR was 918, which reached the target of 849.
- Area affected by fires in Longshan NR was zero in 2012, which was also met the target of less than 3 ha.

(f) Except other monitoring programs, Management Effectiveness Tracking Tool (METT) was used to score the efficiency of nature reserve management by the end of every year. During the implementation of the project, the baseline score of five project-supported nature reserves is 43, and the score of them in 2012 is 76.4, exceeding the target value of 70. According to the comparison between 5 project NRs and 7 comparable non-project NRs (average scores was 51.5), the effectiveness of project NRs reached higher METT score than non-project NRs more than 48.3%, which exceed the target value of 15%.

D. Enhancing Institutional and Management Capacity component

20. During the project implementation period, at provincial level, 53 training courses were held, 10 groups of oversea training and 6 groups of domestic study tours were organized, at county level, 876 various training courses were held, the training contents covered finance management, procurement management, technical and quality control management, environment protection and nursery management and so on. These trainings have greatly helped project staff and households building capacity for the project implementation. Meanwhile, a series of popular and easy to understand technical manuals were prepared and disseminated, including 28 kinds of technical manuals/guidelines, 3 kinds of post maps, 2 sets of video materials, 8 books of popularization of science, totaling 41 technical bulletins with 52,020 copies were prepared and disseminated, which

are warmly welcomed by basic level technicians and households. It exceeded the project target of 20,

21. The rate of the use of improved seed was more than 90%, as for eucalypts, the rate of improved planting material used was 100%. The extensive use of improved planting material has increased the yield and quality of project plantation.

22. By promoting the sustainable forest management approach, implementing EPG, undertaking training courses and technical services, the project forest farm staff have had better understanding on forest management, the concept was renew, the management capacity was built up, which resulted the improvement of their forest management. Project forest farms are gradually conducing forest certification. For instance, in Nov. 2009, Paiyangshan Forest Farm obtained the Forestry Stewardship Council (FSC). Then Gaofeng Forest Farm and Huangmian Forest Farm had also obtained FSCs. It is expected Qipo Forest Farm will obtain the FSCs soon.

23. During project implementation period, around 204.090 local forestry staff and households participated in the project training programs. Among them, there were 181,290 person/time households participating in the training courses to learnt forestry techniques and skills, which also broadened their passes to get rid of poverty and become better off. According to the incomplete statistics, there were 37,180 person/time female and 30,351 person/time ethnic minorities participated in training courses.

24. The researches and extension programs carried out under the project had achieved periodic results and fostered a large number of young talents; along with the project implementation, 13 new technologies have been extended to the project areas such as cutting propagation and light cultural medium technologies for seeding production; use of rooting powder to stimulate the rooting system; the use of disease resistant planting stock; packaged improved silvicultural technologies for masson pine, Chinese fir, bamboo, eucalyptus and local broadlife trees, and integrated watershed management models. 5 research programs have been undertaken, such as researches on selection of superior provenance for native broadlife tree species, advanced-generation genetic improvement and disease–resistant clones selection for commercial tree species, and carbon accounting parameters for key species in Guangxi; 59 papers and 12 books had been published; 4 technical regulations/guidance had been developed and put in use; 4 patents had been obtained and 1,539 ha of demonstration plantation had been established.

25. The new technologies and best silvicultural practice has largely improved the plantation quality and forest land productivities. For instance: (a) the integrated watershed management approach, by promoting multiple storey vegetation resulted in the vegetative cover increase of 10 to 25% and the water and soil control capacity increase of 23% to 46%; (b) adopting tissues culture induction technology, resulted in 30% increase of disease resistant and 15% increase of tissue culture fertility of eucalypt; and (c) the use of rooting powder, resulted in 15% increase of planting survive rate in dry areas. As contributed by new technology extension and quality control and improvement of the forest management, the volume growth of timber plantation gained 33.7% higher than

non-project plantations. Beyond the project, the research results will benefit to forestry sector of Guangxi.

26. Guangxi Forestry Bureau paid great attention to the preparation of "Sustainable Development Strategy of Forestry in Guangxi". Under the leadership of its management team, PPMO had invited 9 senior forestry specialists to undertake this work and organized several monographic workshops/meetings to discuss the outlines and the strategy draft. The report was finished in later 2012 and disseminated to all cities and counties of Guangxi to guide their forestry development decision making. To support the strategy preparation work, a number of studies have been conducted.

27. In order to improve the management capacity, a computerized information management system has been set up. This system uses GIS, computerized net and large data base as platform, realizes the integration of graphic and data processing. It has improved the efficiency of management and promoted the technical merit of project staff. The information system will be continued used for the provincial forest management programs.

E. Safeguard policies implementation

28. The project had adopted participating design approach, which provided equal opportunities for female and ethnic groups to participate in the project and benefitted from the project. The households participated in the project in various ways and on a voluntary basis. The preference on the tree species selection and plantation management arrangement has been fully take consideration during the project preparation and implementation. All the safeguard policies that apply to the project have been implemented according to the project design.

F. Post Project Arrangements

29. After the completion of project implementation, the PPMO, BO, TSP and CPMO will continue follow-up plantation managements including plantation tending and management, forest fire control, pest and disease control and loan repayment, etc.. The technical supporting agencies including Guangxi Forestry Research Institute and Guangxi Forestry Survey and Design Institute will continue to provide technical support to the project.

30. For the plantation management, As State Forestry Administration and Guangxi Government consider Guangxi is a key timber production base of China, as well as critical areas to limestone ecosystem protection and watershed conservation, the project plantations will get support continuously in the aspects of technical services, financing and policy. More specifically, the plantation management in particular on pest management and fire prevention and control as well as needed technical services have been integrated to the county forest management system. The exiting forest management system and routine government budget are in place. In addition, Annual grant of 75

RMB/ha for ecological forest management will also be provided to the households by central government.

31. For the national nature reserve, sufficient recurrent and investment are available to cover the continuation, even for more infrastructure work. The capacity built under the project will enable the project nature reserves better use the government budget and improve the nature reserve management efficiency. In additional, Guangxi Forestry Research Institution has integrated long-team forestry researches and monitoring programs, which would not only benefit to the project, but also the forestry sector of Guangxi, to the Government program with adequate budget arrangements.

IV. EVALUATION ON WORLD BANK AND BORROWER PERFORMANCE

32. **Performance of the World Bank.** From the project preparation to implementation, the World Bank regularly or irregularly sent supervision missions to supervise the project design and implantation. The mission discussed with Forestry Bureau of GZAR, PMO and BO as well as other stakeholders on related issues and made supervision aide-memoire, which played a significant role in guiding and innovative project design and implementation. In particular, the Bank brought international experience and new concept to the project design as well as focus on the capacity building during whole cycle of the project. Therefore, it is believed that the World Bank's performance should be rated as Highly Satisfactory.

33. **Performance of the Borrower.** A Project Leading Group (PLG) and Project Coordination Group (PCG) have been established at the provincial level. The PLG is chaired by the Vice-Governor who is in charge of forestry and comprises representatives from forestry, finance, planning and audit sectors. The PCG is located in the Forestry Bureau of GZAR and is led by its Director General and comprises the relevant deputy directors and division chiefs. The PLG set the principles and policies for the project, approved the overall implementation plan, better coordinated inter-agency discussions and resolved major issues during the project's implementation. For instance the restoration of the natural disaster damaged plantation, mobilizing counterpart funding to fill finance gaps caused by the increase of labor price, as well as coordination to each of the involved agencies.

34. PPMO and BO were established within the GFB. The PPMO is responsible for timber plantation and ecological forest management and BO is responsible for the nature reserve management and ensure that biodiversity concerns was integrated to other project activities under the landscape management approach. PMOs were also established in all project counties and nature reserves with assigned professional and technical personnel. In addition, A TSP was established to provide technical support to the implementation of research, training, and extension programs. It is believed that the borrower has performed well in project implementation and management, in particularly on effectively tackling the challenges of the CDM program implementation, bringing innovative management approaches to nature reserve management and extending new and improved technologies

to the plantation and watershed management, as well as improving the project monitoring and technical services. The performance of the Borrower should be rated as Satisfactory.

V. EXPERIENCES AND LESSONS

35. The main experience and lessons learned of the project include:

(a) The project is highly relevant to China's forestry development strategy and fit well with Guangxi economic development and environment improvement agenda, which ensure the achievement of project targeted objectives and long-term sustainability by strong government commitment and active participation of local farmers and forest farms.

(b) Set up reasonable and high-effective institutional and implementation organization structure with the support from TSP, as well as experienced international and domestic experts, are the key factors of the successful project implementation.

(c) The project supported an integrated forestry management. It promoted not only the forest production, but also watershed management, biodiversity conservation, as well as institutional capacity enhancement, which would contribute to the sustainable forestry development and better generate multiple functions of the forest resources.

(d) The Facilitating Reforestation for Guangxi Watershed Management Project in Pearl River Basin Project is the first Clean Development Mechanism (CDM) afforestation/reforestation project in the world, which was successfully registered from the CDM Executive Board (EB) under the United Nations. The program demonstrated technical and methodological approaches of using reforestation on degraded land to sequester carbon and pilot carbon trading, enhance biodiversity conservation, control soil erosion and generate income for local communities. It promoted the CDM afforestation efforts in China as well as in the world.

(e) 164 species have been newly identified after the survey and research on cave biodiversity in Guangxi, which makes Guangxi become one of the major source of newly-found cave species and one of the richest cave species areas (Global Hotspots) in the world.

(f) The project brought new concept in nature reserve management. It has significantly improved the nature server staff's quality and capacity, enhanced living conditions of villagers in proximity of the nature reserves, and strengthened public awareness on the protection of natural resources, which demonstrate the sustainable nature resources management and biodiversity conservation.

(g) The project has set up a three-dimensional model of training measures and developed a series of monitoring indicators with characteristic to provide

reference to the implementation of similar projects.

(h) The participatory design approach has been applied in the project design and implementation, which effectively improved implementation efficiency and effectiveness of the project. It also improved the project sustainability by bringing relevant stakeholders in particular households' interesting and benefits to the consideration.

(i) The site selection critical of the CDM afforestation/reforestation project resulted in poor conditions of the sites. The carefully select the sites and choose the suitable tree species for planting are crucial to avoid risk.

Annex 6. List of Supporting Documents

1. Project Appraisal Document
2. Borrower's Completion Report
3. Aide-Memoires and ISRs
4. Semi-annual Progress Status Reports from Borrower
5. Project Agreement
6. Loan Agreement
7. Project Design Document of Facilitating Reforestation for Guangxi Watershed Management in Pearl River Basin
8. Project Design Document of Guangxi Northeast Degraded Land Reforestation Project

IBRD 34708R

CHINA

GUANGXI INTEGRATED FORESTRY DEVELOPMENT AND CONSERVATION PROJECT

ECOLOGICAL FOREST PLANTATIONS/PROTECTION PLUS BIO-CARBON PLANTATIONS

PROTECTION FOREST + MOUNTAIN CLOSURE

PROTECTION FOREST + MOUNTAIN CLOSURE **AND** BIO-CARBON PLANTATION

COUNTY CAPITALS

PREFECTURE CAPITALS

PROVINCE CAPITAL

PROVINCIAL HIGHWAYS

NATIONAL HIGHWAYS

RAILROADS

CANALS

RIVERS

COUNTY BOUNDARIES

PROVINCE BOUNDARIES

INTERNATIONAL BOUNDARIES

GUIZHOU

HUNAN

YUNNAN

VIETNAM

GUANGDONG

Beibu Gulf

Sanjiang Dongzu
Longsheng Gezu
Ziyuan
Quanzhou
Xing'an
Guanyang
Lingchuan
Lingui
Guilin
Rong'an
Rongshui Miaozu
Yongfu
Liu Jiang
Tian'e
Nandan
Huanjiang Maonanzu
Luocheng Mulaozu
Nanpan Jiang
Longlin Gezu
Leye
Xilin
Fengshan
Donglan
Hechi
Hongshui He
Yishan
Liucheng
Luzhai
Yangshuo
Gongcheng Yaozu
Fuchuan Yaozu
Pingle
Zhongshan
Hezhou
Lipu
Liuzhou
Liujiang
Tianlin
Lingyun
Bama Yaozu
Bose
Jinxiu Yaozu
Mengshan
Zhaoping
Gui Jiang
Xincheng
Du'an Yaozu
Xiangzhou
Heshan
Laibin
Tianyang
Dahua Yaozu
Mashan
Wuxuan
Pingnan
Xun Jiang
Wuzhou
He Jiang
Tengxian
Cangwu
Napo
Shanglin
Guiping
Yu Jiang
Debao
Pingguo
Long'an
Binyang
Jingxi
Tiandong
You Jiang
Wuming
Guigang
Tiandeng
Daxin
NANNING
Yong Jiang
Rongxian
Cenxi
Xi Jiang
Yongning
Hengxian
Yulin
Beiliu
Fusui
Chongzuo
Longzhou
Lingshan
Luchuan
Pubei
Bobai
Ningming
Pingxiang
Shangsi
Qinzhou
Fangcheng Gezu
Hepu
Beihai

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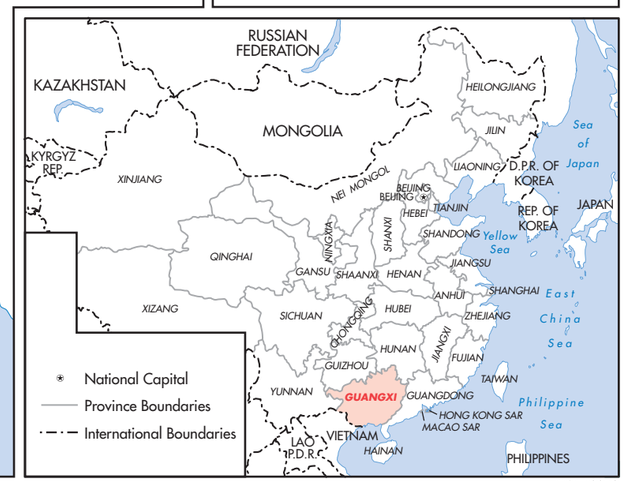
KILOMETERS



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JUNE 2013

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CHINA

GUANGXI INTEGRATED FORESTRY DEVELOPMENT AND CONSERVATION PROJECT

PLANTATION ESTABLISHMENT

GUIZHOU

HUNAN

GUANGDONG

YUNNAN

VIETNAM

Beibu Gulf

Ziyuan
Quanzhou
Sanjiang Dongzu
Longsheng Gezu
Xing'an
Guanyang
Lingchuan
Lingui
Guilin
Rong'an
Rongshui Miaozu
Yongfu
Liuchen
Yangshuo
Pingle
Gongcheng Yaozu
Fuchuan Yaozu
Zhongshan
Lipu
Hezhou
Mengshan
Jinxiu Yaozu
Zhaoping
Daguishan Forest Farm
Xiangzhou
Laibin
Wuxuan
Pingnan
Guiping
Tengxian
Wuzhou
Cangwu
Cenxi
Rongxian
Beiliu
Yulin
Luchuan
Bobai
Pubei
Lingshan
Hengxian
Guigang
Binyang
Shanglin
Heshan
Mashan
Du'an Yaozu
Dahua Yaozu
Tianyang
Tiandong
Napo
Debao
Jingxi
Pingguo
Long'an
Tiandeng
Daxin
Wuming
Nanning
Fusui
Chongzuo
Longzhou
Ningming
Pingxiang
Shangsi
Qinzhou
Fangcheng Gezu
Hepu
Beihai
Liuzhou
Liujiang
Luzhai
Yishan
Hechi
Huanjiang Maonanzu
Luocheng Mulaozu
Donglan
Fengshan
Tian'e
Nandan
Leye
Longlin Gezu
Xilin
Tianlin
Lingyun
Bama Yaozu
Bose
Xincheng
Yachang Forest Farm
Huangmian Forest Farm
Sanmenjiang Forest Farm
Weidu Forest Farm
Gaofeng Forest Farm
Liangfengjiang Forest Farm
Liuwan Forest Farm
Qipo Forest Farm
Dongmen Forest Farm
Paiyangshan Forest Farm
Bobai Forest Farm
Qinlian Forest Farm
Nanpan Jiang
Hongshui He
Yong Jiang
You Jiang
Xun Jiang
He Jiang
Xi Jiang
Gui Jiang
Zuo Jiang

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GSDPM Map Design Unit

TIMBER PLANTATION
FOREST FARMS
COUNTY CAPITALS
PREFECTURE CAPITALS
PROVINCE CAPITAL
PROVINCIAL HIGHWAYS
NATIONAL HIGHWAYS
RAILROADS
CANALS
RIVERS
COUNTY BOUNDARIES
PROVINCE BOUNDARIES
INTERNATIONAL BOUNDARIES

RUSSIAN FEDERATION
KAZAKHSTAN
MONGOLIA
KYRGYZ REP.
XINJIANG
QINGHAI
XIZANG
NEI MONGOL
HEILONGJIANG
JILIN
LIAONING
BEIJING
HEBEI
TIANJIN
SHANXI
NINGXIA
GANSU
SHAANXI
HENAN
SHANDONG
JIANGSU
ANHUI
SHANGHAI
ZHEJIANG
SICHUAN
CHONGQING
HUBEI
HUNAN
JIANGXI
FUJIAN
GUIZHOU
YUNNAN
GUANGXI
GUANGDONG
TAIWAN
HONG KONG SAR
MACAO SAR
HAINAN
LAO P.D.R.
VIETNAM
D.P.R. OF KOREA
REP. OF KOREA
JAPAN
PHILIPPINES
Sea of Japan
Yellow Sea
East China Sea
Philippine Sea

National Capital
Province Boundaries
International Boundaries

JUNE 2013

IBRD 34735R

CHINA

GUANGXI INTEGRATED FORESTRY DEVELOPMENT AND CONSERVATION PROJECT

NATURE RESERVES MANAGEMENT

GUIZHOU

HUNAN

YUNNAN

VIETNAM

GUANGDONG

Beibu Gulf

Mulun

Mao'ershan

Damingshan

Longshan

Nonggang

Ziyuan
Quanzhou
Sanjiang Dongzu
Longsheng Gezu
Xing'an
Guanyang
Lingchuan
Guilin
Lingui
Rong'an
Rongshui Miaozu
Yongfu
Gongcheng Yaozu
Fuchuan Yaozu
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Pingle
Zhongshan
Hezhou
Lipu
Mengshan
Zhaoping
Jinxiu Yaozu
Liuzhou
Liujiang
Liucheng
Luzhai
Huanjiang Maonanzu
Luocheng Mulaozu
Hechi
Yishan
Tian'e
Nandan
Leye
Fengshan
Donglan
Lingyun
Tianlin
Xilin
Longlin Gezu
Bama Yaozu
Bose
Tianyang
Tiandong
Napo
Debao
Jingxi
Du'an Yaozu
Dahua Yaozu
Mashan
Xincheng
Heshan
Laibin
Xiangzhou
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Shanglin
Binyang
Pingguo
Long'an
Wuming
Tiandeng
Daxin
NANNING
Yongning
Hengxian
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Zuo Jiang
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NATURE RESERVES
COUNTY CAPITALS
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JUNE 2013