



**CLEAN DEVELOPMENT MECHANISM  
PROJECT DESIGN DOCUMENT FORM FOR AFFORESTATION AND REFORESTATION  
PROJECT ACTIVITIES (CDM-AR-PDD) Version 04**

**CONTENTS**

**PROJECT DESIGN DOCUMENT FOR AFFORESTATION AND REFORESTATION PROJECT  
ACTIVITIES (CDM-AR-PDD)**

- A. General description of the proposed A/R CDM project activity
- B. Duration of the project activity / crediting period
- C. Application of an approved baseline and monitoring methodology
- D. Estimation of *ex ante* actual net GHG removals by sinks, leakage and estimated amount of net anthropogenic GHG removals by sinks over the chosen crediting period
- E. Monitoring plan
- F. Environmental impacts of the proposed A/R CDM project activity
- G. Socio-economic impacts of the proposed A/R CDM project activity
- H. Stakeholders' comments

**Annexes**

- Annex 1: Contact information on participants in the proposed A/R CDM project activity
- Annex 2: Information regarding public funding
- Annex 3: Baseline information
- Annex 4: Monitoring plan



**SECTION A. General description of the proposed A/R CDM project activity:**

**A.1. Title of the proposed A/R CDM project activity:**

>>

Title: Reforestation on Degraded Lands in Northwest Guangxi

Version 7.0

Date: 09/03/2010

**A.2. Description of the proposed A/R CDM project activity:**

>> The project sites are located in the headwater areas of Pearl River, the third longest river in China, in Guangxi Zhuang Autonomous Region. Due to the high precipitation, frequent storms, complex landform and steep valleys, as well as continual human disturbance (fire, grazing and cultivation) and poor land management, the area has been subjected to severe vegetation degradation and soil erosion. In the project areas, about 80% of local residents are ethnic minorities, including Zhuang, Miao, Yao, Yi and Buyi ethnic Nationalities. The project counties are provincial-level poverty counties with many local people living below the poverty level.

There are over 6,000 flora species in Guangxi, the third highest of all provinces in China. This includes 113 rare and endangered plant species, ranking it second among the 30 provinces and autonomous regions of China. 166 species of mammals have been recorded there, ranking it sixth among China's provinces. Of these 26 species are categorized as protected species. More than 310 bird species have been also recorded, of which, 49 are nationally protected species. The proposed project area is considered one of the key biodiversity areas in Guangxi.

The proposed A/R CDM project activity will establish 8671.3 ha of multiple-purposes forests on degraded lands in Longlin, Tianlin and Lingyun Counties of Guangxi Zhuang Autonomous Region in China. Major species and reforestation models include 1185.1 ha of masson pine (*Pinus massoniana*), 863.2 ha of Chinese fir (*Cunninghamia lanceolata*), 3112.1ha of Shiny-bark birch (*Betula luminifera*), 121.4 ha of *Choerospondias axillaries*, 929ha of masson pine and Schima (*Schima wallichii*) mix forest, 408.7 ha of masson pine and Sweetgum (*Liquidambar formosana*) mixed forest, 1403.5 ha of eucalyptus and 648.3 ha of Flous (*Taiwania flous*). It is expected that the proposed A/R CDM project activity will produce 1,746,158 tCO<sub>2</sub>-e of tCERs at an annual average of 87,308 tCO<sub>2</sub>-e over the first 20-year crediting period starting in 2008.

Both the operating entity (Longlin Forestry Development Company Ltd.) and local farmers hold a view that the proposed A/R CDM project activity, through the above-mentioned activities, will contribute to poverty alleviation and environment improvement (biodiversity conservation and soil erosion control), thus contribute to sustainable development, specifically,:

- (1) control soil and water erosion and land degradation in the selected project areas;
- (2) enhance biodiversity conservation by increasing forest cover and nature habitat connectivity;
- (3) generate income for the local farmers and promote the local community development.

Local farmers and communities will contribute land and labour, while a local forest company will invest in planting activities, provide technical input and manage the plantations during the crediting period, as



## CDM – Executive Board

**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

well as take the investment risks. The shareholding contractual arrangements will be made between the farmers / communities and the forest company with regard to establishment of the plantation, the management responsibilities, inputs and benefit sharing. The farmers, communities and forest company will share income from forest products in proportion to their inputs, while farmers and communities will share a greater portion of revenue from CER transactions. In addition, the forest farms and companies will pay for farmers' labour to ensure the short-term income.

The proposed project is developed under the umbrella of the World Bank (WB) financed Guangxi Integrated Forestry Development and Conservation Project. The project will be designed to satisfy CCB Standards (Climate, Community and Biodiversity Project Design Standards) and to be eligible for the CCB certification. The innovation required in designing a project with CCB standards should result in the delivery of multiple climate, biodiversity and community benefits.

**A.3. Project participants:**

&gt;&gt;

Table A-1 Project participants

<b>Name of Party involved (*) (host) indicates a host Party)</b>	<b>Private and/or public entity(ies) project participants (*) (as applicable)</b>	<b>Indicate if the Party involved wishes to be considered as a project participant (Yes/No)</b>
People's Republic of China	Private entity: Guangxi Longlin Forestry Development Company Ltd.	No
Kingdom of Spain	The International Bank for Reconstruction and Development (IBRD) as Trustee of the BioCarbon Fund	Yes
(*) In accordance with the CDM A/R modalities and procedures, at the time of making the CDM-AR-PDD public at the stage of validation, a Party involved may or may not have provided its <u>approval</u> . At the time of requesting registration, the approval by the Party(ies) involved is required.		

**A.4. Description of location and boundaries of the A/R CDM project activity:**
**A.4.1. Location of the proposed A/R CDM project activity:**
**A.4.1.1. Host Party(ies):**

&gt;&gt; P. R. China

**A.4.1.2. Region/State/Province etc.:**

&gt;&gt;Guangxi Zhuang Autonomous Region

**A.4.1.3. City/Town/Community etc:**



**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

>> Lands to be reforested are located in 43 villages of 13 towns/townships and 3 sub-farms of Jinzhongshan Forestry Farms in Longlin County, 22 villages of 11 towns/townships in Tianlin County, and 3 villages of 2 towns/townships and 4 sub-farms of Jiuhiang Forestry Farm in Linyun County (see Table A-2 and Fig A-1 to Fig A-4 for details).

Table A-2 List of townships and communities involved<sup>1</sup>

Towns/ Townships	Villages	Coordinate		Area (ha)
		Longitude (E, degree)	Latitude (N, degree)	
LongLin County				5748.0
ShaLi	Weigan	105.60236-105.67526	24.739561-24.785588	49.7
	WeiRao	105.56910-105.614058	24.760254-24.810966	131.2
PingBan	WeiLong	105.54662-105.575851	24.754467-24.800739	24.9
	BianYa	105.42689-105.497895	24.72101-24.775827	5.2
	MinLe	105.39417-105.46438	24.783535-24.821099	13.2
	MuGu	105.436314-105.48577	24.759388-24.809359	14.5
	GongHeChang	105.39289-105.45226	24.702059-24.764923	42.6
LongHuo	WeiLing	105.481388-105.54588	24.625555-24.673548	26.8
	YuTang	105.50061-105.54518	24.648746-24.701743	55.3
ZheBao	TongLiu	105.39191-105.48975	24.827213-24.889658	45.6
	BanZhiHuan	105.347742-105.45146	24.882029-24.946602	250.7
ZheLang	ZheYan	105.26979-105.301313	24.781569-24.823208	52.6
GeBu	Zheyan	105.05451-105.13100	24.792719-24.838543	67.6
	ZuoTeng	105.05602-105.12148	24.747751-24.807688	68.8
	ZheJiang	105.02372-105.07829	24.80899-24.850016	43.0
	HongYan	105.098481-105.16709	24.73772-24.804873	189.4
De'e	BaKe	105.15746-105.26303	24.58609-24.634993	42.3
	YanTou	105.16488-105.229436	24.573357-24.607754	18.2
	JinPing	105.12856-105.17163	24.551584-24.603495	57.3
	ShuiJing	105.139414-105.21735	24.660671-24.738968	290.1
	LongYing	105.25519-105.33508	24.645823-24.706753	169.0

<sup>1</sup> The coordinates listed in the table represent the geographical ranges of the villages, which are based on Beijing 1954 3 degree zone and Gauss-kruger projection.



## CDM – Executive Board

**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

Zhuchang	YangJie	105.058853-105.15303	24.706938-24.758263	228.9
	NaYan	104.973878-105.0716	24.567415-24.624638	116.0
SheChang	LeXiang	105.28477-105.34425	24.527533-24.582968	305.8
	XinMin	105.24549-105.29403	24.517004-24.58534	121.4
	XinLi	105.34095-105.41039	24.513315-24.576408	266.0
	Machang	105.21479-105.27247	24.516352-24.590862	126.1
KeChang	HangChang	105.37226-105.44426	24.554058-24.609339	87.6
	HePing	105.39348-105.44412	24.53883-24.578779	408.8
	KeNiang	105.43903-105.49259	24.625023-24.675657	41.3
	XinHe	105.25155-105.31525	24.577288-24.653303	79.9
	XinHua	105.27733-105.33849	24.57481-24.653801	235.3
	HouChang	105.31890-105.39149	24.638981-24.717844	193.5
	DaQing	105.29261-105.3317	24.671701-24.706352	450.1
YanCha	LengDu	105.45530-105.52928	24.438459-24.504124	200.1
	PingTai	105.40021-105.49588	24.390295-24.448271	145.8
	LongTai	105.37083-105.47046	24.44141-24.491156	32.1
	PingBan	105.41013-105.51616	24.500202-24.563868	12.0
JieTing	NaDa	105.47292-105.54466	24.381567-24.456039	101.1
	NongXi	105.53310-105.62213	24.372391-24.425165	82.4
	NaSang	105.510827-105.58971	24.479509-24.544373	102.7
XinZhou	NongSang	105.26918-105.35068	24.704311-24.750227	39.4
	PoYan	105.458734-105.50881	24.644657-24.695047	15.9
Jinzhongshan Forestry centre	WuChong	104.84013-104.93601	24.681383-24.749472	636.1
	MaLan	104.93263-104.9908	24.659658-24.70019	61.7
<b>TianLin County</b>				<b>2411.5</b>
lizhou	nanglao	106.364219-106.364219	24.297103-24.338214	196.3
	fanchang	106.371444-106.437104	24.325814-24.388769	160.9
langping	xiangwei	106.238345-106.271855	24.44079-24.548795	157.7
	hongxing	106.238135-106.315628	24.582321-24.651086	197.9
lucheng	yingpan	105.976337-106.102209	24.413741-24.501745	23.9
	nama	105.79936-105.889628	24.500879-24.569645	93.6



## CDM – Executive Board

**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

baile	baile	106.045501-106.171097	24.633296-24.712869	64.7
	genbiao	106.035818-106.156874	24.547235-24.653112	182.1
jiuzhou	pinglin	105.824614-105.966449	24.638765-24.709809	241.8
	guanglong	105.879844-105.973972	24.602742-24.654942	163.0
	yangbai	105.774751-105.833917	24.54016-24.584198	37.4
	zhenian	105.661758-105.751817	24.646736-24.749523	59.6
Ding'an	anding	105.642281-105.744069	24.299259-24.33888	21.3
	namen	105.567093-105.673907	24.323832-24.378311	60.8
	yangrong	105.601441-105.667623	24.343642-24.416217	44.4
	changjing	105.660084-105.70993	24.359643-24.435266	30.3
gaolong	zheche	105.581963-105.637464	24.130679-24.23297	159.8
zhemiao	bailong	105.737471-105.807633	24.471013-24.551289	103.9
liulong	lietun	106.160643-106.205673	24.059159-24.100444	62.5
	zhouma	105.993301-106.069328	24.091652-24.160078	34.0
nabi	nala	105.628249-105.762918	24.042485-24.159633	111.5
Yangya Field	banyang	105.921254-106.02367	24.51527-24.631275	204.1
<b>Linyun County</b>				<b>511.8</b>
Jiujiang Forestry centre	Yaoma	106.47461-106.53654	24.31401-24.36095	176.5
	Shangmeng	106.53236-106.58782	24.27782-24.31509	14.0
	Yangnang	106.45436-106.50953	24.26637-24.34819	46.4
	Lantaig	106.41192-106.48079	24.25961-24.37997	145.6
sicheng	Longzhao	106.60063-106.64282	24.34982-24.40664	34.4
Jiayou	Moxian	106.68631-106.77443	24.5138-24.58	85.0
	Dongha	106.67946-106.75025	24.55669-24.60651	9.9



Fig.A-1 Locations of Project Counties

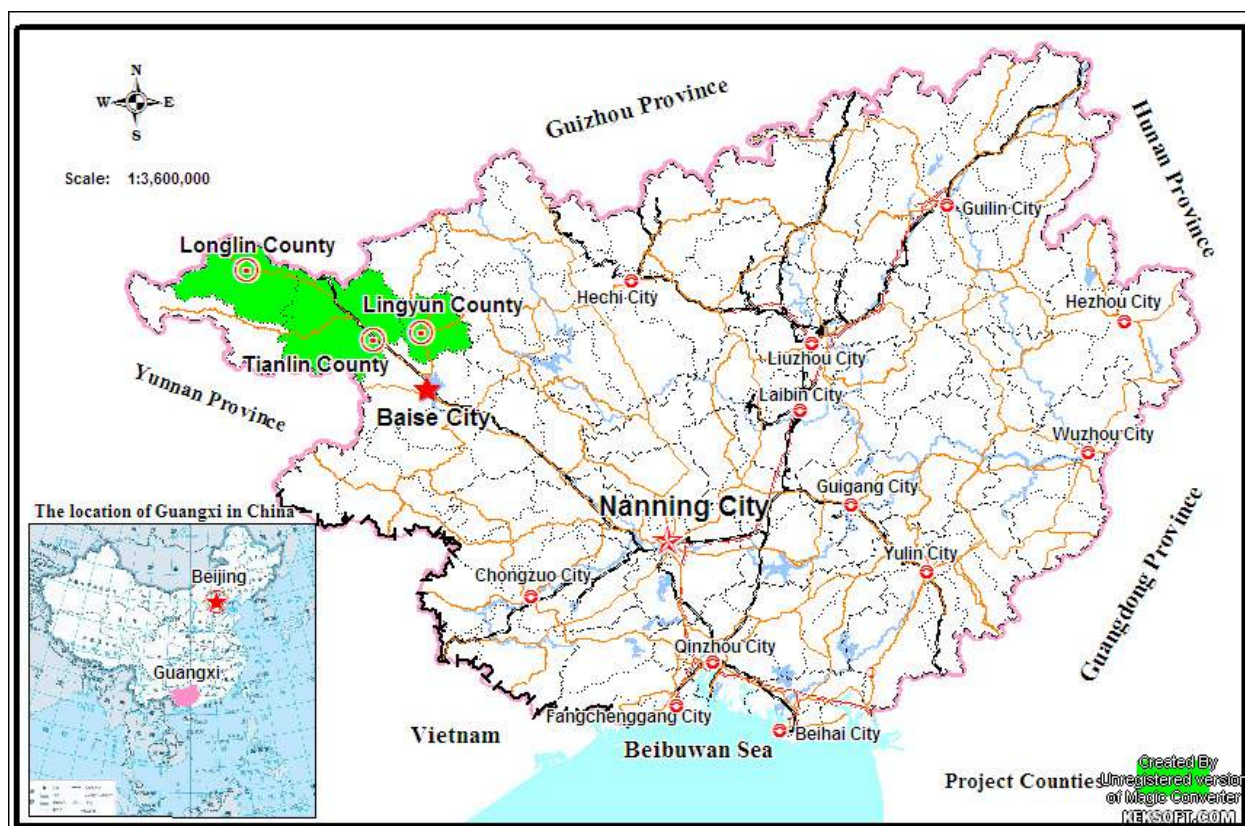




Fig.A-2 Locations of Project Towns/Townships in Longlin County

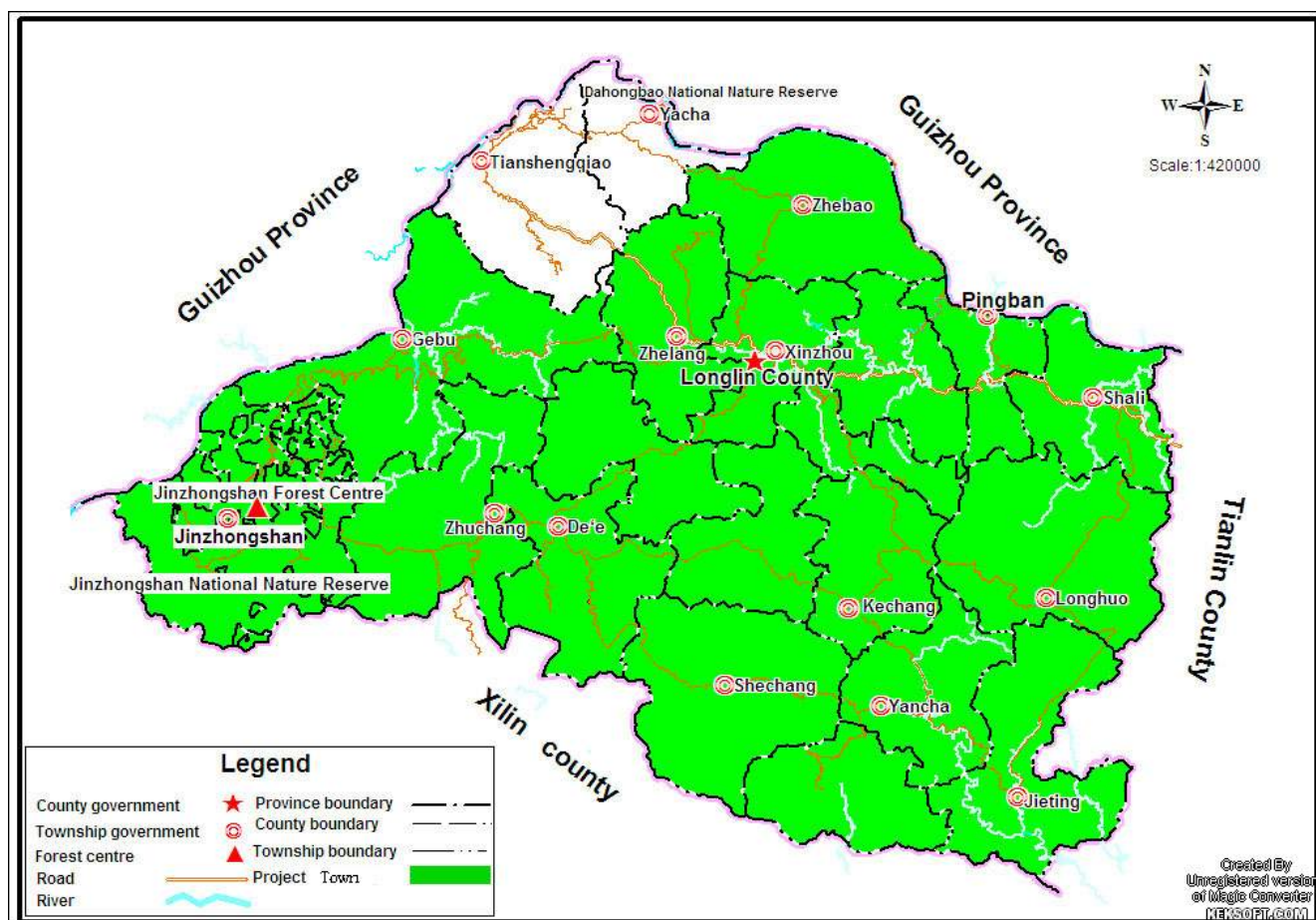






Fig.A-3 Locations of Project Towns/Townships in Tianlin County

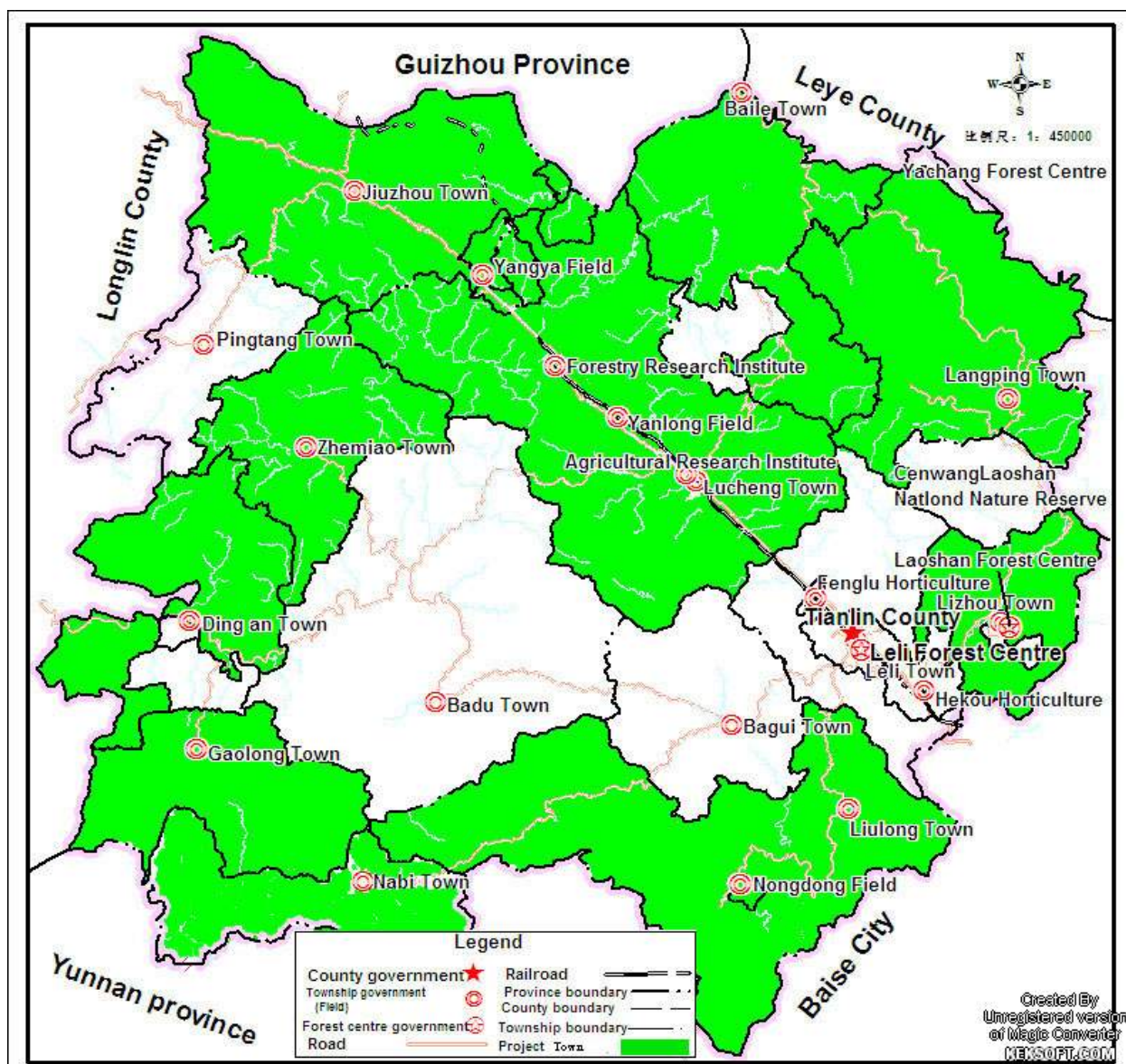
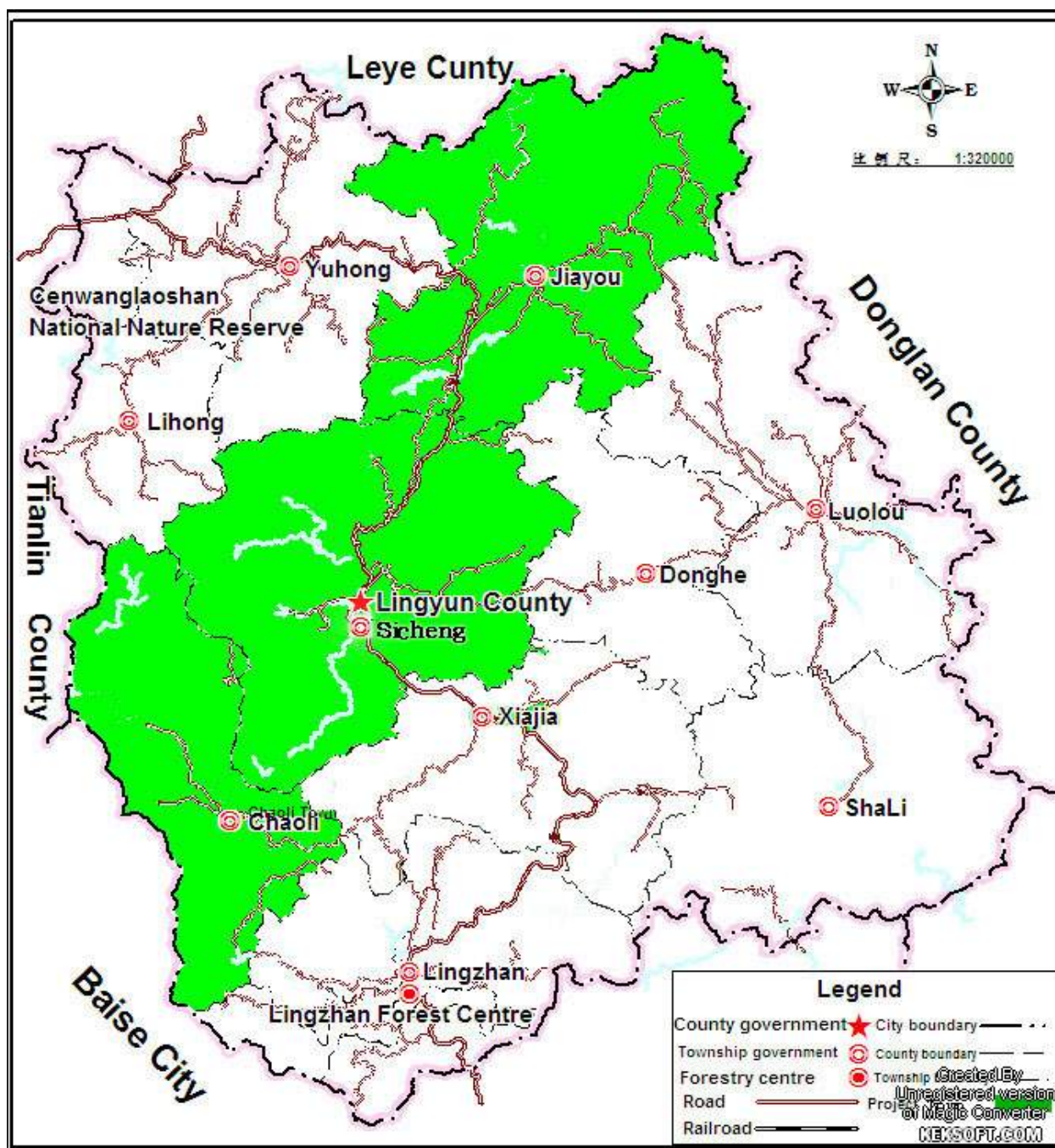




Fig.A-4 Locations of Project Towns/Townships in Lingyun County

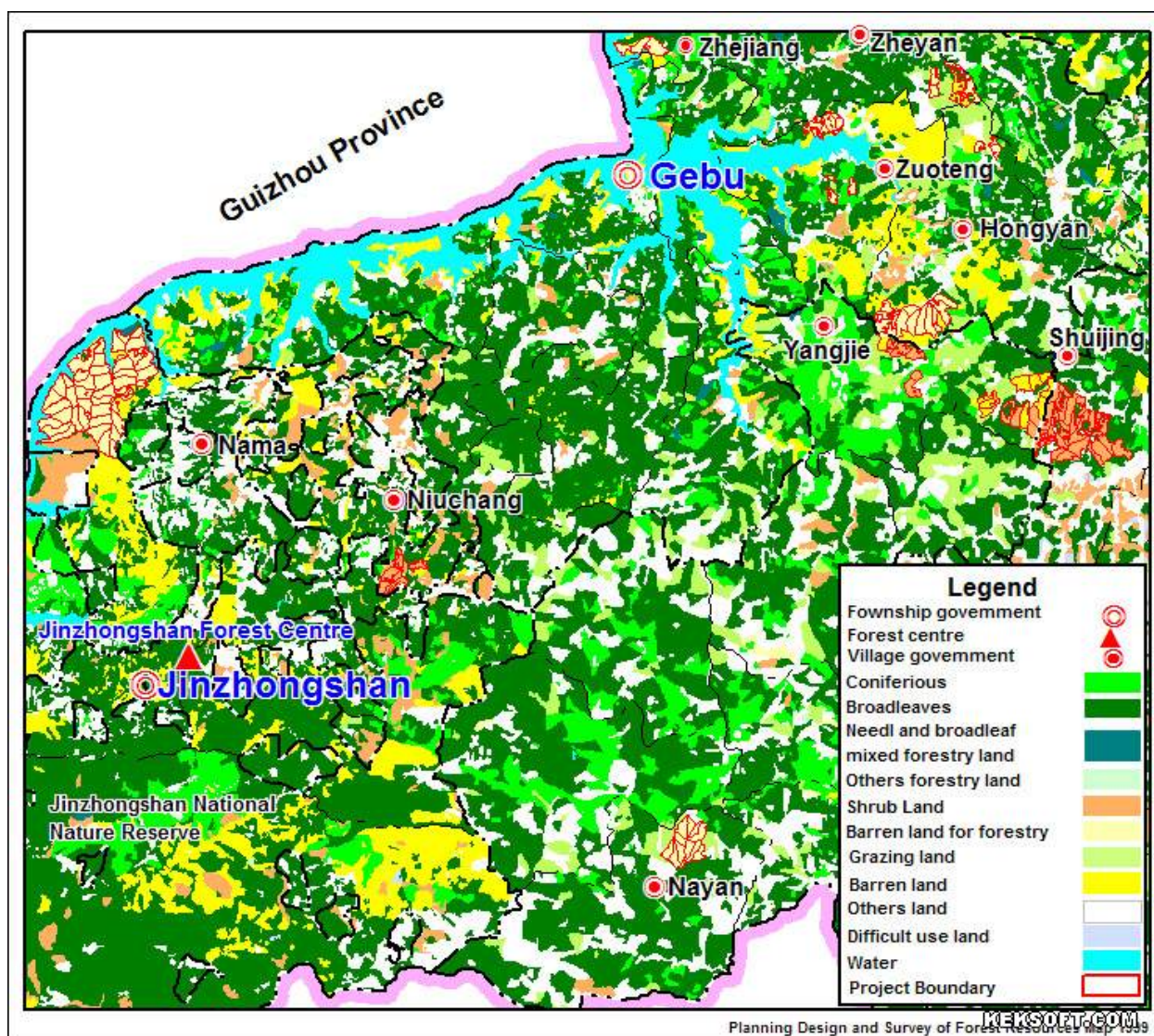




**A.4.2. Detailed geographic delineation of the project boundary, including information allowing the unique identification(s) of the proposed A/R CDM project activity:**

>> The project boundaries and geographical locations are indicated from Fig A-5 to Fig A-14 below. In accordance with decision by EB 41, the numerical data on geographic coordinates of the project boundary for each of 183 parcels of lands that are consistent with table Annex 3-1 are available in the shape (.shp) file format for verification by DOE.

Fig.A-5 Project boundary and Land use/cover map in 1999 for Gebu and Zhuchang Townships and Jingzhongshan Forestry Farm in Longlin County





**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

Fig.A-6 Project boundary and Land use/cover map in 1999 for Pingban, Shali and Zhebao, Zhelang and Xinzhou Towns/Townships in Longlin County

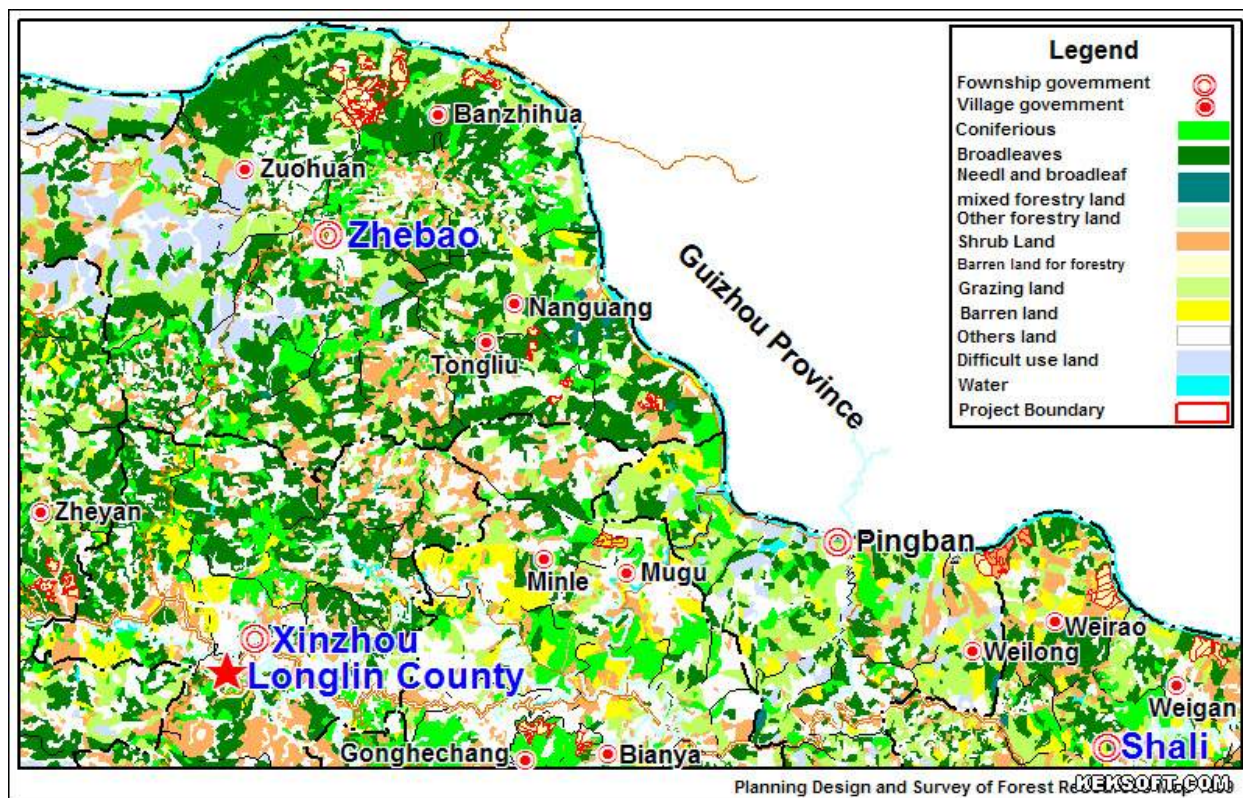






Fig.A-7 Project boundary and Land use/cover map in 1999 for Shechang, De'e and Kechang Towns/Townships in Longlin County

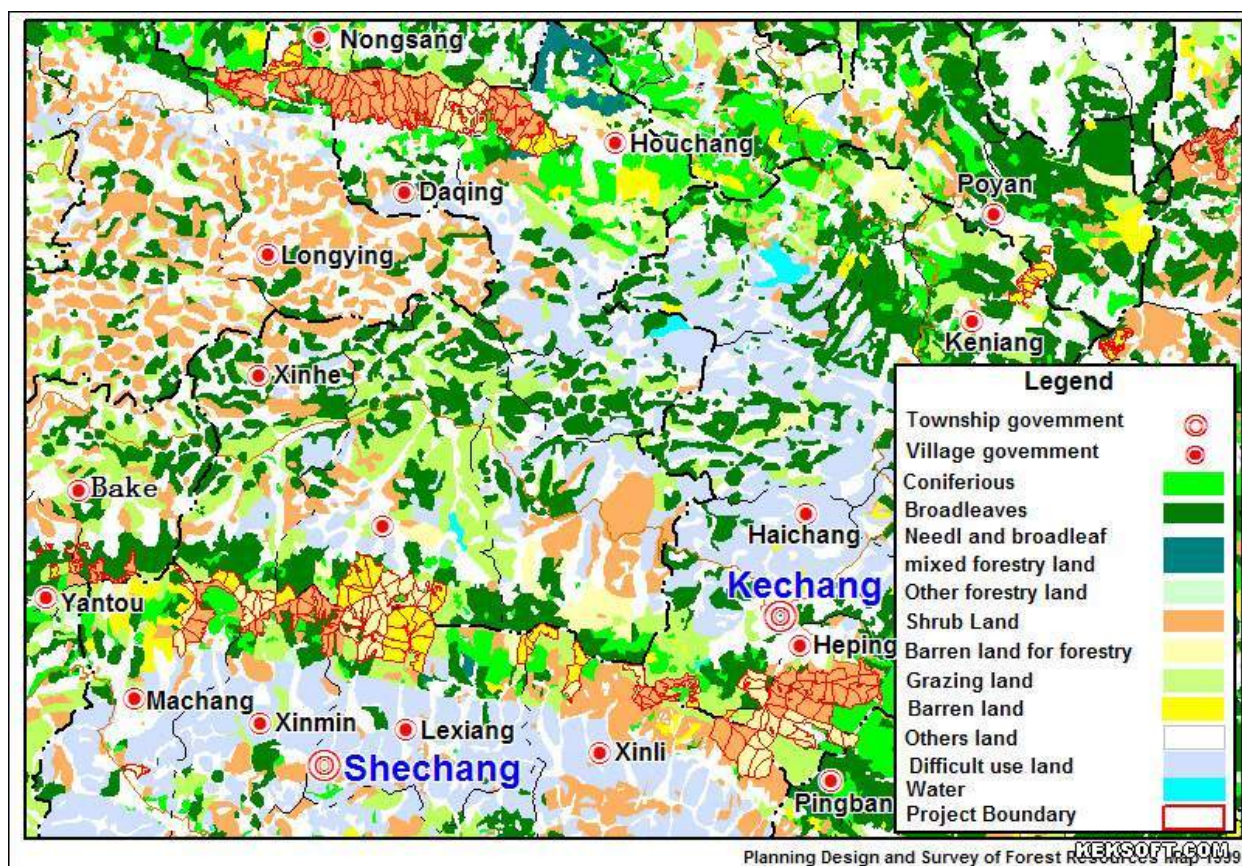






Fig.A-8 Project boundary and Land use/cover map in 1999 for Yancha and Jieting Towns/Townships in Longlin County

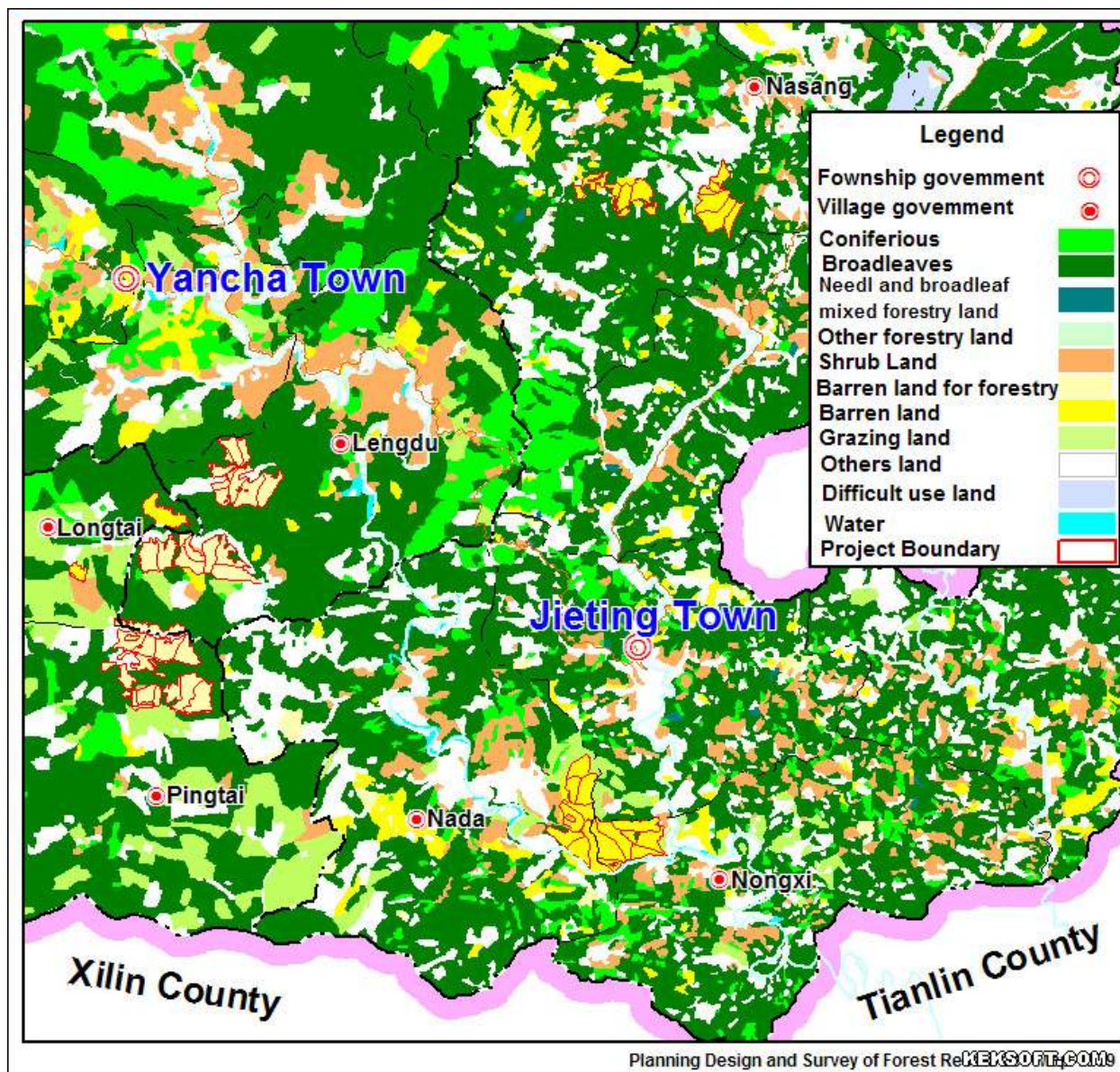






Fig.A-9 Project boundary and Land use/cover map in 1999 for Jiuzhou and Zhemiao Towns/Townships and Yangya farm in Tianlin County

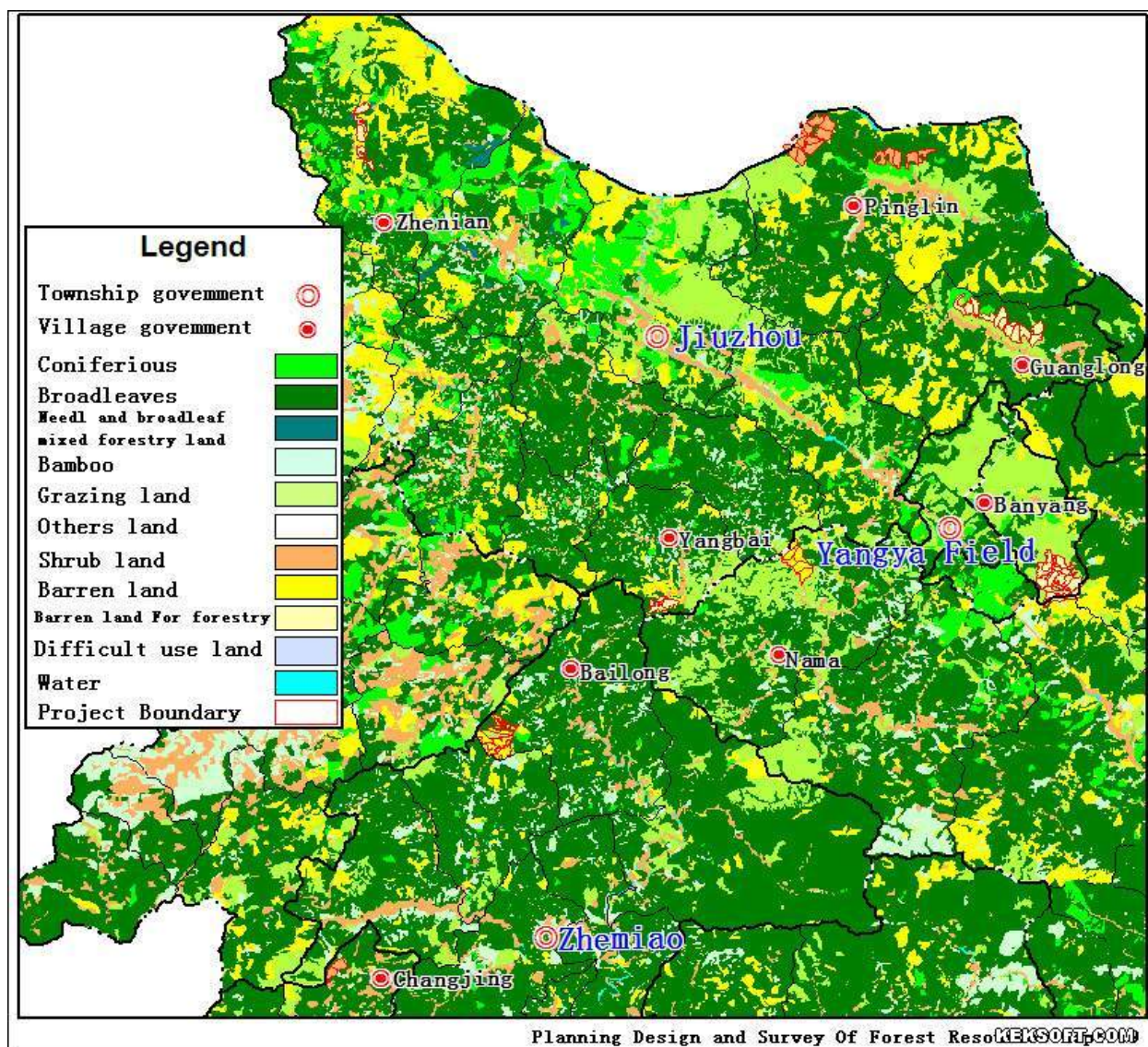






Fig.A-10 Project boundary and Land use/cover map in 1999 for Dingan, Gaolong and Nabi Towns/Townships in Tianlin County

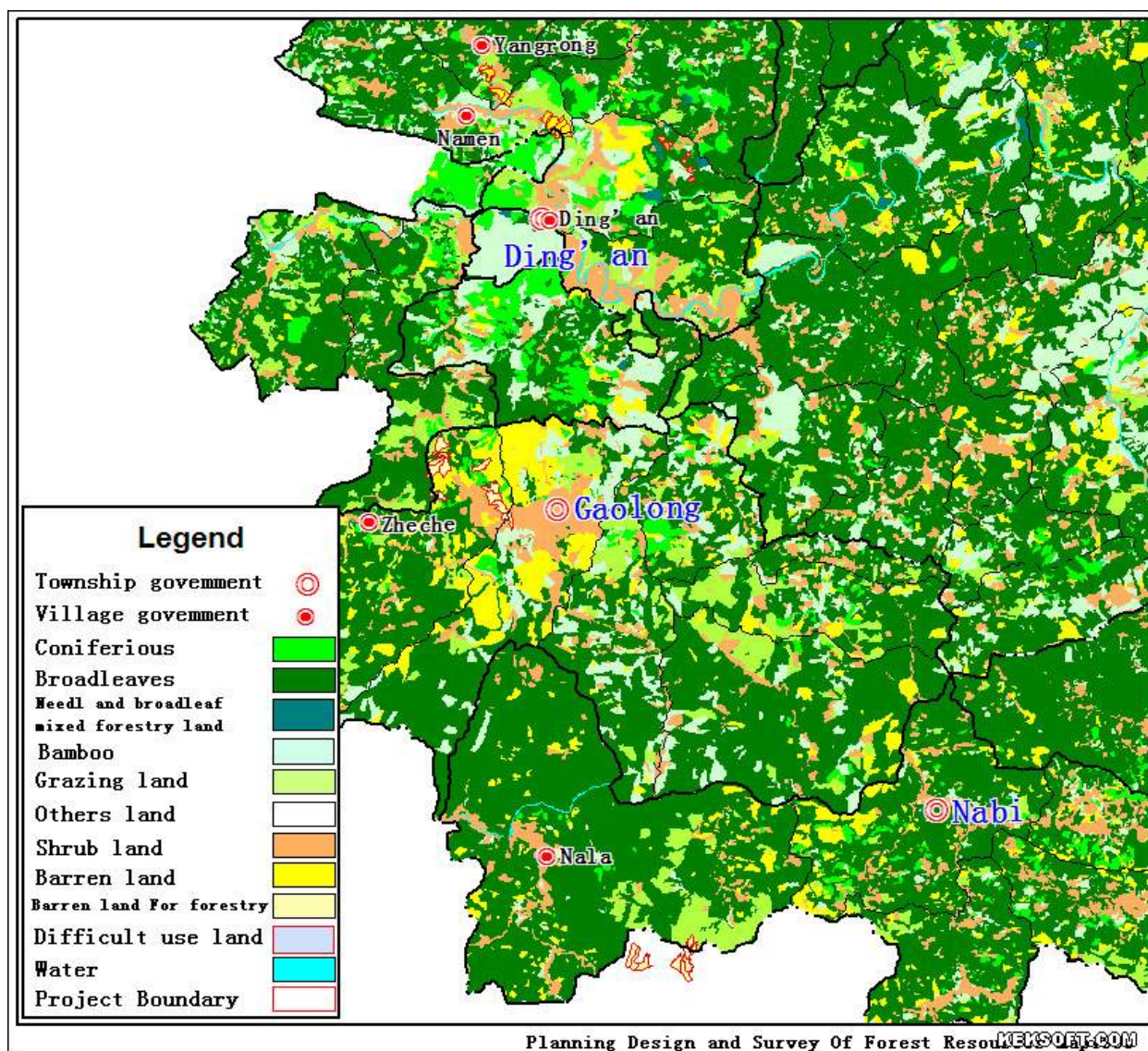






Fig.A-11 Project boundary and Land use/cover map in 1999 for Baile, Langping and Lucheng Township in Tianlin County

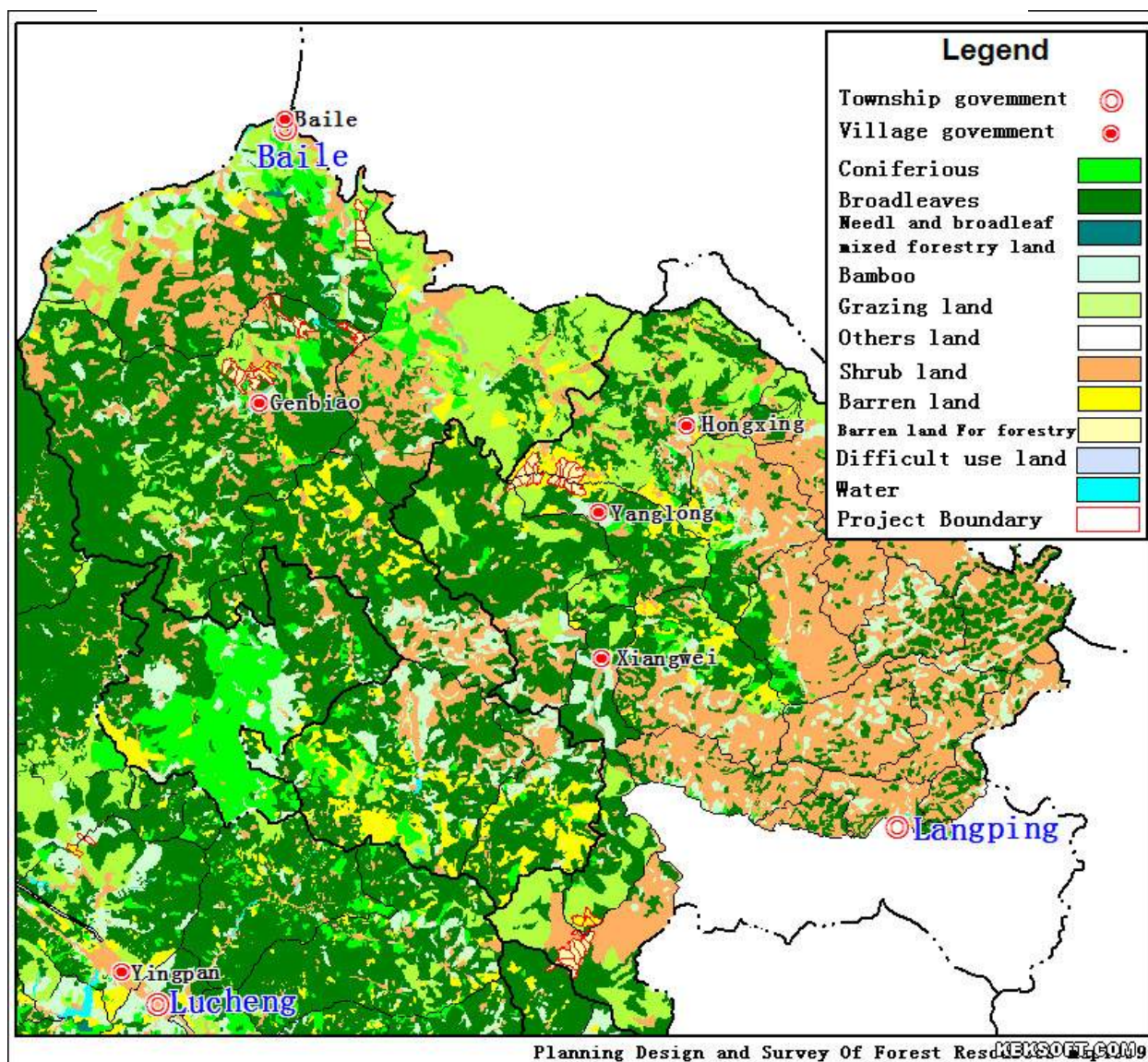






Fig.A-12 Project boundary and Land use/cover map in 1999 for Lizhou and Liulong Towns/Townships in Tianlin County

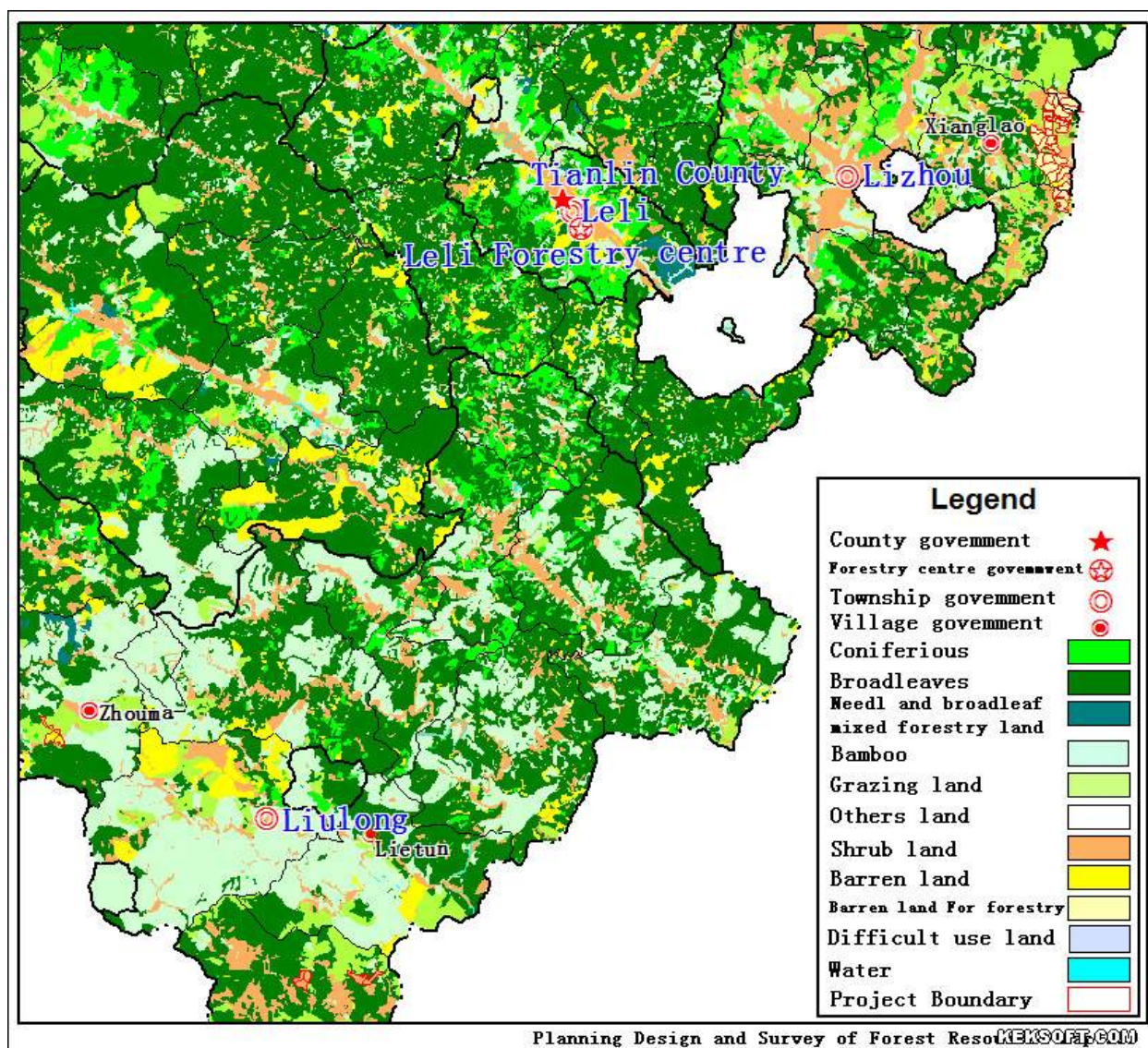






Fig.A-13 Project boundary and Land use/cover map in 1999 for Shicheng and Chaoli Town/Townships in Linyun County

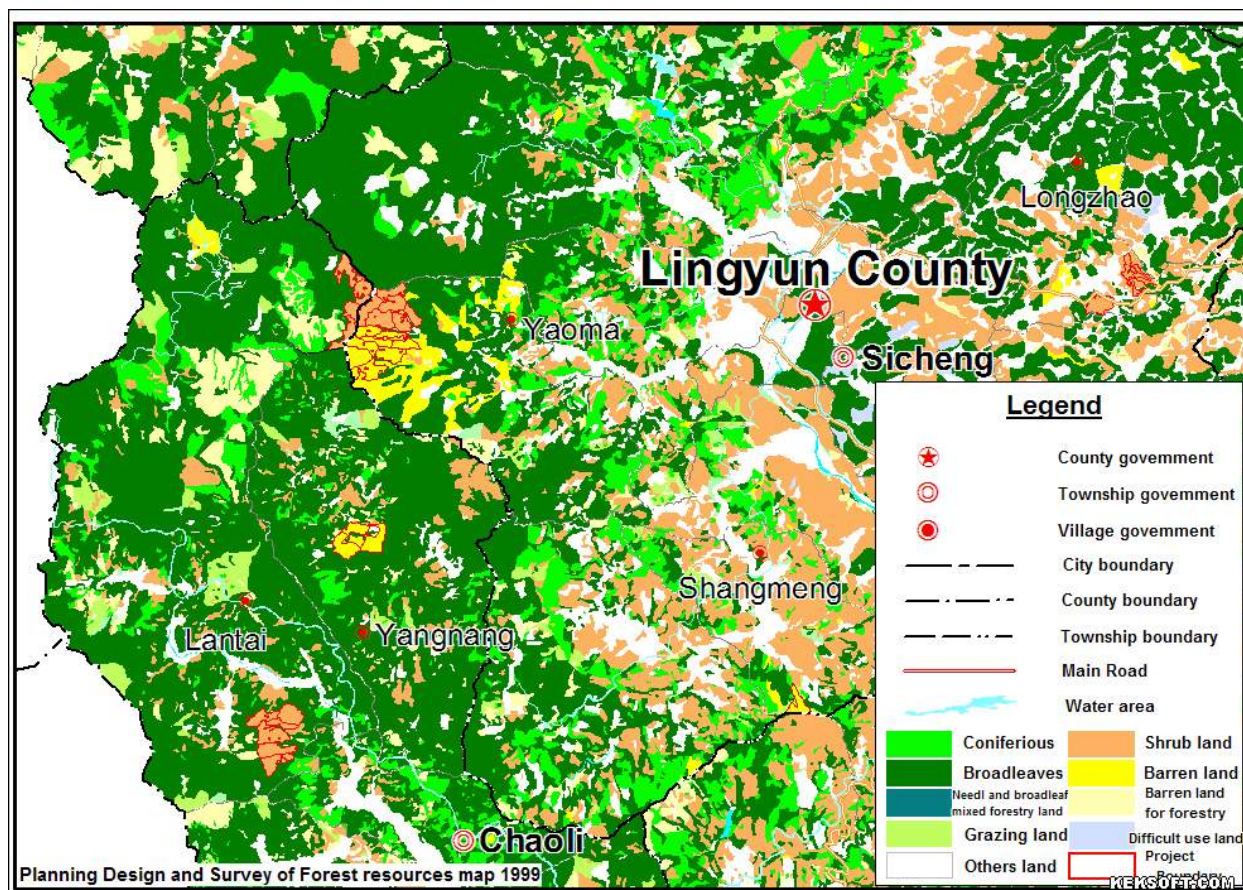
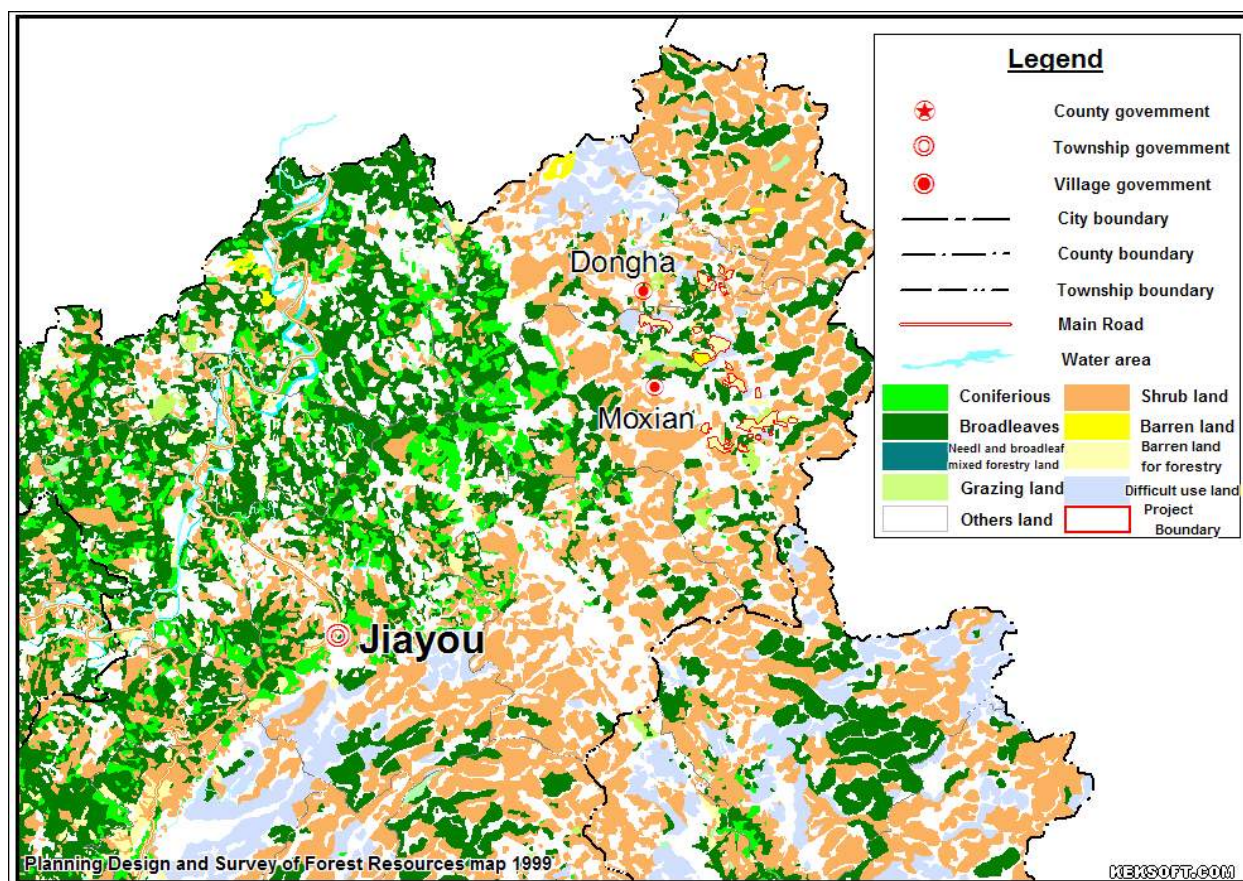




Fig.A-14 Project boundary and Land use/cover map in 1999 for Jiayou Township  
in Linyun County



**A.5. Technical description of the A/R CDM project activity:****A.5.1. Description of the present environmental conditions of the area planned for the proposed A/R CDM project activity, including a concise description of climate, hydrology, soils, ecosystems (including land use):**

>> The environmental conditions of the project area are summarized as follows<sup>2</sup>

**Climate**

The project area falls in the sub-tropical monsoon climate zone. The complex landform and high elevation differences have resulted in clearly evident geographical and vertical variation.

Climate in Tianlin County: The eastern and western part of the county has relatively low temperature with high precipitation, while conditions are warmer and drier in the northern and the southern regions. The temperature and precipitation vary with the elevation. The mean annual temperature is 16.9-21.6 °C, with accumulated temperature ( $\geq 10^{\circ}\text{C}$ ) of 5,274.8-7,183.6 °C. The mean precipitation is 1,000-1,600 mm, mostly concentrated during the period from May to September, and which accounts for 79% of the annual precipitation. There are 320-337 frost-free days per year. There are frequent climatic extremes, including drought in spring and autumn, floods and typhoons in summer, as well as hail and cold periods.

Climate in Longlin County: The general climatic characteristics of Longlin County are mostly warm and wet in the south and cool in the north. It tends to be mild without extremes of hot and cold weather. There are clearly defined dry and wet seasons. The mean annual temperature is 19.1 °C, with accumulated temperature ( $\geq 10^{\circ}\text{C}$ ) of 6,265.3 °C. The mean precipitation is 1,157.9 mm, which is concentrated during the period from May to September. The mean annual evaporation is 1,495.5 mm, which is greater than the annual precipitation. This is particularly a factor in the area along Nanpanjian River in the north where spring droughts occur frequently. The mean annual sunshine is 1,740 hours. The mean annual frost-free days is 333.2. Drought occurs often in the spring, summer and winter. In Jinzhongshan and Gebu, in the western part of the county, spring and winter droughts occur every year. There are also floods approximately once every 6-7 years, with hail and cold spells occurring annually, though relatively infrequently. A typhoon occurs about once every 2 or 3 years.

Climate in Linyun County: Linyun County is generally hot and wet in summer and cool and dry in winter, with four distinct seasons. The mean annual temperature is 20.5 °C, with accumulated temperature ( $\geq 10^{\circ}\text{C}$ ) of 6,000 °C. The mean annual precipitation is 1,603.5 mm, concentrated during the period from May to October. The mean annual evaporation is 1,406.9 mm. The mean relative humidity reaches 78% and the mean annual amount of sunshine is 1,443.7 hours. The average number of frost-free per year is 343 days..

---

<sup>2</sup> Data Sources:

- (1) Editorial Board of Longlin County Annals. 2002. Longlin County Annals
- (2) Editorial Board of Tianlin County Annals. 1996. Tianlin County Annals
- (3) Editorial Board of Linyun County Annals. 1996. Linyun County Annals
- (4) Central-South Institute of Forestry Inventory and Planning and Guangxi Jinzhongshan Nature Reserve Administration. 2006. Report of scientific survey on Guangxi Jinzhongshan Nature Reserve
- (5) Guangxi Institute of Forestry Inventory and Planning. 2003. Report of scientific survey on Guangxi Wanglaoshan Nature Reserve.
- (6) Guangxi Institute of Forestry Inventory and Planning. 2004. Overall planning for Guangxi Dahongbao Nature Reserve



**Hydrology**

The project area is located in the headwater of Youjiang and Nanpanjiang rivers, which are first and second order tributaries of the Pearl River System, respectively. The Nanpanjiang watershed of 3,973 square kilometers and the Youjiang watershed of 6,970 square kilometers cover 36.31% and 63.69%, respectively of the total area within which the project area is located.

Nanpanjiang River in Tianlin County has branch streams including the Banjianhe, Jiuzhouhe and Bailehe, with a total watershed area of 883 square kilometer in the county. Youjiang River in Tianlin County has Tuoniangjiang, Lelihe and Baguihe tributaries that cover a total watershed area of 4,507 square kilometers in the county. The rivers have seasonal variations with flood and drought occurring frequently during rainy season and dry seasons.

Nanpanjiang River in Longlin County covers 2,527 square kilometers of watershed and has Huainuhe, Wuchonghe, Linghaohe, Naweihe, Yanyuhe, Monglihe, Naqianhe, Qiangbohe, Lengshuihe, Xingzhouhe, Maxionghe, Beilouhe, Nadonghe and Sandaohe, tributaries that have a mean annual runoff of 18.85 cubic meters per second. Youjiang River in Longlin County covers a total watershed area of 1,012 square kilometers in its tributaries and account for a mean annual runoff of 5.27 cubic meters per second.

Buliuhe River is the main tributary of the Nanpanjiang in Linyun County, with a total watershed area of 565 square kilometers. Youjiang River in Linyun County consists of the Chengbihe, Sishuihe and Chaolihe tributaries. In addition, there are five underground streams in the county. Shuiyuandong, the longest underground stream, flows over 80 kilometers with a total watershed area of 1,452 square kilometers.

**Soils**

Red, yellow-red and yellow soils formed from sandstone are the predominant soil types in the project area. Others include terra fusca soils formed from limestone.

Red soils are the dominant soil type in Tianlin County and they accounts for 66.4% of the soil types. The yellow-red soils, yellow soils and alpine meadows and terra fusca soils found in the Karst limestone region are the other major soil types.

The yellow-red soils and yellow soils are the main soil types in Linyun County and these are found over 800 m above sea level and account for 56% of the soil types in the county. The terra fusca soils in the Karst limestone region account for 34% and red soils for 10% of the total area in the county.

**Vegetation and Ecosystems**

There are 2,319 tree species in the project region and they represent 206 families. The major vegetation zones are subtropical coniferous forest, subtropical deciduous broadleaf forest, subtropical evergreen and deciduous broadleaf mixed forest, subtropical evergreen deciduous forest and seasonal rain forest. The deforested areas of natural forests are planted with masson pine, Chinese fir and bamboo stands and secondary natural forests.

The project lands were forested in the 1950s-1960s. However, those forests were gradually deforested as a consequence of the land use policies implemented between 1950s and 1970s. The lands proposed for undertaking the A/R CDM project activity had become non-forest lands by the 1980s. Nevertheless, continued human intervention (frequent burning, grazing, shifting agricultural cultivation, over-collection of wood for fuel, etc.) has resulted in the land becoming severely degraded with serious soil erosion. Currently the project lands are mostly degraded underproductive lands covered by shrubs and herbaceous plants. In particular, Eupatorium (Eupatorium adenophorum), an introduced invasive weed, now occupies

parts of the project lands. From the 1970s to the early 1990s, local government attempted to restore forests on project lands in Tianlin County, but failed due to lack of good growth conditions.

Within the project boundary, 7103.5 ha of lands have been defined by local governments for forestry purposes. 1567.8ha remain as undefined in terms of legal land use. There is also grazing on 485 ha of lands, however, 475 ha of these lands are defined for forestry purposes. See Table Annex 3-1 under Annex 3 for detailed land uses and vegetation. There are sufficient lands available surrounding the project lands for adopting grazing animals if the displacement occurs. See also section D.2.

#### **A.5.2. Description of the presence, if any, of rare or endangered species and their habitats:**

>> In the project counties, there are two national nature reserves, Guangxi Cenwanglaoshan National Nature Reserve and Jinzhongshan National Nature Reserve. There is one provincial nature reserve, Dahongbao Nature Reserve near the project area. The Cenwanglaoshan National Nature Reserve is situated on the border of Tianlin and Linyun County. It has a total 18,994 hectares. The Reserve has 2,319 species of plants belonging to 904 genera of 206 families, and 358 species of terrestrial vertebrate. Of those 17 species of plants and 50 species of vertebrate are listed as national protected species. In Jinzhongshan National Nature Reserve there are 1,487 species of vascular plants, 347 species of fungi and 441 species of vertebrates. Of these, 11 species of plants and 52 species of vertebrates are listed as national protected species and 89 species of vertebrate are listed as provincial level protected species. Dahongbao Nature Reserve is located in Longlin County and has a total area of 2,035 hectares. There are 748 species of vascular plants and 232 species of vertebrates in the Reserve, of which 8 species of plants and 30 species of vertebrates are listed as national level protected species.

A baseline survey, done within the proposed reforestation sites, indicates that there are 72 wild animals and 346 plant species. No first class national protected or endangered species or IUCN species was found, but 5 second class national protected animals and 26 Guangxi protected animals are present. It is apparent that there is rich biodiversity in the project region, but low biodiversity value in the proposed reforestation sites.





#### A.5.3. Species and varieties selected for the proposed A/R CDM project activity:

>>Based on the preferences of local farmers and the local site conditions (See Annex 3 for detail site classification and assessment), and also taking carbon sequestration rates, biodiversity conservation, soil erosion control and wood value into consideration, the proposed A/R CDM project activity will plant following tree species:

- Chinese fir: *Cunninghamia lanceolata*;
- *Taiwania flous*
- Masson pine: *Pinus massoniana*;
- Shiny-bark Birch: *Betula luminifera* H. Winkl.
- Sweetgum: *Liquidambar formosana* Hance;
- Schima: *Schima wallichii* Choisy;
- *Choerospondias axillaris* (Roxb.) Burt et
- *Eucalyptus* sp.



All species are native to the area except eucalyptus, which will constitute around 14.6% of the total of the proposed reforestation sites. Eucalyptus was introduced into China about 100 years ago and has been widely planted in Southern China, including Guangxi region, for several decades and has shown no invasive characteristics. Eucalyptus was chosen for the project area at the request of local communities who favour its ability to generate a significant amount of CERs in the early stage of the crediting period, compared to other species that grow relatively slowly in the first several years. No GMO or invasive species will be used. The species to be used will be intermixed in planting.





**A.5.4. Technology to be employed by the proposed A/R CDM project activity:**

>> The following technical standards will be strictly followed:

- State Technical Regulations for Afforestation/Reforestation: GB/T 15776-2006;
- State Technical Regulations for Establishing Environmental Service Forests: GB/T 18337.1-2001, GB/T 18337.2-2001, GB/T 18337.3-2001;
- State Technical Regulations for Designing of Afforestation/Reforestation: LY/T 1607-2003;
- State Technical Regulations for Forest Management: GB/T 15781-1995;
- Standards for Seedling Qualification: GB 6000-1999;
- Technical Standard for Seedling Breeding: GB/T 6001-1985;
- Technical Standard for Container Seedling Breeding: LY1000-1991.
- Seed Certification Regulations (GB2772-1999)
- Technical regulations for forest harvest and regeneration
- Technical Regulations for Chinese fir plantation in Guangxi
- Technical Regulations for masson pine plantation in Guangxi
- Technical Regulations for birch plantation in Guangxi

**Site and Soil Preparation**

Site burning and overall tillage will not be employed during the site and soil preparation in order to prevent soil erosion, to minimize GHG emissions and to protect existing carbon stocks. Small pits (40-50 cm in diameter and 30-40 cm in depth) will be dug manually for tree planting. The pits will be laid out in a triangular pattern on the contours of slopes. Site and soil preparation will be conducted in the winter when there is small probability of rain. All carbon stock in living biomass of pre-project vegetation affected in the soil preparation will be conservatively assumed as an emission.

**Genetic Sources and Nursery Practices**

The tissue culture seedlings of the eucalyptus will be purchased from Guangxi Dongmen Forestry Farm or Guangxi Institute of Forestry and then cultured in the nurseries of Tianlin County.

Seedlings of other species will be generated in temporary on-site nurseries beside the streams and will be irrigated by stream water. Seeds of these species will be collected from local seed orchards or parent tree gardens. All seed and tissue culture seedlings will have a quality certificate, quarantine certificate and inspection certificate. Seedlings of Masson pine, shiny-bark birch and eucalyptus will be produced in plastic tubes (5 cm in diameter and 15 cm length) that hold soils consisting of earth and humus/fertilizer. The technique adopted by the project will ensure the growing conditions for seedlings in the initial stage after planting, and thus increases the survival rate and early growth of seedlings.



The seedlings are qualified according to standard GB 6000-1999. Only the quality grade I and II can be used. Table A-3 lists the standard for seedling grading for tree species used in the proposed A/R CDM project activity.



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

**Table A-3 Standard for seedling grading<sup>3</sup>**

Species	Seedling age	Standard for grade I and II			
		Minimum diameter at base (cm)	Minimum height (cm)	Root	
				Minimum length of main root (cm)	Minimum number of lateral roots with length over 5cm
Chinese fir and flous	6		14		
Masson pine	12	0.4	27	20	10
Shiny-bark birch	6		15-20		
Choerospondias axillaris	12		100		
Schima	12	0.4	35	20	
Sweetgum	1		50-60		
Eucalyptus	3		15-20		

**Forest Establishment**

Planting activities will last three years starting in 2008. Table A-4 summarizes the species/model arrangements and planting plan. Table Annex 3-1 under Annex 3 provides details of the species/models for different compartments and sub-compartments. To ensure high survival rate and good growth of seedlings in the early stages, weeds will be slashed manually two to three times a year in the first two years and one to two times in the third year after planting. Survival rates will be checked and re-planting will be conducted one month after planting if needed. Fig. A-15 presents an example of species combination and planting model arrangements.

**Table A-4 Summary for species, model arrangements and planting plan**

Species/Models	Model ID	Density (tree/ha)	Species ratio	Planting plan (ha)			
				2008	2009	2010	Total
Masson pine	Y-1	1666		505.5	446.4	233.2	1185.1
Chinese fir	Y-2	2500		863.2			863.2
Shiny-bark birch	Y-3	1666		1430.4	1038.1	643.6	3112.1
Choerospondias axillaris	Y-4	1666		121.4			121.4
Masson pine + Schima	Y-5	2500	8:2	243.2	49.7	636.1	929.0
Masson pine + Sweetgum	Y-6	2500	8:2	51.5		357.2	408.7
Eucalyptus	Y-7	1250		76.8			76.8
Eucalyptus	Y-7-1	1666		303.1	608.5	415.1	1326.7
Flous	Y-8	1666		222.4	217.5	208.4	648.3
total				3817.5	2360.2	2493.6	8671.3

Phosphorous fertilizer and synthetic compound fertilizer (nitrogen content around 12%) will be applied at the time of planting and also after planting. The type and amount of fertilizers to be applied for different reforestation models are listed in table A-5.

<sup>3</sup> Data source: Standards for Seedling Qualification: GB 6000-1999



**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

Table A-5 Fertilization plan for different reforestation models

Model ID	Fertilization at planting (g/tree)		Fertilization after planting (g/tree)			
	Fertilizer type <sup>4</sup>	amount	Fertilizer type	1 <sup>st</sup> year	2 <sup>nd</sup> year	3 <sup>rd</sup> year
Y-1	Phosphorous	250	compound			
Y-2	Phosphorous	250	compound	150		
Y-3	Phosphorous	250	compound	150	150	150
Y-4	Phosphorous	250	compound	150		
Y-5	Phosphorous	250	compound <sup>5</sup>	150		
Y-6	Phosphorous	250	compound <sup>5</sup>	150		
Y-7	compound	500	compound	250	250	500
Y-7-1	compound	500	compound	250	250	500
Y-8	Phosphorous	250	compound	150		

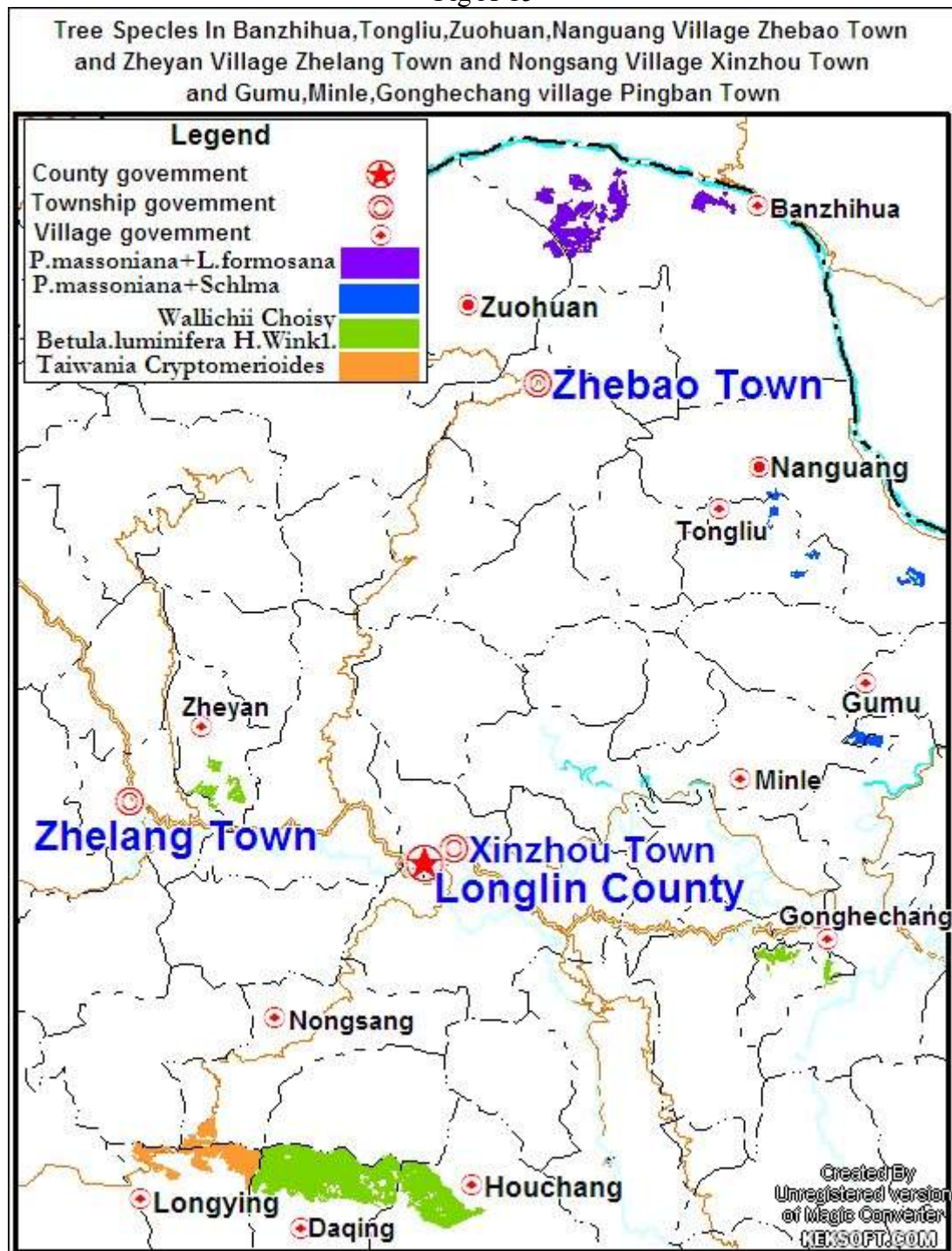
---

<sup>4</sup> Nitrogen content of the synthetic compound is 12%.

<sup>5</sup> Applying only to broadleaf species, not to pine



Fig A-15



**Forest Management**

The plantations will be thinned and harvested according to species and reforestation models (see Table A-6 for detail). After harvesting, eucalyptus will be regenerated by natural sprouting, while other species will be regenerated by direct planting. Both the thinning and harvesting will be conducted manually without any mechanical equipment.

**Table A-6 Plantation management**

Stand Model ID	Thinning age	Thinning Intensity	Harvest age
Y-1	11	25%	21
Y-2	8	25%	21
Y-3	6	25%	21
Y-4	8	25%	31
Y-5	11	25%	21-year-old for masson pine, 31-year-old for Schima
Y-6	11	25%	21-year-old for masson pine, 31-year-old for Sweetgum
Y-7			6
Y-7-1			6
Y-8			26

**A.5.5. Transfer of technology/know-how, if applicable:**

>> No technology will be transferred to the host party.

**A.5.6. Proposed measures to be implemented to minimize potential leakage:**

>> Potential leakage associated with the proposed A/R CDM project activity may include the use of vehicles for the transportation of products, fertilizer and other production materials and the displacement of grazing activity outside of the project area. Although potential transportation leakage is relatively small and the methodology applied does not account for this leakage based on EB 42 decision, the proposed A/R CDM project activity will make an effort to fully-load vehicles on all journeys so as to minimize trips and thus any leakage. Leakage due to the displacement of grazing is unlikely to occur due to the governmental license control of tree logging, awareness enhancement of the sustainable use of lands and increased income through the proposed project activity, and there are sufficient lands available surrounding the project lands for adopting grazing animals if the displacement occurs. See also section D.2



**A.6. Description of legal title to the land, current land tenure and rights to tCERs / ICERs issued for the proposed A/R CDM project activity:**

>> There are two types of legal titles on lands: State owned and village collective owned. The 697.8ha of land in Jingzhongshan Forestry Farm in Longlin County are state owned, and the land tenures of these lands belong to the forestry farm. The other 7973.5 ha of land is collectively owned by local villages, of which 129.3 ha in Jiayou Town and Shicheng Town belongs to individual farmers, while the remaining land belongs to collectives. The control of the project lands is demonstrated by certificates for land ownership/tenures and/or contracts between operating entities and villages/farmers, which are available for verification. See also details in Table Annex 3-1 under Annex 3.

To effectively promote and govern CDM project activities in China, the Chinese government issued the *Measures for Operation and Management of Clean Development Mechanism Projects in China* on October 12, 2005, effective immediately. Based on the *Measures*, the Chinese Government allows any sponsor to apply, invest in, and implement a CDM project activity provided it meets the basic requirements stipulated in the *Measures*. The ownership of the carbon credit belongs fully to the implementing entities after Chinese Government taxes of 2% of the carbon transactional value<sup>6</sup>.

**A.7. Assessment of the eligibility of the land:**

>> The Chinese Government defines forests as lands having growing trees with:

- A minimum area of 0.067 hectares;
- A minimum tree crown cover of 20%; and
- A minimum tree height of 2 meters.

Therefore, the threshold values of the forest definition of the Chinese Government comply with the UNFCCC definition and are to be used for the purposes of the Kyoto Protocol.

The land eligibility is demonstrated using the latest version of “Procedures to demonstrate the eligibility of lands for afforestation and reforestation project activities (Version 01)”<sup>7</sup>, as below.

1. The land within the planned project boundary is eligible for the proposed A/R CDM project activity by following the steps outlined below.

- (a) The land, at the moment the project starts, does not contain forests which can be demonstrated by:
  - (i) Field survey that indicated that the lands to be planted in the proposed A/R CDM project activity are non-forested, barren lands covered with herbaceous plants and shrubs. A large part of lands are occupied by invasive weeds. All lands are not forests or young natural stands and plantations or temporarily unstocked lands that are expected to reach the minimum crown cover and minimum height chosen by China to define a forest. There are limited or no pre-project living trees. The crown cover currently, and even at maturity, is lower than 20% of the minimum threshold of crown cover (See Annex 3 for details).

<sup>6</sup> <http://cdm.ccchina.gov.cn/>

<sup>7</sup> [http://cdm.unfccc.int/EB/Meetings/035/eb35\\_repan18.pdf](http://cdm.unfccc.int/EB/Meetings/035/eb35_repan18.pdf)



**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

---

- (ii) Most recent land use/cover maps showed in figures above (from Fig A-5 to Fig A-14) also demonstrate that the lands to be planted are not forested lands. The maps were derived from local forestry inventory, which is conducted once every ten years.
- (b) The activity is an eligible CDM reforestation project activity, which is demonstrated by
  - (i) Interviews with local farmers/communities on land use/cover history and important events that have had an impact on the land use/cover show that the lands to be planted in the proposed A/R CDM project activity were forested lands in the 1950s, but have been non-forested lands since at least 1989 (see Annex 3 and Section H).
  - (ii) Land use/cover maps showed in figures below (from Fig A-16 to Fig A-18) also demonstrate that the lands to be planted were not forested lands in 1989.

*Note:* The maps in 1990 and 1999 are the basis for pre-selection of project lands. The maps will be accessible to confirm the eligibility of lands. The lands to be planted in the proposed A/R CDM project activity are marked with red lines in these figures.





Fig.A-16 Land use/cover maps in 1989 in Longlin County

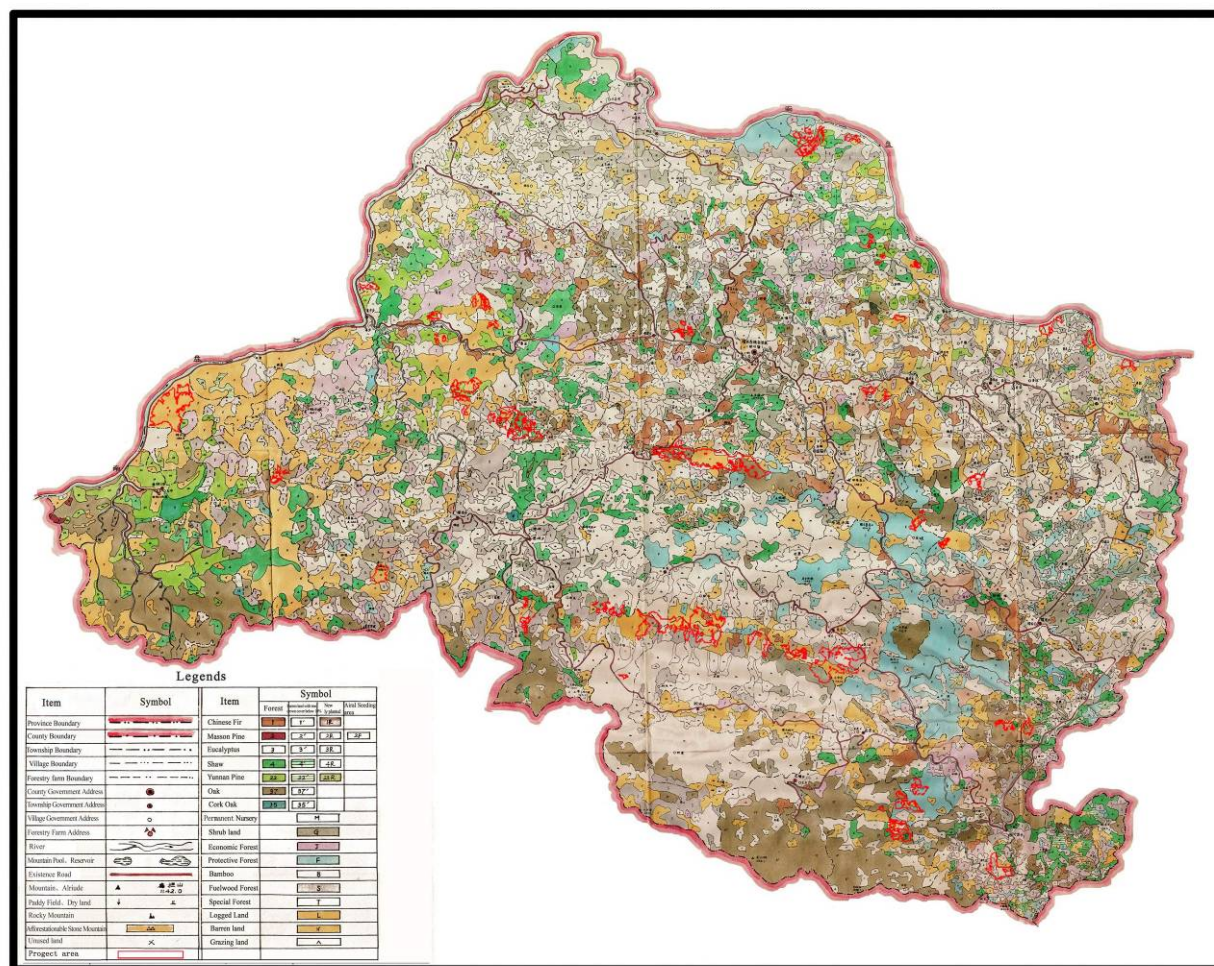




Fig.A-17 Land use/cover map in 1989 Tianlin County

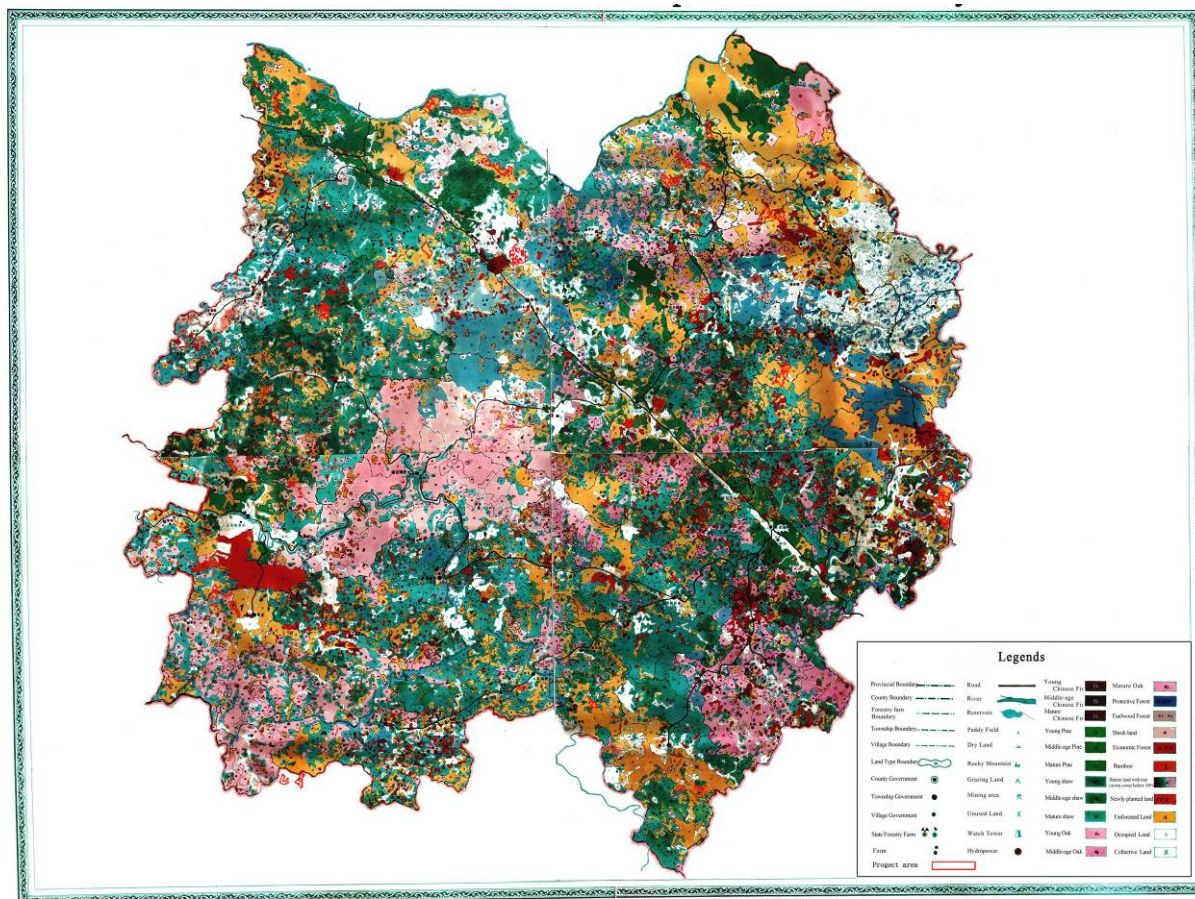
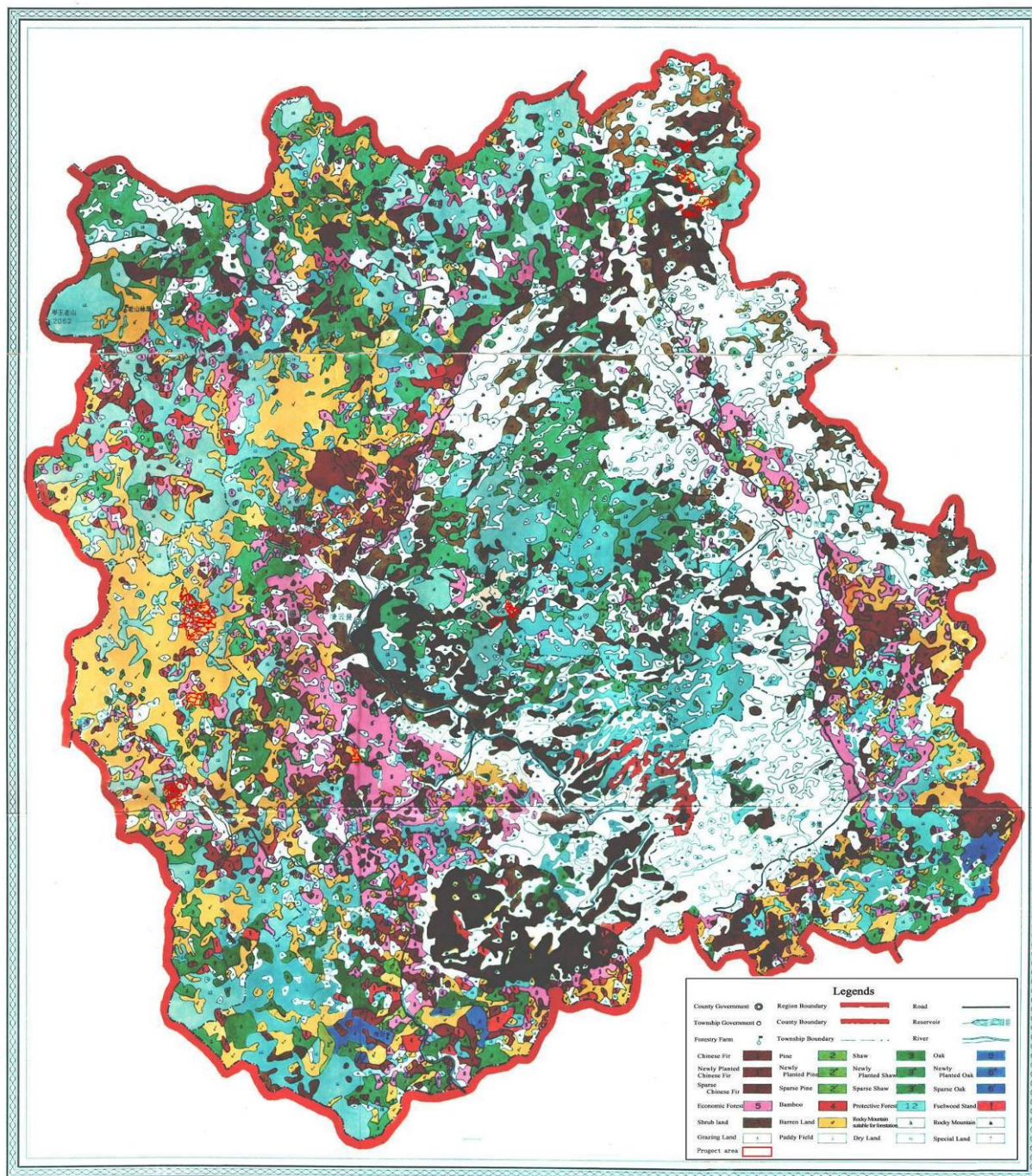






Fig.A-18 Land use/cover map in 1989 in Linyun County



08/25/2006



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

**A.8. Approach for addressing non-permanence:**

>> The issuance of tCER for the net anthropogenic GHG removals by sinks achieved by the proposed A/R CDM project activity is chosen.

**A.9. Estimated amount of net anthropogenic GHG removals by sinks over the chosen crediting period:**

>> It is expected that the proposed A/R CDM project activity will produce 1,746,158 tCO<sub>2</sub>-e of net anthropogenic GHG removals by sinks over the first 20-year crediting period starting in 2008 (Table A-7 for details).

Table A-7 Estimated amount of net anthropogenic GHG removals by sinks

Summary of results obtained in Sections C.5., D.1. and D.2.				
Year	Estimation of baseline net GHG removals by sinks (tonnes of CO <sub>2</sub> e)	Estimation of actual net GHG removals by sinks (tonnes of CO <sub>2</sub> e)	Estimation of leakage (tonnes of CO <sub>2</sub> e)	Estimation of net anthropogenic GHG removals by sinks (tonnes of CO <sub>2</sub> e)
2008	374	-29,704	0	-30,078
2009	430	36,370	0	35,941
2010	484	73,980	0	73,496
2011	536	101,050	0	100,514
2012	585	106,721	0	106,136
2013	631	114,237	0	113,606
2014	675	130,912	0	130,238
2015	716	79,015	0	78,299
2016	754	51,410	0	50,656
2017	790	93,861	0	93,071
2018	824	168,092	0	167,268
2019	856	158,790	0	157,934
2020	885	147,364	0	146,479
2021	913	67,422	0	66,509
2022	938	20,500	0	19,562
2023	961	54,204	0	53,243
2024	983	126,394	0	125,411



**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

2025	1,003	118,373	0	117,370
2026	1,021	109,657	0	108,636
2027	1,037	32,904	0	31,868
<b>Total</b> (tonnes of CO <sub>2</sub> e)	15,394	1,761,552	0	1,746,158

**A.10. Public funding of the proposed A/R CDM project activity:**

>> The establishment cost will be from the World Bank loans (International Bank of Reconstruction and Development ) under the Guangxi Integrated Forestry Development and Conservation Project, counterpart funds from local government and the participants themselves. The operating and maintenance cost will be covered by short-term loans from local commercial banks and participants, as well as the carbon income. There is no available public funding that will result in a diversion of official development assistance and financial obligations of any Parties under UNFCCC.

**SECTION B. Duration of the project activity / crediting period****B.1 Starting date of the proposed A/R CDM project activity and of the crediting period:**

&gt;&gt;01/01/2008

**B. 2. Expected operational lifetime of the proposed A/R CDM project activity:**

&gt;&gt;60 years 0 month

**B.3 Choice of crediting period:**

&gt;&gt; 20 years 0 month, renewable

**B.3.1. Length of the renewable crediting period (in years and months), if selected:**

&gt;&gt; 20 years 0 month, renewable

**B.3.2. Length of the fixed crediting period (in years and months), if selected:**

&gt;&gt; N/A

**SECTION C. Application of an approved baseline and monitoring methodology****C.1. Title and reference of the approved baseline and monitoring methodology applied to the proposed A/R CDM project activity:**

>> The Consolidated afforestation and reforestation baseline and monitoring methodology “Afforestation and reforestation of degraded land” (AR-ACM0001/version 03) is applied. Following methodological tools for A/R CDM project activity have also been used based on the requirement of the methodology applied:

- Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities (Version 01)
- Tool for estimation of emissions from clearing, burning and decay of existing vegetation due to implementation of an A/R CDM project activity (Version 03)
- Guidelines on conditions under which GHG emissions from removal of existing vegetation due to site preparation are insignificant” (Version 01)
- Tool for estimation of GHG emissions related to displacement of grazing activities in an A/R CDM project activity (Version 02)
- Guidelines on conditions under which increase in GHG emissions related to displacement of pre-project grazing activities in A/R CDM project activity is insignificant (Version 01)
- Calculation of the number of sample plots for measurements within A/R CDM project activities (Version 02)
- Tool for the identification of degraded or degrading lands for consideration in implementing A/R CDM project activities (Version 01)
- Procedures to demonstrate the eligibility of lands for afforestation and reforestation project activities (Version 01)

**C.2. Assessment of the applicability of the selected approved methodology to the proposed A/R CDM project activity and justification of the choice of the methodology:**

>> The proposed A/R CDM project activity complies with the conditions under which the chosen methodology applies in the following ways:

- The degraded and degrading state or remaining in a low carbon steady state of the lands to be reforested is demonstrated by applying both procedure (a) and (c) in methodological tool for the identification of degraded or degrading lands for consideration in implementing A/R CDM project activities (EB 41 Annex 15), as following:
  - (a) Steep slope as well as poor vegetation cover due to frequent fire, grazing, agricultural cultivation and/or fuel collection resulted in severely soil erosion, evidenced by Fig C-1, Table F-1 below.
  - (i) Anthropogenic degradation drivers and pressures that led to the land becoming “degraded” are still present: see Annex 3 below for details.

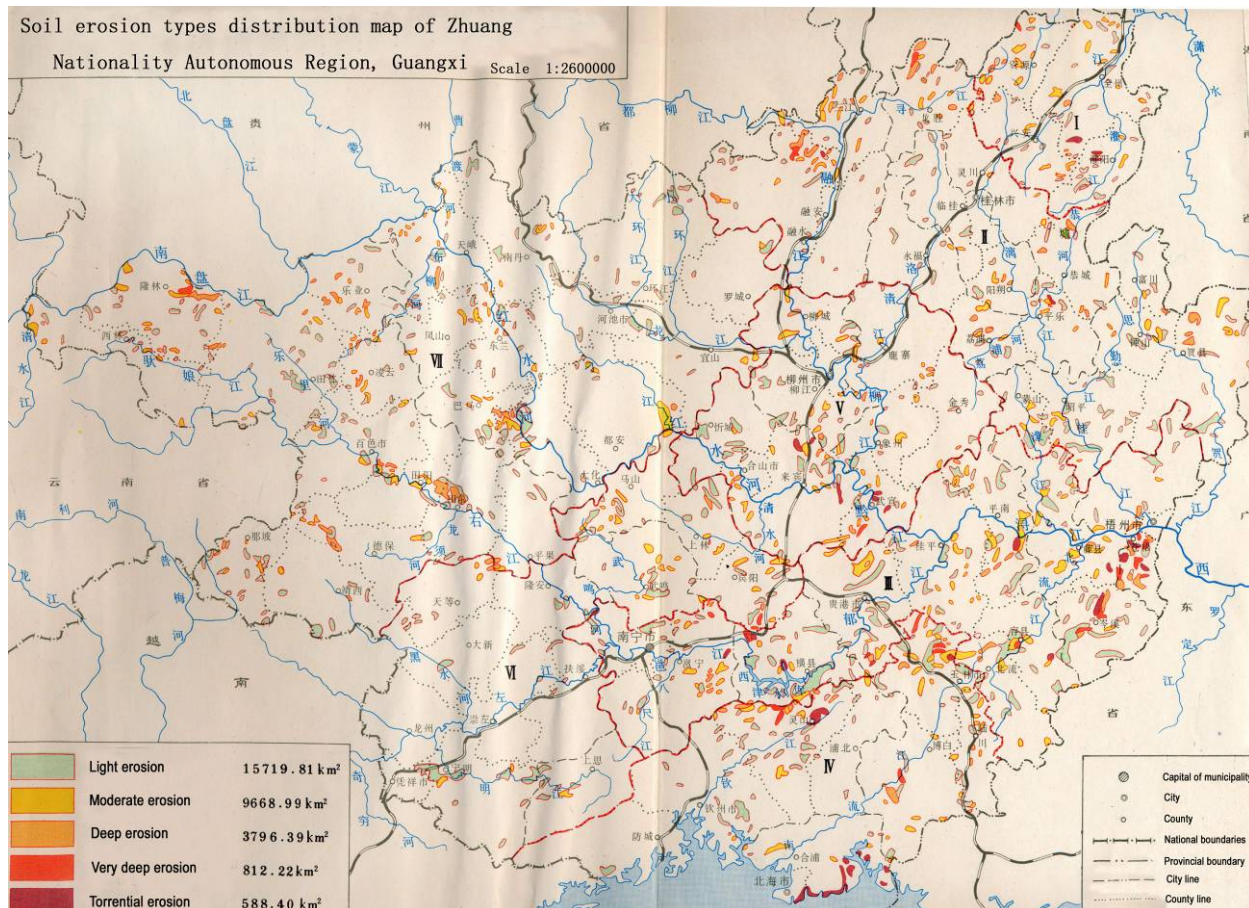




**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

- (c) Soil erosions, exposed sub-soil horizon and rocks or thin top soil were visually assessed, as shown in pictures below as well as pictures in Annex 3. See also Table Annex 3-3 for the depth of top soil.

Fig. C-1 Soil erosion map in Guangxi







- Unavailability of natural seed sources, poor site conditions and/or anthropogenic pressures (e.g., agricultural cultivation, frequent fire and fuel wood collection) in the absence of human assistance, will do not allow the natural encroachment of tree vegetation that leads to the establishment of forests according to the threshold values of the national definition of forest for CDM purposes in China. From 1970s to early 1990s, local government attempted to restore forest vegetation by air seeding in some project areas, but ultimately failed. This demonstrates that, even if seed sources are available, there are no regeneration conditions.
- project activities are not implemented on organic soils
- There will be no irrigation activity in the proposed A/R CDM project activity.
- Trees can be harvested only when the local government issues a harvest licence. Such a licence is usually not issued to allow trees to be harvested for fuel. Local villages usually harvest herbaceous and shrub biomass for fuel because of the unavailability of other cheap fuel materials. Moreover, local farmers will be able to collect living branches for fuel within the project boundary without compromising the growth of trees established under the proposed A/R CDM project activity. Therefore the establishment of project shall not decrease availability of fuelwood.



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

**C.3. Assessment of the selected carbon pools and emission sources of the approved methodology to the proposed A/R CDM project activity:**

&gt;&gt;

Table C-1 Selection of carbon pools

Carbon Pools	Selected (answer with yes or no)	Justification / Explanation
Above ground	Yes	Major carbon pool subjected to the project activity
Below ground	Yes	Major carbon pool subjected to the project activity
Dead wood	No	As there is only a few pre-project living trees and the lands to be planted are degraded and degrading or in a low-level steady state, carbon stocks in dead wood in the baseline scenario can be expected to decrease more or increase less, relative to the project scenario. Therefore based on applied methodology, this pool can be conservatively omitted.
Litter	No	As the lands to be planted are degraded and degrading or in a low-level steady state, carbon stocks in litter in the baseline scenario can be expected to decrease more or increase less, relative to the project scenario. Therefore based on applied methodology, this pool can be conservatively omitted.
Soil organic carbon	Yes	<p>As the lands to be planted are degraded and degrading or in a low-level steady state, and comply to the conditions set for default method of soil organic carbon in section II.5.1.4 of the methodology applied, as follow:</p> <ul style="list-style-type: none"> <li>(i) The lands to be planted are not organic soils (e.g., peat-lands), or wetlands;</li> <li>(ii) As detailed in Section A.5.4, the Site burning and overall tillage will not be employed during the site and soil preparation. 1,667 or 2,500 trees will be planted per hectare. Holes dug for planting will be small (40-50 cm in diameter or 0.126-0.196 m<sup>2</sup> per hole), as a result, the removal of existing vegetation during site preparation for the proposed A/R CDM project activity will be less than 5% of the area;</li> <li>(iii) Litter will not allowed to be removed;</li> <li>(iv) As detailed in Section A.5.4, 1,667 or 2,500 trees will be planted per hectare. Holes dug for planting will be small (40-50 cm in diameter or 0.126-0.196 m<sup>2</sup> per hole). Therefore, the soil disturbed by site preparation is estimated to be a maximum of 5% of the total land surface;</li> <li>(v) The holes dug during site preparation will be dug following land contour.</li> </ul> <p>As a result, based on applied methodology, default method can be applied to account for soil organic carbon.</p>



**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

The methodology applied by the proposed A/R CDM project activity considers one emission by sources within the project boundary, i.e., burning of woody biomass. However there will be no biomass burning for site preparation or for forest management. Therefore, emissions within the project boundary are not taken into account.

**C.4. Description of strata identified using the *ex ante* stratification:**

>> Based on Section II.3 of the approved methodology applied following stratification procedures have been followed.

**Step 1: Stratification according to pre-existing vegetations:**

Based on field surveys, the pre-project vegetations are grouped into four vegetation types. Therefore, 4 baseline strata were identified based on pre-existing vegetation (Table C-2). See also Annex 3 for detail pre-project vegetation and land ID for each baseline stratum.

Table C-2 Baseline strata

Strata ID	Area (ha)	Non-tree vegetation		Spotted trees					
		Type	Height	species group	mean age	mean height (m)	mean DBH (cm)	mean crown diameter (m)	No. of trees
BLS-1	620.5	Tall tussock	>1.0 m	hardwood	8	5.1	7.18	1.9	9,466
				softwood	13	8.7	9.49	3.3	1,433
BLS-2	1274.2	Short tussock	<1.0 m	hardwood	15	7.8	10.76	2.7	552
				softwood	10	6.4	7.94	2.8	1,786
				pine	12	7.0	8.86	3.3	3,437
BLS-3	2275.7	Tall thicket	>1.2 m	hardwood	14	7.6	12.26	3.0	936
				softwood	10	6.9	8.90	2.9	3,171
				pine	9	7.9	8.83	3.2	413
				Chinese fir	15	9.2	15.00	3.0	28
BLS-4	4500.9	Brush-wood	<1.2 m	hardwood	10	6.5	8.91	2.7	8,293
				softwood	10	7.1	8.60	3.0	3,985
				pine	9	7.5	9.34	3.2	2,965
				Chinese fir	14	9.5	12.50	2.8	56

**2 Stratification according to the planned AR CDM project activity:**

The project areas are located in three counties with different climatic and soil conditions and the planting will be conducted from 2008 to 2010. The Site condition and planting time are the main factors influencing the variation of carbon stock changes for each reforestation model under the project scenario,



**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

which have been taken into account in site classification (see Annex 3). Therefore, the lands are stratified into 16 project strata based on types of site condition and planting time (Table C-3).

Table C-3 Project Strata

<b>Project strata ID</b>	<b>Types of site condition</b>	<b>Year to be planted</b>	<b>Area (ha)</b>
PS-I-1-1	I -1	2008	1236.4
PS-I-1-2	I -1	2009	494.2
PS-I-1-3	I -1	2010	548.7
PS-I-2-1	I -2	2008	862.1
PS-I-2-2	I -2	2009	538.1
PS-I-2-3	I -2	2010	1222.9
PS-I-3-1	I -3	2008	707.2
PS-I-3-2	I -3	2009	265.8
PS-I-3-3	I -3	2010	73.7
PS-II-1-1	II -1	2008	496.4
PS-II-1-2	II -1	2009	480.4
PS-II-1-3	II -1	2010	270.9
PS-II-2-1	II -2	2008	386.2
PS-II-2-2	II -2	2009	581.6
PS-II-2-3	II -2	2010	377.4
PS-III-1-1	III-1	2008	129.3
<b>total</b>			<b>8671.3</b>

**Step 3: Mapping stratification:**

Both the baseline stratification and project stratification described above have been built into the GIS platform and used to draw stratification maps (see Fig C-2 and Fig. C-3 for an example of baseline stratification map and project stratification maps, respectively). As the stratification map is developed based on project boundary maps, the strata boundary is consistent with the project boundary.



Fig. C-2 Baseline stratification map for lands in Gebu Township

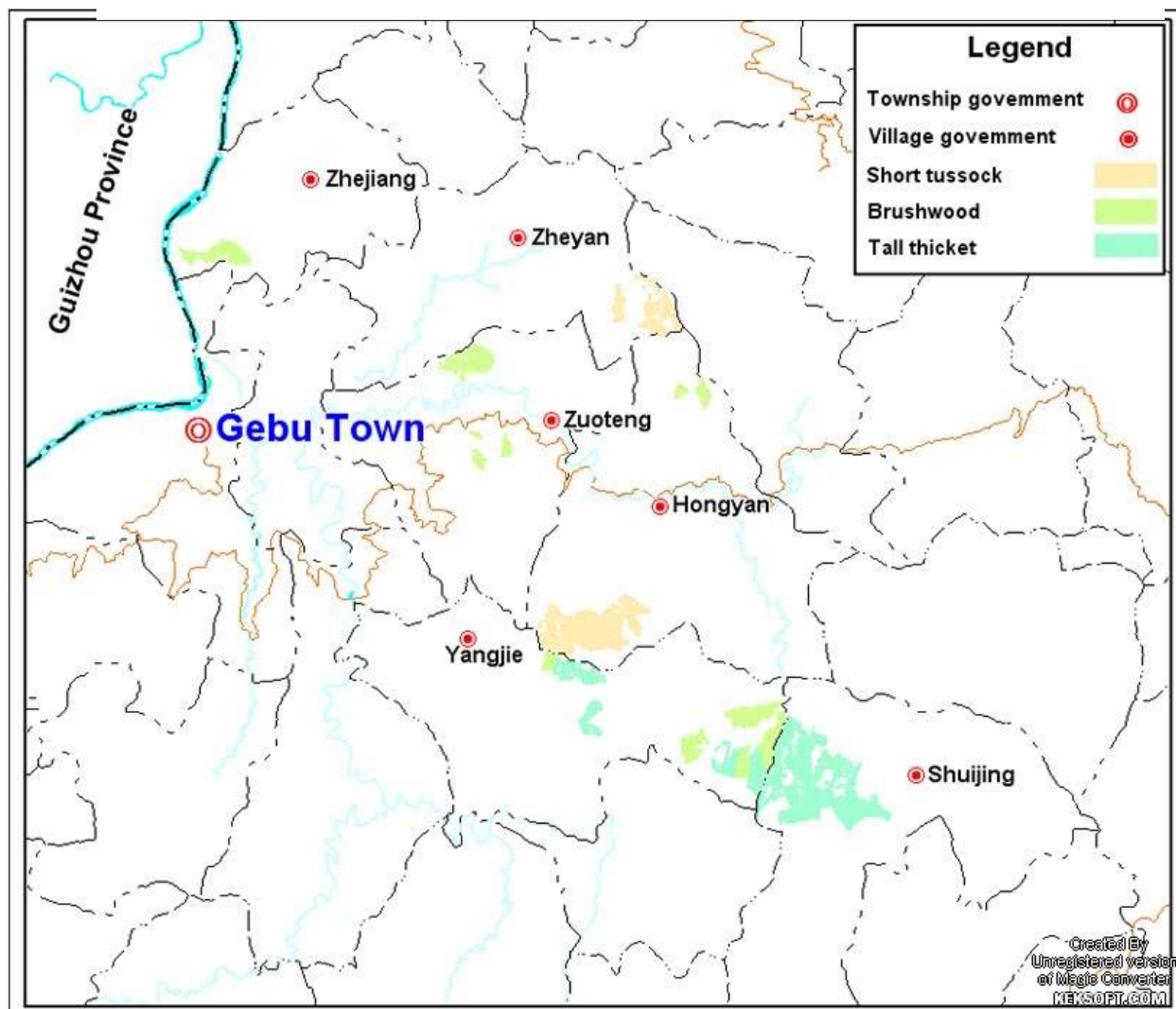
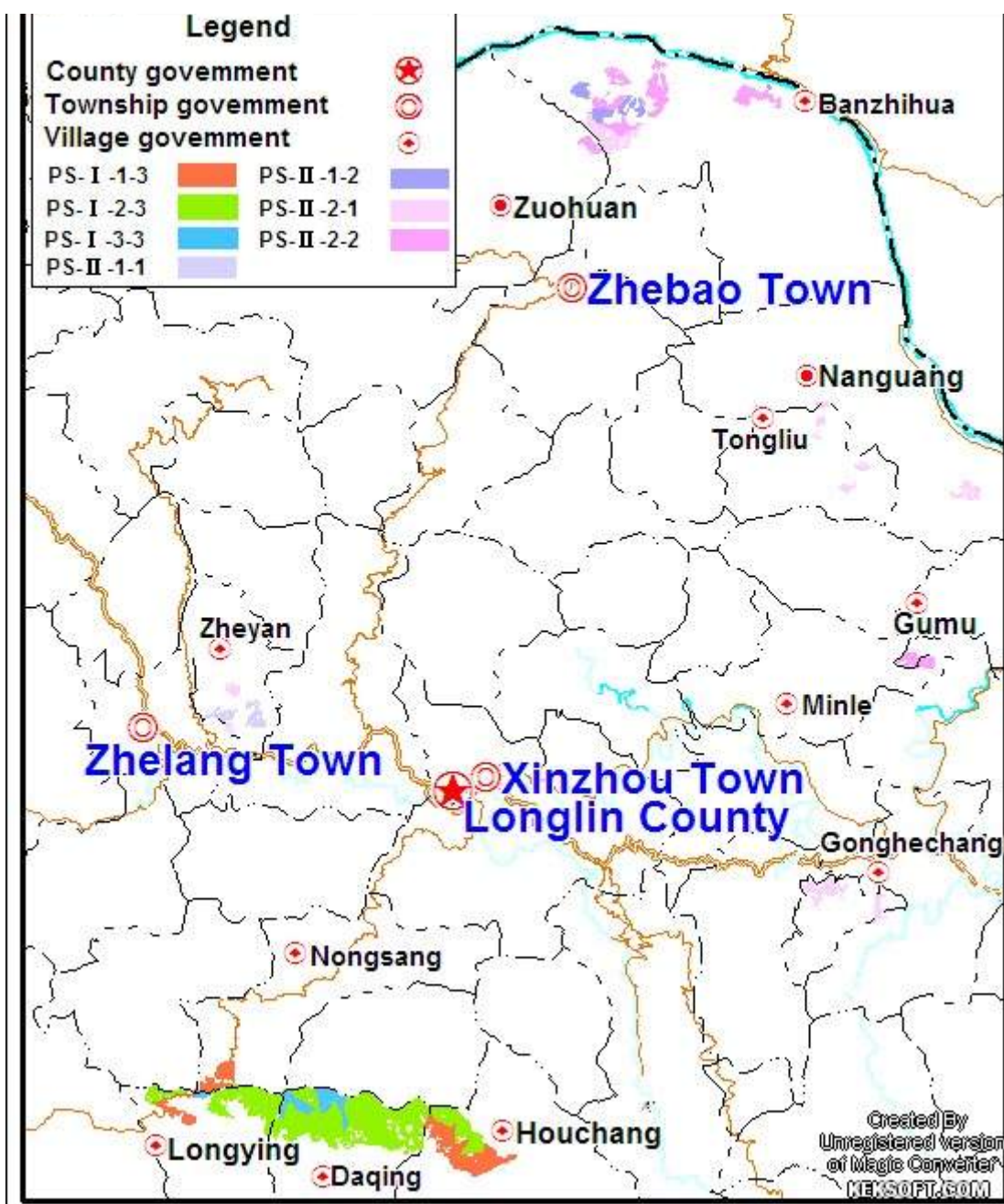






Fig. C-3 Project stratification map (lands in Tongliu village and Banzhihua village of Zhebao Township, Zheyuan village of Zhelang Townships, Nongsang village of Xinzhou Town, Gumu village, Minle village and Gonghechang village of Pingban Town in Longlin County)





**C.5. Identification of the baseline scenario:****C.5.1. Description of the application of the procedure to identify the most plausible baseline scenario (separately for each stratum defined in C.4):**

>> As requested by the applied methodology, the most plausible baseline scenario has been determined using A/R Methodological tool “Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities”<sup>8</sup>. Please see section C.6 for the detail application of the tools.

**C.5.2. Description of the identified baseline scenario (separately for each stratum defined in Section C.4.):**

>> Using A/R Methodological tool “Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities”<sup>8</sup>, the baseline scenario for all strata is to maintain the current status (barren land, with grazing, burning and biomass collection for fuel), see Section C.6 for details. Under the baseline scenario, land cover will continue to decrease or, at best, remain constant, and the natural return of trees is unlikely to occur, because:

- a) Few, if any, seeds can disperse to the project site due to the large size of the project lands and their distance from adjacent forests.
- b) Existing grass and shrub cover prevents seeds from landing on suitable soil and also competes with young seedlings. This has been demonstrated by the failure of previous air seeding on some project areas from the 1970s to the early 1990s. This is also supported by the fact that the lands to be reforested have been non-forested at least since 1989 and no natural growth of trees has been identified.

The project areas would remain degraded and would continue to degrade or remain in a steady state at low level in the absence of the project activity because:

- Most of the project lands are legally restricted to forestry purposes and the remaining small portion of land with an undefined use is not allowed to be legally used for agricultural purposes;
- Reforestation on these lands without CDM benefit is economically unattractive due to the degraded state of the land and its remoteness. The investment analysis indicates that the financial internal return rate (FIRR) without the carbon revenue for the type of proposed A/R project activity is only 4.52%. This is much lower than the 8.0% of the required rate of return (RRR) for an economically viable program set by the Chinese government (see Section C.6 step 3 below for details).
- There are also barriers in investment, such as high pre-investment necessary for reforestation, lack of finance resource by planting entities and farmers, difficulty in obtaining suitable bank loans and the unavailability of government funds, etc. All those barriers prevent the implementation of the project activity (see also Section C.6 step 2 below for detail).
- Continued human intervention, including burning, agricultural cultivation, grazing and fuel collection.

---

<sup>8</sup> [http://cdm.unfccc.int/EB/Meetings/035/eb35\\_repan19.pdf](http://cdm.unfccc.int/EB/Meetings/035/eb35_repan19.pdf)



**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

Under the baseline scenario, the carbon stock in living biomass of non-tree vegetation will remain steady or decrease due to the continual degradation of the lands. Therefore, the baseline carbon stock changes can be estimated as the sum of carbon stock change in pre-project living biomass in the absence of the proposed A/R CDM project activity.

**C.6. Assessment and demonstration of additionality:**

>> The steps as outlined in the A/R Methodological tool “Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities”<sup>8</sup> are followed to demonstrate that the proposed A/R CDM project activity is additional and not the baseline scenario. Both barrier arguments and investment analysis (steps 2 and 3) are applied.

**STEP 0: Preliminary screening based on the starting date of the project activity**

The proposed A/R CDM project will start on 1 January 2008, and the proof that the lands to be planted are eligible for the A/R CDM project activity has been detailed in Section A.7 above based on the definition of forest per Chinese DNA, land use/cover maps of 1990 and 1999, field surveys and interviews with local communities.

The incentive of the planned sale of GHG emission reductions is evidenced by the documents submitted to the World Bank BioCarbon Fund. The project preparation team started the proposed A/R CDM project activity in 2006, drafted and submitted the Project Idea Notes to the Fund Management Commission (FMC) in early 2007. Then the team conducted further surveys and project design, and drafted and submitted the Carbon Finance Document to the FMC in June 2007. Detailed baseline survey, socio-economic survey, participatory rural assessment and project design were completed in summer and autumn of 2007. Without the GHG emission reduction sales, the project would not be economically viable, and would face significant investment and other barriers outlined below.

**STEP 1: Identification of alternative land use scenarios to the proposed A/R CDM project activity*****Sub-step 1a: Identify credible alternative land use scenarios to the proposed CDM project activity***

The following procedures are used to identify credible alternative land use scenarios to the proposed CDM project activity:

- a) Analyzing the historical and existing land-use / land-cover changes and identifying key factors that influence the land-use / land-cover change over times: Collected information demonstrates that the lands to be reforested were forested lands in the 1950s-1970s. However, these forests were destroyed gradually, primarily due to policy-induced events during this period. The first event was the “Great Leap Forward” campaign and the “Steel and Iron” campaign in the late 1950s. Large areas of forest were harvested to provide fuel for the production of steel and iron. The second event was the Cultural Revolution campaign from 1966 to 1976. Many of the remaining secondary forests were deforested, which caused most lands become non-forest land by the 1980s. Over past several decades human intervention continued to have negative impacts on these lands due to frequent burning, agricultural cultivation and grazing, as well as over collection of biomass for fuel (see Annex 3 for detail description).
- b) Interviews with local farmers and forestry farm staff indicate that crown cover of both tree and non-tree vegetation has been decreasing in recent decades due to deforestation caused by grazing, agricultural cultivation and collection of wood for fuel. The deforestation has led to increasingly serious soil erosion (see Section H and Annex 3). An invasive weed, Eupatorium (Eupatorium adenophorum), occupies some of the project land. Under the current conditions, the land will



**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

---

continue to degrade and soil erosion will accelerate. This will result either in the continued decrease of the carbon stocks both in living biomass and soils, or at least, maintenance of these stocks at a low level.

- c) National, local and sectoral land-use policies or regulations: Since the 1980s, China has successively issued and revised a series of laws and administrative regulations related to forestry. These have included, among others, the Regulations for Implementing the Forest Law, the Regulations for Grain for Green, the Regulations for the Protection of Wild Plants and Animals, the Regulation for Nature Reserve, the Regulation for Forest Fire Control, and the Regulation for Forest Diseases and Pests Control, etc. In the 1990s, to encourage reforestation, China initiated a policy that would bring direct benefit to those who planted trees. Villages that owned lands were permitted to contract with farmers to use village land for forestry purposes. The contracts were long term; up to 30-50 years or more. Within this period, the right to use the land will not be changed and the land-use contract can be prolonged should the farmers apply.

To facilitate the restoration of forest resources, the Chinese Government has launched several programs over the past years, including the Grain for Green Program (started in 2001) that subsidized farmers to convert cropland on steep slopes to forests, the Intensively Managed Commercial Timber Plantation Base Program (started in 2000), the Natural Forest Conservation Program (launched in 1998), and the Nature Reserve Development and Wild Conservation Program (started in 2000).

Although these programs had set various overall goals for forestry development and were started before the adoption by the COP of the CDM M&P (decision 17/CP.7, 11 November 2001), few of the programs were targeted at those degraded lands. Therefore, without the proposed A/R CDM project activity the project lands will not be reforested through national or sectoral policies, and will continue to degrade. The project activity will also not reduce any on-going reforestation programs.

- d) Regional forestation rate and their relevance to the proposed A/R CDM project activity: The forestation in the project regions is summarized in the following table C-4. The forestation either planted on cropland, or was conducted for the purpose of fast-growth commercial plantation or economic tree garden. Cropland that was planted, usually close to villages, is not a type of the proposed project lands and the afforestation was subsidized by government. On the other hand, almost all afforestation were conducted for the purpose of developing fast-growth commercial plantation or economic tree garden, which is only viable on, if not cropland, non-degraded lands with good transportation conditions. Therefore few of the previous forestation activity are relevant to the proposed A/R CDM project activity, which will be implemented on remote, mountainous degraded lands. Therefore, with the proposed A/R CDM project activity, the governmental subsidy for afforestation on cropland will not be reduced and the forestation on non-degraded land will not be impacted due to the economically viable feature.





**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

Table C-4 Afforestation/reforestation area in the project region in last three years before project start

Counties	Year	Planted area (ha)		Disaggregated by planting purposes (ha)			
		Total	Among which planted on cropland	Timber		Economic tree garden (fruit, chestnut, walnut, etc)	Sheltering
				Total	Among which fast-growth commercial purpose		
Longlin	2005	3,233	2,633	3,196	3,196	37	
	2006	834	755	791	791	43	
	2007	4,015	3,000	3,818	3,735	177	20
Tianlin	2005	2,052	1,538	1,422	1,327	245	385
	2006	2,324	1,772	2,182	1,974	142	
	2007	2,582	2,535	2,101	1,962	148	333
Linyun	2005	1,100	967			40	1,060
	2006	408	408	381	381	27	
	2007	1,572	400	1,292	1,292	55	225

The above analysis comes to a conclusion that the plausible alternative land uses available to the project participants are:

- The proposed project not undertaken as an A/R CDM project;
- Continuation of current barren lands with grazing, cultivation, burning and biomass collection for fuel.

Within the project boundary, 7103.5 ha of lands are defined by local governments for forestry purposes on which other land uses are not allowed. The other 1567.8 ha are undefined in terms of legal land use. However, agricultural cultivation on these lands, regardless of whether it is defined or undefined as forestry lands, is legally not allowable as local government considers that this activity will cause significant soil erosion. There is also grazing activity on another 487 ha of lands, but because most of these lands are defined as being for forestry purposes, the grazing activities are legal not allowable (See Annex 3 for details).

***Sub-step 1b. Consistency of credible alternative land use scenarios with enforced mandatory applicable laws and regulations***

Current laws and/or regulations allow both the continuation of the current situation and reforestation on the degraded lands. Therefore, the identified alternatives are in compliance with applicable legal and regulatory requirements, currently and in the foreseeable future. The current agricultural cultivation that exists on project lands is not systematically controlled, because local community do not have the awareness of environment and sustainable land use and the local government does not have sufficient funds to assist local farmers or provide alternative income, and thus does not take strict measures to stop these activities, which sometimes can provide the only source of income to local people who live below the poverty level in a very remote mountainous area (see Annex 3 for details).

**STEP 2: Barrier analysis**

*Sub-step 2a: Identification of barriers that would prevent the implementation of at least one alternative land use scenarios:*

a) Investment barriers

- Lack of access to credit: No credit mechanisms exist for farmers to make long-term investment in plantation forestry. Agriculture is the main income source for local communities in the project area. However, agricultural production is subjected to flooding, drought and other natural disasters. Food productivity is very low and the mean annual income per capita in the project areas is around US\$ 200, and even much lower in many villages in the region (see Table G-1). Under this situation, many farmers live below the provincial poverty level. It is extremely difficult for local farmers/communities to afford the high initial plantation establishment investment, especially because all income from wood and non-wood products will occur much later than the initial investment. However, carbon credits will provide an income in a shorter period following the start of the proposed A/R project activity.
- Debt funding not available for this project activity: The opportunity to get long-term commercial loans from banks for the purpose of reforestation is low in the project area due to the high risk and the economical unattractiveness of remote, degraded lands. Loans for agricultural activities and reforestation on non-degraded, less remote, economically attractive lands using short-term faster growing species are easier to obtain. With the proposed A/R CDM project activity, acquiring loans from local commercial banks becomes more likely, because the transaction of Carbon Credit for a substantial time period would be a stable source of revenues to guarantee the repayment in the short-term before timber harvest. Statements from local commercial banks are available for verification.
- The forestry farms participating in the proposed A/R CDM project activity are financially independent accounting enterprises. The existing forest resources available for harvesting annually are limited and the access to these resources is constrained further by government issued license. The revenue from timber harvest after the regeneration of land and the operation of the forestry farm, including salary, is very limited. In addition to the unavailable debt funding from banks, as elaborated above, it is difficult for the farms to reforest the remote, degraded lands in the absence of the proposed A/R CDM project activity.
- Technological barriers: Interviews with local communities indicate that local farmers/communities usually do not have access to quality seed sources and also lack the necessary skills to produce high quality seedlings and to perform successful tree planting. In addition they lack the knowledge and experience to prevent planted trees from fire, and attack by pest and disease. While the forestry farms have experience in reforestation on accessible land in good condition, they have no experience on remote, degraded land. All of their previous reforestation activities have occurred on land that is more easily accessible and with good site and soil conditions. This of course makes planting and management easier. The technical barrier of local farmers/communities can be demonstrated by results of the 6<sup>th</sup> national forestry inventory conducted in 2000 in Guangxi. The mean standing volume per hectare of forests owned by local farmers/communities is much lower than state owned-forests that usually managed by forestry farms (table C-5).



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

Table C-5 Comparison of standing volume of forest owned by different stakeholders in Guangxi<sup>9</sup>

State-owned	Standing volume (m <sup>3</sup> .ha <sup>-1</sup> )		
	State-owned	Collective communities	individuals
Masson pine	81.0	38.1	
Chinese fir	82.4	49.8	
Eucalyptus	36.2	23.3	
Mean value for all forests in Guangxi	78.1	44.1	49.9

***Sub-step 2b: Elimination of land use scenarios that are prevented by the identified barriers.***

The alternative land use scenario “proposed project not undertaken as an A/R CDM project” identified in sub-step 1a above can be eliminated from land use scenarios due to barriers faced. The alternative land

<sup>9</sup> Data source: forest database of Guangxi based on 6th forestry inventory conducted in 2000





**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

use (continued status as barren land with shifting agricultural cultivation or grazing, frequent fire and biomass collection for fuel) does not face the above-mentioned barriers.

***Sub-step 2c. Determination of baseline scenario (if allowed by the barrier analysis)***

Is afforestation without being registered as an A/R CDM project activity included in the list of land use scenarios that are not prevented by any barrier?

→ no, then:

Does the list contain only one land use scenario?

→yes, the remaining land use is the baseline scenario.

**STEP 3: Investment analysis**

***Sub-step 3a. Determine appropriate analysis method***

The benchmark analysis method (Option III) is chosen. The PIN Financial Analysis spreadsheet developed by the World Bank BioCarbon Fund<sup>10</sup> has been used to conduct the investment analysis in which Financial Internal Return Rate (FIRR), with and without the carbon benefit, is the relevant indicator.

***Sub-step 3b – Option III: Apply benchmark analysis***

The required rate of return (RRR) on equity (8%)<sup>11</sup> for investment projects based on the standard issued by the National Reform and Development Commission (NDRC) is used for the analysis. A much higher RRR (12%) was applied to the Guangxi Integrated Forestry Development and Conservation Project (World Bank loan project). This means that projects can be approved by the Government only when their FIRR is expected to be higher than this threshold value. Therefore using of 8% as the benchmark is conservative.

***Sub-step 3c. Calculation and comparison of financial indicators.***

The FIRR of the proposed A/R CDM project activity is calculated below, both without and with carbon finance, and is 4.52% and 9.11%, respectively (at \$5.00 per tonne of CO<sub>2</sub>-e). When carbon benefit was included, the FIRR exceeded the benchmark thereby making the proposed A/R CDM project activity financially viable. When carbon benefit was excluded, the FIRR was significantly below the benchmark, so that the proposed A/R CDM project activity is not financially viable in the absence of the sale of carbon credits.

Detailed calculation is summarized as following:

The planting is proposed to be conducted in the years 2008-2010. The cost of forest establishment (US\$/ha) in the first 3 years after planting is listed in Table C-6 below. Costs for weed control, fire prevention and disease control will occur through 2008-2010. For those areas to be planted in 2008, 2009 and 2010, costs for fertilization, weeding and fire and disease control will occur through 2009-2010, 2010-2011 and 2011-2012, respectively. The preparation cost (200,000 US\$) is included in the establishment costs and verification and monitoring cost are included in the operating cost (20,000 US\$ annually).

<sup>10</sup> [www.biocarfund.org](http://www.biocarfund.org)

<sup>11</sup> NDRC et al. 2006. Economic analysis methods and parameter for construction project (version 3). China Planning Press



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

Table C-6 Parameter for establishment costs in US\$/ha<sup>12</sup>

Items	Stand Models							
	Y-1	Y-2	Y-3	Y-4	Y-5/Y-6	Y-7	Y-7-1	Y-8
Planting in 2008 (ha)	505.5	863.2	1430.4	121.4	294.7	76.8	303.1	222.4
Planting in 2009 (ha)	446.4		1038.1		49.7		608.5	217.5
Planting in 2010 (ha)	233.2		643.6		993.3		415.1	208.4
<b>1 Establishment</b>	<b>775.56</b>	<b>1044.60</b>	<b>1179.19</b>	<b>886.93</b>	<b>994.36</b>	<b>1231.63</b>	<b>1445.34</b>	<b>802.76</b>
1.1 site preparation	269.36	317.84	269.36	235.69	253.20	258.58	317.84	235.69
1.2 seedlings	53.87	72.73	80.81	80.81	80.81	60.61	80.81	48.48
1.3 planting	43.10	53.87	43.10	37.71	48.48	43.10	48.48	37.71
1.4 fertilization (3years)	86.94	236.53	309.16	157.65	236.53	387.20	516.06	157.65
1.5 pest insect, disease and fire control (3 years)	34.75	22.22	22.22	22.22	33.94	22.22	22.22	22.22
1.6 weeding (3 years)	287.54	341.41	454.54	352.86	341.41	459.93	459.93	301.01
<b>2 Equipment and infrastructure</b>	<b>53.20</b>	<b>53.20</b>	<b>53.20</b>	<b>53.20</b>	<b>53.20</b>	<b>53.20</b>	<b>53.20</b>	<b>53.20</b>
2.1 road and protection	39.73	39.73	39.73	39.73	39.73	39.73	39.73	39.73
2.2 tools	13.47	13.47	13.47	13.47	13.47	13.47	13.47	13.47
<b>3 Other costs</b> (designing, training, technical demonstration and consultation, administration, supervision and, etc)	<b>104.46</b>	<b>104.46</b>	<b>104.46</b>	<b>104.46</b>	<b>104.46</b>	<b>104.46</b>	<b>104.46</b>	<b>104.46</b>
<b>4 Unpredictable (10% of cost above)</b>	<b>93.32</b>	<b>120.23</b>	<b>133.68</b>	<b>104.46</b>	<b>110.56</b>	<b>138.93</b>	<b>160.30</b>	<b>96.04</b>
<b>5 Total</b>	<b>1026.53</b>	<b>1322.48</b>	<b>1470.53</b>	<b>1149.05</b>	<b>1262.58</b>	<b>1528.22</b>	<b>1763.30</b>	<b>1056.46</b>

The operation costs include harvesting, thinning, product (wood and resin) transportation, replanting after harvest, maintenance, administration, fire, and pest and disease control from the 4th year onward after

<sup>12</sup> Data Sources: Models and cost analysis report (2005), adjusted based on price and labor cost in 2007. Exchange rate US\$ 1= RMB7.4251 was applied in the calculation.



## CDM – Executive Board

**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

planting, until the end of the crediting period. Revenue includes income from selling wood, resin and carbon credits. Major parameters of operation costs are listed in Table below.

Table C-7 Parameters for operating costs and revenues

Items	Chinese fir	Shiny-bark birch	Choerospondias axillaris	Flous	Schima /Sweetgum	Eucalyptus	Masson pine	
	Timber	Timber	Timber		Timber	Timber	Timber	Resin
Age at thinning	8	6	8				11	
Thinning intensity (percentage of standing volume at the time of thinning)	4.93	3.59	4.67				8.97	
Timber output thinned (m <sup>3</sup> /ha)	50.50	50.50	47.14				44.44	
Price for thinned timber (US\$/m <sup>3</sup> )	21	21	31	26	6	31	21	
Standing volume at the time of harvest (m <sup>3</sup> /ha)	178.45	97.97			99.57		177.83	
Timber output ratio (%)	70	68			80		70	
Timber output harvested (m <sup>3</sup> /ha)	124.92	66.62			79.66		124.48	
Resin output (t/ha/yr, age 16-20 years )								1.8
Timber harvest cost (US\$/m <sup>3</sup> )	12.79	12.79			11.85		12.79	
Resin harvest cost (US\$/t)								296.29
Timber transportation (US\$/m <sup>3</sup> )	9.43	9.43			8.75		9.43	
Resin transportation (US\$/t)								37.04
Price of timber (US\$/m <sup>3</sup> )	71.38	88.89			57.91		64.65	
Price of resin (US\$/t resin)								511.78
Tax (% of Gross income)	20	20			10		20	
Cost for protection, fire control, pest insect and disease control (US\$/ha/yr)	10.1							
Sale cost	1.5% of gross income							
Other management cost	10% of labour cost							
Staff salary and	4.04							





welfare (US\$/ha/yr)	
Harvest design and road maintenance (US\$/m <sup>3</sup> )	2.56
Domestic short-term loan	7.47% of loan

### *Sup-step 3d: Sensitivity analysis*

The most important factors influencing the FIRR for the proposed A/R CDM project activity are the establishment cost, product output, product price and operating costs. Sensitivity analyses with  $\pm 10\%$  variations of these most important factors show that the FIRR without carbon will be below RRR (8%) in the case of (Table C-8)

- 10% decrease in establishment cost, or
- 10% increase in product output or price, or
- 10% decrease in operating cost

And the FIRR with carbon revenue will still be above RRR in the case of

- 10% increase in establishment cost, or
- 10% decrease in product output or price, or
- 10% increase in operating cost

This infers that the proposed A/R CDM project activity is still economically unattractive in the absence of carbon benefit, and is still attractive with carbon revenues, if 10% changes in the key assumptions are assumed.

Table C-8 Sensitive analysis

Parameters	Variation	FIRR (%)	sensitivity	Critical point
Without carbon benefit				
Establishment cost	+10%	3.57	2.10	
	-10%	5.57	2.32	
Product price	+10%	6.68	4.78	
	-10%	1.91	5.77	
Product output	+10%	6.72	4.87	
	-10%	1.87	5.86	
Operating cost	+10%	3.05	3.25	
	-10%	5.85	2.94	
With carbon benefit				
Establishment cost	+10%	7.88	1.35	8.95
	-10%	10.52	1.55	
Product price	+10%	11.01	2.09	
	-10%	6.89	2.44	5.20
Product output	+10%	11.04	2.12	
	-10%	6.85	2.48	5.10



**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

Operating cost	+10%	7.82	1.42	8.70
	-10%	10.29	1.30	

**STEP 4: Common practice analysis**

We are taking Guangxi Zhuang Autonomous Region (Guangxi) as project region for the common practice analysis as the project area is a small part of Guangxi territory. There are small-scale afforestation/reforestation activities in the project regions. The species used were mainly fast-growing eucalyptus with a relatively high economic return and they are managed as short-rotation commercial plantations. However, eucalyptus requires good site conditions and cannot adapt to degraded or poor sites. Also, to reduce cost these commercial plantations have been in easily accessible lands with good nearby transportation infrastructure. Without these features plantations are not economically attractive.

There has been some afforestation and reforestation in the project regions on lands similar to the degraded lands of the proposed A/R CDM project activity, but this has been limited. The afforestation and reforestation was mainly established several years ago by a small number of relatively wealthy communities and farmers at a time when there were not many alternative investment opportunities. As it was not profitable and there was little market incentive, the activities could not be extended by investors. As the forestry industry has developed rapidly in recent years in Guangxi and the cost of labour and planting materials including seedling and fertilizers has increased significantly, the farmers and forest companies turn to plant short-rotation and fast-growth species in accessible areas rather than planting long-term local species in remote, degraded land, which is not economically attractive. This is consistent with the above financial analysis results, which indicates that reforestation is economically unattractive in the absence of proposed A/R CDM project activity, due to slow tree growth, low land productivity and high transportation costs. Also, in recent years, large increases in the price of seedling and fertilizers, as well as the cost of labour, has greatly reduced the expected economic return.

Some project counties under the World Bank loan project, i.e., the Guangxi Integrated Forestry Development and Conservation Project, have withdrawn from the project. Many of these counties are located in the remote mountainous areas and they consider that it is too risky to borrow the World Bank loan for a afforestation program due to the high cost of labour and planting materials, the lengthy period of tree rotation and low economical benefits, though the land condition is better than the proposed CDM project.

With the carbon benefit, reforestation on degraded lands becomes economically acceptable. This creates an incentive to the project entities/communities to apply the World Bank loan to reforestation on degraded lands, as well as to plant local long-term species. In turn this provides more ecological benefits such as conservation of biodiversity and soil erosion control. This will contribute to the goal of the World Bank-financed umbrella project of increasing forest resources, as well as the carbon dioxide sequestration and general ecological environment improvement.

A few Eucalyptus and other fast growing species will be used in the proposed A/R CDM project activity to raise the overall economic return rate of the project. Otherwise, even with the carbon benefit, it will not be economically attractive.

**C.7. Estimation of the *ex ante* baseline net GHG removals by sinks:**

>>The baseline net removals by sinks are the sum of the carbon stock changes in carbon pools in the absence of the proposed A/R CDM project activity. As demonstrated above, the baseline scenario is the



**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

continued current degradation or maintenance at a steady state, under which the carbon stock changes in dead wood, litter and soil organic matter are conservatively assumed to be zero based on the methodology applied. There are pre-project growing trees, thus the baseline net removals by sinks are estimated as the sum of the carbon stock change due to the growth of pre-project growing trees. See Annex 3 for detail estimation.

Table C-9 Estimated baseline net removals by sinks

<b>Year</b>	<b>Annual estimation of baseline net anthropogenic GHG removals by sinks in tonnes of CO<sub>2</sub> e</b>
2008	374
2009	430
2010	484
2011	536
2012	585
2013	631
2014	675
2015	716
2016	754
2017	790
2018	824
2019	856
2020	885
2021	913
2022	938
2023	961
2024	983
2025	1,003
2026	1,021
2027	1,037
<b>Total estimated baseline net GHG removals by sinks (tonnes of CO<sub>2</sub> e)</b>	<b>15,394</b>
<b>Total number of crediting years</b>	<b>20</b>
<b>Annual average over the crediting period of estimated baseline net GHG removals by sinks (tonnes of CO<sub>2</sub> e)</b>	<b>770</b>

**C.8. Date of completion of the baseline study and the name of person(s)/entity(ies) determining the baseline:**

>> Date of completion of Baseline study: 11/25/2007

Name of persons/entity determining the baseline





## CDM – Executive Board

**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

- Guangxi Forestry Inventory and Design, P.R.China: Ms. Mo Zhuping ([mzp1968@163.com](mailto:mzp1968@163.com)), Mr. Wei Qizhong, Mr. Wei Liquan, Mr. Dong Dewen, Ms Yang Xiaolan, Ms Li Mei, Mr. Shi Chenyuan, Mr. Pan Yanying, Mr. Shu Faren, Ms Tan Ting,
- International Cooperation Project Office, Guangxi Forestry Department, P.R. China: Mr. Li Fufu ([lifufu@sina.com](mailto:lifufu@sina.com)), Mr. He Shanzhong, Mr. Wu Zhimin, Mr. Peng Wensheng
- Guangxi University, P.R. China: Mr. Liang Hongwen ([lhwen59@163.com](mailto:lhwen59@163.com)), Mr. Pan Bingde, Mr. Yang Xiaoping, Ms Wen Juan, Mr. Lu Jiayun, Mr. Pan Qilong, Mr. Mong Ren, Mr. Zhe Zhanggui, Mr. Wei Chengkai, Mr. Tan Jun, Mr. Deng Chuanhua, Mr. Yan Rongbing, Mr. Zhou Fang, Mr. Jiang Aiwu, Mr. Du Yan, Ms Shu Xiaolian
- Guangxi Natural Museum: Mr. Mo Yunming ([moyunming@163.com](mailto:moyunming@163.com)), Mr. Xie Zhiming
- Forestry Bureau of Longlin County: Mr. Huang Jianji ([hjj3194@126.com](mailto:hjj3194@126.com)), Mr. Huang Hongfu, Mr. Zhang Shiguang, Mr. Zhu Guangtai, Mr. Liang Chaoan, Ms Lu Zhenyan, Mr. Lu Chengbing, Mr. Liu Xueqian
- Forestry Bureau of Tianlin County: Ms Nan Lishe, Mr. Zhong Hui, Mr. Shi Zheng, Mr. Tan Jinghua, Ms Lu Liping, Mr. Chen Ning, Ms Qing Chailan, Mr. Mong Zhihai
- Forestry Bureau of Linyun County: Mr. Zuo Mingxing ([lylyjuxmb2007@163.com](mailto:lylyjuxmb2007@163.com)), Ms Mi Rengui
- World Bank Beijing Office: Ms Jin Liu, [Jliu@worldbank.org](mailto:Jliu@worldbank.org)
- Institute of Forest Ecology, Environment and Protection, the Chinese Academy of Forestry: Dr. Xiaoquan Zhang, [xiaoquan@caf.ac.cn](mailto:xiaoquan@caf.ac.cn)

All persons/entity determining the baseline are not the project participants listed in Annex 1.



**SECTION D. Estimation of *ex ante* actual net GHG removals by sinks, leakage and estimated amount of net anthropogenic GHG removals by sinks over the chosen crediting period**

**D.1. Estimate of the *ex ante* actual net GHG removals by sinks:**

>> The actual net greenhouse gas removals by sinks represent the sum of the changes in carbon stocks in the carbon pools within the project boundary, minus the increase in non-CO<sub>2</sub> GHG emissions measured in CO<sub>2</sub> equivalents by sources that are increased as a result of the implementation of the proposed A/R CDM project activity, while avoiding double counting, within the project boundary, attributable to the A/R CDM project activity. Based on the approved methodology applied, the aboveground biomass, belowground biomass and soil organic matter are the pools to be accounted for. Parameters used for the estimate of the actual net greenhouse gas removals by sinks are listed in table D-1 below.

Table D-1 Parameters used for ex ante estimate of the actual net greenhouse gas removals by sinks

	Parameters	Values <sup>(a)</sup>	Data sources
BEF <sub>2j</sub>	Chinese fir and flous	1.74 (251, 0.08)	Institute of Forest Ecology, Environment and Protection, CAF, Updated national and species-specific or group of species-specific values for on-going China's second National GHG Inventory in Forestry Sector, which is most priority in hierarchy of sources
	Masson pine	1.54 (221, 0.03)	
	Shiny-bark birch	1.37 (15, 0.04)	
	Choerospondias axillaries and Sweetgum <sup>(b)</sup>	1.59 (39, 0.05)	
	Schima <sup>(c)</sup>	1.67 (133, 0.04)	
	Eucalyptus	1.43 (85, 0.03)	
CF <sub>j</sub> (tC t <sup>-1</sup> d.m.)		0.5	Default value mentioned in the hierarchy of sources
D <sub>j</sub> (t d.m. m <sup>-3</sup> )	Chinese fir and flous	0.307 (54, 0.009)	Institute of Forest Ecology, Environment and Protection, CAF, Updated national and species-specific or group of species-specific values for on-going China's second GHG Inventory in Forestry Sector, which is most priority in the hierarchy of sources
	Masson pine	0.380 (43, 0.019)	
	Shiny-bark birch	0.541 (62, 0.018)	
	Choerospondias axillaries and Sweetgum <sup>(b)</sup>	0.443 (189, 0.013)	
	Schima <sup>(c)</sup>	0.598 (482, 0.012)	
	Eucalyptus	0.578 (104, 0.019)	
R <sub>j</sub> (kg d.m. kg <sup>-1</sup> d.m.)	Chinese fir and flous	0.219 (261, 0.004)	Institute of Forest Ecology, Environment and Protection, CAF, Updated national and species-specific or group of species-specific values for on-going China's second
	Masson pine	0.200 (202, 0.007)	
	Shiny-bark birch	0.231 (21, 0.018)	
	Choerospondias axillaries and Sweetgum <sup>(b)</sup>	0.289 (43, 0.011)	



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

	Schima <sup>(c)</sup>	0.261 (14, 0.010)	GHG Inventory in Forestry Sector, which is most priority in the hierarchy of sources
	Eucalyptus	0.218 (88, 0.005)	
$\Delta C$		0.5	Default annual increase in carbon stock in soil organic carbon as per the methodology applied; t C ha <sup>-1</sup> yr <sup>-1</sup>

Note:

- (a) data in parentheses represent the number of samples and standard of error respectively.
- (b) Mean value for softwood, so the value was also used for softwood in the estimate of the baseline net removals by sinks
- (c) Mean value for hardwood, so the value was also used for softwood in the estimate of the baseline net removals by sinks

#### a. Estimate of carbon stock changes under the project scenario

Methods and procedures described in Section II.5.1 of the applied methodology have been followed below.

##### a.1 Loss of pre-project tree and non-tree woody vegetation

Although the GHG emissions from removal of existing vegetation due to site preparation may be insignificant by applying “Guidelines on conditions under which GHG emissions from removal of existing vegetation due to site preparation are insignificant” (Version 01), it is conservatively assumed that all pre-project tree and shrub vegetation will die out instantly and be accounted for as carbon loss in the proposed A/R CDM project activity<sup>13</sup>. Therefore, the carbon stock loss of pre-project tree and non-tree vegetation is equal to the carbon stock in pre-project trees and shrubs at the start of the proposed A/R CDM project activity which has been estimated using equation (1)-(3) in the A/R Methodological Tool “Estimation of emissions from clearing, burning and decay of existing vegetation due to implementation of a CDM A/R project activity”<sup>14</sup> (Table D-2, see Annex 3 for detail estimation). All carbon loss is accounted for in the year 2008.

Table D-2 carbon loss of pre-project tree and shrub vegetation

Baseline strata ID	Area (ha)	Carbon loss (tCO <sub>2</sub> )		
		AGB	BGB	Total
BLS -1	620.5	739	324	1,063
BLS -2	1274.2	1,034	345	1,379

<sup>13</sup> Based on guidance made by EB 42<sup>nd</sup> meeting, removal of herbaceous vegetation is neglected in accounting GHG emissions in A/R CDM project activities.

<sup>14</sup> [http://cdm.unfccc.int/EB/Meetings/036/eb36\\_repan20.pdf](http://cdm.unfccc.int/EB/Meetings/036/eb36_repan20.pdf)





**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

BLS -3	2275.7	12,947	4,048	16,995
BLS-4	4500.9	12,609	4,657	17,266
<b>Total</b>	<b>8671.3</b>	27,328	9,375	36,703

Note: AGB: aboveground biomass; BGB: belowground biomass

## a.2 Estimates of carbon stock changes in living biomass of planted trees

BEF method as presented in Section II.5.1 of the approved methodology applied is used. For the models with mixed species, tree species are mixed in a block way. In this case, each species within a mixed plantation can be regarded as a pure stand for the purpose of carbon accounting. Since there is no yield table or growth data for different strata (represented by stand models and site conditions), it is assumed that each species (species group) has the same growth pattern. Local growth curves are developed using data from forestry inventory that have been conducted once every 5 years since the end of the 1970s:

$$\text{Masson Pine: } V_{(t)} = e^{(5.878883974 - 11.2157319 / (t-2))}$$

$$\text{Chinese Fir and Flous: } V_{(t)} = e^{(5.720501874 - 8.7306838 / (t-3))}$$

$$\text{Eucalyptus: } V_{(t)} = 229.83364644 \cdot (1 - e^{(-0.15235802 \cdot t)})^{1.31560218 \cdot 15}$$

$$\text{Other broadleaf species: } V_{(t)} = 126.27034 \cdot (1 - e^{(-0.091328 \cdot t)})^{1.274443}$$

Where

$V_{(t)}$  stem volume at time  $t$  for the project scenario,  $\text{m}^3 \text{ha}^{-1}$

$t$  Stand age, year

These curves were used to estimate the average plantation stem volume per hectare for each species. However, within some parcels of lands, some small land pieces may not be able to be fully planted as planned due to rocky and too thin soil depth or small tree lands that are less than 0.067 ha for the definition of forest in China thus unable to be excluded from the project boundary. To factor out the potential impacts, we discount the average growth rate based on site conditions, favourite conditions of each species, experience from the first registered project “Facilitating Reforestation for Guangxi Watershed Management in Pearl River Basin” (Ref: 0547), as well as expert judgement. The discount factor used is 0.15 for Eucalyptus, 0.10 for Masson pine and 0.05 for all other species. The average volume is then converted into carbon stock and carbon stock changes in above ground biomass and below ground biomass via wood density (WD) and Biomass Expansion Factors (BEF) and root-shoot ratio (R) (Table D-1) based on equations (15)-(18) presented in the approved methodology applied, using LULUCF Sequestration Input Tools developed by the World Bank BioCarbon Fund ([www.biocarbonfund.org](http://www.biocarbonfund.org)). The carbon stock and carbon stock changes in living biomass are summarized in Table D-3. Please see attached spreadsheet for the detailed calculations.

Table D-3 Estimated carbon stock changes in living biomass

Year	Carbon stock (t C)	Carbon stock changes (t C/yr)
------	--------------------	-------------------------------

<sup>15</sup> Yield table for fast-growing Eucalyptus in Guangxi Province.



**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

	AGB	BGB	total	AGB	BGB	total
2007	7,453	2,557	10,010			
2008	0	0	0	-27,328	-9,375	-36,703
2009	5,558	1,272	6,830	20,381	4,664	25,045
2010	18,477	4,194	22,671	47,370	10,713	58,083
2011	37,415	8,479	45,895	69,438	15,714	85,153
2012	57,616	13,048	70,665	74,071	16,753	90,823
2013	79,520	17,965	97,484	80,312	18,027	98,339
2014	105,193	23,659	128,852	94,134	20,881	115,015
2015	119,294	26,772	146,066	51,703	11,415	63,118
2016	127,252	28,500	155,751	29,180	6,332	35,512
2017	144,736	32,278	177,014	64,109	13,855	77,964
2018	178,850	39,672	218,522	125,084	27,111	152,195
2019	210,882	46,610	257,492	117,452	25,440	142,893
2020	240,355	52,992	293,347	108,065	23,401	131,466
2021	251,924	55,475	307,399	42,421	9,103	51,525
2022	252,984	55,670	308,654	3,886	717	4,603
2023	261,588	57,514	319,102	31,547	6,760	38,307
2024	286,353	62,884	349,237	90,806	19,690	110,496
2025	309,320	67,865	377,185	84,213	18,263	102,476
2026	330,334	72,422	402,756	77,050	16,709	93,759
2027	334,160	73,234	407,394	14,029	2,978	17,007
Total				1,197,925	259,150	1,457,075

### a.3 Estimates of carbon stock changes in soil organic matter

Default method as described in section II.5.1.4 of the approved methodology applied has been used for estimation, i.e., 0.5 tC ha<sup>-1</sup> yr<sup>-1</sup> for the first 20 years after planting and zero afterward.

Table D-4 Carbon stock changes in soil organic matter

Year	SOC (tC/yr)
2008	1,909
2009	3,089
2010	4,336
2011	4,336



**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

2012	4,336
2013	4,336
2014	4,336
2015	4,336
2016	4,336
2017	4,336
2018	4,336
2019	4,336
2020	4,336
2021	4,336
2022	4,336
2023	4,336
2024	4,336
2025	4,336
2026	4,336
2027	4,336
total	83,039

**b. Estimates of the increase in GHG emissions by sources**

There will be no biomass burning during site preparation, and based on the “tool for estimation of emissions from clearing, burning and decay of existing vegetation due to implementation of an A/R CDM project activity (Version 03)”, there will be no GHG emissions from clearing, burning and decay of existing vegetation due to implementation of an A/R CDM project activity, i.e.,  $E_{BiomassBurn,t} = 0$ . Therefore,  $GHG_E = 0$

**D.2. Estimate of the *ex ante* leakage:**

>> Based on the approved baseline and monitoring methodology applied, there only one potential sources of leakage (LK):

- Carbon stock decreases caused by displacement of pre-project grazing activities,  $LK_{ActivityDisplacement}$ ;

**a. Estimation of  $LK_{ActivityDisplacement}$** 

Some lands to be planted in the proposed A/R CDM project activity have grazing animals. Thus, as the result of the project activity, grazing may be temporarily or permanently displaced from the project sites to other locations. The displacement may result in leakage if the new grazing areas are obtained by converting stocked areas, particularly forests, to grazing land.

**a.1. Estimation of  $LK_{Conversion}$  (Leakage due to conversion of land to grazing land)**

The pre-project animal population and the number of months of grazing of different livestock groups on lands, both within the project boundary and outside the project boundary that are under the control of the



**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

project participants, have been surveyed using Participatory Rural Appraisal (PRA), with the results summarized in Table D-5 below. The annual biomass intake of the animals over the project lands and existing degraded grasslands is estimated using equation (3) in the A/R methodological tool “Estimation of GHG emissions related to displacement of grazing activities in A/R CDM project activity”<sup>16</sup> and the required area to accept displaced animals is estimated using equation (4) of the methodological tool.  $DMI_g$  is from Table 3 in methodological tool.

The default values from Table 3.4.2 of IPCC good practice guidance LULUCF was used as annual net primary production ( $ANPP$ ) in the calculation.

Table D-5 indicates that there are sufficient existing grassland lands under the control of the project participants that can adopt displaced animals even if all pre-project animals are displaced to existing grasslands outside the project boundary. Therefore,  $LK_{Conversion} = 0$ .

Guidelines on conditions under which increase in GHG emissions related to displacement of pre-project grazing activities in A/R CDM project activity is insignificant (Version 01) was also applied to demonstrate that the displacement of pre-project grazing activity is insignificant and can be accounted as zero, by complying conditions in the guidelines as follows:

- Complying with paragraph 4(b) (i) grazing animals is expected to be displaced to degraded or degrading lands that are similar to the project lands; and 4(b)(ii) Existing grasslands with the carrying capacity that allows for accommodation of the displaced animals during the entire period of displacement, as estimated above;
- Complying with paragraph 4(d)(i) grazing animals is expected to be displaced to degraded or degrading lands that are similar to the project lands; and 4(d)(ii) Existing grasslands with the carrying capacity that allows for accommodation of the displaced animals during the entire period of displacement, as estimated above.

---

<sup>16</sup> [http://cdm.unfccc.int/EB/Meetings/039/eb39\\_repan12.pdf](http://cdm.unfccc.int/EB/Meetings/039/eb39_repan12.pdf)





**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

**Table D-5 Pre-project animal populations and land available for adopting displaced animals**

Towns Township s Farms	Villages Sub-farms	Land ID	Compa rment ID: Sub- Compa rment ID	Area (ha)	Animals within the project boundary			Dry matter intake (t d.m/yr)	Existing grazing land outside the project boundary under the control of the animal owners				ANPP (t d.m/ha/yr)	Area required (ha)	
					Number of animals (head)				Are a (ha)	Number of animals (head)					Biomass consump- tion (t d.m/yr)
					Cattle	Horse	goat			Cattle	Horse	goat			
ShaLi				180.9											
PingBan				100.4											
LongHuo				82.1											
ZheBao				296.3											
Zhelang				52.6											
Gebu				368.8											
De'e	BaKe			42.3											
	YanTou			18.2											
	JinPing			57.3											
	ShuiJing	LL140201	6:1-4	67.7											
			6:5	9.5											
			7:1-18	212.9	16	6	4	183	26				8.2	22	
LongYing	LL140501	1:1-2, 6	169.0												
ZhuChan g	Yangjie	LL130601	1:1	10.1	3	1		32	6					8.2	4
			2:1-3	36.2											
		LL130602 ~LL130605	6:1-2	182.6											
	Nayan			116.0											
SheChan g	LeXiang			305.8											
	XinMin	LL150301	1:1-11	113.8	15	14		232	35					8.2	28



CDM – Executive Board

UNFCCC/CCNUCC



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

			2:1-2	7.6											
	MaChang			126.1											
	XinLi			266.0											
KeChang				1496.5											
YanCha	LengDu			390.0											
JieTing				286.2											
XinZhou				55.3											
JinZhongShan Forestry Farm				645.5			697.8								
LiZhou				357.2											
Langping				355.6											
LuCheng				117.5											
Baile				246.8											
JiuZhou	ZheNian	TL091301 TL091302	21:1~3 24: 1	59.6	80	17		775	166					8.2	95
	PinLin	TL090301	10:1-3	47.1	115	20		1079	133					8.2	132
		TL090302	10:4	17.9											
			9:1	16.0											
		TL090303	12:1-8	126.0											
		TL090304	12:9-10	34.8											
	GuangLong	TL090401	3:1	14.4		125	17	1028	135					8.2	125
			4:1-6	85.0											
			5:1-4	63.6											
	Yangbai			37.4											
AnDing				156.8											
GaoLong				159.8											
ZheMiao				103.9											
LiuLong				96.5											



**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

NaBi	NaLa	TL200501	34:1-3	111.5											
YangYa				204.1											
ShiCheng	LongZhao	LY011401	7:1	16.3	17	6	10	201	80	23	18	65	437	8.2	78
		LY011402	8:1	18.1											
JiuJiang Forestry Farm				350.0			382.5								
JiaYou	MoXian	LY080701	3: 1	11.8	12	7	12	172	71	23	14	32	349	8.2	64
		LY080702~LY080718		73.2											
	DongHa			9.9											

**SECTION E. Monitoring plan****E.1. Monitoring of the project implementation:****E.1.1. Monitoring of forest establishment and management:**

&gt;&gt;

**a. Monitoring of forest establishment**

- (a) The geographic coordinates of the project boundary and any stratification inside the boundary for all areas of land will be measured using geo-referenced spatial data, supplementary with on-site GPS measurement. A;; data will be recorded and archived.
- (b) Commonly accepted principles of forest inventory and management will be implemented;
- (i) Standard operating procedures (SOPs) and quality control/quality assurance (QA/QC) procedures for forest inventory including field data collection and data management will be applied. The SOPs and QA/QC procedures have been applying in national forest inventory and monitoring since 1980s.
- (ii) SOPs for on-site checking will be implemented to confirm that the site and soil preparations are implemented based on the practice documented in the PDD, e.g., no slash and burn, no overall ploughing, and that the area disturbed by soil preparation is less than 10% of the total surface area.
- (iii) monitoring of the forest planting and management, including
- Planting date, location, area, tree species (including mixture models);
  - Survival rate:
    - ✓ The initial survival rate of planted trees shall be checked one months after planting, and re-planting shall be conducted when the survival rate is lower than 90% of the final planting density;
    - ✓ Final survival rate should be checked three years after planting;
    - ✓ Checking the survival rate use sampling methods defined in PDD.
  - Confirming that the weeding practice is implemented as described in the PDD;
  - Documenting and reporting any deviation between plantation establishment and management activities and project design;
  - Control of land: Ensuring that all project land would be controlled by project participants, especially for lands that are collectively owned by villages with a few contracted individual land. Contracts that document the access to land, management responsibilities and benefits including carbon revenue sharing agreement shall be signed between operating entities and villages/farmers.

**b. Monitoring of forest management**

Forest management practices to be monitored include:

- Thinning: date, location, area, tree species, thinning intensity, volumes or biomass removed;
- Harvesting: date, location, area, tree species, volumes or biomass removed;





## CDM – Executive Board

**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

- Coppicing: date, location, area, tree species;
- Fuel wood collection: date, location, area, tree species, volumes or biomass removed;
- Disturbances to plantations: date, location, area (GPS coordinates and remote sensing, as applicable), tree species, type of disturbance, biomass lost, implemented corrective measures, change in the boundary of strata and stands.

To promote delivery of climate change mitigation, biodiversity conservation and community benefits from the project activities, baseline surveys on biodiversity and community status in the project areas have been conducted. The monitoring plans for biodiversity conservation and community development that have also been developed will be implemented during the project period for the purpose of CCB verification, although they are not a part of the CDM monitoring plan here.

<b>ID number</b>	<b>Data variable</b>	<b>Data unit</b>	<b>Measured (m), calculated (c) estimated (e) or default (d)</b>	<b>Recording frequency</b>	<b>Number of sample plots at which the data will be monitored</b>	<b>Comment</b>
<i>E.1.1.2</i>	<i>percentage of disturbed soil surface</i>	<i>%</i>	<i>m</i>	<i>At the time of forest establishment</i>	<i>100%</i>	
<i>E.1.1.3</i>	<i>Planting location, date</i>	<i>dimensionless</i>		<i>soil preparation for planting</i>	<i>100%</i>	<i>Recording site by site</i>
<i>E.1.1.4</i>	<i>Survival rate</i>	<i>%</i>	<i>m</i>	<i>One month and three years after planting</i>	<i>100%</i>	<i>Sampling survey</i>
<i>E.1.1.5</i>	<i>Weeding practice</i>	<i>dimensionless</i>		<i>in the first 3 years after planting</i>	<i>100%</i>	<i>Recording site by site</i>
<i>E.1.1.6</i>	<i>Thinning</i>	<i>Dimensionless/ha for area/m<sup>3</sup> for volume / t.d.m for biomass removed</i>	<i>m</i>	<i>At the time of thinning</i>	<i>100%</i>	Recording date, location, area, tree species, thinning intensity, volumes or biomass removed
<i>E.1.1.7</i>	<i>harvesting</i>	<i>Dimensionless/ha for area/m<sup>3</sup> for volume / t.d.m for</i>	<i>m</i>	<i>At the time of harvesting</i>	<i>100%</i>	Recording date, location, area, tree



## CDM – Executive Board

**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

		<i>biomass removed</i>				species, volumes or biomass removed
<i>E.1.1.8</i>	Coppicing	<i>Dimensionless/ha for area</i>	<i>m</i>	<i>At the time of leaving for coppicing</i>	<i>100%</i>	Recording date, location, area, tree species
<i>E.1.1.9</i>	Fuelwood collection	<i>Dimensionless/ha for area/m<sup>3</sup> for volume / t.d.m for biomass removed</i>	<i>m</i>	<i>At the time of logging</i>	<i>100%</i>	Recording date, location, area, tree species, volumes or biomass removed
<i>E.1.1.10</i>	Disturbances to plantations	<i>Dimensionless/ha for area</i>	<i>m</i>	<i>At the time of disturbance</i>	<i>100%</i>	Recording date, location, area, tree species, type of disturbance

**E.1.2. If required by the selected approved methodology, describe or provide reference to, SOPs and quality control/quality assurance (QA/QC) procedures applied:**

>> To ensure the net anthropogenic GHG removals by sinks is to be measured and monitored precisely, credibly, verifiably, and transparently, the following quality assurance and quality control (QA/QC) procedure will be implemented:

**a) Reliable field measurements**

To ensure reliable field measurements,

- Standard Operating Procedures (SOPs) for each step of the field measurements will be developed and adhered to. The detailed field survey and measurements related information and document should be recorded and filed for verification purposes.
- Training courses on field data collection and data analyses will be held for all staff involved in the field measurement work. The training courses should ensure that each task team member is fully aware of all procedures and the importance of collecting data as accurately as requested. To achieve this, both classroom examination and field examination will be conducted, and only those who pass the required examination can join the task team.
- A document that describes the measurement steps will be presented in the monitoring report.

## CDM – Executive Board

**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

- New staff will be adequately trained.

**b) Verification of field data collection**

To verify that the sample plots have been installed and the measurements have been taken correctly, the following work would be undertaken:

- 15% of randomly selected plots will be re-measured by different working team;
- Key re-measurement elements including the location of plots, DBH and the height of all trees.
- The re-measurement data will be compared with the original measurement data. Any deviation between measurement and re-measurement below 5% will be considered tolerable and deviation above 5% will be considered an error. Any errors found will be corrected and recorded. The errors discovered will be presented as a percentage of all plots that have been rechecked.

**c) Verification of data entry and analysis**

Reliable estimation of carbon stock in pools requires proper entry of data into the data analyses spreadsheets. To minimize possible errors in the processing of data entry, the entry of both field data and laboratory data will be reviewed using expert judgement and, where necessary, compared with independent data to ensure that the data is realistic. Communication between all personnel involved in measuring and analysing data will be used to resolve any apparent anomalies before the final analysis of the monitoring data is completed. If the data problems of monitoring plots cannot be resolved as part of the QA/QC procedures, the plots should be dropped and replaced with other plots that are in conformity with monitoring procedures.

**d) Data maintenance and archiving**

Data will be archived by both electronic and paper forms, and copies of all data will be provided to each project participant. All electronic data and reports will be copied on durable media such as compact discs (CDs) and copies of the CDs will be stored in multiple locations. The archives include:

- Copies of all original field measurement data, laboratory data, data analysis spreadsheets;
- Estimates of the carbon stock changes in all chosen pools and non-CO<sub>2</sub> GHG and corresponding calculation spreadsheets;
- GIS products;
- Copies of the measuring and monitoring reports.

**E.2. Sampling design and stratification:**

>> The number and boundaries of the strata defined ex-ante in Section C.4 may change during the crediting period (ex-post). Therefore, strata should be monitored periodically. If a change in the number and area of the project strata occurs, the sampling framework should be adjusted accordingly.

**a. monitoring of strata**

The *ex ante* project stratification presented in Section C.4 will be used as a basis for monitoring. However, since there is usually a diversion in the planned forest establishment and management practice, as well as unexpected disturbances, this *ex ante* stratification shall be monitored regularly (based on *ex post* stratification):

**CDM – Executive Board**
**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

- Unexpected disturbances occurring during the crediting period (e.g. due to fire, pests or disease outbreaks), affecting different parts of an originally homogeneous stratum or stand in a different way;
- Forest establishment and management (clearing, planting, thinning, harvesting, coppicing, re-planting) may be implemented at different intensities, dates and spatial locations than originally planned in the PDD;
- Two different strata may be similar enough to allow merging into one stratum. If this occurs, ex-post stratification may be required. The possible need for ex-post stratification will be evaluated at each monitoring event and changes in the strata will be reported to the DOE for Review and verification.

**b. Sampling size and plot allocation among strata**

A permanent sampling plot will be established and measured periodically for monitoring purposes. Assuming the cost for establishing a sample plot for each stratum is constant, equations (1), (2) and (4) in methodological tool “Calculation of the number of sample plots for measurements within A/R CDM project activities”<sup>17</sup> have been used to calculate the number of plots for each stratum (Table E-1 below). The average standing volume ( $Q$ ,  $m^3 \cdot ha^{-1}$ ) of mature plantations has been calculated based on growth curves presented in Section D.1.a.2 above. The standard deviation of each stratum ( $st_i$ ) is set as 30% of the standing volume. The precision level was set at 10%. To ensure statistical independence for each stratum, a minimum of 3 plots will be set for each stratum.

However, it is possible to reasonably modify the sample size after the first monitoring event based on the variation of the carbon stock changes and possible disturbances.

Table E-1 Number of monitoring plots for each stratum

Strata ID	Stand model	Tree species	Area (ha)	Number of plots
<b>PS-I-1-1</b>	Y-1	masson pine	157.7	3
	Y-2	Chinese fir	359.9	7
	Y-3	Birch	393.4	6
	Y-4	Choerospondias	55.4	3
	Y-5	masson pine	105.5	3
		Schima	26.4	3
<b>PS-I-1-2</b>	Y-8	Flous	138	3
	Y-1	masson pine	204.1	4
	Y-3	Birch	165.2	3
<b>PS-I-1-3</b>	Y-8	Flous	124.9	3
	Y-3	Birch	119.5	3
	Y-5	masson pine	254.9	5
		Schima	63.7	3

<sup>17</sup> [http://cdm.unfccc.int/EB/Meetings/031/eb31\\_repan15.pdf](http://cdm.unfccc.int/EB/Meetings/031/eb31_repan15.pdf)





## CDM – Executive Board

**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

	Y-8	Flous	62	3
	Y-6	masson pine	38.9	3
		Sweetgum	9.7	3
<b>PS-I-2-1</b>	Y-2	Chinese fir	386	7
	Y-3	Birch	350.1	5
	Y-4	Choerospondias	21.8	3
	Y-5	masson pine	15.8	3
		Schima	4	3
	Y-8	Flous	84.4	3
<b>PS-I-2-2</b>	Y-3	Birch	423.5	6
	Y-5	masson pine	17.6	3
		Schima	4.4	3
	Y-8	Flous	92.6	3
<b>PS-I-2-3</b>	Y-3	Birch	456.8	5
	Y-5	masson pine	254	5
		Schima	63.5	3
	Y-6	masson pine	246.9	5
		Sweetgum	61.7	3
	Y-8	Flous	140	3
<b>PS-I-3-1</b>	Y-2	Chinese fir	92.4	3
	Y-3	Birch	586.5	8
	Y-4	Choerospondias	28.3	3
<b>PS-I-3-2</b>	Y-3	Birch	265.9	4
<b>PS-I-3-3</b>	Y-3	Birch	67.3	3
	Y-8	Flous	6.4	3
<b>PS-II-1-1</b>	Y-1	masson pine	181.1	3
	Y-2	Chinese fir	13.6	3
	Y-3	Birch	38.1	3
	Y-4	Choerospondias	15.9	3
	Y-5	masson pine	14	3
		Schima	3.5	3
	Y-7	Eucalyptus	76.8	3
	Y-7-1	Eucalyptus	153.4	3



## CDM – Executive Board

**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

<b>PS-II-1-2</b>	Y-1	masson pine	16.8	3
	Y-3	Birch	169.2	3
	Y-7-1	Eucalyptus	294.4	4
<b>PS-II-1-3</b>	Y-1	masson pine	159.4	3
	Y-7-1	Eucalyptus	111.5	3
<b>PS-II-2-1</b>	Y-1	masson pine	37.4	3
	Y-2	Chinese fir	11.3	3
	Y-3	Birch	62.3	3
	Y-5	masson pine	59.2	3
		Schima	14.8	3
	Y-6	masson pine	41.2	3
		Sweetgum	10.3	3
	Y-7-1	Eucalyptus	149.7	3
<b>PS-II-2-2</b>	Y-1	masson pine	225.5	4
	Y-3	Birch	14.3	3
	Y-5	masson pine	22.2	3
		Schima	5.5	3
	Y-7-1	Eucalyptus	314.1	5
<b>PS-II-2-3</b>	Y-1	masson pine	73.8	3
	Y-7-1	Eucalyptus	303.6	5
<b>PS-III-1-1</b>	Y-1	masson pine	129.3	3
<b>Total</b>			8671.3	236

**c. Sampling plot size**

The stands to be established are relatively dense (1667 or 2500 trees per hectare). The size of plots is hence set at 400 m<sup>2</sup> (20 m x 20 m).

**d. Locating sampling plots**

To avoid subjective choice of plot locations (plot centres, plot reference points, movement of plot centres to more “convenient” positions), the permanent sample plots will be set systematically with a random start. It ensures that the sampling plots will be evenly and randomly spread in project sites. This will be accomplished with the help of a GPS in the field. The geographical position (GPS coordinate), administrative location, stratum and sub-stratum series number of each plot will be recorded and archived.

**e. Monitoring frequency**

**CDM – Executive Board****PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

The planting activity will be implemented from 2008 to 2010 (see Table A-4 for details). Shiny-bark birch will be thinned at age 6, Masson pine at age 11, and Chinese fir and *Choerospondias axillaris* at age 8. Eucalyptus will be harvested at age 6. Other species will not be harvested during the first crediting period. To avoid the coincidence with peaks in carbon stocks, the first monitoring and verification will be conducted in the year 2012, with a subsequent monitoring and verification interval of 5 years, i.e., in 2017, 2022, and 2027 respectively (Table E-2). After harvesting, Eucalyptus will be regenerated by natural sprouting.

**f. Measuring and estimating carbon stock changes over time**

The growth of individual trees in sample plots will be measured at each monitoring event. Non-tree vegetation such as herbaceous plants, grasses, and shrubs will not be measured and accounted as per methodology applied. The carbon stock changes in the living biomass of the trees on each plot are then estimated through the Biomass Expansion Factors (BEF) method.

**g. Monitoring GHG emissions by sources increased as results of the A/R CDM project activity**

There will be no slash and burn site preparation, nor overall ploughing or flood irrigation. Also, no machinery tools will be used within the project boundary. However, additional N<sub>2</sub>O emissions will occur due to fertilization taking place within the project boundary and CO<sub>2</sub> emissions from transportation outside the project boundary. These emissions will be monitored using the methods described in the sections below.



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

Table E-2 Monitoring and verification times versus harvest and thinning time<sup>18</sup>

Year No	Year	Reforestation models and tree species											Monitor -ing	Verifica -tion
		Y-1 Pine	Y-2 Chinese fir	Y-3 Birch	Y-4 Choero- spondias	Y5 Pine Schinma		Y-6 Pine Sweetgum		Y-7 Eucalyptus Eucalyptus		Y-8 Flous		
1	2008	P	P	P	P	P	P	P	P	P		P		
2	2009	P		P		P	P	P	P		P	P		
3	2010	P		P		P	P				P	P		
4	2011													
5	2012												M	V
6	2013			T						H				
7	2014			T							H			
8	2015		T	T	T						H			
9	2016													
10	2017												M	V
11	2018	T				T		T						
12	2019	T				T		T		H				
13	2020	T				T					H			
14	2021										H			

<sup>18</sup> P: Planting, T: Thinning, H: Harvesting, M: Monitoring, V: Verification





**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

15	2022												M	V
16	2023													
17	2024													
18	2025									H				
19	2026										H			
20	2027										H		M	V



**E.3. Monitoring of the baseline net GHG removals by sinks, if required by the selected approved methodology:**

>> Monitoring of the baseline net GHG removals by sinks is not needed as per the approved methodology AR-ACM0001/version 03 applied.

**E.4. Monitoring of the actual net GHG removals by sinks:**

**E.4.1. Data to be collected in order to monitor the verifiable changes in carbon stock in the carbon pools within the project boundary resulting from the proposed A/R CDM project activity:**

>> Step-wise procedures for BEF method and equation (14)-(18) in Section II.5.1.1 of the approved baseline and monitoring methodology (AR-ACM0001/version 03) will be followed to monitor the verifiable carbon stock changes in the above-ground and below-ground living biomass within the project boundary.

Diameter at breast height (DBH, at 1.3 m above ground) and height of all the trees within each permanent sample plot above a minimum DBH (2 cm) will be measured. The merchantable volume of trees ( $V_{i,j,l,sp,t}$ ) in equation (15) of the methodology will be estimated using locally derived equations<sup>19,20</sup>

$$\text{Masson pine} \quad V = 0.0000714265 \cdot 437 \cdot DBH^{1.867010} \cdot H^{0.9014932}$$

$$\text{Chinese fir and flous} \quad V = 0.000065671 \cdot DBH^{1.769412} \cdot H^{1.069769}$$

$$\text{Eucalyptus} \quad V = 0.0001091541 \cdot 45 \cdot DBH^{(1.8789237 - 0.0056918550 \cdot 3 \cdot (DBH + H))} \cdot H^{(0.6259805 + 0.0078475350 \cdot 7 \cdot (DBH + H))}$$

$$\text{Other species} \quad V = 0.0000667054 \cdot DBH^{1.8479545} \cdot H^{0.96657509}$$

Where

$V$  standing volume of trees,  $m^3 \cdot tree^{-1}$

$DBH$  diameter at breast height, cm

$H$  tree height, m

The merchantable volume of trees will be then converted to carbon stock in aboveground and belowground biomass using Equation (15) and (16) of the applied methodology and species-specific biomass expansion factor for conversion of biomass of tree volume to above-ground biomass ( $BEF_{2,j}$ ), wood density ( $D_j$ ) and root-shoot ratio ( $R_j$ ) that are listed in Table D-1 above. These parameters are estimated from published data.. IPCC default value (0.5) for the carbon fraction (CF) will be used.

Data and parameters not to be measured/collected in order to monitor the verifiable changes in carbon stock in the carbon pools within the project boundary resulting from the proposed A/R CDM project activity

<sup>19</sup> Forestry Inventory Manual. 1986. Guangxi Institute of Forestry Inventory and Design

<sup>20</sup> Yield Table of Eucalyptus. 2005. Guangxi Institute of Forestry Inventory and Design



## CDM – Executive Board

**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

ID number	Data variable	Data unit	Data value	Comment
$A_{BSL,i}$	Area of baseline stratum $i$	ha	Refer to annex 3 and table C-2	GIS coordinates
$nTR_{j,I,t}$	Pre-project tree stand density of species $j$ in stratum $i$ , at time $t$	tree ha <sup>-1</sup>	Refer to annex 3 and table C-2	Field measurements (pre-project)
$V_{tree,j,I,t}$	Pre-project tree stem volume of stratum $i$ , species $j$ , at time $t$	m <sup>3</sup> ha <sup>-1</sup>	Refer to annex 3	estimated based on the basis of number of trees and national/local growth curve
$V_{l,j,I,sp,t}=f(DBH,H)$	Allometric equation for estimating stem volume of tree $l$ of species $j$ in plot $sp$ in stratum $i$ at time $t$	m <sup>3</sup> tree <sup>-1</sup>	Refer to Section E.4.1 here	From local forestry inventory manual or local yield table, Guangxi Institute of Forestry Inventory and Design
$BEF_{2,j}$	Biomass expansion factor for conversion of stem biomass to above-ground tree biomass for tree species $j$	dimensionless	Refer to table D-1 above	Institute of Forest Ecology, Environment and Protection, CAF, updated national and species-specific or group of species-specific values for on-going China's second National GHG Inventory in Forestry Sector, which is most priority in hierarchy of sources
$D_j$	Basic wood density for species $j$	t d.m. m <sup>-3</sup>	Refer to table D-1 above	Institute of Forest Ecology, Environment and Protection, CAF, updated national and species-specific or group of species-specific values for on-going China's second National GHG Inventory in Forestry Sector, which is most priority in hierarchy of sources
$R_j$	root-shoot ratio for	dimensionless	Refer to table D-1	Institute of Forest Ecology, Environment and Protection, CAF, updated national and



## CDM – Executive Board

**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

	<i>species j</i>		above	species-specific or group of species-specific values for on-going China's second National GHG Inventory in Forestry Sector, which is most priority in hierarchy of sources
<i>CF</i>	<i>Carbon fraction</i>	<i>t C t<sup>-1</sup> d.m.</i>	0.5	Default value mentioned in the hierarchy of sources
$\Delta C$	<i>Default annual increase in carbon stock in soil organic carbon</i>	<i>t C ha<sup>-1</sup> yr<sup>-1</sup></i>	0.5	Default as per the methodology
<i>t<sub>equilibrium</sub></i>	Time until a new equilibrium in carbon stock in soil organic matter is reached	<i>years</i>	20	Default as per the methodology

Data to be collected in order to monitor the verifiable changes in carbon stock in the carbon pools within the project boundary resulting from the proposed A/R CDM project activity

<b>ID number</b>	<b>Data variable</b>	<b>Data unit</b>	<b>Measured (m), calculated (c) estimated (e) or default (d)</b>	<b>Recording frequency</b>	<b>Number of sample plots at which the data will be monitored</b>	<b>Comment</b>
<i>A<sub>s</sub></i>	<i>Area of stratum</i>	<i>ha</i>	<i>m</i>	<i>At the time of site preparation</i>	field-based GPS measurements or GIS estimate	<i>If fire is used as part of site preparation the area burned shall be defined as a stratum, and all biomass in the stratum is considered to be burned)</i>
<i>B<sub>AB,tree</sub></i>	<i>Average</i>	<i>t d.m. ha<sup>-1</sup></i>	<i>e</i>	<i>Before</i>	<i>100% of</i>	<i>Estimated</i>



## CDM – Executive Board

**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

	<i>above-ground biomass stock of pre-project tree vegetation</i>			<i>project start date</i>	<i>area</i>	<i>based on pre-project sampling inventory</i>
$B_{AB,shrub}$	<i>Average above-ground biomass stock of pre-project shrub vegetation</i>	$t\ d.m.\ ha^{-1}$	$e$	<i>Before project start date</i>	<i>100% of area</i>	<i>Estimated based on pre-project sampling inventory</i>
$A_i$	<i>Area of stratum i</i>	<i>hectare</i>	$m$	<i>Before the start of the project and adjusted thereafter every 5-year</i>	<i>100%</i>	<i>Area of strata will be monitored using GIS</i>
$a_{i,sp}$	<i>Area of sampling frame for plot sp in stratum i</i>	$m^2$	$m$	<i>Once at the first monitoring and fix throughout crediting period</i>	<i>100%</i>	<i>Simple measurement of manufacturer's data</i>
$A_{sp_i}$	<i>Total area of all sample plots in stratum i</i>	<i>hectare</i>	$m$	<i>every 5-year</i>	<i>100%</i>	<i>Field measurement</i>
$DBH$	<i>Diameter at breast height of living trees</i>	$cm$	$m$	<i>5 years</i>	<i>100% trees in plots</i>	<i>Measuring at each monitoring time per sampling plot</i>
$H$	<i>Tree height</i>	$m$	$m$	<i>5 years</i>	<i>100% trees in plots</i>	<i>Measuring at each monitoring time per sampling plot</i>
$B_{fire}$	<i>Biomass loss due to forest fire</i>	$t\ d.m$	$m$	<i>5 years</i>	<i>100% project area</i>	<i>Measuring at each monitoring time</i>
<i>E.1.4.1.1</i>	<i>the access to land and carbon rights</i>			<i>annually</i>	<i>All land use contract</i>	<i>contracts between operating entities and</i>





## CDM – Executive Board

**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

						<i>villages/farmers</i>
--	--	--	--	--	--	-------------------------

**E.4.2. Data to be collected in order to monitor the GHG emissions by the sources, measured in units of CO<sub>2</sub> equivalent, that are increased as a result of the implementation of the proposed A/R CDM project activity within the project boundary:**

>> In terms of the approved methodology applied by the proposed A/R CDM project activity, the potential emission by sources is burning of woody biomass. However, there will be no biomass burning during the site preparation (See section A.5.4), and based on the “tool for estimation of emissions from clearing, burning and decay of existing vegetation due to implementation of an A/R CDM project activity (Version 03)”, there will be no GHG emissions from clearing, burning and decay of existing vegetation due to implementation of an A/R CDM project activity, i.e.,  $E_{\text{BiomassBurn},t} = 0$ , thus GHG emissions from slash and burn are zero. Therefore, the GHG emissions by sources within the project boundary will not be monitored.

Data to be collected in order to monitor the GHG emissions by the sources

ID number	Data variable	Data unit	Measured (m), calculated (c) estimated (e) or default (d)	Recording frequency	Number of sample plots at which the data will be monitored	Comment

**E.5. Leakage:**

>> As per the approved methodology applied, the potential sources of leakages in the proposed A/R CDM project activity is the displacement of grazing activity. although the leakage from the displacement of grazing is nil as elaborated in Section D-2, the leakage due to the displacement of grazing activity will be monitored following the “Tool for estimation of GHG emissions related to displacement of grazing activities in an A/R CDM project activity (Version 02)”.

**E.5.1. If applicable, please describe the data and information that will be collected in order to monitor leakage of the proposed A/R CDM project activity:**

>>

ID number	Data variable	Data unit	Measured (m), calculated (c) estimated (e) or default (d)	Recording frequency	Number of data points	Comment
$Area_{k,t}$	Area of	ha	m	Determined	100%	Measured



## CDM – Executive Board

**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

	<i>parcel k</i>			<i>at year of displacement</i>		<i>using GPS or GIS</i>
$Area_{forest,k,t}$	<i>Area of identified forest land deforested to feed animals displaced in year t</i>	<i>ha</i>	<i>m</i>	<i>Determined at year of displacement</i>	<i>100%</i>	<i>Measured using GPS or GIS</i>
$Area_{perennial,k,t}$	<i>Area of identified perennial cropland to which feed or animals are displaced in year t</i>	<i>ha</i>	<i>m</i>	<i>Determined at year of displacement</i>	<i>100%</i>	<i>Measured using GPS or GIS</i>
$B_{AB,k}$	<i>Above-ground woody biomass of forest land parcel k to which animals are displaced</i>	<i>t dm / ha</i>	<i>e</i>	<i>Determined at year of displacement</i>	<i>100%</i>	<i>estimated based on the IPCC GPG LULCF</i>
$B_{Deadwood,k}$	<i>Dead wood on forest land parcel k to which animals are displaced</i>	<i>t dm / ha</i>	<i>e</i>	<i>Determined at year of displacement</i>	<i>100%</i>	<i>estimated based on the IPCC GPG LULCF</i>
$B_{Litter,k}$	<i>Litter on forest land parcel k to which animals are displaced</i>	<i>t dm / ha</i>	<i>e</i>	<i>Determined at year of displacement</i>	<i>100%</i>	<i>estimated based on the IPCC GPG LULCF</i>
$B_{Perennial,k}$	<i>Above-ground biomass of perennial cropland parcel k to which animals are displaced</i>	<i>t dm / ha</i>	<i>e</i>	<i>Determined at year of displacement</i>	<i>100%</i>	<i>average values from the IPCC GPG LULCF</i>



## CDM – Executive Board

**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

$H_{existing,g,k,t}$	Number of head of animal type $g$ existing on parcel $k$ and/or being fed by fodder produced on parcel $k$ before displacement of animals in year $t$	head	$m$	Determined at year of displacement	100%	through animal census
$H_{g,k,t}$	Number of head of animal type $g$ displaced and/or the number of animals of type $g$ fed by fodder for which production is displaced to parcel $k$ in year $t$	head	$m$	Determined at year of displacement	100%	through animal census
$H_{Unidentified,g,t}$	Number of head of animals type $g$ that are displaced to unidentified lands in year $t$ and number of head of animals type $g$ that are fed by the fodder collected from unidentified lands in year $t$	head	$m$	Determined at year of displacement	100%	through animal census
$M_{ON-Displacement,o,t}$	Mass of increased organic fertilizer type	$t$	$m$	Determined at year of displacement	100%	Through purchase invoice



## CDM – Executive Board

**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

	<i>o applied in year t on all parcels to which grazing activities have been displaced since the start of the project activity</i>					
$M_{SN-Displacement,o,t}$	<i>Mass of increased synthetic fertilizer type m applied in year t on all parcels to which grazing activities have been displaced since the start of the project activity</i>	<i>t</i>	<i>m</i>	<i>Determined at year of displacement</i>	<i>100%</i>	<i>Through purchase invoice</i>
$NC_m$	<i>Nitrogen content of synthetic fertilizer m</i>	<i>t N / t fertilizer</i>	<i>e</i>	<i>Determined at year of displacement</i>	<i>100%</i>	<i>Factory data</i>
$NC_o$	<i>Nitrogen content of organic fertilizer o</i>	<i>t N / t fertilizer</i>	<i>e</i>	<i>Determined at year of displacement</i>	<i>100%</i>	<i>Factory data</i>
$R_{perennial,k}$	<i>Root-to-shoot ratio for biomass stock of perennial crop land parcel k to which animals are displaced</i>	<i>t d.m./t d.m.</i>	<i>e</i>	<i>Determined at year of displacement</i>	<i>100%</i>	<i>average values from the IPCC GPG LULUCF</i>

**E.5.2. Please specify the procedures for the periodic review of implementation of activities and measures to minimize leakage, if required by the selected approved methodology:**

**CDM – Executive Board**

**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

>> Following procedures for periodic review of the implementation of measures to minimize leakage will be conducted:

- a) Periodic review of illegal logging activities; in particular, those relevant to the implementation of the proposed A/R CDM project activity, based on relevant data of forest administration from local forestry sector;
- b) Periodic review of awareness training courses for forest protection and their effectiveness.

**E.6. Quality control (QC) and quality assurance (QA) procedures undertaken for data monitored not included in section E.1.2:**

See Section E.1.2 for the QA/QC procedures to be undertaken.

<b>Data (Indicate ID number )</b>	<b>Uncertainty level of data (High/Medium/Low)</b>	<b>Explain QA/QC procedures planned for these data, or why such procedures are not necessary.</b>
<i>Plot location (latitude /longitude)</i>	<i>low</i>	<i>Random plot verification using GPS to ensure the consistent measuring and monitoring of the carbon stock change over time</i>
<i>Tree species (j)</i>	<i>low</i>	<i>Random Verification over the project area to ensure the area of each tree species is correctly measured</i>
<i>Age of plantation</i>	<i>low</i>	<i>Random Verification over the project area to ensure the area in terms of plantation age is correctly measured</i>
<i>Diameter at breast height of living trees (DBH)</i>	<i>low</i>	<i>Random plot verification</i>
<i>Tree height</i>	<i>low</i>	<i>Random plot verification</i>
<i>boundary reconfirmation</i>	<i>low</i>	<i>GPS will be used for confirmation</i>
<i>Total project area</i>	<i>low</i>	<i>Project area will be estimated based on GPS boundary.</i>

**E.7. Please describe the operational and management structure(s) that the project operator will implement in order to monitor actual GHG removals by sinks and any leakage generated by the proposed A/R CDM project activity:**

>> The proposed A/R CDM project activity will be implemented under the following operational and management structure:

- The provincial and county Project Management Offices (PMOs) that have been established under the umbrella of the GIFDCP will be responsible for coordinating the project participants and providing technical services. This includes arranging training for the planting entities and farmers/communities involved, supervising the implementation of the proposed A/R CDM project activity, as well as organizing a technical support panel (TSP) to carry out the monitoring of the project implementation performance and impacts. This includes measuring and monitoring of the





## CDM – Executive Board

**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

actual GHG removals by sinks and any leakage generated by the proposed A/R CDM project activity. The relevant information and data will be documented and archived in the PMOs and project entities in both electronic and paper copy.

- The Guangxi Forestry Inventory and Planning Institute will take the lead for the measuring and monitoring of the actual GHG removals by sinks and any leakage generated by the proposed A/R CDM project activity. They will closely work with county PMOs and the project entities by providing technical guidance on the monitoring process, jointly carry out the field measurement and necessary surveys, as well as the data collection and analysis. The project entities will be responsible for the requested routine measurement, data collection and documentation filing according to the project monitoring plan.
- The Chinese Academy of Forestry (CAF) will provide technical consultation and training to provincial and county technicians and the project entity staff in the measuring and monitoring of the actual GHG removals by sinks and leakage generated by the proposed A/R CDM project activity. CAF will also verify field data and data entry and analysis, as well as provide guidance for drafting project monitoring report.
- The Guangxi Longlin Forestry Development Company as the Project Entity will be responsible for the implementation of project reforestation activities, forest management and maintenance, forest harvesting and regeneration, as well as the carbon credit trade process. The Entity will also be responsible for day to day project monitoring and providing training to local communities and farmers on plantation management technologies by closely working with county PMOs as well as TSP. In addition, the Entity will be responsible for drafting the project progress and monitoring reports under the guidance of county PMOs and expert teams.

**E.8. Name of person(s)/entity(ies) applying the monitoring plan:**

>> Name of person/entity applying the monitoring plan:

- Institute of Forest Ecology and Environment, the Chinese Academy of Forestry
  - Dr. Xiaoquan Zhang, [xiaoquan@caf.ac.cn](mailto:xiaoquan@caf.ac.cn)
- Guangxi Forestry Inventory and Design, P.R.China
  - Ms. Zhuping Mo, [mzp1968@163.com](mailto:mzp1968@163.com)
- World Bank Beijing Office
  - Ms Jin Liu, [Jliu@worldbank.org](mailto:Jliu@worldbank.org)

All persons/entity determining the monitoring plan are not the project participant listed in Annex 1.



**SECTION F. Environmental impacts of the proposed A/R CDM project activity:**

**F.1. Documentation on the analysis of the environmental impacts, including impacts on biodiversity and natural ecosystems, and impacts outside the project boundary of the proposed A/R CDM project activity:**

>> Through establishing 8,015 ha of forests on degraded land that suffer from severe soil erosion and human intervention, the proposed activities will increase the forest cover in project towns and township areas, and provide the following additional local environmental benefits.

● **Biodiversity conservation**

The project area is one of the critical areas of China's biodiversity conservation. In the project counties, there are two national nature reserves (Guangxi Cenwanglaoshan National Nature Reserve and Jinzhongshan National Nature Reserve), and one provincial nature reserve (Dahongbao Nature Reserve). The Cenwanglaoshan National Nature Reserve is situated in the border area of Tianlin and Linyun County, with a total area of 18,994 hectares. In the Reserve there are 2,319 species of plants belonging to 904 genera of 206 families, and 358 species of terrestrial vertebrate, of which 17 species of plants and 50 species of vertebrate are listed as national protected species, respectively. In Jinzhongshan National Nature Reserve there are 1,487 species of vascular plant, 347 species of fungi and 441 species of vertebrate, of which 11 species of plants and 52 species of vertebrates are listed as national protected species. Also, 89 species of vertebrate are listed as a provincial level protected species. Dahongbao Nature Reserve is located in Longlin County with a total area of 2,035 hectares. There are 748 species of vascular plants and 232 species of vertebrates in the Reserve, among which 8 species of plants and 30 species of vertebrates are listed as national level protected species. Since the project lands are distributed around, or fall between these nature reserves, the proposed A/R CDM project activity will provide significant positive biodiversity benefits by:

- Enhancing corridors and connectivity between forests, which will expand the habitat of wildlife or serve as a habitat suitable for movement between other habitats for wildlife. This will assist the biodiversity conservation benefits and facilitate gene flow by affording native species the opportunity to enhance the viability of the species' populations. For instance, *Pinus massoniana* will produce fruits/seeds, which serve as food for monkeys and other wildlife.
- Suppressing invasive weed (*Eupatorium* sp), which currently occupies some of the project lands, also preventing further invasion of the nature reserve.
- Providing fuelwood to the local communities, thus reducing the pressure of fuelwood collection in the nature reserves and thereby strengthening the biodiversity conservation.
- Generating increased income to local communities from the proposed A/R CDM project activity. This will reduce the tendency of local communities to degrade biodiversity through practices such as poaching and illegal logging and NTFP collection in the nature reserves.

● **Controlling soil erosion**

Due to the continued long-term deforestation, followed by subsequent agricultural cultivation, grazing, over collection of wood for fuel and frequent fire, most of the land is severely degraded and suffers from serious soil erosion that directly threaten nearby croplands and the waterways downstream (Table F-1). If the current situation remains, the lands will degrade further and the soil erosion will become increasingly severe. The forest restoration will assist the control of both soil and water erosion control in this area.

Table F-1 Soil erosion in the project counties



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

Counties	Land area (km <sup>2</sup> )	Area suffered from soil erosion		Average erosion modulus (t. km <sup>-2</sup> .yr <sup>-1</sup> )
		km <sup>2</sup>	% of land area	
Lingyun	2016.48	641.0	31.79	199
Tianlin	5168.68	239.4	4.63	420
Longlin	3273.84	789.5	24.11	1259

● **Other environmental services**

- Regulating hydrological flows which in turn alleviates drought risk and reduces flooding risks;
- Building and improving nutrient cycling within soil; and
- Contributing to local climate stabilization and improving local living conditions.

**Risk analysis and countermeasures:**

- **Monoculture:** Mitigation measures will be taken to reduce or avoid the potential negative impacts of planting pure eucalyptus. This includes limiting the size of the eucalyptus plantation to less than 16.2% of total project target, low planting density, and having mixed planting sites with local species interspersed in a mosaic layout and retaining the original vegetation in valleys.
- **Fire risk:** Burning in neighboring cropland brings the threat of fire to the forests. This can be alleviated by providing technical and awareness training to local farmers/communities, strengthening patrolling and monitoring, as well as building a fire-break belt and having mixed reforestation arrangements.
- **Site preparation:** The site preparation will disturb the vegetation and soil in the planting sites. The main technical measures taken to mitigate the impact is to plant the trees with a low density (1667-2500 trees per hectare), limited hole site preparation (40-50 cm in diameter or 0.126-0.2 m<sup>2</sup>), and retain the existing vegetation as much as possible. As a result, the surface area disturbed by site preparation is estimated to account for <5% of the total site surface. The hole will be dug along the contours of the site in a triangular form to reduce soil loss. Therefore, the site and soil preparation will have minor temporary negative impact on the original soil and vegetation.
- **Fertilization:** In the proposed A/R CDM project activity, fertilizer will be applied by dribbling rather than overall dispersing, so that the potential risk to soil and water pollution might caused by fertilization application can be mitigated.
- **Pesticide Application:** Improper pesticide application would be harmful to the natural environment, by polluting the soil, water and air, as well posing a threat to wildlife. However, under the proposed A/R CDM activity, environmentally friendly measures will be adopted such as mixed species arrangement, seed and seedling quarantine, as well as an integrated pest management (IPM) approach. In addition, biological measures to control pests and diseases will be adopted. Therefore, the use of pesticide will be limited. The Pest Management Plan has been developed for the umbrella GIFDCP and it will be used to guide the pest and disease prevention and control, as well as the pesticide application in case of an outbreak or infestation of pest/disease during the project implementation.



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

None of these risks and/or negative impacts are considered to be significant.

**F.2. If any negative impact is considered significant by the project participants or the host Party, a statement that project participants have undertaken an environmental impact assessment, in accordance with the procedures required by the host Party, including conclusions and all references to support documentation:**

>>The project counties had already been under the umbrella Guangxi Integrated Forestry Development and Conservation Project (GIFDCP) before the proposed A/R CDM project activity. The environment impact assessments (EIA) of the GIFDCP covered all project counties under the umbrella including the proposed project area has been approved by Guangxi Environment Agency. For the proposed AR CDM project activity, the Guangxi Environment Agency issued a ratification document after re-examination, which indicates that the project counties of the proposed AR CDM project are within the range of approved EIA issued for GIFDCP in 2005 and the implementation of the proposed AR CDM project would not impact the conclusion made by EIA for GIFDCP, i.e., no significant negative impacts have been identified due to the environmental-friendly techniques to be adopted in the proposed A/R CDM project activity, e.g., avoidance of slash and burn and overall tillage, suitable choice of tree species and their spatial arrangement, etc.

**F.3. Description of planned monitoring and remedial measures to address significant impacts referred to in section F.2. above:**

>>Even though no significant negative impact has been identified, an environmental impact assessment has been undertaken and an environment management plan has been developed under the umbrella GIFDCP to guide and monitor this project implementation. These documents are available to the DOE for inspection.

**SECTION G. Socio-economic impacts of the proposed A/R CDM project activity:**

&gt;&gt;

**G.1. Documentation on the analysis of the major socio-economic impacts, including impacts outside the project boundary of the proposed A/R CDM project activity:**

>> Agriculture is the main source of income for local communities in the project area. However, agricultural production is subjected to natural disasters such as droughts and floods. Food productivity is very low and the mean per capita annual income in the project areas is US\$ 231 in Longlin County, US\$ 255 in Tianlin County and US\$ 207 in Linyun County, respectively. The lowest per capita reported in the project area is US\$ 150 (see Table H-1). The very low per capita incomes highlight the chronic and extreme poverty in Guangxi.

To maximize the socio-economic benefit, the reforestation design was prepared with a participatory approach. PRA methods were adopted in interviewing and consulting with farmers' households in the project areas to understand the local farmers/communities' preferences and concerns so that the proposed A/R CDM project activity would better respond to their desires for livelihood development (see Section H below). Farmers exercised their preference in the choice of tree species and contractual production arrangements and shareholding arrangements between local farmers/communities and forestry company (see Section H.2). The local farmers will participate in the reforestation activities such as site preparation, planting, weeding, thinning, harvesting, etc. and will earn direct benefits during the crediting period. It is expected that 19,180 villagers from 74 villages of 28 towns/townships in the three project counties will benefit from the proposed project, around 86% of which are ethnic minorities (Table G-2). The main socio-economic benefits of the project are described below.

**(1) Income generation:** The total income to be created by the proposed A/R CDM project activity in the first crediting period is estimated at US\$ 57.08 million, including about US\$ 28.78 million from employment and labor input, US\$ 19.57million from sale of wood and non-wood products and US\$ 8.73 million from sale of CERs. The mean net annual income per capita will be increased by US\$ 151 or by 64%, compared to the year 2005 (Table G-3 below).





**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

Table G-1 Socio-economic profile in the project area

Town Townships Farm	Village Sub-farm	Area of projec t lands	Numbe r of village groups	Numbe r of house- holds	Population and number of labour				Mean area of croplan d per capita	Mean annua l food output per capita	Live- stock per capita	Mean annual net incom e per capita	Mean annual fuelwood consump- tion per capita
					Popula- tion	Popula- tion of ethnic minority	Labour	Labour finding job outside					
		ha							ha	Kg	Head	US\$	Kg
<b>Longlin County</b>	<b>Total</b>	<b>5748.0</b>	<b>632</b>	<b>18142</b>	<b>83819</b>	<b>67865</b>	<b>43314</b>	<b>8987</b>	<b>0.074</b>	<b>270</b>	<b>0.5</b>	<b>231</b>	<b>169</b>
Shali	Sub-total	180.9	31	838	4218	4218	1967	413	0.062	284	0.3	199	174
	Weigan	49.7	16	427	2010	2010	920	193	0.048	280	0.3		176
	WeiRao	131.2	15	411	2208	2208	1047	220	0.075	288	0.3		194
PingBan	Sub-total	100.4	83	1854	11732	10564	6520	1330	0.046	234	0.2	249	180
	WeiLong	24.9	13	292	1535	1434	1023	205	0.081	279	0.3		380
	GongHeC hang	42.6	15	389	2233	2233	1304	274	0.051	218	0.2		180
	BianYa	5.2	20	451	3412	2599	1679	336	0.03	184	0.1		498
	MinLe	13.2	14	351	2350	2096	1241	248	0.039	292	0.2	259	147
	MuGu	14.5	21	371	2202	2202	1273	267	0.051	233	0.2		152
LongHuo	Sub-total	82.1	20	578	2994	1279	1483	303	0.121	228	0.6	205	182
	WeiLing	26.8	11	316	1633	1007	885	177	0.09	236	0.9		387
	YuTang	55.3	9	262	1361	272	598	126	0.158	219	0.3		153
ZheBao	Sub-total	296.3	19	727	2746	2653	1717	360	0.058	196	0.3	221	177
	BanZhiHu an	250.7	9	286	1145	1052	601	126	0.054	169	0.3		168
	TongLiu	45.6	10	441	1601	1601	1116	234	0.061	216	0.3		185



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

ZheLang	ZheYan	52.6	10	297	1169	967	402	84	0.037	187	0.2	208	184
GeBu	Sub-total	368.8	42	1772	5858	5514	2876	594	0.116	310	0.3	226	185
	ZheJiang	43	12	365	984	984	443	93	0.242	347	0.4		175
	ZheYan	67.6	11	510	1680	1680	1011	212	0.143	317	0.3		184
	HongYan	189.4	9	560	2204	1860	940	188	0.056	315	0.2		508
	ZuoTeng	68.8	10	337	990	990	482	101	0.077	254	0.4		193
De'e	Sub-total	576.9	85	2092	9576	9223	5895	1221	0.079	286	0.7	173	190
	BaKe	42.3	23	629	2758	2882	1839	368	0.073	307	1.6		539
	YanTou	18.2	10	308	1237	1011	817	172	0.061	250	0.4		186
	JinPing	57.3	9	282	1287	1287	404	85	0.102	305	0.4		177
	ShuiJing	290.1	20	411	2409	2409	1485	312	0.075	270	0.3		190
	LongYing	169	23	462	1885	1634	1350	284	0.088	288	0.4		208
Zhuchang	Sub-total	344.9	29	957	4702	4454	2272	477	0.086	361	0.6	221	174
	NaYan	116	18	548	2848	2756	1458	306	0.078	325	0.5		156
	YangJie	228.9	11	409	1854	1698	814	171	0.099	416	0.6		172
SheChang	Sub-total	819.3	50	1614	7942	5375	3523	739	0.081	310	0.7	243	178
	LeXiang	305.8	13	390	1837	1249	572	120	0.087	301	0.8		168
	Machang	126.1	11	413	2004	1402	1005	211	0.063	331	0.8		189
	XinLi	266	14	423	2146	1395	821	172	0.095	315	0.7		152
	XinMin	121.4	12	388	1955	1329	1125	236	0.079	293	0.7		187
KeChang	Sub-total	1496.5	119	3252	15379	10861	9205	1934	0.065	258	0.4	225	183
	DaQing	450.1	15	371	1688	1203	674	142	0.073	271	0.4		157
	HaiChang	87.6	22	892	3832	2568	2610	548	0.051	177	0.4		146
	HePing	408.8	12	302	1467	852	933	196	0.061	255	0.4		192
	HouChang	193.5	19	542	2671	1826	990	208	0.056	238	0.3		169



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

	XinHe	79.9	23	350	1824	1243	1280	269	0.061	377	0.3		180
	XinHua	235.3	20	538	2679	1987	1932	406	0.09	248	0.3		210
	KeNiang	41.3	8	257	1218	1182	786	165	0.075	384	0.4		221
YanCha	Sub-total	390	77	2254	9523	7669	4092	836	0.075	261	0.6	239	358
	LengDu	200.1	11	546	2481	2084	1040	218	0.064	164	0.2		225
	PingBan	12	24	744	2892	2904	1362	272	0.081	255	0.4		515
	LongTai	32.1	25	438	1836	1247	891	178	0.06	381	2.1		477
	PingTai	145.8	17	526	2314	1434	799	168	0.089	276	0.2		213
JieTing	Sub-total	286.2	48	1323	5545	3282	2403	499	0.078	265	0.4	201	178
	NongXi	82.4	15	359	1490	872	542	108	0.093	224	0.7		482
	NaDa	101.1	23	678	2798	1594	1134	238	0.061	239	0.2		178
	NaSang	102.7	10	286	1257	816	727	153	0.102	259	0.3		167
XinZhou	Sub-total	55.3	17	521	2177	1806	959	197	0.092	285	0.3	307	165
	PoYan	15.9	7	201	772	778	422	84	0.107	260	0.7		15
	NongSang	39.4	10	320	1405	1028	537	113	0.084	299	0.1		165
JinZhong Shan Forest Farm	Sub-total	697.8	2	63	258							1077	
	WuChong Sub-farm	636.1	1	46	210								
	MaLan Sub-farm	61.7	1	17	48								
<b>TianLin County</b>	<b>Total</b>	<b>2411.5</b>	<b>218</b>	<b>7047</b>	<b>31193</b>	<b>26454</b>	<b>18273</b>	<b>1945</b>	<b>0.119</b>	<b>379</b>	<b>1</b>	<b>255</b>	<b>1410</b>
JiuZhou	Sub-total	501.8	33	1058	4506	4115	2629	311	0.124	395	1	262	1418
	PingLin	241.8	13	382	1571	1244	802	60	0.089	358	0.7		1532
	YangBai	37.4	7	209	846	823	460	61	0.148	573	1.8		1556



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

	GuangLong	163	4	175	783	761	410	20	0.128	454	0.8		1408
	ZheNian	59.6	9	292	1306	1287	957	170	0.147	404	0.5		1409
BaiLe	Sub-total	246.8	22	711	3076	2682	2020	180	0.174	639	1.2	249	1402
	GenBiao	182.1	8	303	1294	1136	859	53	0.199	855	0.4		1425
	BaiLe	64.7	14	408	1782	1546	1161	127	0.155	815	1		1442
LiuLong	Sub-total	96.5	16	512	2212	2145	1583	113	0.121	362	1.5	253	1442
	ZhouMa	34	10	250	1106	1058	837	28	0.13	301	0.7		1424
	LieTun	62.5	6	262	1106	1087	746	85	0.112	537	2		1492
LangPing	Sub-total	355.6	24	517	2371	951	1097	85	0.128	346	0.7	258	1487
	HongXing	197.9	15	328	1443	68	629	40	0.172	430	0.7		1432
	XiangWei	157.7	9	189	928	883	468	45	0.06	275	0.5		1450
ZheMiao	BaiLong	103.9	5	428	1995	1961	1597	140	0.091	280	1	174	1350
GaoLong	ZheChe	159.8	6	216	971	936	604	20	0.251	633	0.8	272	1430
YangYa	BanYang	204.1	3	58	112	87	70	20				150	
Ding'an	Sub-total	156.8	57	1537	6755	5324	3915	821	0.088	435	1.5	265	1401
	ChangJing	30.3	10	213	941	401	564	64	0.111	363	1.9		1426
	NaMen	60.8	17	418	1897	1646	1140	434	0.097	394	1.3		1388
	Ding'an	21.3	17	639	2699	2380	1331	229	0.072	417	0.1		1390
	YangRong	44.4	13	267	1218	897	880	94	0.089	385	0.3		1455
NaBi	NaLa	111.5	12	343	1694	1654	902	30	0.177	380	1.3	247	1276
LiZhou	Sub-total	357.2	24	679	3165	2475	1527	126	0.073	324	0.4	261	1352
	FanChang	160.9	17	451	2172	2152	1040	97	0.061	292	0.4		1308
	NangLao	196.3	7	228	993	323	487	29	0.1	394	0.5		1447
LuCheng	Sub-total	117.5	16	988	4336	4124	2329	99	0.116	366	1	268	1431



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

	NaMa	93.6	9	428	1929	1797	916	49	0.133	398	0.6		1397
	YingPan	23.9	7	560	2407	2327	1413	50	0.103	368	0.8		1465
<b>Linyun County</b>	<b>Total</b>	<b>511.8</b>	<b>57</b>	<b>1517</b>	<b>6691</b>	<b>1972</b>	<b>3909</b>	<b>806</b>	<b>0.046</b>	<b>193</b>	<b>0.5</b>	<b>207</b>	<b>930</b>
SiCheng	LongZhao	34.4	15	323	1393	682	755	150	0.044	214	0.7	166	104
JiuJiang Forestry Farm	Sub-total	382.5		76	293	36	215	9				1279	
	ShangMeng	14		2	7	2	4						
	YangNang	46.4		4	15	3	10						
	YaoMa	176.5		47	184	19	142	6					
	LanTai	145.6		23	87	12	59	3					
JiaYou	Sub-total	94.9	42	1118	5005	1254	2939	647	0.05	198	0.5	156	953
	MoXian	85	28	731	3184	1250	1893	380	0.045	164	0.4		1033
	DongHa	9.9	14	387	1821	4	1046	267	0.057	258	0.55		867





**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

Table G-2 Number of beneficiaries for different ethnic minorities

Counties	Towns/ townships/ Forestry Farms	Number of villages that benefit	Number of Beneficiaries	Number of beneficiaries of ethnic minorities					
				Zhuang	Yao	Miao	Yi	Buyi	Total
<b>Total</b>	<b>28</b>	<b>74</b>	<b>19180</b>	<b>10274</b>	<b>956</b>	<b>4364</b>	<b>481</b>	<b>420</b>	<b>16495</b>
<b>Longlin County</b>	<b>14</b>	<b>45</b>	<b>11951</b>	<b>5458</b>	<b>0</b>	<b>4364</b>	<b>231</b>	<b>0</b>	<b>10053</b>
	Shali	2	650	650					650
	Pingban	5	1623	1623					1623
	Longhuo	2	118			37			37
	Zhebao	2	1276	1276					1276
	Zhelang	1	179	179					179
	Gebu	4	154	154					154
	De'e	5	981	47		703	231		981
	Zhuchang	2	772	182		590			772
	Shechang	4	1957			1441			1441
	Kechang	7	3043	913		1418			2331
	Yancha	4	537	434		103			537
	Jieting	3	295						0
	Xin Zhou	2	72			72			72
	Jinzhong shan Forest Farm	2	294						0
<b>Tianlin</b>	<b>11</b>	<b>22</b>	<b>6702</b>	<b>4783</b>	<b>949</b>	<b>0</b>	<b>250</b>	<b>420</b>	<b>6402</b>
	Jiuzhou	4	1015	1015					1015
	Baile	2	1425	1005				420	1425
	Liulong	2	125	125					125
	Langping	2	470	100	70				170
	Zhemiao	1	720	720					720
	Gaolong	1	472	278	194				472
	Yangya	1	112	112					112
	Ding'an	4	763	513			250		763
	Nabi	1	150	150					150
	Lizhou	2	975	290	685				975
	Lucheng	2	475	475					475
<b>Linyun</b>	<b>3</b>	<b>7</b>	<b>527</b>	<b>33</b>	<b>7</b>				<b>40</b>



## CDM – Executive Board

**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

	Sicheng	1	147						0
	Jiujiang Forestry Farm	4	293	33	3				36
	Jiayou	2	87		4				4



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

Table G-3 Income generated by the proposed A/R CDM project activity

Counties	Town Townships Farm	Number of villages benefit	Number of beneficiaries	Net income (1000 US\$)				Increase d annual income	Increase d annual income per capita	Mean annual net income per capita in 2005	Percentage of increased annual net income
				Labour	Timber and Non-wood product	Carbon credit	total	1000 US\$	US\$	US\$	%
<b>Total</b>	<b>28</b>	<b>74</b>	<b>19180</b>	<b>28784</b>	<b>19570</b>	<b>8731</b>	<b>57085</b>	<b>2854</b>	<b>151</b>	<b>235</b>	<b>64</b>
<b>Longlin County</b>	<b>14</b>	<b>45</b>	<b>11951</b>	<b>11698</b>	<b>8885</b>	<b>4099</b>	<b>24681</b>	<b>1234</b>	<b>103</b>	<b>231</b>	<b>45</b>
	Shali	2	650	1129	470	336	1935	97	149	199	75
	Pingban	5	1623	359	231	102	692	35	21	249	9
	Longhuo	2	118	129	57	49	235	12	99	205	48
	Zhebao	2	1276	1648	788	464	2900	145	114	221	51
	Zhelang	1	179	97	98	31	227	11	63	208	30
	Gebu	4	154	954	262	377	1593	80	517	226	229
	De'e	5	981	642	-311	532	863	43	44	173	25
	Zhuchang	2	772	640	498	236	1374	69	89	221	40
	Shechang	4	1957	1485	1391	488	3365	168	86	243	35
	Kechang	7	3043	2737	2638	892	6267	313	103	225	46
	Yancha	4	537	991	1328	414	2734	137	255	239	107



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

	Jieting	3	295	603	696	220	1520	76	258	201	128
	Xinzhou	2	72	46	-93	52	4	0	3	307	1
	Jinzhong shan Forest Farm	2	294	2765	1883	657	5305	265	902	1077	84
<b>TianLin County</b>	<b>11</b>	<b>22</b>	<b>6702</b>	<b>12939</b>	<b>7798</b>	<b>3330</b>	<b>24066</b>	<b>1203</b>	<b>189</b>	<b>255</b>	<b>74</b>
	Jiuzhou	4	1015	2877	1575	775	5228	261	258	262	98
	Baile	2	1425	1362	831	349	2542	127	89	249	36
	Liulong	2	125	602	251	179	1032	52	413	253	163
	Langping	2	470	2017	1140	536	3693	185	393	258	152
	Zhemiao	1	720	648	270	193	1111	56	139	174	80
	Gaolong	1	472	792	634	171	1597	80	169	272	62
	Yangya	1	112	1012	809	218	2040	102	911	150	607
	Ding'an	4	763	777	622	168	1567	78	103	265	39
	Nabi	1	150	696	290	207	1193	60	398	247	161
	Lizhou	2	975	1489	993	348	2830	141	145	261	56
	Lucheng	2	475	666	383	186	1235	62	130	262	50
<b>Linyun County</b>	<b>3</b>	<b>7</b>	<b>527</b>	<b>1621</b>	<b>1835</b>	<b>550</b>	<b>4006</b>	<b>200</b>	<b>380</b>	<b>207</b>	<b>184</b>
	Sicheng	1	147	171	136	37	344	17	117	166	71
	Jiujiang Forestry Farm	4	293	980	1322	412	2714	136	463	1279	36
	Jiayou	2	87	471	376	101	948	47	545	156	349



**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

(2) **Creating employment:** The proposed A/R CDM project activity will create about 4.65 million person-days of temporary employment opportunities from planting, weeding, harvesting and resin collection. It will also create 48 long-term job positions for plantation maintenance and management during the crediting period (Table G-4). Most employment opportunities will be taken by the local farmers/communities involved in the proposed A/R CDM project activity and others whose lands do not fall within the project boundary.

Table G-4 Employment created by project activities

Counties	Towns/ Townships /Farm	Number of villages benefit	Number of beneficiaries	Temporary (days)					Long-term position
				Planting	Weeding & tending	Harvesting	Resin collecting	Total	
<b>Total</b>	<b>28</b>	<b>74</b>	<b>19,180</b>	<b>707201</b>	<b>907417</b>	<b>2423864</b>	<b>1028306</b>	<b>5066788</b>	<b>48</b>
<b>Longlin County</b>	<b>14</b>	<b>45</b>	<b>11,951</b>	<b>308521</b>	<b>417609</b>	<b>917344</b>	<b>357654</b>	<b>2001128</b>	<b>33</b>
	Shali	2	650	36904	47961	118887	0	203751	1
	Pingban	5	1,623	9403	12646	31358	10104	63512	1
	Longhuo	2	118	4762	6930	9561	0	21253	1
	Zhebao	2	1,276	46074	59360	155534	35419	296387	2
	Zhelang	1	179	3051	4596	8771	0	16418	
	Gebu	4	154	19754	23403	50103	72078	165338	3
	De'e	5	981	30623	39252	30932	0	100807	3
	Zhuchang	2	772	19625	28377	51702	8025	107728	2
	Shechang	4	1,957	47519	71246	130858	0	249623	4
	Kechang	7	3,043	86797	130381	243181	0	460359	8
	Yancha	4	537	26778	26138	118570	0	171487	2
	Jieting	3	295	17729	22850	62270	0	102849	2
	Xin Zhou	2	72	2922	3564	202	0	6688	
	Jinzhongshan Forest Farm	2	294	39200	48280	171578	232028	491087	4
<b>TianLin County</b>	<b>11</b>	<b>22</b>	<b>6,702</b>	<b>282169</b>	<b>349599</b>	<b>1081417</b>	<b>611697</b>	<b>2324881</b>	<b>12</b>
	Jiuzhou	4	1,015	73430	91903	262344	90371	518048	2
	Baile	2	1,425	30126	36687	115072	63150	245036	1
	Liulong	2	125	19686	25585	63419	0	108690	
	Langping	2	470	49518	61548	180042	71905	363013	2
	Zhemiao	1	720	21196	27546	68283	0	117025	



## CDM – Executive Board

**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

	Gaolong	1	472	9268	9200	50649	72862	141980	1
	Yangya	1	112	11838	11751	64690	93061	181340	1
	Ding'an	4	763	9094	9028	49698	71494	139314	1
	Nabi	1	150	22746	29561	73277	0	125585	1
	Lizhou	2	975	20003	24084	90572	130295	264954	2
	Lucheng	2	475	15263	22705	63372	18558	119898	1
Linyun County	<b>3</b>	<b>7</b>	<b>527</b>	<b>33892</b>	<b>32833</b>	<b>158939</b>	<b>58956</b>	<b>284619</b>	<b>3</b>
	Sicheng	1	147	1995	1981	10903	15685	30564	
	Jiujiang Forestry Farm	4							
			293	26393	25388	117957	0	169738	2
	Jiayou	2	87	5504	5464	30079	43271	84317	1

**(3) Sustainable fuel wood supply:** The local communities depend on fuel from wood for a living to a certain extent, especially the minority villagers. Most of the fuelwood currently collected from the project area is either shrub or herbaceous plants. The proposed A/R CDM activity will provide more sustainable fuel sources for local farmers

**(4) Strengthening social cohesion:** Individual farmer households/communities are unable to successfully undertake the process from investment, through production and to market especially for the timber and non-wood forest products which take much longer to materialize than food production. In addition, the lack of organizational instruments also prevents them from overcoming technological barriers. Overall, the proposed A/R CDM project activity will allow close interaction between individuals, communities, the forestry farms and local government, by having intensified communication among them and providing support networks for social and productive services. Again, this will be especially helpful to ethnic minorities.

**(5) Technical training and demonstration:** Interviews with local communities indicated that local farmers/communities are usually short of access to quality seed sources and lack the skills to produce high quality seedlings. They also lack the skill and experience to successfully undertake tree planting, and prevent planted trees from being damaged by fire, pest and disease. This is one of the significant barriers to local communities in attempting to plant trees on their lands. In the proposed A/R CDM project activity, the local forestry agencies as well as farms, will organize training for local communities to assist them in understanding and evaluating the issues of hosting the proposed A/R CDM project activity, both on-site and off-site, which mainly include seed and seedling selection, nursery management, site preparation, planting and pest management.

#### Potential socio-economic risks and countermeasures

##### (1) Cultural Resources

No cultural relics and/or cultural reserves have been identified in the project area, and consequently, no damage to non-replicable cultural property will occur under the proposed A/R CDM project activity. Meanwhile, the project does not involve any sites for local social gatherings or other spiritual activities,





**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

thus the project activities will not have an impact on the normal local gatherings and religious activities.

**(2) Ethnic Minority Groups**

There are 5 ethnic minority groups involved in the proposed A/R CDM project activities. According to the social assessment report done by the social assessment team, the ethnic minority groups will have equal rights to access the development opportunities. A Multi-Ethnic Minority Development Plan (EMDP) has been developed to address all the concerns and issues specific to these ethnic groups for the umbrella GIFDCP. This plan will be applied to the project to indicate the ways that the proposed A/R CDM project activity can be designed compatibly with ethnic minorities' cultures.

**(3) Economic risk**

The potential economic risks will be poor management of the plantations established under the project, such as lack of pest and fire control, which would contribute to the project's failure and farmers' loss. This risk will be mitigated by having local forestry agencies, forestry research and design institutions, as well as the extension network of the forestry sector, to provide technical assistance and training to farmers and communities to build up their capacity in implementing the project effectively. Forestry farms and companies are experienced in reforestation and watershed management, and they will also provide the technical assistance to the farmers/communities.

**G.2. If any negative impact is considered significant by the project participants or the host Party, a statement that project participants have undertaken a socio-economic impact assessment, in accordance with the procedures required by the host Party, including conclusions and all references to supporting documentation:**

>> Because the proposed A/R CDM project activity has applied PRA method in the project design, which ensures the project activity can reflect the needs and wishes of the local farmers, and the project will generate social benefits, as mentioned above, to local communities, there is no negative socio-economic impact that is considered significant by the project participants or the host party.

**G.3. Description of planned monitoring and remedial measures to address significant impacts referred to in section G.2 above:**

>>N/A

**SECTION H. Stakeholders' comments:****H.1. Brief description of how comments by local stakeholders have been invited and compiled:**

>> Comments by stakeholders have been invited through Participatory Rural Assessment in July 2007. Around 400 households from selected 26 villages, 15 townships were interviewed in the project counties, which account for 11.5%, 35.1% and 53.6% of total project households, villages and townships respectively. In addition, the stakeholder comments were collected using questionnaires from 480 farmers and other stakeholders. The steps followed in the PRA process are outlined below.

- **Establishing PRA team:** The teams were set to conduct the PRA, which consists of social experts, local government officials, technical staff from county forestry bureaus and township forestry stations, as well as the farmer representatives.
- **Distribution of project information.** A project leaflet was prepared with a brief introduction to the project objectives, activities, benefits and risks, as well as the details of CDM A/R project activities. The leaflet was distributed to the proposed project communities before the PRA process, and was explained by the PRA team.
- **Village meeting.** To acquire comprehensive information regarding the historic and current situation and existing problems in local communities, as well as to understand the needs and wishes of local farmers. A meeting of farmer representatives was held in each selected village. The PRA team also used this chance to introduce the project objectives and specific CDM A/R project requests, as well as collect the feedback from the farmers on the project design. Around 5-10 farmers' representatives from each village have been selected by villagers in the village meeting to participate and assist the survey.

To better use the village meeting, group interviews were also conducted. The PRA team interviewed village leaders, senior villagers, representatives of ethnic minorities group, representatives of women, farmer households. Around 15 households were interviewed in each selected village.

- **Questionnaire.** Questionnaire forms were developed and distributed among different stakeholders, including farmer households, village committees, forest farms, township governments, local forest stations and forestry bureaus and nature reserves. The questionnaires covered information and feedback on: the local socio-economic profiles, land use, land tenure and land management, farmer income and sources, farmers' preference in tree species selection and production arrangements, technical and financial barriers in afforestation practice and etc..



**H.2. Summary of the comments received:**

>> Comments from local farmers, villages and farms, etc. are summarized as follow:

**1. Primary stakeholders****(1) Farmers/communities**

Local farmers/communities expressed their strong interest in participating in the proposed A/R CDM project activity because they thought that their participation would bring the following benefits:

- ✓ Income generation by selling wood and non-wood products;
- ✓ Income generation by selling carbon credits;
- ✓ Income generation from increased employment: Local farmers can get additional income by participating in the site preparation, planting and forest management practice.
- ✓ Employment opportunities, especially being able to work locally which would mean that they could tend their cropland at the same time.
- ✓ Rejuvenating their grasslands and barren lands would improve the local environment, shelter cropland and reduce the incidence and severity of drought, flood and other natural disasters.
- ✓ Learning good practices for tree planting and forest management from technical training.

The PRA survey indicates that the project lands have been non-forested since at least the 1990s. All farmer households were willing to participate in the proposed A/R CDM project activity. Most households interviewed prefer to cooperate with the forest farm by contractual arrangements rather than to simply lease lands to the forestry farm. Local farmers/communities indicated that without the proposed A/R CDM project activity it would be impossible for them to plant trees on the project area due to the large pre-investment, lack of technical knowledge, organizational barriers and low economic return in terms of the degraded, remote lands.

During the PRA process, the preference assessment on tree species also indicates that local farmers and communities favor tree species that grow quickly and have a readily available market, such as *Eucalyptus* sp, *Pinus massoniana*, *Schima* sp., *Cunninghamia lanceolata*, *Liquidambar formosana*, *Betula* sp. and bamboo, etc.

**(2) Local Forestry Farms/companies**

The forestry farms that mainly focus on reforestation and forest management are very interested in participating in the proposed A/R CDM project activity. They would like to invest in the reforestation because:

- ✓ In addition to income from timber and non-wood products, they could receive income from the sale of CERs that have no market risk, and result to increase economic return rate.
- ✓ The commercial loan and government counterpart funding can alleviate the pre-investment financial pressure. Without the proposed A/R CDM project activity such loans are difficult to obtain for remote, degraded lands and co-funding would be unavailable.



**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

- ✓ Without the proposed A/R CDM project activity, they would be unwilling to invest in the reforestation on both the communities' lands and their own lands due to the unacceptably low economic revenues.

With regard to the financing arrangements, the forestry farms prefer to rent lands from local farmers/communities and pay labor costs in addition to land lease costs. However, they are also willing to accept the share holder arrangements, as promoted by the project.

## **2. Secondary stakeholders**

**(1) Local forestry departments:** Guangxi Forestry Department and County Forestry Bureaus as well as local forestry stations consider that the proposed A/R CDM project activity will increase the forest resources, improve the local environment, enhance biodiversity conservation and increase the income of local farmers and communities. They would provide technical training and consultation to farmers/communities and planting entities, and supervise the implementation of the proposed A/R CDM project activity.

**(2) Local Governments:** County and township governments all consider that the proposed A/R CDM project activity can improve the local economy and alleviate poverty to local communities, especially for the ethnic minority group, and at the same time benefit global climate change mitigation and biodiversity conservation as well as improve soil erosion control.

**(3) Nature Reserves:** The reserves around the project area believe that the proposed A/R CDM project activity will benefit biodiversity conservation by suppressing invasive pests and plants, establishing a buffer zone on the perimeter of the reserve, enhancing forest connectivity, and reducing pressure on the natural resources by providing sustainable wood for fuel to the local communities. The reserves also suggested to use native species as much as possible, establish mixed forests to avoid monoculture, conservatively use pesticide and herbicide, and avoid site burning and overall tillage.

### **H.3. Report on how due account was taken of any comments received:**

>> The comments received from the PRA survey were fully taken into account as follows:

- ✓ Participation of local farmers/communities and farms/companies is on a voluntarily basis.
- ✓ Choice of shareholding arrangements for reforestation activities was based on the preference of local farmers/communities.
- ✓ Preferences of local farmers/communities were taken into account in the selection of tree species;
- ✓ Most tree species used are locally native and a mixed arrangement of species will be used. For eucalyptus, small patches will be planted rather than a large area of pure eucalyptus plantation;
- ✓ Fertilizers will be applied through dribbling rather than overall dispersion to minimize its environmental impact;
- ✓ Use of chemical pesticides will be limited. Instead, the diseases and pests will be mainly controlled by mixed tree species arrangement and other biological measures;
- ✓ No herbicide will be applied. Weeds will be slashed manually;
- ✓ Slash and burn site preparation will not be used.



**Annex 1**

CONTACT INFORMATION ON PARTICIPANTS IN THE PROPOSED A/R CDM PROJECT  
ACTIVITY

Organization:	Guangxi Longlin Forestry Development Company Ltd.
Street/P.O.Box:	No 629, Yingbing Road, Xinzhou Town, Longlin County
Building:	
City:	Baise City
State/Region:	Guangxi Zhuang Autonomous Region
Postfix/ZIP:	533400
Country:	P.R. China
Telephone:	+86 776-8206853 +86 776-8203355
FAX:	+86 776-8206853
E-Mail:	<a href="mailto:lllygs@163.com">lllygs@163.com</a>
URL:	
Represented by:	Li Zhi Shuang
Title:	Director
Salutation:	Mr.
Last Name:	Li
Middle Name:	
First Name:	Zhi Shuang
Department:	
Mobile:	+86 13877670347
Direct FAX:	+86 776-8202187
Direct tel:	+86 776-8203358
Personal E-Mail:	<a href="mailto:Shuang6388@163.com">Shuang6388@163.com</a>

Organization:	International Bank for Reconstruction and Development (IBRD) as Trustee of the BioCarbon Fund
Street/P.O.Box:	1818 H Street, NW, District of Columbia
Building:	
City:	Washington DC
State/Region:	
Postfix/ZIP:	20433
Country:	USA
Telephone:	1202 473 9189
FAX:	1202 522 7432
E-Mail:	<a href="mailto:IBRD-carbonfinance@worldbank.org">IBRD-carbonfinance@worldbank.org</a>
URL:	<a href="http://www.carbonfinance.org">www.carbonfinance.org</a>
Represented by:	Ms. Joëlle Chassard
Title:	Manager Carbon Finance Unit
Salutation:	Ms.



## CDM – Executive Board

**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

Last Name:	Chassard
Middle Name:	
First Name:	Joëlle
Department:	ENVCF
Mobile:	
Direct FAX:	1202 522 7432
Direct tel:	1202 458 1873
Personal E-Mail:	Jchassard@worldbank.org

Organization:	Kingdom of Spain - Ministry of Environment and Rural and Marine Affairs
Street/P.O.Box:	C/Alcalá 92, 28009
Building:	
City:	Madrid
State/Region:	
Postfix/ZIP:	28009
Country:	Spain
Telephone:	+34 91-4361549
FAX:	+34 91-4361501
E-Mail:	and@mma.es
URL:	
Represented by:	
Title:	General Secretary
Salutation:	
Last Name:	MONTALVO
Middle Name:	
First Name:	Alicia
Department:	Spanish Office of Climate Change (OECC)
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	and@mma.es





**Annex 2**

**INFORMATION REGARDING PUBLIC FUNDING**

There is no available public funding that will result in a diversion of official development assistance and financial obligations of any Parties under UNFCCC.

**Annex 3****BASELINE INFORMATION**

The baseline survey was conducted in the summer and autumn 2007. Its purpose is to provide information on the project boundary, site assessment and tree species (models) selection, land eligibility, baseline stratification, determination of baseline scenario and the ex ante estimation of baseline net removals by sinks and leakage. The survey includes:

- Selection of eligible lands and delineation of project boundary;
- Biodiversity survey
- Causes of deforestation, current land use and intervention
- Current vegetation and baseline stratification
- Investigation, classification and assessment of site conditions
- Pre-project carbon stock in living biomass and natural regeneration of trees
- Grazing activity within and outside the project boundary.
- Stakeholder consultation and social-economic data collection

For the purpose of the baseline survey, operation procedure has been developed based on required information of the approved methodology (AR-ACM0001/version 03) applied and CCB (Climate, Community, Biodiversity) standard. The baseline survey was conducted in combination with PRA socio-economic survey so that some vital information can be shared and verified. The methods and results are summarized below.

**1. Determination of eligible lands and Delineation of the project boundary**

The eligible lands have been determined based on land use/cover maps derived from forestry inventory with a interval of 10 years, on-site survey and checking and interviewing of local communities. Specifically, the land use/cover maps derived from forestry inventory respectively in 1989 and 1999 have been overlapped to identify non-forested lands at the two time points. Then, an on-site survey was conducted to confirm the current non-forested nature of the lands and delineate the project boundary on 1:10,000 landform maps. Furthermore, local farmers as well as staff from forestry farms were interviewed concerning the historical land use/cover and important events that have driven the land use/cover changes. Through these methods it is confirmed that all lands to be planted in the proposed A/R CDM project activity were forested land in the 1950s-1960s, but became non-forested before 1990. Finally, the project boundary has been input on GIS along the eligible boundary of each parcel of lands. See Fig.A-1 to Fig.A-14.

**2. Driving force of deforestation, current land use and intervention**

Collected information demonstrates that the lands to be reforested were forested lands in the 1950s-1960s. However, these forests were gradually destroyed primarily due to policy-induced events from the 1950s to the 1970s. The first event was the Great Leap Forward campaign followed by the Steel and Iron campaign in the late 1950s. Large areas of forest were harvested for steel and iron production. The second event was the Cultural Revolution campaign from 1966 to 1976. During that period many of the remaining secondary forests were continuously deforested and cultivated, as well as burnt. Due to these events, most lands had become non-forest lands by the 1980s. Over last decades, human intervention has

being continued. As a result, currently land to be planted in the proposed A/R CDM project activity are degraded, barren lands covered by shrub and grass, including invasive weed, *Eupatorium adenophorum*). These lands also suffer from severe soil erosion. More specifically, the human intervention include:

- Frequent fire: Local people have not acquired awareness of fire control due to familiarity only with non-forested, barren land. Consequently fire is often unintentionally caused by human activities (such as smoking, prescribed burning of cropland residue or burning during agricultural cultivation of the barren lands). Also, local people sometimes intentionally burn barren land to encourage growth of better vegetation for livestock.



- Within the project boundary, 7103.5 ha of lands are defined by local governments as being for forestry purposes, and the other 1567.8 ha are undefined in terms of legal land use. Agricultural cultivation, either on lands which do not have a land use defined, or on forestry lands, are considered basically not allowable as local government regards this as a major cause of soil erosion. There are also grazing activities on 485 ha of the lands. However, 475 ha of these land are defined as being for forestry purposes, which means that the majority of these grazing activities are legally not allowable. Nevertheless, grazing and agricultural cultivation in some project areas have not effectively ceased, and local government does not take strict measures to stop these activities, especially when they provide vital income for local people who live in poverty in deep mountainous areas (see Table Annex 3-1 for details), because the local government is unable to help local farmers funding the alternative income generation activities to change those unsustainable land use approach.



- Biomass collecting for fuel: Due to poverty, local farmers depend largely on living biomass for heating and cooking (see also Table G-1). Trees can be harvested only when the local government issues a harvest licence and such a licence is usually not issued for collecting trees for the purpose of fuel. This harvest regulation has been well enforced over China. Therefore, local villages usually harvest herbaceous and shrub biomass remaining on the lands for fuel because of the unavailability of other cheap fuel materials.





**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

Table annex 3-1 Vegetation, land use, land tenure and reforestation design on project lands

Towns /Townships /Farms	Villages /Sub-farms	Land ID	Comparison	Sub-compartment	Area (ha)	Vegetation	Legal land use	Grazing	Land ownership	Land tenure	Model ID	Planting year
ShaLi	WeiRao	LL010201	1	1~2	14.0	<i>Psidium guajava, Woodfordia fruticosa, Woodfordia fruticosa, Woodfordia fruticosa, Eupatorium odoratum, etc.</i>	Forestry	/	Collective	Collective	Y-7-1	2009
		LL010202	3	1~5	46.3		Forestry	/	Collective	Collective	Y-7-1	2009
		LL010203	7	1~7	70.9		Forestry	/	Collective	Collective	Y-7-1	2009
	WeiGan	LL010301	4	1~2	30.2	<i>Woodfordia fruticosa, Eupatorium odoratum, Imperata cylindrica, Cynodon dactylon, etc.</i>	Forestry	/	Collective	Collective	Y-7-1	2009
			5	1	6.1		Forestry	/	Collective	Collective	Y-7-1	2009
		LL010302	5	2	13.4		Forestry	/	Collective	Collective	Y-7-1	2009
PingBan	WeiLong	LL020101	2	1~2	24.9	<i>Woodfordia fruticosa, Woodfordia fruticosa, Solanum verbascifolium, Eupatorium japonicum, Ageratum conyzoides, Fern, etc.</i>	Forestry	/	Collective	Collective	Y-7-1	2009
	BianYa	LL040101	8	1	5.2		Forestry	/	Collective	Collective	Y-3	2008
	MinLe	LL040601	3	1~2	13.2		Undefined	/	Collective	Collective	Y-5	2009
	MuGu	LL040801	1	1~2	14.5		Undefined	/	Collective	Collective	Y-5	2009
	GongHe Chang	LL040901	1	1~4	32.7		Forestry	/	Collective	Collective	Y-3	2008
		LL040902	1	5~6	9.9		Forestry	/	Collective	Collective	Y-3	2008
LongHuo	WeiLing	LL031401	2	1~4	24.8	<i>Melastoma candidum, Polygonum chinensis, Eupatorium japonicum, Dicranopteris linearis, Fern, etc.</i>	Undefined	/	Collective	Collective	Y-4	2008



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

			3	1	2.0	<i>Alnus nepalensis, Oak coppie, Melastoma candidum, Polygonum chinensis, Eupatorium japonicum, Dicranopteris linearis, Fern, etc.</i>	Forestry	/	Collective	Collective	Y-4	2008
	YuTang	LL031501	1	1~6	31.1	<i>Polygonum chinensis, Melastoma candidum, Lespedeza formosa, Dicranopteris linearis, etc.</i>	Forestry	/	Collective	Collective	Y-3	2008
			3	1	1.5		Forestry	/	Collective	Collective	Y-3	2008
			4	1~5	22.7		Forestry	/	Collective	Collective	Y-3	2008
ZheBao	TongLiu	LL060601	2	1	6.3	<i>Woodfordia fruticosa, Psidium guajava, Woodfordia fruticosa, Eupatorium odoratum, Imperata cylindrica, etc.</i>	Forestry	/	Collective	Collective	Y-5	2008
		LL060602	2	2	5.3		Forestry	/	Collective	Collective	Y-5	2008
		LL060603	2	3	2.8		Forestry	/	Collective	Collective	Y-5	2008
		LL060604	3	1	6.0		Forestry	/	Collective	Collective	Y-5	2008
		LL060605	3	2	5.8		Forestry	/	Collective	Collective	Y-5	2008
		LL060706	6	1	13.3		Forestry	/	Collective	Collective	Y-5	2008
		LL060707	6	2	6.1		Forestry	/	Collective	Collective	Y-5	2008
	BanZhi Huan	LL061101	2	2	17.0	<i>Psidium guajava, Phyllanthus emblica, Dendrolobium triangulare, Woodfordia fruticosa, Eupatorium japonicum, Imperata cylindrical, etc.</i>	Forestry	/	Collective	Collective	Y-6	2008
		LL061102	3	1	16.4		Forestry	/	Collective	Collective	Y-7-1	2008
		LL061103	4	2~4	44.5		Forestry	/	Collective	Collective	Y-7-1	2008
		LL061104	3	2~7	69.2		Forestry	/	Collective	Collective	Y-7-1	2008
			3	4、8	24.7		Forestry	/	Collective	Collective	Y-6	2008
			4	1	1.9		Forestry	/	Collective	Collective	Y-7-1	2008
			5	1~2	26.8		Forestry	/	Collective	Collective	Y-6	2008
		LL061105	7	1、3	33.9		Forestry	/	Collective	Collective	Y-7-1	2008
		LL061106	7	2	1.4		Forestry	/	Collective	Collective	Y-7-1	2008





**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

		LL061207	5	1	14.9		Forestry	/	Collective	Collective	Y-7-1	2008
ZheLang	ZheYan	LL080201	4	1	10.2	<i>Woodfordia fruticosa, Inula cappa, Eupatorium japonicum, Fern, etc.</i>	Forestry	/	Collective	Collective	Y-3	2008
		LL080202	4	2~3	21.7		Forestry	/	Collective	Collective	Y-3	2008
		LL080203	4	4~5	20.7		Forestry	/	Collective	Collective	Y-3	2008
GeBu	Zheyang	LL100801	8	8、19	17.4	<i>Woodfordia fruticosa, Inula cappa, Solanum verbascifolium, Ficus tikoua, Eupatorium japonicum, Imperata cylindrica, Heteropogon contortus, Festuca parvigluma, etc.</i>	Forestry	/	Collective	Collective	Y-5	2008
		LL100802	8	6、22	23.3		Forestry	/	Collective	Collective	Y-5	2008
		LL100803	8	23	0.7		Forestry	/	Collective	Collective	Y-5	2008
		LL100804	8	5	12.3		Undefined	/	Collective	Collective	Y-5	2008
		LL100805	8	15~16	12.9		Undefined	/	Collective	Collective	Y-5	2008
		LL100806	8	20	0.8		Undefined	/	Collective	Collective	Y-5	2008
		LL100807	8	21	0.2		Undefined	/	Collective	Collective	Y-5	2008
	ZuoTeng	LL100901	2	1~6	46.1	<i>Woodfordia fruticosa, Melastoma candidum, Eupatorium odoratum, Microstegium vagans, Imperata cylindrica, Miscanthus floridulus, etc.</i>	Forestry	/	Collective	Collective	Y-5	2008
			4	1~3	2.9		Forestry	/	Collective	Collective	Y-5	2008
		LL100902	6	1	8.6		Forestry	/	Collective	Collective	Y-5	2008
		LL100903	6	2	2.8		Forestry	/	Collective	Collective	Y-5	2008
		LL100904	6	3	8.4		Forestry	/	Collective	Collective	Y-5	2008
	ZheJiang	LL101001	6	1~3	43.0	<i>Elsholtzia cypriani, Melastoma candidum, Eulaliopsis binata, etc</i>	Forestry	/	Collective	Collective	Y-5	2008
	HongYan	LL101201	1	1	6.3	<i>Woodfordia fruticosa, Inula cappa, Solanum verbascifolium, Ficus tikoua, Eupatorium japonicum, Imperata cylindrica, Heteropogon contortus, Arundinella</i>	Forestry	/	Collective	Collective	Y-5	2008
			3	2	0.4		Forestry	/	Collective	Collective	Y-5	2008
		LL101202	1	2	3.6		Forestry	/	Collective	Collective	Y-5	2008
			3	1	7.9		Forestry	/	Collective	Collective	Y-5	2008
		LL101203	8	5~14	139.5		Forestry	/	Collective	Collective	Y-2-1	2009



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

			9	1~2	31.7	<i>nepalensis, etc.</i>	Forestry	/	Collective	Collective	Y-2-1	2009
De'e	BaKe	LL120401	12	1	7.8	<i>Woodfordia fruticosa, Melastoma candidum, Woodfordia fruticosa, Dicranopteris linearis, Eupatorium japonicum, etc.</i>	Forestry	/	Collective	Collective	Y-3	2008
		LL120402	12	2	2.3		Forestry	/	Collective	Collective	Y-3	2008
		LL120403	12	3~5	32.2		Forestry	/	Collective	Collective	Y-3	2008
	YanTou	LL120601	1	1	1.3	<i>Rhododendron sp., Lyonia ovalifolia, Craibiodendron stellatum, Gaultheria yunnanensis, Dicranopteris linearis, etc.</i>	Forestry	/	Collective	Collective	Y-3	2008
		LL120602	1	2	2.1		Forestry	/	Collective	Collective	Y-3	2008
		LL120603	1	3	3.7		Forestry	/	Collective	Collective	Y-3	2008
		LL120604	2	1	5.5		Undefined	/	Collective	Collective	Y-3	2008
		LL120605	2	2	4.3		Undefined	/	Collective	Collective	Y-3	2008
		LL120606	6	1	1.3		Undefined	/	Collective	Collective	Y-3	2008
	JinPing	LL120801	2	1~2	12.3		Forestry	/	Collective	Collective	Y-3	2008
		LL120802	4	1	0.7		Forestry	/	Collective	Collective	Y-3	2008
		LL120803	4	2	0.1		Forestry	/	Collective	Collective	Y-3	2008
		LL120804	4	3~7	44.0		Forestry	/	Collective	Collective	Y-3	2008
		LL120805	4	8	0.2		Forestry	/	Collective	Collective	Y-3	2008
	ShuiJing	LL140201	6	1~4	67.7	<i>Oak coppie, Lyonia ovalifolia, Melastoma candidum, Eurya ciliata, Fern, Dicranopteris linearis, etc.</i>	Forestry	Yes	Collective	Collective	Y-3	2008
				5	9.5		Forestry	/	Collective	Collective	Y-2-1	2008
			7	1~18	212.9		Forestry	/	Collective	Collective	Y-2-1	2008
	LongYing	LL140501	1	1、2、6	25.7	<i>Oak coppies, Lyonia ovalifolia, Fern, Woodwardia japonica, etc.</i>	Forestry	/	Collective	Collective	Y-2-1	2010
		LL140502	1	3	1.3		Forestry	/	Collective	Collective	Y-2-1	2010
			2	1~9	119.4		Forestry	/	Collective	Collective	Y-2-1	2010
		LL140503	1	4~5	22.6		Forestry	/	Collective	Collective	Y-2-1	2010



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

ZhuChang	YangJie	LL130601	1	1	10.1	<i>Eurya ciliata, Miscanthus floridulus, Dicranopteris linearis, etc.</i>	Undefined	Yes	Collective	Collective	Y-2-1	2009
			2	1~3	36.2	<i>Oak coppie, Eurya ciliata, Miscanthus floridulus, Dicranopteris linearis, etc.</i>	Forestry	/	Collective	Collective	Y-2-1	2009
		LL130602	6	1~2	22.0	<i>Miscanthus floridulus, Dicranopteris linearis, etc.</i>	Forestry	/	Collective	Collective	Y-5	2009
		LL130603	7	3~5	25.6	<i>Eurya ciliata, Miscanthus floridulus, Dicranopteris linearis, etc.</i>	Undefined	/	Collective	Collective	Y-3	2008
		LL130604	8	1~3	39.2		Undefined	/	Collective	Collective	Y-3	2008
		LL130605	8	4、5、8	42.8		Undefined	/	Collective	Collective	Y-3	2008
			8	6、7、9、10	53.0	<i>Oak coppie, Eurya ciliata, Miscanthus floridulus, Dicranopteris linearis, etc.</i>	Forestry	/	Collective	Collective	Y-3	2008
	NaYan	LL130801	2	1~11	116.0	<i>Woodfordia fruticosa, Eupatorium japonicum, Dicranopteris linearis, Fern, Imperata cylindrica, etc.</i>	Forestry	/	Collective	Collective	Y-3	2009
SheChang	LeXiang	LL150201	1	1	9.7	<i>Lyonia ovalifolia, Gaultheria yunnanensis, Dicranopteris linearis, Imperata cylindrica, etc.</i>	Forestry	/	Collective	Collective	Y-3	2008
		LL150202	1	2~11	125.0	<i>Gaultheria yunnanensis, Dicranopteris linearis, Imperata cylindrica, etc.</i>	Forestry	/	Collective	Collective	Y-3	2008
			2	1~9	156.3		Undefined	/	Collective	Collective	Y-3	2008
		LL150203	5	1	14.8		Undefined	/	Collective	Collective	Y-3	2009
	XinMin	LL150301	1	1~3	35.7	<i>Rhododendron sp., Lyonia ovalifolia,</i>	Forestry	Yes	Collective	Collective	Y-3	2009
			1	4~11	78.1		Forestry	/	Collective	Collective	Y-3	2008



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

			2	1~2	7.6	<i>Craibiodendron stellatum, Gaultheria yunnanensis, Dicranopteris linearis, etc.</i>	Forestry	/	Collective	Collective	Y-3	2009
	MaChang	LL150401	3	1~3	39.2	<i>Eurya ciliata, Miscanthus floridulus, Dicranopteris linearis, etc.</i>	Forestry	/	Collective	Collective	Y-3	2009
			4	1~3、5	64.0	<i>Oak coppie, Eurya ciliata, Miscanthus floridulus, Dicranopteris linearis, etc.</i>	Forestry	/	Collective	Collective	Y-3	2009
		LL150402	4	4	12.1	<i>Rhododendron sp., Woodwardia japonica, Dicranopteris linearis, etc.</i>	Forestry	/	Collective	Collective	Y-3	2009
		LL150403	8	6.1、8.1	10.8		Forestry	/	Collective	Collective	Y-4	2008
	XinLi	LL150701	1	1、2、5	24.9	<i>Lyonia ovalifolia, Craibiodendron stellatum, Eupatorium japonicum, Cymbopogon tortilis, Fern, etc.</i>	Undefined	/	Collective	Collective	Y-3	2009
		LL150702	1	3~4	30.6		Undefined	/	Collective	Collective	Y-3	2009
			2	1	13.3		Forestry	/	Collective	Collective	Y-3	2009
		LL150703	4	1	15.1		Forestry	/	Collective	Collective	Y-3	2009
				2~3	4.6		Forestry	/	Collective	Collective	Y-3	2008
			5	1~6	26.6	<i>Oak coppie, Lyonia ovalifolia, Craibiodendron stellatum, Eupatorium japonicum, Cymbopogon tortilis, Fern, etc.</i>	Forestry	/	Collective	Collective	Y-4	2008
		LL150704	6	1	15.0		Forestry	/	Collective	Collective	Y-3	2008
				2~3	61.8	<i>Lyonia ovalifolia, Craibiodendron stellatum, Eupatorium japonicum, Cymbopogon tortilis, Fern, etc.</i>	Forestry	/	Collective	Collective	Y-3	2009
			7	1	11.3	<i>Lyonia ovalifolia, Craibiodendron stellatum, Eupatorium japonicum, Cymbopogon tortilis, Fern, etc.</i>	Forestry	/	Collective	Collective	Y-3	2008
				2~4	62.8		Forestry	/	Collective	Collective	Y-3	2009



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

KeChang	HaiChang	LL160101	12	1、3、4、6、7	25.2	<i>Oak coppie, Melastoma candidum, Eurya ciliata, Eupatorium japonicum, Dicranopteris linearis, etc.</i>	Forestry	/	Collective	Collective	Y-3	2008
		LL160102	12	2	0.3	<i>Melastoma candidum, Eurya ciliata, Eupatorium japonicum, Dicranopteris linearis, etc.</i>	Undefined	/	Collective	Collective	Y-3	2008
		LL160103	12	5	0.4		Undefined	/	Collective	Collective	Y-3	2008
		LL160104	11	1、2	5.0		Forestry	/	Collective	Collective	Y-3	2008
		LL160105	11	3	1.2		Forestry	/	Collective	Collective	Y-3	2008
		LL160106	11	4	6.1		Undefined	/	Collective	Collective	Y-3	2008
		LL160107	10	1、4~6	45.0		Forestry	/	Collective	Collective	Y-3	2008
		LL160108	10	2	4.4		Undefined	/	Collective	Collective	Y-3	2008
	HePing	LL160201	1	1~5	66.4	<i>Oak coppie, Melastoma candidum, Eurya ciliata, Eupatorium japonicum, Dicranopteris linearis, etc.</i>	Forestry	/	Collective	Collective	Y-3	2008
			2	1、2	21.4		Forestry	/	Collective	Collective	Y-3	2008
			4	1~11	149.2		Forestry	/	Collective	Collective	Y-3	2008
				12~13	41.5		Forestry	/	Collective	Collective	Y-3	2009
			5	2~11	130.3	<i>Melastoma candidum, Eurya ciliata, Eupatorium japonicum, Dicranopteris linearis, etc.</i>	Forestry	/	Collective	Collective	Y-3	2008
	KeNiang	LL160501	2	1~2	19.8	<i>Woodfordia fruticosa, Woodfordia fruticosa, Melastoma candidum, Dicranopteris linearis, Eupatorium japonica, etc.</i>	Undefined	/	Collective	Collective	Y-4	2008
			4	1~2	20.8		Undefined	/	Collective	Collective	Y-4	2008
		LL160502	4	3	0.7		Undefined	/	Collective	Collective	Y-4	2008
	XinHe	LL170101	9	1~2	24.0		Undefined	/	Collective	Collective	Y-3	2009



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

			10	1~5	55.9		Forestry	/	Collective	Collective	Y-3	2009
	XinHua	LL170201	9	1	18.1		Undefined	/	Collective	Collective	Y-3	2009
		LL170202	10	1~6	94.4		Undefined	/	Collective	Collective	Y-3	2009
			11	1~8	99.1		Forestry	/	Collective	Collective	Y-3	2009
			12	1~2	23.7		Undefined	/	Collective	Collective	Y-3	2009
	HouChang	LL170501	3	1~10	132.6	<i>Oak coppie, Woodfordia fruticosa, Polygonum chinensis, Baeckea frutescens, Dicranopteris linearis, Eupatorium japonicum, etc.</i>	Forestry	/	Collective	Collective	Y-3	2010
			4	1~5	60.9	<i>Woodfordia fruticosa, Polygonum chinensis, Baeckea frutescens, Dicranopteris linearis, Eupatorium japonicum, etc.</i>	Undefined	/	Collective	Collective	Y-3	2010
	DaQing	LL170601	1	1~10	131.3	<i>Oak coppie, Woodfordia fruticosa, Polygonum chinensis, Baeckea frutescens, Dicranopteris linearis, Eupatorium japonicum, etc.</i>	Forestry	/	Collective	Collective	Y-3	2010
			2	1~11	180.0	<i>Woodfordia fruticosa, Polygonum chinensis, Baeckea frutescens, Dicranopteris linearis, Eupatorium japonicum, etc.</i>	Forestry	/	Collective	Collective	Y-3	2010
			3	1~9	138.8	<i>Woodfordia fruticosa, Polygonum chinensis, Baeckea frutescens, Dicranopteris linearis, Eupatorium japonicum, etc.</i>	Forestry	/	Collective	Collective	Y-3	2010
YanCha	LengDu	LL180401	9	4	6.4	<i>Melastoma candidum,</i>	Forestry	/	Collective	Collective	Y-2	2008
			10	1~2	12.8	<i>Eurya ciliata,</i>	Forestry	/	Collective	Collective	Y-2	2008





**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

		LL180402	10	3	6.8	<i>Woodfordia fruticosa, Oak coppice, Microstegium vagans, Fern, Eupatorium japonicum, , etc.</i>	Forestry	/	Collective	Collective	Y-2	2008
		LL180403	9	1~3	45.2		Forestry	/	Collective	Collective	Y-2	2008
			10	4~6	12.6		Forestry	/	Collective	Collective	Y-2	2008
		LL180404	11	1、2、4	23.8		Forestry	/	Collective	Collective	Y-2	2008
			13	1~3	45.7		Forestry	/	Collective	Collective	Y-2	2008
		LL180405	11	3	15.6		Forestry	/	Collective	Collective	Y-2	2008
		LL180406	11	5~6	31.2		Forestry	/	Collective	Collective	Y-2	2008
	PingBan	LL180501	9	1	12.0	<i>Woodfordia fruticosa, Mallotus apelta, Litsea pungens, Melastoma candidum, Microstegium vagans, fern, Eupatorium odoratum, etc.</i>	Forestry	/	Collective	Collective	Y-3	2008
	PingTai	LL190101	4	1	0.9		Forestry	/	Collective	Collective	Y-2	2008
		LL190102	4	2	0.5		Forestry	/	Collective	Collective	Y-2	2008
		LL190103	4	3~7	48.8		Forestry	/	Collective	Collective	Y-2	2008
			5	4	15.6		Forestry	/	Collective	Collective	Y-2	2008
		LL190104	4	8	0.6		Forestry	/	Collective	Collective	Y-2	2008
		LL190105	5	1	1.0		Forestry	/	Collective	Collective	Y-2	2008
		LL190106	4	11	1.4		Forestry	/	Collective	Collective	Y-2	2008
		LL190107	4	12	7.8		Forestry	/	Collective	Collective	Y-2	2008
		LL190108	4	13	2.9		Forestry	/	Collective	Collective	Y-2	2008
		LL190109	4	9~10	11.7		Forestry	/	Collective	Collective	Y-2	2008
			5	2	4.1		Forestry	/	Collective	Collective	Y-2	2008
			9	1	2.3		Forestry	/	Collective	Collective	Y-2	2008
		LL190110	5	3、5、6	46.1		Forestry	/	Collective	Collective	Y-2	2008
			9	2~3	2.1		Forestry	/	Collective	Collective	Y-2	2008
	LongTai	LL190201	18	1	0.9		Undefined	/	Collective	Collective	Y-2	2008
		LL190202	18	2	0.7		Undefined	/	Collective	Collective	Y-2	2008



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

			16	1	6.4		Undefined	/	Collective	Collective	Y-2	2008	
		LL190203	11	1	24.1		Undefined	/	Collective	Collective	Y-2	2008	
JieTing	NaDa	LL200201	15	2~6	57.7	<i>Woodfordia fruticosa, Melastoma candidum, Eupatorium japonicum, Imperata cylindrica, etc.</i>	Undefined	/	Collective	Collective	Y-3	2009	
			16	1~3	43.4		Undefined	/	Collective	Collective	Y-3	2009	
	NongXi	LL200301	9	1~6	82.4		Undefined	/	Collective	Collective	Y-3	2009	
	NaSang	LL200501	11	1~3	13.6	<i>Woodfordia fruticosa, Psidium guajava, Eupatorium japonicum, Imperata cylindrica, Miscanthus floridulus, Fern, etc.</i>	Undefined	/	Collective	Collective	Y-2	2008	
			18	1~3	45.2		Undefined	/	Collective	Collective	Y-2	2008	
		LL200502	12	1~2	11.3		Undefined	/	Collective	Collective	Y-2	2008	
			16	1~5	32.6		Undefined	/	Collective	Collective	Y-2	2008	
	XinZhou	NongSang	LL210701	8	1~4	39.4	<i>Eupatorium japonicum, Woodfordia fruticosa, Fern, etc.</i>	Undefined	/	Collective	Collective	Y-2-1	2010
		PoYan	LL211401	7	1	3.6		Undefined	/	Collective	Collective	Y-4	2008
			LL211402	7	2	12.3		Undefined	/	Collective	Collective	Y-4	2008
JinZhongShan Forest Farm	WuChong	LL220101	1	1~20	318.6	<i>Inula cappa, Woodfordia fruticosa, Ficus tikoua, Eupatorium japonicum, Imperata cylindrica,</i>	Forestry	/	State	State	Y-5	2010	
			2	1~19	235.5		Forestry	/	State	State	Y-5	2010	
			3	1~6	82.0		Forestry	/	State	State	Y-5	2010	
	MaLan	LL220301	15	1	1.8	<i>Woodfordia fruticosa, Melastoma candidum, Miscanthus floridulus, Microstegium vagans, Eulaliopsis binata, Eupatorium japonicum, etc.</i>	Forestry	/	State	State	Y-3	2008	
			16	1~2	8.9		Forestry	/	State	State	Y-3	2008	
		LL220302	16	4	8.3		Forestry	/	State	State	Y-3	2008	
			17	1	1.4		Forestry	/	State	State	Y-3	2008	
		LL220303	16	3	1.0		Forestry	/	State	State	Y-3	2008	



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

			20	1~3	40.3		Forestry	/	State	State	Y-3	2008
LiZhou	FanChang	TL020901	16	1~10	160.9	<i>Woodfordia fruticosa, Eurya ciliata, Melastoma candidum, Baeckea frutescens, Woodfordia fruticosa, Dicranopteris linearis, Imperata cylindrica, etc.</i>	Forestry	/	Collective	Collective	Y-6	2010
	NangLao	TL020701	4	1~10	147.7		Forestry	/	Collective	Collective	Y-6	2010
		TL020702	5	1~4	48.6		Forestry	/	Collective	Collective	Y-6	2010
LangPing	HongXing	TL041101	18	1~5	84.2	<i>Capillipedium assimile, Imperata cylindrica, Arundinella setosa, etc.</i>	Forestry	/	Collective	Collective	Y-7-1	2009
		TL041102	18	6~7	33.4	<i>Phyllanthus emblica, Inula cappa, Solanum verbascifolium, Imperata cylindrica, Eupatorium japonicum, etc.</i>	Forestry	/	Collective	Collective	Y-7-1	2009
			19	1~4	80.3		Forestry	/	Collective	Collective	Y-7-1	2009
	XiangWei	TL040201	2	1~3	40.4	<i>Woodfordia fruticosa, Melastoma candidum, Glochidion sp., Imperata cylindrica, Dicranopteris linearis</i>	Undefined	/	Collective	Collective	Y-1	2008
		TL040202	3	1~8	117.3		Forestry	/	Collective	Collective	Y-1	2008
LuCheng	YingPan	TL050201	5	1	10.6	<i>Woodfordia fruticosa, Melastoma candidum, Mallotus apelta, Imperata cylindrica, Miscanthus floridulus, Dicranopteris linearis, etc.</i>	Forestry	/	Collective	Collective	Y-1	2010
		TL050202	5	2	13.3		Undefined	/	Collective	Collective	Y-1	2010
	NaMa	TL080401	9	1~5	76.8	<i>Psidium guajava, Woodfordia fruticosa, Mallotus apelta, Melastoma candidum,</i>	Undefined	/	Collective	Collective	Y-7	2008



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

			9	6	16.8	<i>Dendrolobium triangulare, Imperata cylindrica</i>	Undefined	/	Collective	Collective	Y-1	2009
BaiLe	BaiLe	TL070101	4	1~4	64.7	<i>Dendrolobium triangulare, Inula cappa, Woodfordia fruticosa, Imperata cylindrica, Ischaemum aristatum, Eupatorium odoratum, etc.</i>	Forestry	/	Collective	Collective	Y-1	2009
	GengBiao	TL070301	7	1	10.2	<i>Cipadessa cinerascens, Solanum verbascifolium, Eupatorium odoratum, Imperata cylindrica, etc.</i>	Forestry	/	Collective	Collective	Y-1	2010
		TL070302	7	2	4.6		Forestry	/	Collective	Collective	Y-1	2010
		TL070303	7	3	4.7		Forestry	/	Collective	Collective	Y-1	2010
		TL070304	7	4~5	27.1		Forestry	/	Collective	Collective	Y-1	2010
		TL070305	8	1~2	27.2		Forestry	/	Collective	Collective	Y-1	2010
		TL070306	9	1	24.2		Undefined	/	Collective	Collective	Y-7-1	2009
			13	1~6	84.1		Forestry	/	Collective	Collective	Y-7-1	2009
JiuZhou	ZheNian	TL091301	21	1~3	42.7	<i>Helicteres angustifolia, Imperata cylindrica, Miscanthus floridulus, etc.</i>	Forestry	Yes	Collective	Collective	Y-7-1	2010
		TL091302	24	1	16.9		Forestry	/	Collective	Collective	Y-7-1	2010
	PingLin	TL090301	10	1~3	47.1	<i>Wendlandia sp, Solanum verbascifolium Woodfordia fruticosa, Melastoma candidum, Cipadessa cinerascens, Dendrolobium</i>	Forestry	/	Collective	Collective	Y-7-1	2010
		TL090302	10	4	17.9		Forestry	Yes	Collective	Collective	Y-7-1	2010
			9	1	16.0		Forestry	/	Collective	Collective	Y-7-1	2010
		TL090303	12	1~8	126.0		Forestry	/	Collective	Collective	Y-1	2009



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

		TL090304	12	9~10	34.8	<i>triangulare, Phyllanthus emblica, Inula cappa, Eupatorium odoratum, Imperata cylindrica, Miscanthus floridulus, etc.</i>	Forestry	/	Collective	Collective	Y-1	2009
	GuangL ong	TL090401	3	1	14.4	<i>Woodfordia fruticosa, Woodfordia fruticosa, Helicteres angustifolia, Imperata cylindrica, Fern, etc.</i>	Forestry	Yes	Collective	Collective	Y-7-1	2010
			4	1~6	85.0		Forestry	/	Collective	Collective	Y-7-1	2010
			5	1~4	63.6		Forestry	/	Collective	Collective	Y-7-1	2010
	YangBai	TL090601	13	1	4.5	<i>Phyllanthus emblica, Craibiodendron stellatum, Inula cappa, Arundinella setosa, Imperata cylindrica</i>	Forestry	/	Collective	Collective	Y-1	2008
		TL090602	13	2~3	32.9		Forestry	/	Collective	Collective	Y-1	2008
Ding'an	ChangJi ng	TL110701	2	1~2	30.3	<i>Psidium guajava, Euodia leptta, Solanum verbascifolium, Eupatorium odoratum, Imperata cylindrica, etc.</i>	Forestry	/	Collective	Collective	Y-1	2010
	YangRo ng	TL110601	13	1	5.5	<i>Euodia leptta, Solanum verbascifolium, Eupatorium odoratum, Microstegium vagans, Imperata cylindrica, Miscanthus floridulus, etc.</i>	Undefined	/	Collective	Collective	Y-1	2010
			15	1	13.6		Undefined	/	Collective	Collective	Y-1	2010
		TL110602	16	1~2	25.3		Undefined	/	Collective	Collective	Y-1	2010
	NaMen	TL110501	8	1~4	60.8		Undefined	/	Collective	Collective	Y-1	2010
	Ding'an	TL110101	6	1	4.3	<i>Psidium guajava, Euodia leptta, Solanum verbascifolium, Eupatorium odoratum, Microstegium vagans, Imperata cylindrica, Miscanthus floridulus, etc.</i>	Forestry	/	Collective	Collective	Y-1	2008
		TL110102	6	2	6.1		Forestry	/	Collective	Collective	Y-1	2008
		TL110103	6	3	2.3		Forestry	/	Collective	Collective	Y-1	2008
		TL110104	6	4	2.1		Forestry	/	Collective	Collective	Y-1	2008
		TL110105	6	5	3.6		Forestry	/	Collective	Collective	Y-1	2008



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

		TL110106	6	6	2.9	<i>etc.</i>	Forestry	/	Collective	Collective	Y-1	2008
GaoLong	ZheChe	TL120101	1	1	18.1	<i>Inula cappa, Rubus sp, Miscanthus floridulus, Imperata cylindrica, etc.</i>	Forestry	/	Collective	Collective	Y-1	2008
		TL120102	1	2~4	52.3		Forestry	/	Collective	Collective	Y-1	2008
		TL120103	1	5	14.3		Forestry	/	Collective	Collective	Y-1	2008
		TL120104	2	1~4	62.8		Forestry	/	Collective	Collective	Y-1	2008
		TL120105	3	1	12.3		Forestry	/	Collective	Collective	Y-1	2008
ZheMiao	BaiLong	TL130401	10	1~6	103.9	<i>Phyllanthus emblica, Inula cappa, Baeckea frutescens, Dicranopteris linearis, Heteropogon contortus, Eupatorium japonicum, etc.</i>	Undefined	/	Collective	Collective	Y-7-1	2008
LiuLong	LieTun	TL180301	16	1~2	30.3	<i>Wendlandia sp, Psidium guajava, Solanum verbascifolium, Melastoma candidum, Inula cappa, Imperata cylindrica, Ischaemum sp, Dicranopteris linearis, etc.</i>	Forestry	/	Collective	Collective	Y-7-1	2009
		TL180302	17	1~3	32.2		Forestry	/	Collective	Collective	Y-7-1	2009
	ZhouMa	TL190601	5	1	9.5	<i>Solanum verbascifolium, Inula cappa, Arundinella setosa, Imperata cylindrical, etc.</i>	Undefined	/	Collective	Collective	Y-7-1	2009
			11	1~2	24.5		Undefined	/	Collective	Collective	Y-7-1	2009
NaBi	NaLa	TL200501	34	1~3	44.6	<i>Woodfordia fruticosa, Phyllanthus emblica, Woodfordia fruticosa, Imperata cylindrica, Miscanthus floridulus, Dicranopteris linearis, etc.</i>	Forestry	/	Collective	Collective	Y-7-1	2010
		TL200502	48	1~5	66.9		Forestry	/	Collective	Collective	Y-7-1	2010





**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

YangYa	BanYan g	TL230201	3	1~13	204.1	<i>Inula cappa, Miscanthus floridulus, Microstegium vagans, Imperata cylindrica, Ischaemum aristatum, etc.</i>	Forestry	/	Collective	Collective	Y-1	2009
SiCheng	LongZha o	LY011401	7	1	16.3	<i>Mallotus philippinensis, Dicranopteris linearis, Ischaemum sp</i>	Forestry	Yes	Collective	Private	Y-1	2008
		LY011402	8	1	18.1		Forestry	/	Collective	Private	Y-1	2008
JiuJiang Forestry Farm	YangNa ng	LY010501	2	1~6	77.9	<i>Woodfordia fruticosa, Litsea pungens, Eurya ciliata, Miscanthus floridulus, Sinarundinaria cuspidate, Dicranopteris linearis, etc.</i>	Forestry	/	Collective	Collective	Y-2	2008
			3	1~4	35.4	<i>Miscanthus floridulus, Dicranopteris linearis, etc.</i>	Forestry	/	Collective	Collective	Y-2	2008
			4	1~4	63.2	<i>Eurya ciliata, Miscanthus floridulus, Sinarundinaria cuspidate, Dicranopteris linearis, etc</i>	Forestry	/	Collective	Collective	Y-2	2008
	LanTa	LY040601 LY040602	11	1~4	56.1	<i>Eurya ciliata, Miscanthus floridulus, Dicranopteris linearis, Microstegium vagans, etc.</i>	Forestry	/	Collective	Collective	Y-2	2008
			31	1~2	30.0		Forestry	/	Collective	Collective	Y-2	2008
			37	1~4	59.5		Forestry	/	Collective	Collective	Y-2	2008
	ShangM eng	LY010301	5	1	14.0	<i>Woodfordia fruticosa, Miscanthus floridulus, Gynura crepidioides, fern, etc.</i>	Undefined	/	Collective	Collective	Y-2	2008
	YangNa ng	LY040501	8	1~3	46.4		Undefined	/	Collective	Collective	Y-2	2008
JiaYou	MoXian	LY080701	3	1	11.8	<i>Oak coppice, Eurya ciliata, Cipadessa</i>	Forestry	Yes	Collective	Private	Y-1	2008
		LY080702	3	2	1.8		Forestry	/	Collective	Private	Y-1	2008

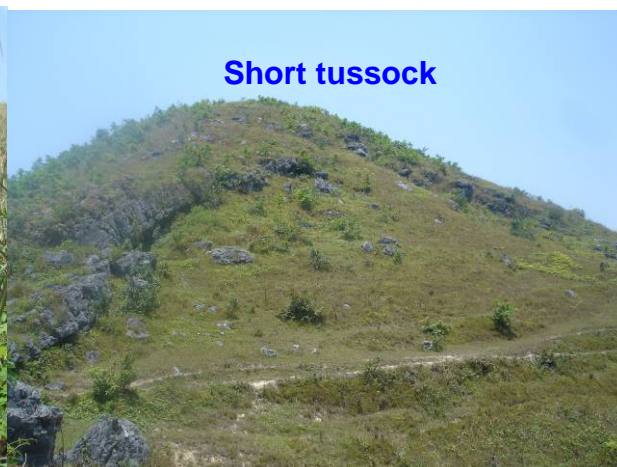


**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

		LY080703	3	3	7.7	<i>cinerascens, Eulalia quadrinervis, Dicranopteris linearis, etc.</i>	Forestry	/	Collective	Private	Y-1	2008
		LY080704	6	1	1.8	<i>Eurya ciliata, Melastoma candidum, Ischaemum sp, etc.</i>	Forestry	/	Collective	Private	Y-1	2008
		LY080705	6	2	0.3		Forestry	/	Collective	Private	Y-1	2008
		LY080706	6	3	1.6		Forestry	/	Collective	Private	Y-1	2008
		LY080707	6	4	11.2		Forestry	/	Collective	Private	Y-1	2008
		LY080708	6	5	1.5		Forestry	/	Collective	Private	Y-1	2008
		LY080709	6	6	3.3		Forestry	/	Collective	Private	Y-1	2008
			10	1	5.7	<i>Eurya ciliata, Melastoma candidum, Ischaemum sp, Dicranopteris linearis, etc.</i>	Forestry	/	Collective	Private	Y-1	2008
		LY080710	9	1	2.9		Forestry	/	Collective	Private	Y-1	2008
		LY080711	10	2	2.0		Forestry	/	Collective	Private	Y-1	2008
		LY080712	10	3	17.9		Forestry	/	Collective	Private	Y-1	2008
		LY080713	10	4	1.8		Forestry	/	Collective	Private	Y-1	2008
		LY080714	10	5	0.5		Forestry	/	Collective	Private	Y-1	2008
		LY080715	10	6	1.0		Forestry	/	Collective	Private	Y-1	2008
		LY080716	10	7	0.7		Forestry	/	Collective	Private	Y-1	2008
		LY080717	12	1	9.1	<i>Ischaemum sp, Inula cappa, Dicranopteris linearis, etc.</i>	Undefined	/	Collective	Private	Y-1	2008
		LY080718	12	2	2.4		Undefined	/	Collective	Private	Y-1	2008
	DongHa	LY080901	4	1	6.1	<i>Eurya ciliata, Melastoma candidum, Ischaemum sp, etc.</i>	Forestry	/	Collective	Private	Y-1	2008
		LY080902	4	2	3.8		Forestry	/	Collective	Private	Y-1	2008

### 3. Current vegetation and baseline stratification

Vegetation survey indicates that the lands to be planted in the proposed A/R CDM project activity are currently non-forested, barren lands, covered by herbaceous plants and shrubs which have formed hundreds of vegetation communities. The project lands are stratified into four baseline strata based on crown cover and height of vegetation (Table Annex 3-2).



### 4. Site classification and evaluation

Main site factors influence tree growth in the project area. These include elevation, landform, soil parent rock, soil type, soil depth, depth of soil humus layer, soil nutrient content, microclimate, etc. To select the most appropriate tree species and reforestation models for the project area, these site factors have been investigated. As a result, the project area has been classified into 6 site types. See Table Annex 3-3 for the description of site types and Table Annex 3-4 for soil conditions.



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

Table Annex 3-2 Baseline stratification

Strat a ID	Area (ha)	Non-tree vegetation				Spotted trees						Land ID
		Type	Height	Crown cover (%)	Dominant species	species group	mean age	mean height (m)	mean DBH (cm)	mean crown diameter (m)	No. of trees	
BLS-1	620.5	Tall tussock	>1.0 m		<i>Eupatorium japonicum</i> , <i>Microstegium vagans</i> , <i>Miscanthus floridulus</i> , fern, etc.	hardwood	8	5.1	7.18	1.9	9,466	LL130801, TL110601, TL110602, TL110501, TL120101, TL120102, TL120103, TL120104, TL120105, TL230201, LY010501
						softwood	13	8.7	9.49	3.3	1,433	
BLS-2	1274.2	Short tussock	<1.0 m		<i>Dicranopteris linearis</i> , <i>Imperata cylindrica</i> , <i>Ischaemum indicum</i> , <i>Bothriochloa intermedia</i> , <i>Festuca parvigluma</i> , <i>Arundinella setosa</i> , <i>Cymbopogon caesi</i> , <i>Capillipedium assimile</i> , etc.	hardwood	15	7.8	10.76	2.7	552	LL080201, LL080202, LL080203, LL100801, LL100802, LL100803, LL100805, LL100806, LL100807, LL101203, LL210701, LL211401, LL211402, LL220101, TL041101, TL070101, TL091301, TL091302, TL090601, TL090602, TL190601, LY080717, LY080718
						softwood	10	6.4	7.94	2.8	1,786	
						pine	12	7.0	8.86	3.3	3,437	
BLS-3	2275.7	Tall thicket	>1.2 m	>20%	<i>Quercus fabri</i> , <i>Lyonia ovalifolia</i> , <i>Alnus nepalensis</i> , <i>Craibiodendron stellatum</i> , <i>Wendlandia tinctoria</i> var. <i>intermedia</i> , <i>Eurya ciliata</i> , <i>Psidium guajava</i> , <i>Schima supera</i> , <i>Woodfordia fruticosa</i> , <i>Clerodendrum japonicum</i> , <i>Cipadessa cinerascens</i> , <i>Dendrolobium triangulare</i> , <i>Rhus chinensis</i> , <i>Litsea pungens</i> , <i>Sinarundinaria cuspidate</i> , etc.	hardwood	14	7.6	12.26	3.0	936	LL010201, LL010202, LL031401, LL140201, LL140501, LL140502, LL140503, LL130601, LL130602, LL130605, LL150401, LL150703, LL150704, LL160101, LL160201, LL170501, LL170601, LL200501, LL200502, TL090301, TL090302, TL090303, TL090304, TL180301, TL180302, LY011401, LY011402, LY010501, LY040601, LY040602
						softwood	10	6.9	8.90	2.9	3,171	
						pine	9	7.9	8.83	3.2	413	
						Chinese fir	15	9.2	15.00	3.0	28	
BLS-4	4500.9	Brushwood	<1.2 m	>20%	<i>Melastoma candidum</i> , <i>Rhododendron</i> sp., <i>Phyllanthus emblica</i> , <i>Osbeckia crinita</i> , <i>Solanum torvum</i> var. <i>verbascifolium</i> , <i>Gaultheria yunnanensi</i> , etc.	hardwood	10	6.5	8.91	2.7	8,293	LL010203, LL010301, LL010302, LL020101, LL040101, LL040601, LL040801, LL040901, LL040902, LL031401, LL031501, LL060601, LL060602, LL060603, LL060604, LL060605, LL060706, LL060707
						softwood	10	7.1	8.60	3.0	3,985	
						pine	9	7.5	9.34	3.2	2,965	



CDM – Executive Board

UNFCCC/CCNUCC



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

						Chinese fir	14	9.5	12.50	2.8	56	LL061101, LL061104, LL061207, LL100903, LL101201, LL120402, LL120602, LL120605, LL120802, LL120805, LL130604, LL150202, LL150401, LL150701, LL150704, LL160104, LL160107, LL160501, LL170201, LL170601, LL180403, LL180406, LL190102, LL190105, LL190108, LL190201, LL200201, LL220302, TL020701, TL040201, TL050202, TL070302, TL070305, TL110701, TL110103, TL110106, TL200502, LY080701, LY080704, LY080707, LY080710, LY080713, LY080716,	LL061102, LL061105, LL100901, LL100904, LL101202, LL120403, LL120603, LL120606, LL120803, LL130601, LL130605, LL150203, LL150402, LL150702, LL160102, LL160105, LL160108, LL160502, LL170202, LL180401, LL180404, LL180501, LL190103, LL190106, LL190109, LL190202, LL200301, LL220303, TL020702, TL040202, TL080401, TL070303, TL070306, TL110101, TL110104, TL130401, LY010301, LY080702, LY080705, LY080708, LY080711, LY080714, LY080901,	LL061103, LL061106, LL100902, LL101001, LL120401, LL120601, LL120604, LL120801, LL120804, LL130603, LL150201, LL150301, LL150403, LL150703, LL160103, LL160106, LL160201, LL170101, LL170501, LL180402, LL180405, LL190101, LL190104, LL190107, LL190108, LL190203, LL220301, TL020901, TL041102, TL050201, TL070301, TL070304, TL090401, TL110102, TL110105, TL200501, LY040501, LY080703, LY080706, LY080709, LY080712, LY080715, LY080902
						132/144								



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

Table Annex 3-3 Description of site classes

Site type ID	Area (ha)	Soil parent rock	Elevation (m a.s.l)	Landform	Soil types	Soil depth (cm)	Depth of soil humus layer (cm)	Microclimate
I-1	2279.3	Sandstone	1000-1200	Lower part of slope, valley	Yellow soil	>80	10-20	Moist
I-2	2623.1	Sandstone	1200-1500	Upper part of slope	Yellow soil	>50	<10	Windy, semi-arid
I-3	1046.7	Sandstone	>1500	Ridge	Yellow soil	<50	<10	Windy
II-1	1247.7	Sandstone	500-1000	Lower part of slope, valley	Red soil, yesslow-red soil	>80	10-20	Moderate Moist
II-2	1345.2	Sandstone	500-1000	Upper part of slop, ridge, arid valley along Hongshuihe River	Red soil, yesslow-red soil	>50	<10	Hot, arid
III-1	129.3	limestone	500-1000	Karst	Brown lime soil	>50	<15	arid





**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

Table Annex 3-4 Soil conditions for different site types

Site class ID	Sample No	Soil horizon	pH value	Organic matter (g/kg)	Total N (g/kg)	Available P (mg/kg)	Available K (mg/kg)
I -1	1	A	5.11	31.06	2.32	1.1	72.6
		AB	5.24	17.70	1.88	0.5	40.7
		B	5.64	10.42	1.62	0.5	31.9
	2	A	4.83	33.25	1.58	0.7	18.7
		AB	4.76	20.96	1.17	0.7	13.2
		B	5.02	12.34	0.99	0.5	12.1
	3	A	5.11	57.05	1.69	1.1	39.6
		AB	5.03	22.63	1.15	0.7	18.7
		B	4.93	22.72	1.13	0.7	22.0
	4	A	3.94	55.62	2.28	0.8	39.6
		B	4.88	13.76	1.03	0.5	19.8
	5	A	4.33	80.08	3.10	1.1	81.4
		AB	4.39	30.29	1.61	0.6	25.3
		B	4.82	19.94	1.35	0.5	13.2
	6	A	3.72	102.99	3.79	1.2	41.8
		AB	4.44	55.42	2.57	0.6	24.2
		B	5.16	17.73	1.24	0.4	11.0
	7	A	5.28	70.43	3.15	1.3	72.6
		B	5.29	35.83	1.78	0.9	31.9
	8	A	5.00	90.47	4.29	1.1	122.1
		B	5.02	36.87	1.67	0.7	41.8
	Mean value	A	4.67	65.12	2.78	1.1	61.1
		AB	4.77	29.40	1.68	0.6	24.4
		B	5.10	21.20	1.35	0.6	23.0
I -2	9	A	4.09	112.90	0.40	0.9	34.1
		AB	4.38	118.16	3.36	0.8	28.6
		B	4.79	25.44	1.85	0.7	19.8
	10	A	3.90	198.80	5.84	1.1	71.5
		AB	4.44	110.94	3.08	0.7	22.0



**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

		B	4.55	111.98	2.08	0.7	12.1
	11	A	4.02	72.40	2.48	1.0	275.9
		AB	4.10	30.40	1.26	0.5	63.8
		B	4.53	12.39	0.97	0.3	24.2
	12	A	4.78	71.83	2.61	0.5	85.8
		AB	5.32	23.73	1.15	0.4	24.2
		B	5.49	10.79	0.62	0.4	19.8
	13	A	4.71	73.28	3.39	0.5	38.5
		AB	4.71	48.49	2.51	0.4	22.0
		B	5.05	18.85	1.32	0.3	22.0
	14	A	4.13	106.60	2.98	1.2	45.1
		AB	4.38	42.99	1.43	0.8	12.1
		B	5.18	12.80	0.61	0.8	91.3
	15	A	4.35	157.60	7.29	1.5	91.3
		AB	4.95	78.15	4.09	0.9	30.8
		B	5.10	42.42	2.67	0.6	24.2
	16	A	4.48	170.70	6.67	1.3	85.8
		AB	4.54	63.36	3.11	0.7	31.9
		B	4.86	40.46	2.22	0.5	20.9
	17	A	4.41	55.08	2.07	0.7	26.4
		B	5.45	25.19	1.08	0.5	15.4
	Mean value	A	4.32	113.24	3.75	1.0	83.8
		AB	4.60	64.53	2.50	0.7	29.4
		B	5.00	33.37	1.49	0.5	27.7
I -3	18	A	3.89	104.84	4.42	0.6	41.8
		AB	3.87	93.46	4.08	0.6	46.2
		B	4.63	36.27	2.27	0.5	23.1
	19	A	4.24	146.27	5.72	1.5	143.0
		AB	4.29	70.11	3.37	0.9	62.7
		B	4.45	35.88	2.35	0.5	41.8
	20	A	4.41	89.83	3.83	0.8	49.5
		AB	4.58	52.43	3.11	0.5	35.2



**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

		B	4.83	34.23	2.28	0.5	19.8
	21	A	4.07	129.00	5.77	2.2	445.9
		AB	3.92	91.05	3.92	0.8	66.0
		B	4.80	31.33	1.65	0.4	25.3
	Mean value	A	4.15	117.49	4.94	1.3	170.1
		AB	4.17	76.76	3.62	0.7	52.5
		B	4.68	34.43	2.14	0.5	27.5
	II -1	A	5.14	33.18	1.79	1.0	57.2
		AB	5.22	22.03	1.25	0.8	34.1
		B	5.63	10.30	0.69	0.5	19.8
	22	A	5.14	33.18	1.79	1.0	57.2
		AB	5.22	22.03	1.25	0.8	34.1
		B	5.63	10.30	0.69	0.5	19.8
	23	A	5.08	42.18	2.14	4.2	115.5
		AB	5.31	8.68	0.67	1.4	51.7
		B	5.48	6.66	0.52	0.7	22.0
	24	A	6.15	50.31	2.16	1.1	67.1
		AB	5.65	32.76	1.29	0.8	23.1
		B	5.30	14.51	0.84	0.6	23.1
	25	A	4.56	38.75	1.73	0.7	34.1
		AB	4.97	24.95	1.45	0.4	18.7
		B	6.04	17.49	1.33	0.3	20.9
	26	A	6.14	45.78	1.93	3.2	89.1
		B	6.27	32.26	1.69	1.1	39.6
	27	A	4.62	70.79	2.37	2.0	42.9
		B	5.03	17.49	1.15	0.8	25.3
	28	A	5.00	90.47	4.29	1.1	122.1
		B	5.02	36.87	1.67	0.7	41.8
	29	A	4.20	75.78	2.44	1.2	69.3
		AB	4.50	35.95	1.82	0.7	26.4
		B	5.67	11.58	1.02	0.5	13.2
	Mean value	A	5.11	55.91	2.36	1.8	74.7
		AB	5.13	24.87	1.30	0.8	30.8
		B	5.56	18.40	1.11	0.7	25.7
II -2	30	A	6.12	22.34	1.41	0.8	62.7
		AB	6.09	19.08	1.49	0.8	82.5



**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

		B	6.91	13.34	1.26	0.7	61.6
	31	A	5.80	57.65	2.75	2.9	144.1
		AB	5.98	28.47	1.63	0.8	40.7
		B	6.21	13.45	1.21	0.6	34.1
	32	A	5.60	39.31	1.98	1.3	45.1
		AB	5.62	16.62	1.00	0.8	27.5
		B	5.60	12.61	0.94	0.7	25.3
	33	A	6.14	66.32	2.57	3.2	225.4
		AB	5.85	29.47	1.22	1.6	58.3
		B	5.66	14.76	0.68	0.9	55.0
	34	A	5.26	22.04	1.01	0.9	49.5
		AB	4.81	14.08	0.72	0.8	36.3
		B	5.30	3.34	0.36	0.7	24.2
	35	A	6.03	34.25	1.88	0.7	71.5
		B	6.58	12.46	1.26	0.5	47.3
	36	A	5.37	76.19	3.33	7.4	145.2
		B	5.54	11.15	0.91	1.9	24.2
	37	A	5.40	34.69	1.90	1.5	85.8
		B	5.68	7.88	0.71	0.6	23.1
	Mean value	A	5.72	44.10	2.10	2.3	103.7
		AB	5.67	21.54	1.21	1.0	49.1
		B	5.94	11.12	0.92	0.8	36.9
III-1	38	A	5.64	40.24	1.69	0.8	23.1
		AB	5.80	14.59	0.73	0.7	11.0
		B	5.92	4.99	0.48	0.4	66.0
	39	A	6.19	48.18	1.74	0.6	27.5
		AB	6.64	9.31	0.39	0.4	4.4
		B	6.91	6.95	0.34	0.4	4.4
	40	A	4.60	15.40	0.56	0.8	6.6
		B	5.01	4.99	0.29	0.5	5.5
	Mean value	A	5.48	34.61	1.33	0.7	19.1
		AB	6.22	11.95	0.56	0.6	7.7
		B	5.95	5.64	0.37	0.4	25.3



## 5. Pre-project carbon stock in living tree biomass and natural regeneration of trees

### 5.1 non-tree vegetation

Temporary plots have been randomly selected for the purpose of measuring pre-project carbon stock in living biomass of non-tree vegetation for each baseline stratum, following the procedures in Annex 1 of the A/R Methodological Tool “Estimation of emissions from clearing, burning and decay of existing vegetation due to implementation of a CDM A/R project activity”<sup>14</sup>. The number of plots for each baseline stratum depends on pre-project vegetation types and the area of stratum. To achieve 95% precision level at 95% confidence interval, two steps of sampling have been implemented. The first step is the initial investigation, in which 30 temporary plots for each baseline stratum have been sampled and surveyed, and the variation of biomass stock was estimated. For those stratum that were failed to reach the requested precision level in measurement, then the second step of sampling survey, the complementary survey, was conducted. See Table Annex 3-5 for the number of plots sampled.

Table Annex 3-5 Number of plots sampled for each baseline stratum

Baseline stratum ID	Area (ha)	Site type ID	Number of plots sampled
BLS-1	620.5	I-1	7
		I-2	8
		I-3	7
		II-1	7
		II-2	8
		SUB-TOTAL	37
BLS-2	1274.2	I-1	31
		I-2	3
		I-3	2
		II-1	13
		II-2	12
		III-1	2
		SUB-TOTAL	63
BSL-3	2275.7	I-1	11
		I-2	15
		I-3	4
		II-1	5



**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

		II-2	14
		SUB-TOTAL	49
BLS-4	4500.9	I-1	7
		I-2	0
		I-3	17
		II-1	6
		II-2	9
		III-1	8
		SUB-TOTAL	47
TOTAL	8671.3	TOTAL	196

The size of the plots is 1 m × 1 m (square) for low grass stratum (BLS-2), and 2 m × 2 m for all other baseline strata (BLS-1, BLS-2 and BLS-3). All living material of shrubs inside the plots was harvested to ground level and weighed, and the underground part was also dug and weighed. Well-mixed samples (80-120 g) were then collected and oven dried to determine dry-to-wet matter ratios. These ratios are then used to convert the entire sample to oven-dry matter. To understand the natural regeneration of trees on the project lands, the appearance of natural regenerated trees was counted before the time of destructive harvest. No natural regenerated sapling or young trees have been found during the sampling survey.

Based on the sampling measurement, the carbon stock in the living biomass of shrubs on land prior to the start of the proposed A/R CDM project activity were estimated as shown in Table annex 3-6.

Table Annex 3-6 Carbon stock in living biomass of pre-project shrubs

Baseline strata ID	Area (ha)	Carbon stock (tC/ha)			Carbon stock (tC)		
		AGB	BGB	Total	AGB	BGB	Total
BLS -1	620.5	0.273 (0.066)	0.128 (0.026)	0.401	169.6	79.5	249.1
BLS -2	1274.2	0.134 (0.028)	0.056 (0.009)	0.190	171.4	70.8	242.2
BLS -3	2275.7	1.538 (0.022)	0.482 (0.007)	2.019	3,499.9	1,095.9	4,595.7
BLS -4	4500.9	0.746 (0.088)	0.278 (0.031)	1.024	3,357.7	1,250.6	4,608.3
<b>Total</b>	8671.3				7,198.6	2,496.7	9,695.3

Figures in brackets are standard errors.

## 5.2 Pre-project scarce trees





**PROJECT DESIGN DOCUMENT FORM**  
**FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

The pre-project living trees have been measured by sampling or full counting depending on the density or scarcity of their numbers. In Tianlin County, where relatively more living trees exist on lands, a sampling survey was conducted. A temporary plot with an area of 0.067 ha has been randomly selected for each sub-compartment. DBH, height, age and crown radius of all trees within sampled plots were measured. The number of sampling plots were decided depending on the size of the sub-compartment, i.e., 2 plots for a sub-compartment less than 3 ha, 4 plots for 3-7 ha of sub-compartment, 6 plots for 7-10 ha of sub-compartment and 8 plot for a sub-compartment over 10 ha. 1166 plots have been sampled in total, including 211 plots without living trees.

For lands in Longlin County and Linyun County where pre-project trees are either very scarce or absent, all trees on each sub-compartment have been counted and measured. The mean age, DBH, height, crown diameter and number of pre-living trees for each baseline stratum have been summarized in Annex table 3-2.

The potential crown diameter at maturity has been estimated. The crown area for one tree at maturity is estimated about 25 m<sup>2</sup>, and a maximum of 75 trees per hectare gives 1875 m<sup>2</sup>, equivalent to 18.75% of crown cover which is below the threshold of 20% for defining as a forest.

Allometric volume equations presented in Section E.4.1 are used to estimate the standing volume of the pre-project scarce trees. The standing volume is then converted to aboveground and belowground biomass via parameters listed in Table D-1 above.

Table Annex 3-7 Carbon stock in pre-project living trees

Stratum ID	Species	Carbon stock (tC)		
		AGB	BGB	total
BLS-1	hardwood	12.4	3.2	15.6
	softwood	19.5	5.6	25.1
	<b>sub-total</b>	<b>31.8</b>	<b>8.9</b>	<b>40.7</b>
BLS-2	hardwood	6.0	1.6	7.5
	softwood	9.5	2.7	12.2
	pine	95.0	19.0	114.0
	<b>sub-total</b>	<b>110.5</b>	<b>23.3</b>	<b>133.8</b>
BLS-3	hardwood	7.6	2.0	9.6
	softwood	17.1	4.9	22.0
	pine	5.8	1.2	7.0
	Chinese fir	0.6	0.1	0.8
	<b>sub-total</b>	<b>31.2</b>	<b>8.2</b>	<b>39.4</b>
BLS-4	hardwood	23.8	6.2	30.0
	softwood	21.2	6.1	27.4
	pine	35.0	7.0	42.0
	Chinese fir	0.9	0.2	1.1
	<b>sub-total</b>	<b>81.0</b>	<b>19.6</b>	<b>100.6</b>
<b>Total</b>		<b>254.5</b>	<b>60.0</b>	<b>314.5</b>



## 6. Baseline net removal by sinks

The carbon stock in living biomass of pre-project growing trees is expected to increase in the absence of the proposed A/R CDM project activity, due to continuous growth of the living trees. The carbon stock in the living biomass of pre-project trees has been predicted using carbon stock change method (refer to Equation (7)-(10) in Section II.4.1 of the applied methodology AR-ACM0001/version 03:

$$C_{it} = \sum_{j=1}^J (C_{AB,ijt} + C_{BB,ijt})$$

$$C_{AB,ijt} = V_{ijt} \cdot D_j \cdot BEF_{2,j} \cdot CF$$

$$C_{BB,ijt} = C_{AB,ijt} \cdot R_j$$

$$V_{ijt} = V_{ijt,s} \cdot N_{ij}$$

Where

$C_{it}$	carbon stock in living biomass for stratum $i$ , time $t$ ; tonnes C.
$C_{AB,ijt}$	carbon stock in above-ground biomass for stratum $i$ , species $j$ , at time $t$ ; tonnes C
$C_{BB,ijt}$	carbon stock in below-ground biomass for stratum $i$ , species $j$ , at time $t$ ; tonnes C
$V_{ijt}$	Standing volume of stratum $i$ , species $j$ , at time $t$ ; m <sup>3</sup>
$D_j$	wood density for species $j$ ; tonnes d.m. m <sup>-3</sup> standing volume, from table D-1
$BEF_{2,j}$	biomass expansion factor for conversion of standing volume to aboveground tree biomass for species $j$ ; dimensionless
$CF$	Carbon fraction, dimensionless, $CF=0.5$ (IPCC default)
$R_j$	root-shoot ratio for species $j$ ; dimensionless, from table D-1
$V_{ijt,s}$	average standing volume per tree in stratum $i$ , species $j$ , at time $t$ ; m <sup>3</sup> tree <sup>-1</sup>
$N_{ij}$	Number of pre-project living trees for stratum $i$ species $j$ ;

BEF for single trees is likely larger than forests and there is no BEF for single trees. To make our estimation conservative, we assumed that BEF for single trees is 30% larger than that for forests in from table D-1.

$V_{ijt,s}$  is estimated using growth curves below. These curves were fitted with local forest inventory data.

Hardwood:  $V = 0.9741(1 - e^{-0.0314 \cdot A})^{4.2366}$

Softwood:  $V = 1.12599 / ((1 + 9.000025/A)^{6.8837})$

Pine:  $V = 2.0019 / ((1 + 4.9998/A)^{9.2962})$

Chinese fir:  $V = 0.4451(1 - e^{-0.0800 \cdot A})^{5.3617}$

The estimated baseline net GHG removals by sinks are the sum of the carbon stock change in above- and below-ground biomass. Detail information is listed in Table annex 3-8 and Table annex 3-9 below.



**PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

Table annex 3-8 Estimates of baseline carbon stock changes

Year	C stock (tC)			C stock change (tCO <sub>2</sub> /yr)			Cumulative C stock change (tCO <sub>2</sub> )
	AGB	BGB	Total	AGB	BGB	total	
2007	254.5	60.0	314.5	0	0	0	
2008	336.8	79.6	416.4	302	72	374	374
2009	431.4	102.3	533.6	347	83	430	804
2010	537.8	127.9	665.7	390	94	484	1,288
2011	655.5	156.3	811.8	431	104	536	1,823
2012	783.8	187.4	971.2	471	114	585	2,408
2013	922.2	221.1	1,143.3	507	124	631	3,039
2014	1,070.1	257.3	1,327.3	542	132	675	3,714
2015	1,226.8	295.7	1,522.5	575	141	716	4,430
2016	1,391.9	336.3	1,728.2	605	149	754	5,184
2017	1,564.8	379.0	1,943.8	634	156	790	5,974
2018	1,745.0	423.5	2,168.6	661	163	824	6,798
2019	1,932.1	469.9	2,402.0	686	170	856	7,654
2020	2,125.4	518.0	2,643.4	709	176	885	8,539
2021	2,324.7	567.6	2,892.3	731	182	913	9,452
2022	2,529.4	618.8	3,148.1	751	187	938	10,390
2023	2,739.1	671.2	3,410.3	769	192	961	11,352
2024	2,953.5	725.0	3,678.4	786	197	983	12,335
2025	3,172.0	779.9	3,951.9	801	201	1,003	13,337
2026	3,394.4	835.8	4,230.2	815	205	1,021	14,358
2027	3,620.3	892.7	4,512.9	828	209	1,037	15,394

Table annex 3-9 Estimates of baseline net removals for each baseline stratum

Year	Baseline net removals by sinks (tCO <sub>2</sub> /yr)			
	BLS-1	BLS-2	BLS-3	BLS-4
2008	50.2	127.9	50.0	145.6
2009	60.7	139.4	57.8	172.0
2010	72.1	149.4	65.2	197.4
2011	84.2	157.8	72.0	221.7
2012	97.0	164.8	78.2	244.7
2013	110.4	170.6	83.7	266.3
2014	124.2	175.2	88.7	286.6
2015	138.3	178.7	93.2	305.5
2016	152.7	181.4	97.1	323.1
2017	167.1	183.3	100.5	339.6
2018	181.5	184.5	103.4	354.8
2019	195.9	185.1	105.9	369.0

**CDM – Executive Board****PROJECT DESIGN DOCUMENT FORM  
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-AR-PDD) - Version 04**

2020	210.1	185.1	108.0	382.0
2021	224.0	184.8	109.8	394.1
2022	237.6	184.0	111.2	405.2
2023	250.7	183.0	112.4	415.4
2024	263.5	181.6	113.3	424.6
2025	275.7	180.1	113.9	433.0
2026	287.3	178.3	114.3	440.6
2027	298.3	176.4	114.6	447.4



**Annex 4**

**MONITORING PLAN**

All information has been included in Section E above. Therefore, Annex 4 here is left intentionally blank.