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History of the document

Version	Date	Nature of revision
01	19 Feb 2008	This CCBA PDD template has been developed by TÜV SÜD in support to CCBA. TÜV SÜD refrains from responsibilities related to the completeness and accurate inclusion of CCBA indicators to this form. For AR projects: If the CCBA PDD is used in combination with an AR-CDM PDD, it is recommended to briefly indicate in the CCBA PDD, which chapter of the AR-CDM PDD already contains the relevant information - avoiding in this manner the duplication of information.

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I. Basic Data:

1) The title of the CCB Standards project activity:

>> Afforestation and Reforestation on Degraded Lands in Northwest Sichuan, China

2) The version number of the document:

>> Version 04

3) The date of the document:

>> Date of the document: 07/27/2010

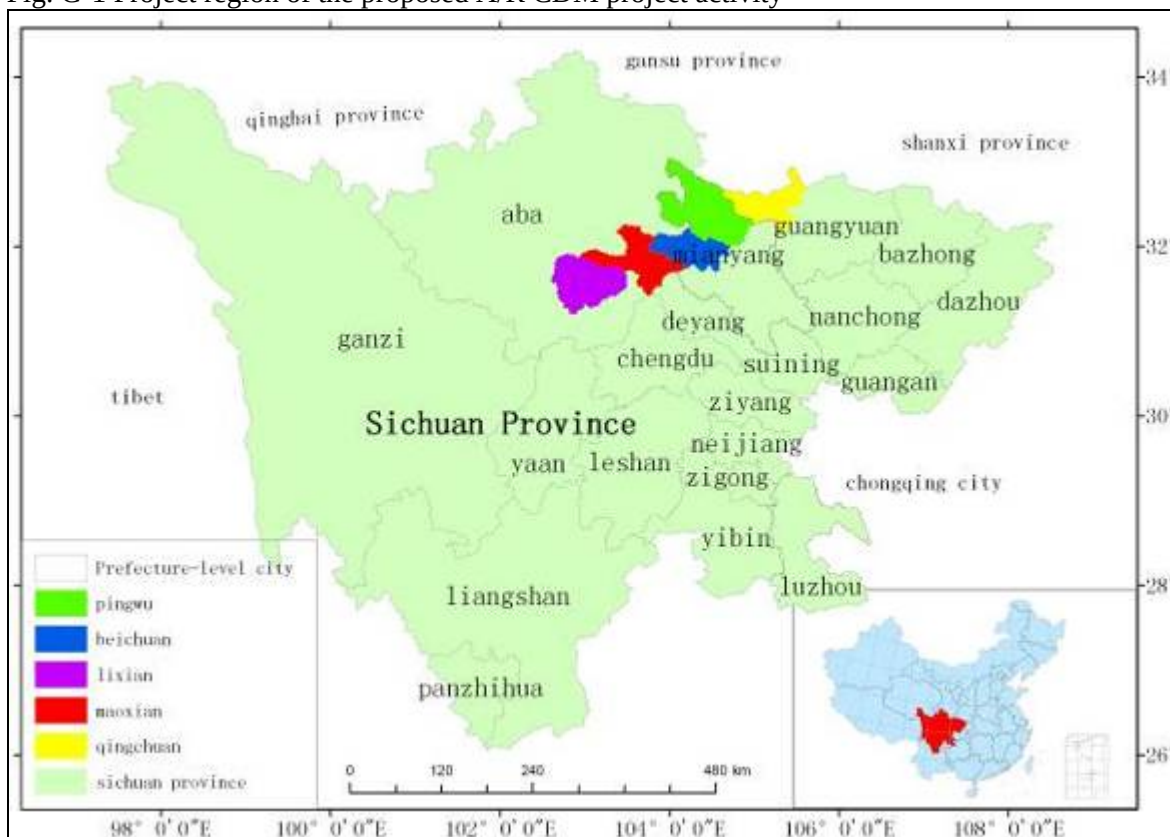
II. General Section:

G1 Original Conditions at Project Site (Required)

G.1.1 Describe the location of the project and basic physical parameters (e.g., soil, geology, climate).

>> **location**

Fig. G-1 Project region of the proposed A/R CDM project activity



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Table G-1 List of townships and villages involved:

Counties	Towns/ Townships	Villages	Land ID	Local names	Area (ha)
Beichuan	Xiaoba	Yongxin	BC-YX-2006-01	Sanchagou	29.1
			BC-TB-2006-01	Damaopo	28.4
	Chenjiaba	Tongbao	BC-TB-2006-02	Damaopo	6.3
			BC-TB-2006-03	Longchiliang	23.6
	Duba	Huangdimiao	BC-HDM-2006-01	Jianheya	56.8
	Qingpian	Anmian	BC-AM-2006-01	Qishuliangzi	19.0
		Zhenghe	BC-ZH-2006-01	Aozhaowan	37.0
Lixian	Ganbao	Rierzhu, Ganbao, Xionger	LX-XE-2006-01	Xiongershan	200.4
		Xionger, Lianhe	LX-XE-2006-02	Xiongershan	378.5
	Xuecheng	Shajin	LX-XE-2006-03	Xiongershan	168.9
Maoxian	Nanxin	Bieli	MX-BL-2006-01	Chimuping	234.9
Pingwu	Gaochun	Wuyi	PW-WY-2006-01	Jingyingshan, Shijialiang, Shijiawan	109.8
	Shuijing	Xinhua	PW-XH-2006-01	Meiziping, Jingzhulin	42.2
	Nanba	Tongjiang	PW-TJ-2006-01	Fengxiangshu	14.5
	Pingtong	Xinyuan	PW-XY -2006-01	Mazhiping	24.1
Qingchuan	Baijia	Huajian	QC-HJ-2006-01	Hougouping	50.5
			QC-HJ-2006-02	Hougouping	9.8
	Dayuan	Shuojia	QC-SJ-2006-01	Gongjiawan, Dabeishan	107.1
	Fangshi	Xinqiao	QC-XQ-2006-02	Denzhuangling	125.0
			QC-XQ-2006-01	Zhongjianliang	52.9
	Kongqi	Yaolin	QC-YL-2006-01	Tianchibao	23.3
			QC-CX-2006-02	Xiaofetan	34.4
	Malu	Caiqi	QC-CX-2006-01	Xiaofetan	45.5
		Fangshi	QC-FS-2006-01	Bayanwo	60.2
	Maoba	Jinjia	QC-JJ-2006-01	Xiangyanzi	45.2
	Qiaolou	Hexi	QC-HX-2006-01	Baijiawan	44.0
			QC-DQ-2006-01	Shipoliang	39.2
	Qingqi	Dongqiao	QC-DQ-2006-02	Dongshan	28.8
			QC-LYG-2006-01	Miaobeihou	58.2
		Luoyigou	QC-LYG-2006-02	Miaobeihou	16.2
			QC-WB-2006-01	Guniuwan	38.4
	Sanguo	Dongyang	QC-DY-2006-01	Dachaoli	15.5
			QC-DY-2006-02	Siertai	12.0
			QC-DY-2006-03	Dachaoli	5.0
			QC-DY-2006-04	Fangniuping	5.3
	Zhuyuan	Qingjiang	QC-QJ-2006-01	Taba	61.8

>>physical parameters

The project area is located at the transitional zone from Western Sichuan Plateau to Sichuan Basin. Deep valleys intervene among high mountains, with a mean elevation 2000-3500m. The environmental conditions of the project area planned for the proposed A/R CDM project activity are summarized as follows¹

Climate

Climate in *Lixian County* belongs to mountainous monsoon climate, controlled by west current and southwest monsoon. There are apparent two drought seasons and two rainy seasons annually. Drought seasons appear in the winter and summer (July and August) while rainy seasons occur in the spring and autumn. Due to the high mountains and deep valleys, there is an apparent vertical climatic feature. The annual mean air temperature varies among 6-9 °C with significant daily and seasonal variations. Annual precipitation is 400-900mm, increase with the increasing of the elevation. Annual mean evaporation is 739.3mm, with extreme evaporation of 1656.7mm. The climate of the project lands in Lixian County belongs to warm-temperate and temperate climate.

In *Maoxian County*, the mean annual temperature is 11.9°C with extreme lowest temperature - 11.6 °C and highest temperature up to 29.4 °C. The mean annual precipitation is 481.4 mm which is much lower than mean annual evaporation (1445.5 mm). There is apparent vertical climatic feature, and drought and raining season.

The climate in *Qingchuan County* belongs to subtropical moist monsoon climate. The mean annual temperature is 13.7°C, decreasing from southeast to the northwest. There are 233 days of frost-free days. The mean annual precipitation is 993 mm, mainly occurring in summer and autumn, and the precipitation increases with the increasing elevation. The mean annual sunshine is 1100-1500 hours and the mean annual relative air humidity is 75 per cent.

The climate in *Pingwu County* belongs also to the subtropical monsoon climate, with a mean annual temperature of 14.7°C, mean annual precipitation of 806 mm, annual evaporation 1089.7 mm, extreme highest temperature 37 °C and extreme lowest temperature.

Beichuan County has a subtropical wet monsoon climate, with mean annual temperature 15.6°C, annual precipitation 1400 mm and annual frost-free days 282 days. 86 percent of precipitation occurs from May to September, accounting for 86%. Due to the complex landform, there is a typical drought in winter and spring, and flood in summer and autumn.

There are frequent natural disasters in the project area. For example, frequent land slide in Qingchuan County and Beichuan County, frequent drought in both spring and summer in Pingwu County.

Soil

There is an apparent vertical spectrum of soils in Lixian County and Maoxian County. They are mountainous dry cinnamon soil (1442-2000m), mountainous cinnamon soil (2000-2800m), mountainous brown soil (2800-3500m), mountainous podzolic soil (3500~4200m), subalpine meadow soil and alpine meadow soil (4200~4400m). Soil for the lands to be planted in Lixian

¹ Data sources: Forest Inventory in Sichuan Province, 2001; Forest inventory in Lixian County, 2003; Forest inventory in Maoxian County, 2005; Forest inventory in Qingchuan County, 2003; Forest inventory in Pingwu County, 1998; Forest inventory in Beichuan County, 2001

County is mountainous cinnamon soil, with sparse vegetation and severe soil erosion, and it is brown soil in Maoxian County, with less soil erosion.

The zonic soil in Qingchuan County is yellow earth. However there is also a vertical variation. The yellow earth is generally distributed below 1100 m. It is mountainous yellow earth at 1100-1500 m, mountainous yellow-brown soil at 1500-1900 m, brown soil at 1900-2400 m, and mountainous podzolic soil at 2400-2800 m and mountainous meadow over 2800 m. The soil for lands to be planted in Qingchuan County is mountainous yellow earth, with a pH value 5.5-6.5, loam texture. The parent rock of the soil includes schist, shale, sand stone, lime stone, etc.

Soils in Beichuan County and Pingwu County include mountainous yellow earth at 540-1450 m, mountainous yellow-brown soil at 1450-2100 m, brown soil and dark brown soil at 2200-3000 m, alpine meadow soil at 3700-4000 m. The soil for lands to be planted in Beichuan and Pingwu County is mountainous yellow earth, with a pH value 5.5-6.5

Hydrology

The project areas are located at the upper stream of Minjiang River, Jialinjiang River and Fujiang River, all of which are the first order branches of the Yangtze River.

Lixian County: Zagulao River, the branch stream of the Minjiang River flows through the county. The Zagulao River is 157.4 km in length and has a mean discharge of $63.9 \text{ m}^3 \text{ s}^{-1}$, an annual mean soil transportation around 2.1 million tonnes and annual surface runoff 3.47 billion m^3 . It has 48 branches among which 9 branches have their watershed area over 100 km^2 each. The lands to be planted in the proposed A/R CDM project activity are located on the steep slopes at two sides of the mainstream of the Zagulao River. There are also 95 natural lakes in the county with a total water volume up to 113 million m^3 .

Maoxian County: Heisuihe River that is the branch stream of the Minjiang River and Tumenhe River that is the branch of Fujiang River, flow through the county.

Qingchuan County: There are over 19 rivers with watershed area each over 50 km^2 , including Bailongjiang River, Qingzhujiang River and Qiaozhuang River. The total length is over 550 km, with a river density 0.17 km per km^2 and the mean surface runoff 170 million cubic meter. All of these rivers belong to Jialinjiang River.

Pingwu County: Hujiang River, Duobuhe River and Qingyijiang River and their branches flow through the county.

Beichuan County: Hujiang River and its branches distributed in the county, with a total watershed area of 2625 km^2 .

G.1.2 Describe the types and condition of vegetation at the project site:

>> vegetation in *Lixian County*: Due to the vertical climatic feature, There is an apparent vertical vegetation spectrum. The vegetation from 1442 m to 2000m belongs to warm-temperate xerosere shrub and herbs, with sparse natural vegetation cover, dominated by such shrubs as *Sophora viciifolia* (vetchleaf sophora), *Convolvulus tragacuthoides* (Spiny glorybind), *Bauhinia variegata* (Buddhist bauhinia), *Indigofera tinctoria* (True indigo), *Berberis sp* (barberry), *Periploca sepium* (Chinese silkvine), etc., and herbaceous plants. At the elevation 2000-2500m, zonic vegetation is temperate needle-leaf and broadleaf mixed forest, dominated by *Quercus liaodongensis*, poplar sp, *Cupressus chengiana*, *Acer sp*, *Pinus tabulaeformis*, etc. At the elevation 2500-3000m, it is needle-leaf and broadleaf mixed forest belt, with tree species dominated by Hemlock, *Quercus sp*, *Abies sp*,

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Spruce sp, Pinus, Pinus armandi (Armand pine), Acer sp, birch, bass etc. At the elevation 3000-4000 m it is subalpine needle-leaf forest belt, with main species including Abies sp, Spruce, larch, Betula albo-sinensis, oak and birch. The subapline meadow is distributed at elevation 4000-4400m. Lands to be planted in Lixian County in the proposed A/R CDM project activity is located in the drought valley with a elevation 1700-2600m above sea level and slope gradient 20-35 degree. The lands have been non-forested lands in the memory of local people. Adapted to the drought climate, the lands are currently covered with sparse shrub and herbaceous plants including Artemisia apiacea (Celery wormwood), Caryopteris sp (Bluebeard), Selaginella tamariscina---Sophora viciifolia, Berberis sp grassland andA rtemisia apiacea, Caryopteris sp----Berberis sp, Sophora viciifolia, and rosebush.

vegetation in *Maoxian County* are similar to those in Lixian County. Located at 2400-3000m above sea level with slope gradient 25-35 degree, the lands to be planted in Maoxian County in the proposed A/R CDM project activity are covered with shrub and/or grass dominated by gramineous grass and ranunculus grass, secondary vegetation following the deforestation of original needle-leaf and broadleaf mixed forest.

In *Qingchuan County*, it is evergreen and deciduous broadleaf forest belt below 1100m, dominated by such species as oak, maple, masson pine, cypress, etc. It is replaced by deciduous forests at 1100-1900m above sea level, dominated by oak, birch, basswood, etc.. At 1900-2800m above sea level it is dark coniferous forests composed mainly of abies and spruce. The vegetation above 2800m is mainly meadow and shrub. Located at elevation 1000-1800m above sea level with slope gradient 10-30 degree, lands to be planted in Qingchuan County in the proposed A/R CDM project activity are covered with shrub and/or grass, including cogon-raspberry bush, cogon-hickory bush or cogon grass, the secondary vegetation following the deforestation of original deciduous broadleaf forests and human intervention.

The zonic vegetation in *Pingwu County* is evergreen broadleaf forests at elevation 600-1600m, evergreen and deciduous mixed broadleaf forests at 1600-2200m, needleleaf and broadleaf mixed forests at 2200-2800m, dark coniferous forests at 2800-3500m, and sub-alpine shrub vegetation above 3500 m above sea level. Lands to be planted in Pingwu County in the proposed A/R CDM project activity are located at elevation 1300-1900m above sea level with slope gradient 15-22 degree. Current vegetation are grass and shrub species dominated by gramineous, fern-raspberry, Vitex negundo, Pyracantha fortuneana (firethorn), Berberis sp bush and gramineous grass and fern, a zonic vegetation after the deforestation of original broadleaf forests or needleleaf and broadleaf mixed forests followed by human intervention.

The zonic vegetation in *Beichuan County* is evergreen broadleaf forests at elevation 540-1800m, evergreen and deciduous mixed broadleaf forests at 1800-2200m, needleleaf and broadleaf mixed forests at 2200-2800m, dark coniferous forests at 2800-3500m, and sub-alpine shrub vegetation above 3500m. Lands to be planted in Beichuan County in the proposed A/R CDM project activity is covered with shrub and/or grass, at elevation 1400-2300m above sea level and slope gradient 20-30 degree. Major species covering on lands include Diplopterygium glaucum-Indigofera tinctoria, Sophora viciifolia bush, fern, gramineous grass, and fern-rosebush and raspberry bush.

The lands to be afforested or reforested were mostly deforested in 1950s-1980s. Currently 234.9 ha of lands (in Maoxian) are grazing lands and a few other pieces of lands are sporadically grazing, and all other lands are abandoned barren lands (Table A-3). However grazing is illegal activities because all lands within the project boundary are legally defined as forestry land. There is no land tenure conflict. (see table G-2 for the current land use/cover and deforestation time).

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Table G-2 Current land use/cover and deforestation time of the lands to be planted

Counties	Towns/ Townships	Villages	Land ID	Current land use	Current vegetation	deforestation time
Beichuan	Xiaoba	Yongxin	BC-YX-2006-01	Barren land	Shrub land dominated by Diplopterygium glaucum- Indigofera tinctoria, Sophora viciifolia bush	Early 1960s due to agricultural cultivation
			BC-TB-2006-01		Grassland dominated by fern, gramineous herb	Late 1950s due to agricultural cultivation
	Chenjiaba	Tongbao	BC-TB-2006-02	Sporadic grazing	Grassland dominated by fern, gramineous herb	Late 1950s due to agricultural cultivation
			BC-TB-2006-03		Shrub land dominated by fern-Indigofera tinctoria, Sophora viciifolia bush	Late 1950s due to agricultural cultivation
	Duba	Huangdi miao	BC-HDM-2006-01	Sporadic grazing	Shrub land dominated by fern-rosebush, raspberry bush	1960s due to agricultural cultivation
	Qingpian	Anmian	BC-AM-2006-01	Barren land	Grassland dominated by fern, gramineous herb	Early 1960s due to cultivation for medicine
		Zenghe	BC-ZH-2006-01			
	Lixian	Ganbao, Xuecheng	LX-XE-2006-01-1	Sporadic grazing	Grassland, with shrub crown cover less than 10%, dominated by Artemisia apiacea, Caryopteris sp, Selaginella tamariscina—Sophora viciifolia, Berberis sp	Over 100 years
			LX-XE-2006-01-2			
			LX-XE-2006-01-3			
			LX-XE-2006-01-4			
			LX-XE-2006-01-5			
			LX-XE-2006-01-6			
			LX-XE-2006-01-7			
			LX-XE-2006-02-1			
			LX-XE-2006-02-2			
			LX-XE-2006-02-3			
			LX-XE-2006-02-4			
			LX-XE-2006-02-5			
			LX-XE-2006-02-6			
			LX-XE-2006-02-7			
			LX-XE-2006-02-8			
			LX-XE-2006-02-9			
			LX-XE-2006-03-3			
			LX-XE-2006-03-4			
			LX-XE-2006-03-5			
			LX-XE-2006-03-6			
			LX-XE-2006-01-8	Sporadic grazing	Shrub-grassland, with shrub crown cover about 40%, dominated by Artemisia apiacea, Caryopteris sp— Berberis sp, Sophora viciifolia, rosebush	Over 100 years
			LX-XE-2006-02-10			
			LX-XE-2006-02-11			
			LX-XE-2006-02-12			
			LX-XE-2006-03-1			
			LX-XE-2006-03-2			
Maoxian	Nanxin	Bieli	MX-BL-2006-01	Grazing land	Grassland dominated by gramineous herb and	Early 1970s due to cultivation

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				ranunculaceous herb	for medicine planting and grazing	
Pingwu	Gaochun	Wuyi	PW-WY-2006-01-1	Barren land	Shrub-grassland with shrub crown cover less than 30%, dominated by gramineous herb, fern-raspberry, Vitex negundo, firethorn, Berberis sp bush	Late 1950s and early 1960s due to Iron and Steel Campaign
			PW-WY-2006-01-2	Barren land	Grassland dominated by gramineous herb and fern	Late 1950s and early 1960s due to Iron and Steel Campaign
			PW-WY-2006-01-3	Barren land	Shrub-grassland with shrub crown cover less than 30%, dominated by gramineous herb, fern-raspberry, Vitex negundo, firethorn, Berberis sp bush	Late 1950s and early 1960s due to Iron and Steel Campaign
	Shuijing	Xinhua	PW-XH-2006-01	Barren land	Shrub-grassland with shrub crown cover less than 30%, dominated by gramineous herb, fern-rosebush, Vitex negundo bush	Late 1950s and early 1960s due to Iron and Steel Campaign
	Nanba	Tongjiang	PW-TJ-2006-01	Barren land	Grassland dominated by gramineous herb and fern	Late 1950s and early 1960s due to Iron and Steel Campaign
	Pingtong	Xinyuan	PW-XY -2006-01	Barren land	Grassland dominated by gramineous herb and fern	Late 1950s and early 1960s due to Iron and Steel Campaign
Qinchuan	Baijia	Huajian	QC-HJ-2006-01 QC-HJ-2006-02	Barren land	Shrub-grassland with shrub crown cover 30-40%, dominated by fern	1950s-1970 due to Iron and Steel Campaign
	Dayuan	Shuojia	QC-SJ-2006-01	Sporadic grazing	Grassland dominated by fern and cogon herbs	Late 1950s due to Iron and Steel Campaign
	Fangshi	Xinqiao	QC-XQ-2006-01 QC-XQ-2006-02	Sporadic grazing	Shrub-grassland with shrub crown cover 30-40%, dominated by fern	1950s-1970 due to Iron and Steel Campaign
	Kongqi	Yaolin	QC-YL-2006-01	Barren land	Shrub-grassland dominated by fern, cogon-hickory bush	Early 1980s due to land tenure reform
	Malu	Laiqi	QC-CX-2006-01 QC-CX-2006-02	Barren land	Shrub-grassland with shrub crown cover 30-40%, dominated by fern	Early 1960s due to Iron and Steel Campaign
		Fangshi	QC-FS-2006-01	Sporadic grazing	Shrub-grassland with shrub crown cover 30-40%, dominated by fern	Early 1980s due to land tenure reform

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Maoba	Jinjia	QC-JJ-2006-01	Barren land	Grassland dominated by fern and cogon bush	1950s-1970 due to Iron and Steel Campaign
Qiaolou	Hexi	QC-HX-2006-01-1	Sporadic grazing	Shrub-grassland with shrub crown cover 30-40%, dominated by fern-hickory bush	Early 1980s due to land tenure reform
		QC-HX-2006-01-2	Sporadic grazing	Shrub-grassland with shrub crown cover less than 30%, dominated by fern	Early 1980s due to land tenure reform
Qingqi	Dongqiao	QC-DQ-2006-01	Sporadic grazing	Shrub-grassland with shrub crown cover less than 30%, dominated by cogon-raspberry bush	Early 1980s due to land tenure reform
		QC-DQ-2006-02			
	Luoyigou	QC-LYG-2006-01	Barren land	Shrub-grassland with shrub crown cover 30-40%, dominated by fern and cogon bush	1950s-1970 due to Iron and Steel Campaign
		QC-LYG-2006-02			
Weiba	QC-WB-2006-01	Barren land	Shrub-grassland with shrub crown cover 30-40%, dominated by fern and cogon bush	Early 1980s due to land tenure reform	
Sanguo	Dongyang	QC-DY-2006-01	Barren land	Grassland dominated by gramineous herb	1950s-1970 due to Iron and Steel Campaign
		QC-DY-2006-02	Barren land	Grassland dominated by cogon	1950s-1970 due to Iron and Steel Campaign
		QC-DY-200603 QC-DY-200604			
Zhuyuan	Qingjiang	QC-QJ-2006-01	Barren land	Shrub-grassland with shrub crown cover 30-40%, dominated by fern	1950s-1970 due to Iron and Steel Campaign

G.1.3 Current carbon stocks at the project site(s), using methodologies from the Intergovernmental Panel on Climate Change's Good Practice Guidance (IPCC GPG) or other internationally approved methodologies (e.g. from the CDM Executive Board):

>> **using methodologies:** The revised approved afforestation and reforestation baseline methodology "Afforestation and reforestation of degraded land through tree planting, assisted natural regeneration and control of animal grazing" (AR-AM0003/version 03)² is applied. The proposed A/R CDM project activity complies with the conditions under which the chosen methodology applies in the following ways:

- As presented in Table G-2, some parcels of lands to be planted in the proposed A/R CDM project activity are currently grazing lands or sporadically grazing lands, thus are subjected to a shift of pre-project grazing activities outside the project boundary.
- Lands to be afforested or reforested are severely degraded and the lands are still degrading or remain in a low carbon steady state. Most lands are currently covered by grasses, shrubs and a few spotted growing trees. But the tree crown cover on this land is below the

² http://cdm.unfccc.int/EB/Meetings/026/eb26_repan16.pdf

thresholds for defining a forest set by Chinese DNA that are consistent with decision 3/CMP.1 and 5/CMP.1, and would not reach the threshold under continuation of current management (see also Table G-2 above).



- Unavailability of natural seed sources, environmental conditions, and/or anthropogenic pressures (grazing, fuelwood collection, fire, etc.), do not permit the encroachment of natural 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.
- Lands will be afforested or reforested through direct planting or sowing in the proposed A/R CDM project activity.
- Trees will be planted with low density (1667-2500 trees per hectare), small hole site preparation (30-60 cm in diameter or 0.07-0.28 m²). As a result, the maximum surface area disturbed by site preparation is estimated to be 7.1% of the total land surface. In addition, there will be no site burning. Therefore the site preparation will not cause significant long-term net emissions from soil carbon.
- In the context of degraded and degrading lands, carbon stocks in soil organic matter, litter and deadwood will decrease more or increase less in the absence of the project activity, relative to the project scenario.
- There will be no flood irrigation in the proposed A/R CDM project activity.
- There will be no soil drainage in the proposed A/R CDM project activity so that non CO₂-

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greenhouse gas emissions from this type of activities can be neglected.

- No species used in the proposed A/R CDM project activity are not nitrogen-fixing species, thus there will be no greenhouse gas emissions from denitrification.
- Due to the degraded, degrading and remote features, the lands to be planted have been non-forested lands for many years, even over a hundred years. The limited fund also prevents government from invest on the remote degraded lands. Currently there are no other on-going or planned afforestation or reforestation activities on the lands to be planted in the proposed A/R CDM project activity.

the selected carbon pools and emission sources of the approved methodology

Table G-3 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	Conservatively omitted by the approved methodology applied
Litter	No	Conservatively omitted by the approved methodology applied
Soil organic carbon	No	Conservatively omitted by the approved methodology applied

Table G-4 GHG emissions by sources other than those resulting from changes in carbon pools

Source	Gas	Included/excluded	Justification / Explanation
Combustion of fossil fuels used for vehicles	CO ₂	Included	Potential significant emission source due to transportation
	CH ₄	Excluded	Potential emission is negligibly small as the methodology applied
	N ₂ O	Excluded	Potential emission is negligibly small as the methodology applied

G.1.4 Description of communities located in and around the project area, including basic socioeconomic information (using appropriate methodologies such as the livelihoods framework).

>> The CCB standards have been applied in the project design to ensure the integrated benefit of climate, communities and biodiversity. The CCB will be verified at the same time of the validation.

Agriculture and/or grazing are the main sources of income for local communities in the project area. However, due to severe soil erosion, agricultural production has suffered very much from flood, drought and other disasters. Food productivity is very low and the mean annual gross income per capita in the project areas is only US\$ 210 with the lowest at US\$ 109 in Bieli Village of Maoxian County (see Table G-7). To maximize the socio-economic benefit, the afforestation/reforestation design was prepared with a participatory approach. PRA methods were adopted in interviewing and consulting with farmer households in the project areas to understand the local farmers/communities' preferences, wishes and concerns, so that the proposed A/R CDM project activity would better respond to their desires for livelihood development. Communities located in and around the project area have been invited using PRA approach.

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Organizing assessment team, collecting related social-economic data, developing assessment plan and preparing tools needed for PRA. Conducting PRA by various group. Each group was lead by an expert. Specific PRA method includes:

(1) Semi-Structure Interview:

- (a) Interviewing with key persons such as village head, senior villagers and VIPs that are familiar with local social-economy, land and forest resources, land use and land tenure, fuelwood consumption, grazing activities, important historic events and environment conditions, and based on the interview developing resource map of local communities, agricultural seasoning and historic event-records.
- (b) Interviewing with farmer households: 10-15 households from each of 29 project villages of 5 counties, 348 households in total, have been randomly selected and interviewed. See Table H-1 for the number of household interviewed.

Table G-5 Number of household interviewed and questionaired

Counties	Qingchuan	Pingwu	Beichuan	Maoxian	Lixian	Total
Number of Town /Townships	10	4	4	1	2	21
Number of villages	14	4	5	1	5	29
Number of households interviewed	178	40	54	16	60	348

- (c) Questionnaire forms were developed and distributed among different stakeholders, including households interviewed above, villages, town/township governments, local forest posts and forestry bureau and nature reserves. The questionnaire forms were collected and analyzed to understand the local socio-economic profiles, land use, land tenure, income and sources, land management ways, awareness, technical know-how, favorable tree species, technical and financial barriers, need and desire of farmers in the ways to participating in the proposed A/R CDM project activity from relevant stakeholders.

- (2) Seminar of farmers' representatives.** To briefly introduce the concept, benefits and risks, procedures and modalities of CDM afforestation/reforestation project, to get comprehensive information of the historic and current situation and existing problems in local communities, as well as to understand the need and desire of local farmers, a meeting of farmer representatives was held in each village. Favorable tree species were also discussed.

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

Local farmers are well acquainted with the environmental benefits of forests. They understand that forests can contribute to sustainable environmental and socio-economic development through controlling soil erosion, cleaning air, protecting cropland and mitigating flood and drought. They also have a good conservation awareness of rare and endangered wild animals and plants. Most of them can tell the names of some protected animals in the vicinity and can voluntarily and actively participate the wildlife conservation.

At the time of the interview, local farmers had little knowledge on the concept of the carbon credit, even had not heard the terms. After the introduction by the team, local farmers/communities expresses their strong interests to participate in the proposed A/R CDM project activity because they thought that through participating in the proposed A/R CDM project activity they can obtain the following benefits:

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- ✓ Employment chance: They do not have to find jobs far away from hometown, which make it possible to look after their cropland and/or livestock at the same time.
- ✓ Income increase from selling wood and non-woody forest products and CER trade in addition to direct products.
- ✓ Greening their non-forested lands that can improve local environment, shelter cropland and reduce drought, flood, land slide and other natural disasters.
- ✓ Learning good practice on tree planting and forest management from technical training.

Many farmers regard the carbon trade invisible and intangible, hence still suspect the trueness of the carbon transaction. More training work s are necessary.

The survey showed the proposed production arrangements: the household offer lands for forest establishment as equity. The operating entity will invest in forest establishment (including site preparation, seedling, weeding, etc.), provide technical inputs, project preparation (including PDD preparation, validation, registration, verification, etc.) and manage the plantations during the crediting period, as well as take the natural and investment risks. The operating entity invests in seedlings, fertilizer, pesticide and forest management, and provide technical inputs and undertake related risks. Local farmers/communities indicated that without the proposed small-scale A/R CDM project activity it is impossible for them to plant trees on the project area due to huge pre-investment, technical unknown how, organizational barriers and low economic return in terms of the degraded remote lands.

During the PRA process, the assessment on tree species also indicates that local farmers/communities like native species and prefer tree species in orders as listed in Table H-2. However they would like to accept the recommendation of experts concerning the choice of tree species.

Table G-6 Preference order of tree species by local communities

Counties	Preference Order of Tree Species (From High to Low)
Qingchuan	<i>Cunninghamia lanceolata</i> , <i>Betula sp.</i> , <i>Liquidambar formosana</i> , <i>Quercus acutissima</i> , <i>Pinus massoniana</i>
Pingwu	<i>C. lanceolata</i> , <i>Betula sp.</i> , <i>larix sp.</i> , <i>Quercus acutissima</i>
Beichuan	<i>Magnolia officinalis</i> , <i>Betula sp.</i> , <i>Alder sp.</i> , <i>Larix sp</i>
Maoxian	<i>Betula sp.</i> , <i>Acer sp.</i> , <i>C. lanceolata</i> , <i>Quercus sp.</i> , <i>Pinus tabulaeformis</i> , <i>poplar sp.</i>
Lixian	<i>Cupressus chengiana</i> , <i>Platycladus orientalis</i> , <i>Ulmus sp.</i> , <i>Pinus tabulaeformis</i> , <i>Quercus sp.</i>

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Table G-7 Socio-economic Profiles of Project Areas

County	Town/ Township	Villages	Area to be planted (ha)	Number of household	Popu- lation	Number of labors	People employed outside	Population of ethnic minority	Forest area (ha)	Number o live-stock (head)	Cropland area (ha)	Food productio n per capita (kg)	Mean annual gross income per capita (US\$)	Annual fuelwood Consumption per capita (kg)
Beichuan	Qingpian	Zhenghe	37.0	112	488	240	72	432	106.6	720	1.4	350	386	3000
		Anmian	19.0	102	391	213	65	363	41.3	605	2.0	320	264	2800
	Xiaoba	Yongxin	29.1	81	305	245	75	492	24.5	450	2.5	350	371	2000
	Chenjiaba	Tongbao	58.3	187	715	466	140	280	9.4	950	7.4	360	262	2000
	Duba	Huangdimiao	56.8	140	524	263	80	424	48.0	1365	2.3	350	270	2500
Lixian	Ganbao	Ganbao	82.6	215	895	623	148	850	19.3	1800	2.4	400	192	1000
		Lianhe	247.4	37	243	126	47	243	15.0	274	1.9	400	128	2000
		Rierzhu	76.1	164	678	350	60	663	156.0	1800	2.6	400	167	2000
		xiong'er	172.8	102	465	312	14	465	35.1	2220	1.5	430	295	2000
	Xuecheng	Shajin	164.4	172	608	262	96	382	26.0	373	3.5	78	199	800
	State owned		4.5											
Maoxian	Nanxin	Bieli	234.9	318	1560	1200	48	1560	226.7	2700	110.0	100	109	1000
Pingwu	Gaochun	Wuyi	109.8	386	1240	1038	120	0	25.3	651	12.0	680	282	900
	Nanba	Tongjiang	14.5	167	607	205	58	0	59.7	40	30.5	400	233	850
	Shuijing	Xinhua	42.2	174	794	402	70	0	58.1	136	19.9	530	333	800
	Pingtong	Xinyuan	24.1	171	607	365	116	577	34.5	26	20.6	420	328	810
Qingchuan	Qiaolou	Hexi	44.0	349	1154	714	180	420	23.3	572	8.1	700	199	900
	Baijia	Huajian	60.3	281	1023	594	50	0	56.5	220	5.1	530	244	500

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Malu	Fangshi	60.2	262	1028	498	123	0	18.8	125	1.4	350	253	350
	caiqi	79.9	100	362	300	20	0	75.7	120	3.2	600	295	920
Fangshi	Xinqiao	177.9	279	1018	550	120	0	40.9	1215	11.8	573	192	500
Zhuyuan	Qingjiang	61.8	683	2730	1315	200	0	60.6	1370	6.9	780	151	300
Qingqi	Weiba	38.4	316	1070	500	163	0	180.0	1243	8.3	697	255	600
	Dongqiao	68.0	224	940	660	69	468	22.2	700	4.0	400	179	300
	Luoyigou	74.4	254	960	618	55	0	28.1	970	3.9	720	203	700
Dayuan	Shuojia	107.1	151	565	300	50	539	375.9	400	5.4	400	196	500
Kongqi	Yaolin	23.3	211	812	404	61	0	92.5	705	9.0	450	253	800
Maoba	Jinjia	45.2	161	624	200	56	0	45.1	200	5.6	500	141	900
Sanguo	Dongyang	37.8	700	2400	1520	116	0	449.9	2720	19.8	730	241	800

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G.1.5 A description of current land use and land tenure at the project site.

>> The lands to be afforested or reforested were mostly deforested in 1950s-1980s. Currently 234.9 ha of lands (in Maoxian) are grazing lands and a few other pieces of lands are sporadically grazing, and all other lands are abandoned barren lands (Table G-2). However grazing is illegal activities because all lands within the project boundary are legally defined as forestry land.

Except for 4.5 ha of lands in Lixian County is state-owned, all other lands to be planted in the proposed A/R CDM project activity are collective owned by villages. Most of land tenure belongs to local villages or villagers group. Except for 58.2 ha of lands in Tongbao village of Chenjiaba Township that are contracted to individual farmers for a period 2004-2053 (50 years) and 56.8 ha of lands in Huangdimiao village of Duba Township in Beichuan that are contracted to individual farmers for a period 2001-2030 (30 years). There is no land ownership/tenure conflict.

Table G-8 Current legal title to the land and the land tenure

Counties	Towns/ Townships	Villages	Land ID	Legal title to the land	Land tenure	Area (ha)
Beichuan	Xiaoba	Yongxin	BC-YX-2006-01	village	Villagers group	29.1
	Chenjiaba	Tongbao	BC-TB-2006-01 BC-TB-2006-02 BC-TB-2006-03	village	Individual farmers	58.3
	Duba	Huangdimiao	BC-HDM-2006-01	village	Individual farmers	56.8
	Qingpian	Anmian	BC-AM-2006-01	village	Villagers group	19.0
		Zenghe	BC-ZH-2006-01	village	village	37.0
Lixian	Ganbao, Xuecheng	Rierzhu, Ganbao, Xionger, Lianhe,Shajin	LX-XE-2006-01 LX-XE-2006-02 LX-XE-2006-03-1 LX-XE-2006-03-2 LX-XE-2006-03-3 LX-XE-2006-03-4 LX-XE-2006-03-5	villages	village	743.3
			LX-XE-2006-03-6	State- owned	state	4.5
Maoxian	Nanxin	Bieli	MX-BL-2006-01	village	village	234.9
Pingwu	Gaochun	Wuyi	PW-WY-2006-01	village	village	109.8
	Shuijing	Xinhua	PW-XH-2006-01	village	village	42.2
	Nanba	Tongjiang	PW-TJ-2006-01	village	village	14.5
	Pingtong	Xinyuan	PW-XY -2006-01	village	village	24.1
	Baijia	Huajian	QC-HJ-2006-01 QC-HJ-2006-02	village	village	60.3
Qingchuan	Dayuan	Shuojia	QC-SJ-2006-01	village	Villagers group	107.1

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Fangshi	Xinqiao	QC-XQ-2006-01 QC-XQ-2006-02	village	village	177.9
Kongqi	Yaolin	QC-YL-2006-01	village	village	23.3
Malu	Laiqi	QC-CX-2006-01 QC-CX-2006-02	village	village	79.9
	Fangshi	QC-FS-2006-01	village	village	60.2
Maoba	Jinjia	QC-JJ-2006-01	village	village	45.2
Qiaolou	Hexi	QC-HX-2006-01	village	Villagers group	44.0
Qingqi	Dongqiao	QC-DQ-2006-01 QC-DQ-2006-02	village	village	68.0
		QC-LYG-2006-01 QC-LYG-2006-02	village	village	74.4
	Weiba	QC-WB-2006-01	village	Villagers group	38.4
Sanguo	Dongyang	QC-DY-2006-01 QC-DY-2006-02 QC-DY-2006-03 QC-DY-2006-04	village	Villagers group	37.8
Zhuyuan	Qingjiang	QC-QJ-2006-01	village	Villagers group	61.8

G.1.6 Description of current biodiversity in the project area and threats to that biodiversity, using appropriate methodologies (e.g., key species habitat analysis, connectivity analysis), substantiated with reference (evidence) where possible.

>> The five counties within which the proposed A/R CDM project activity will be implemented have very rich biodiversity. There are 2 national nature reserves and 7 provincial nature reserves. Over 3000 species of high plants, 85 species of beasts, 210 species of birds, 18 species of amphibians, 19 species of reptiles, 12 species of fishes and 287 species of insects have been recorded in these nature reserves. Among them, seven plant species are listed in category I of national protected plants, and other 6 species in category II. *Moschus berezovskii*, *Moschus moschiferus*, *Ailuropoda melanoleuca*, *Rhinopi the cus bieti*, *Budorcas taxicolor*, *Panthera uncial*, *Neofelis nebulosa*, etc. are listed in the category I of the national protected animals. *Lophophorus lhuysii*, *Tetraophasis obscurus*, *Tetrastes sewerzowi*, *Aquila chrysaetos* and *Grus nigricollis* belong to category I of the national protected birds.

G.1.7 List of all IUCN Red List threatened species (which encompasses endangered and vulnerable species) and species on nationally recognized list (where applicable) found within the Project boundary.

>> Based on baseline survey no protected or endangered species and IUCN species have been found on the proposed project lands. These lands currently have low biodiversity.

G2 Baseline Projections (Required)

G.2.1 Description of the most likely land-use scenario in the absence of the Project activity.
Identify whether the scenario assumes that existing laws or regulations would have required that project activities be undertaken anyway:

>> Analyze historical land use, local and sectoral land-use policies or regulations and land use alternatives.

- a) As presented in table G-2, lands to be planted within the project boundary had been forested lands in the history, from a century ago to 1980s. However, the areas suffered several large-scale events of deforestation since then, mainly caused by unreasonable policies. Currently, the lands are degraded barren lands of low productivity with a few grazing activities, covered with some grasses, shrubs and spotted trees. Since all lands within the project boundary are legally forestry lands, the current grazing or sporadic grazing activities are illegal. The crown cover of the spotted trees is below 20% that is the threshold of forest definition in China, and will not exceed 20% with continuation of current management such as grazing, fuel wood collection, frequent fire, soil erosion .
- b) Interview with local farmers indicated that crown cover of both tree and non-tree vegetation have been decreasing in the last decades due to illegal grazing, fire and/or fuelwood collecting, and soil erosion become more and more severe.
- c) National, local and sectoral land-use policies or regulations Since 1980s, China has successively issued and revised a series of laws and administrative regulations related to forestry, such as 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, China initiated a policy of “the one who planted trees will be the one to benefit” to encourage afforestation/reforestation on barren lands. The villages owning barren lands were allowed to be contracted with farmers for forestry purposes, with 30-50 years or even longer contract period. Within this period, the right of using lands will not be changed. The land use contract can be prolonged if the farmers apply for it.

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

Although these programs had set overall development 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), none of the programs are related to degraded lands. The commercial timber plantation base program usually target to productive lands with high economic return. Moreover, they are not legally- or policy-binding, and meeting the goals depends largely on the availability of funds. There is a large financial gap to realize these goals. As the domestic funds for the afforestation/reforestation in this region have been limited for many years, and mainly used for planting trees on the economically attractive lands or more accessible lands. The project lands are so remote that they are not attractive for timber markets and are usually not target lands for the reforestation/afforestation programmers. In addition, local farmers/communities are usually not able to fully finance forest establishment because it is difficult for them to get loans from

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local banks for the purpose of afforestation/reforestation on remote degraded lands (loans for agricultural activities and afforestation/reforestation on near and non-degraded economically attractive lands are much easier to obtain). - 19 -

Therefore, without the proposed A/R CDM project activity the project sites will not be afforested/reforested as a result of national or sectoral policies, and will continue to degrade. With the project activity the on-going reforestation programs will not be reduced.

- d) The field surveys, interviews with stakeholders and social economic analysis indicated that the plausible alternative land uses available to the project participants are either continuation of the current status of the land (keeping barren status or illegal grazing) or forest plantation because the barren lands to be planted are legally restricted for forestry purposes by government. As a result other land uses, e.g., agriculture, are not allowed.

G.2.2 Provide a projection of future carbon stock changes in the absence of the project, based on the land-use scenario described above. The timeframe for this analysis can be either the project lifetime or the project accounting period, whichever is more appropriate.

>> As described above, the baseline scenario of all baseline strata is the continuation of historical or existing land use, i.e., the abandoned barren lands with illegal grazing activity. Based on the revised approved methodology AR-AM0003/version 03 applied, the baseline carbon stock change can be estimated by steps as follow:

- a) For those strata without growing trees, the sum of carbon stock changes the sum of carbon stock changes is set as zero in all carbon pools;
- b) For those strata with growing trees, the sum of carbon stock changes is set zero in the soil organic carbon, dead wood and litter carbon pools, and a net positive change is estimated in the living biomass carbon pools based on the projection of number, growth rate of trees, allometric equations, IPCC good practice guidance, and local or national or IPCC default parameters.
- c) the ex ante estimation of the baseline net GHG removals by sinks.

Table G-9 Estimated baseline net GHG removals by sinks

Year	Annual estimation of baseline net anthropogenic GHG removals by sinks in tonnes of CO₂ e
2007	170.1
2008	164.4
2009	157.9
2010	151.0
2011	143.8
2012	136.5
2013	129.3
2014	122.1
2015	115.1
2016	108.3
2017	101.8
2018	95.5
2019	89.5
2020	83.8
2021	78.4
2022	73.3

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2023	68.5
2024	63.9
2025	59.6
2026	55.6
Total estimated baseline net GHG removals by sinks (tonnes of CO₂ e)	2,168.3
Total number of crediting years	20
Annual average over the crediting period of estimated baseline net GHG removals by sinks (tonnes of CO₂ e)	108.4

G.2.2a If there is evidence that non-CO₂ greenhouse gas (GHG) emissions such as CH₄ or N₂O are more than 15% of the baseline GHG fluxes at the project site (in terms of CO₂ equivalents), they must be estimated.

>> There will be no significant GHG emissions by sources that are increased as a result of the implementation of the A/R CDM project activity within the project boundary, because:

- The site preparation, thinning as well as the logging in the proposed A/R CDM project activity will be conducted manually, without using machinery tools that consume fossil fuel;
- There will be no biomass burning during site preparation thus GHG emissions from slash and burn activity are nil;
- There will be no N-fertilizer application, thus the direct N₂O emissions caused by N fertilization practices can be omitted;
- No flood irrigation will be used in the proposed A/R CDM project activity.

Therefore, $GHG_E = 0$.

G.2.3 Description of how the “without-project” scenario would affect local communities in the project area.

>> Agriculture and/or grazing are the main sources of income for local communities in the project area. However, due to severe soil erosion, agricultural production has suffered very much from flood, drought and other disasters, food productivity is very low. Without project the local communities would keep on maintaining the impoverished life.

G.2.4 Description of how the “without-project” land-use scenario would affect biodiversity in the project area.

>> Although there is no significant negative impact to biodiversity, but without project the land-use will be continuation of current barren lands or illegal grazing lands, and the lands will degrade further. This will have the huge threat to habitat of wild animals and plants. This will take negative effect to biodiversity.

G.2.8 Description of how the “without-project” land-use scenario would affect water and soil resources.

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>>Due to the consecutive deforestation, subsequent over-use of fuelwood collection, illegal^{- 21 -} grazing and frequent fire, most lands are severely degraded and suffer from serious soil erosions that directly threaten the streams and rivers below. If the current situation remains as it has been, the lands will degrade further and the soil erosion will become more and more severely.

G3 Project Design & Goals (Required)

G.3.1 Provide a description of the scope of the project and a summary of the major climate, community and biodiversity goals.

>> The proposed A/R CDM project activity implemented at the upper reaches of Minjiang River and Jialingjiang River, the main first order branches of the Yangtze River, is located in 28 villages of 21 towns/townships in five counties (i.e., Beichuan, Lixian, Maoxian, Pingwu and Qingchuan) in the northwest of Sichuan Province, P.R.China, including 5 villages of 2 towns/townships in Lixian County, 1 village in Maoxiao County, 13 villages of 10 towns/townships in Qingchuan County, 4 villages of 4 towns/townships in Pingwu County and 5 villages of 4 towns/townships in Beichuan County. The project area is also one of the key areas of the biodiversity conservation. Living in the remote steep mountains, local farmers/communities (mostly ethnic minority Tibet, Qiang and Hui) are living below the poverty level. About 12,745 local farmers of 3,231 households will benefit from the project, including 5,384 people of ethnic minorities.

To contribute to the local sustainable development, the proposed A/R CDM project activity, Reforestation on Degraded Lands in Northwest Sichuan, China, aims to:

- Sequester carbon dioxide and mitigating climate change;
- Enhance biodiversity conservation by increasing the connectivity of forests adjacent to nature reserves;
- Improve soil and water conservation in the upper reaches of the Yangtze River;
- Generate income for local communities.

G.3.2 Describe each major project activity (if more than one) and its relevance to achieving the project's goals.

>> To achieve the objectives, in the proposed A/R CDM project activity, 2,551.8 hectare (ha) of multiple-use forest will be established by direct planting on degraded lands in five counties (Beichuan, Lixian, Maoxian, Pingwu and Qingchuan) in the northwestern Sichuan Province, including 330.5 ha of *Betula luminifera*, 62.4 ha of *Betula albo-sinensis*, 156.4 ha of *Magnolia officinalis*, 294.2 ha of *Quercus acutissima*, 467.0 ha of *Cupressus chengiana*, 109 ha of *Platycladus orientalis*, 274.0 ha of *Cunninghamia lanceolata*, 223.3 ha of *Pinus tabulaeformis*, 66.0 ha of *Pinus massonia*, 63.0 ha of *Populus szechuanica*, 120.4 ha of *Larix gmelinii*, and 86.0 ha of *Picea asperata*. All species used are native to local, without any invasive alien species or genetically modified organisms. Most of the lands to be planted were deforested in 1950s through 1980s and have never been reforested since then. At the same time, the proposed A/R CDM project activity will be used as a trial application of the Climate, Community and Biodiversity Standard (CCB) under the support of the Conservation International.

Both the operating entity (Daduhe Forest Administration) and local farmers hold a view that the proposed A/R CDM project activity will contribute to poverty alleviation and environment (biodiversity conservation and soil erosion control), thus contribute to sustainable development. The

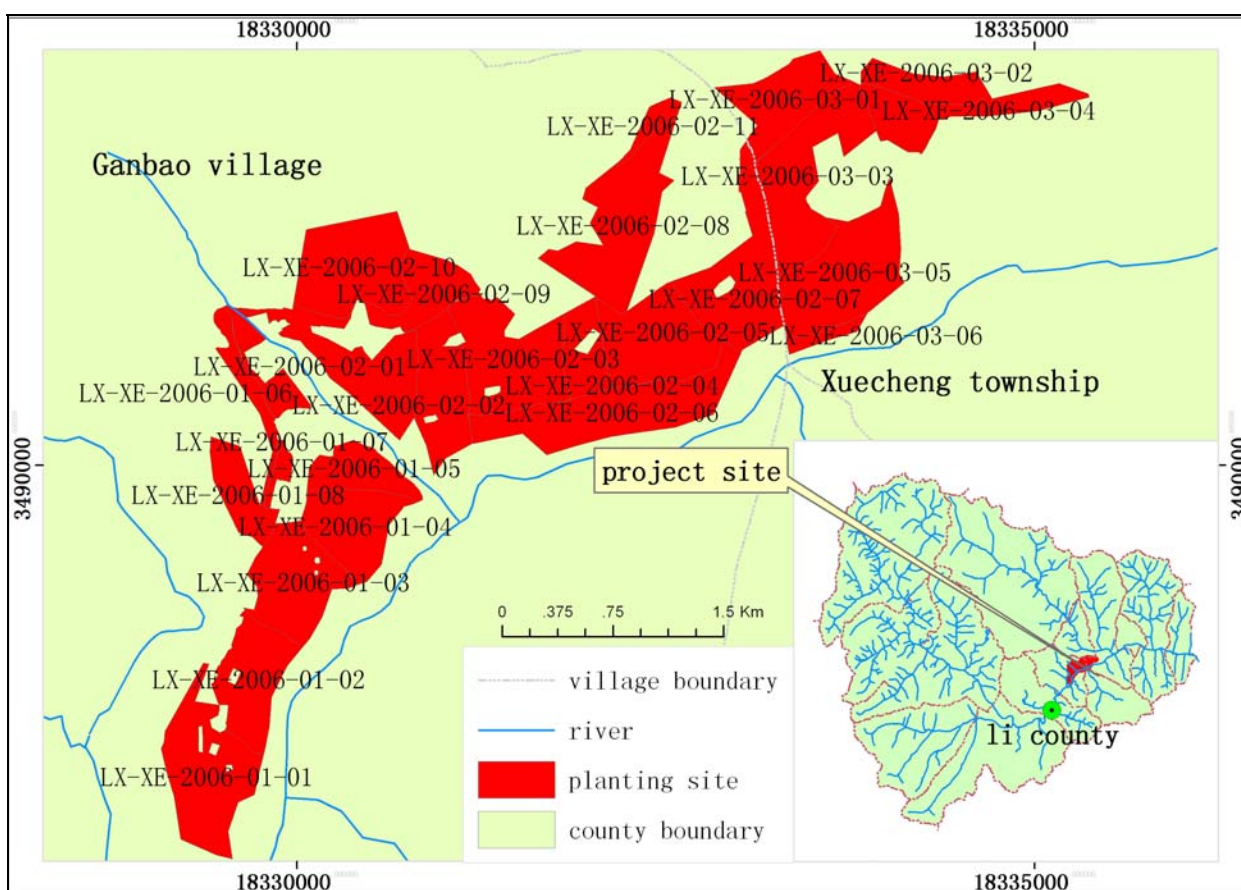
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audit of the CCB would demonstrate that the proposed A/R CDM project activity will not only benefit to climate change mitigation, but also have co-benefits to local communities and environmental conservation. - 22 -

G.3.3 Provide a map identifying the project location, where the major project activities will occur, geo-referenced boundaries of the project site(s).

>> The project boundaries and geographical locations are indicated in figures below and the specific geographical positions (longitude, latitude) at each corner of each of 36 parcels of land have been determined by land use/cover maps followed by verification for each corner of polygonal site using GPS and interviewing with local farmers (see Fig. G-2 through Fig. G-6).

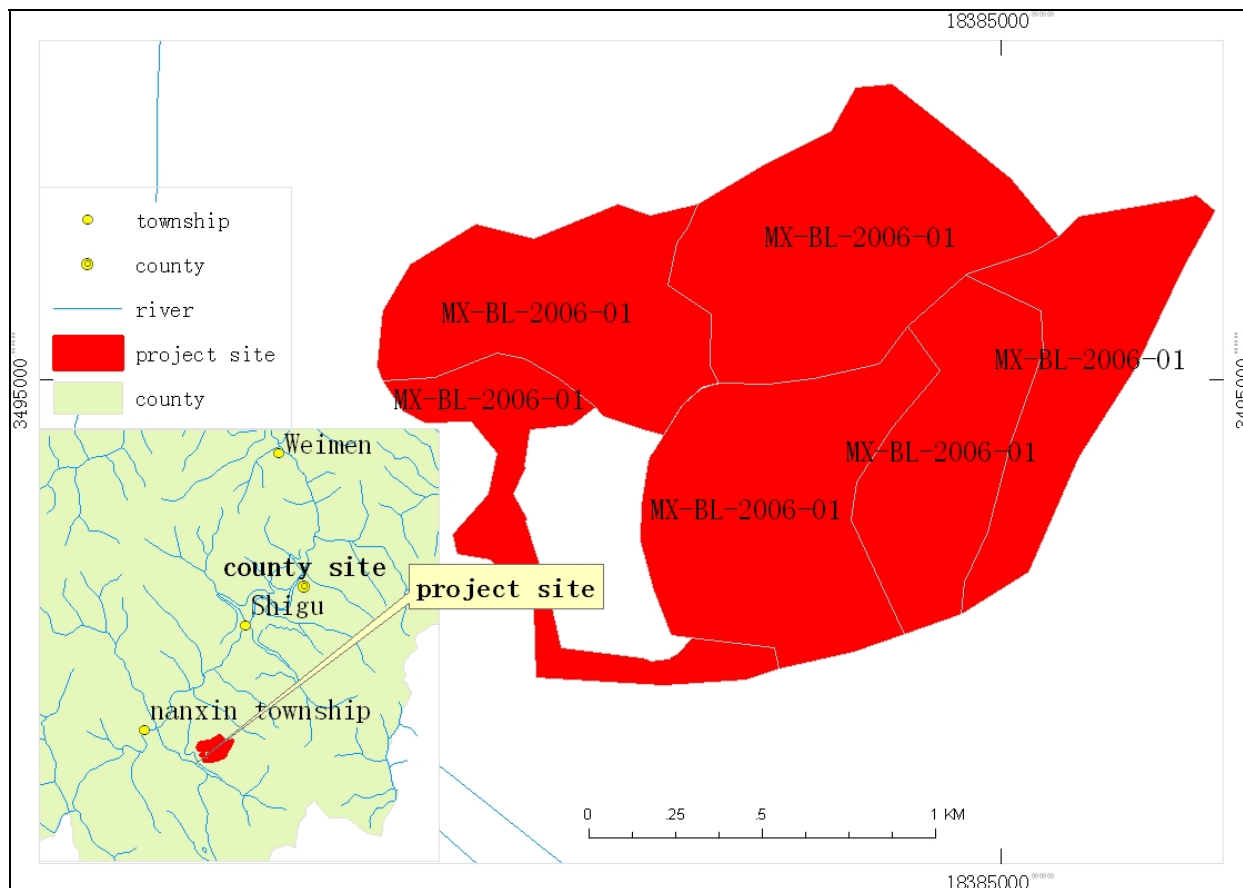
Fig. G-2 Project boundary in Lixian County



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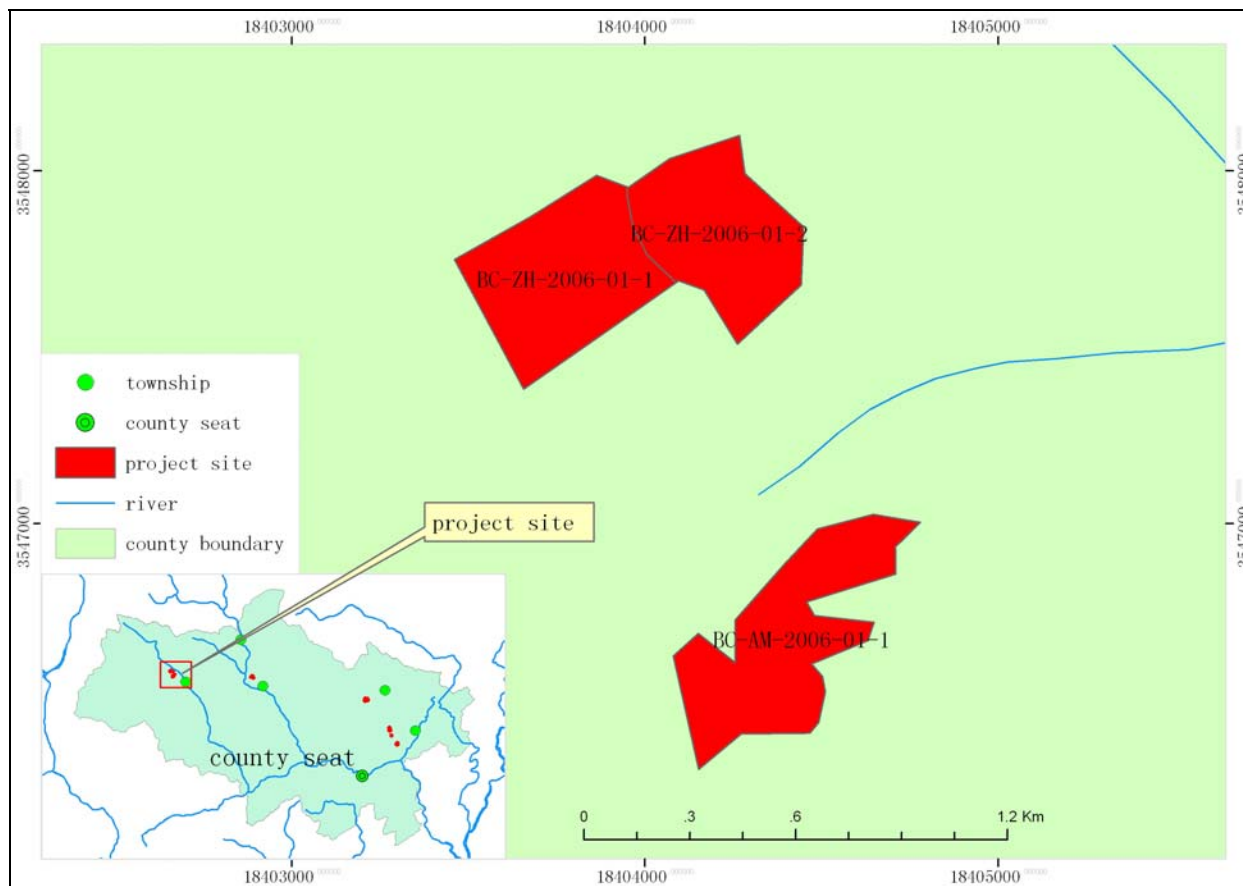
Fig. G-3 Project boundary in Maoxian County



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Fig. G.4.1. Project sites in Beichuan County-I:



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Fig. G.4.2. Project sites in Beichuan County-II:

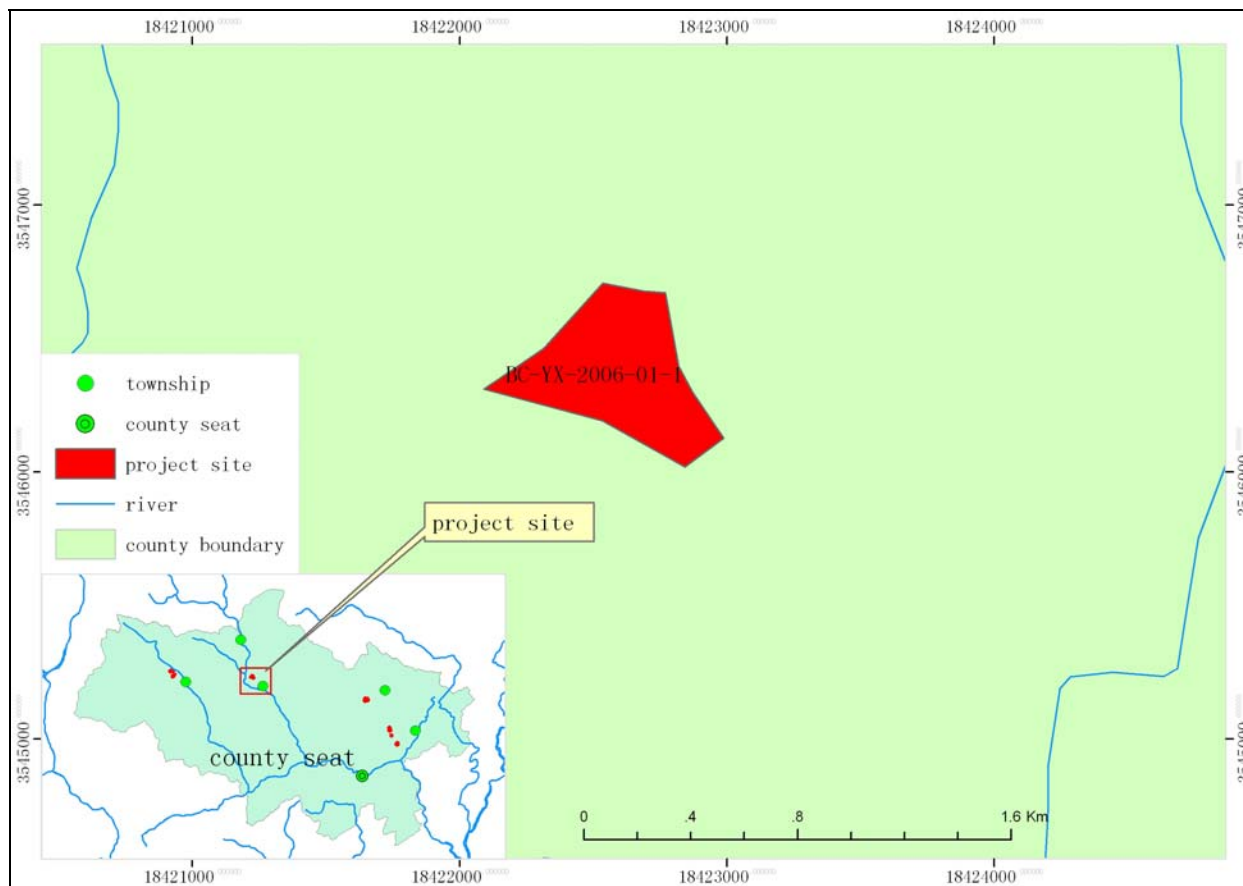


Fig. G.4.3. Project sites in Beichuan County-III:

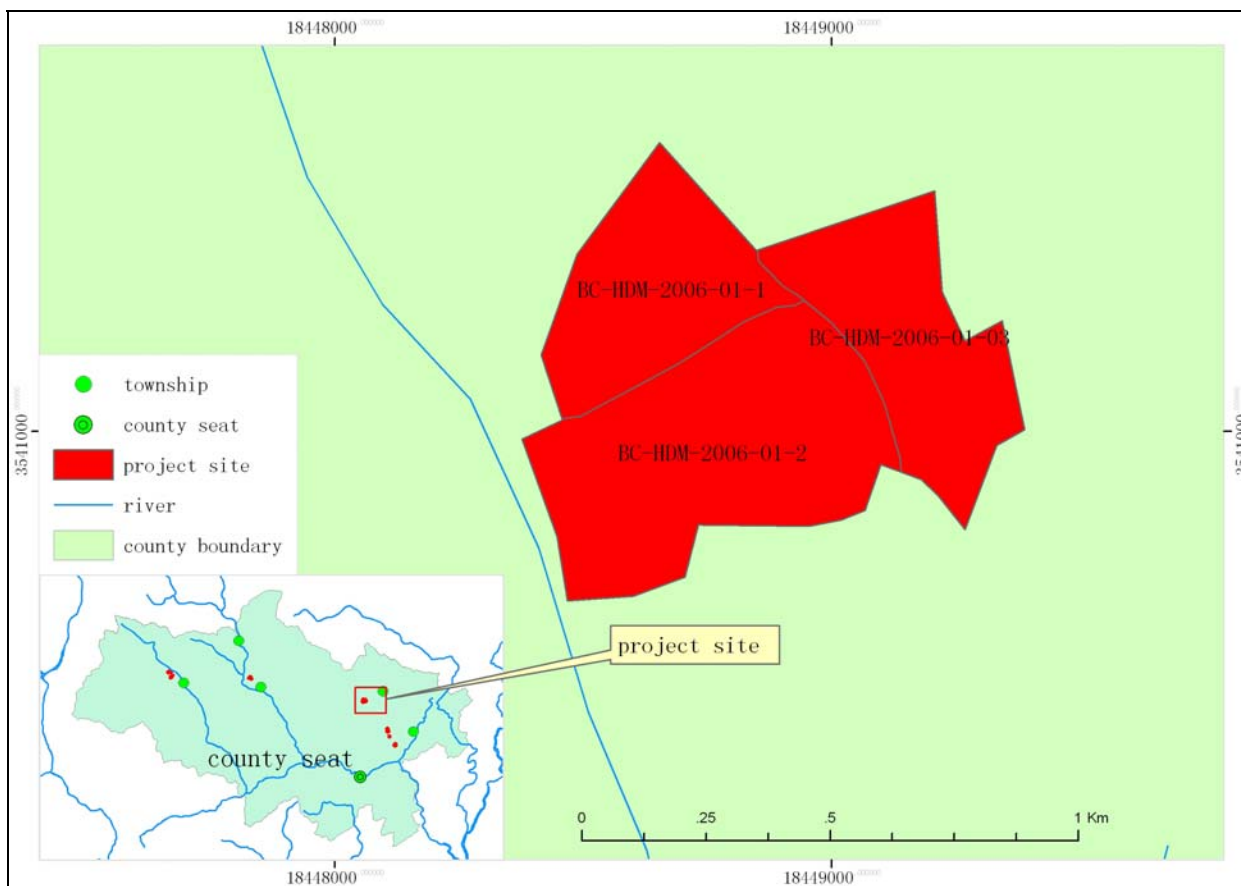


Fig. G.4.4. Project sites in Beichuan County-IV:

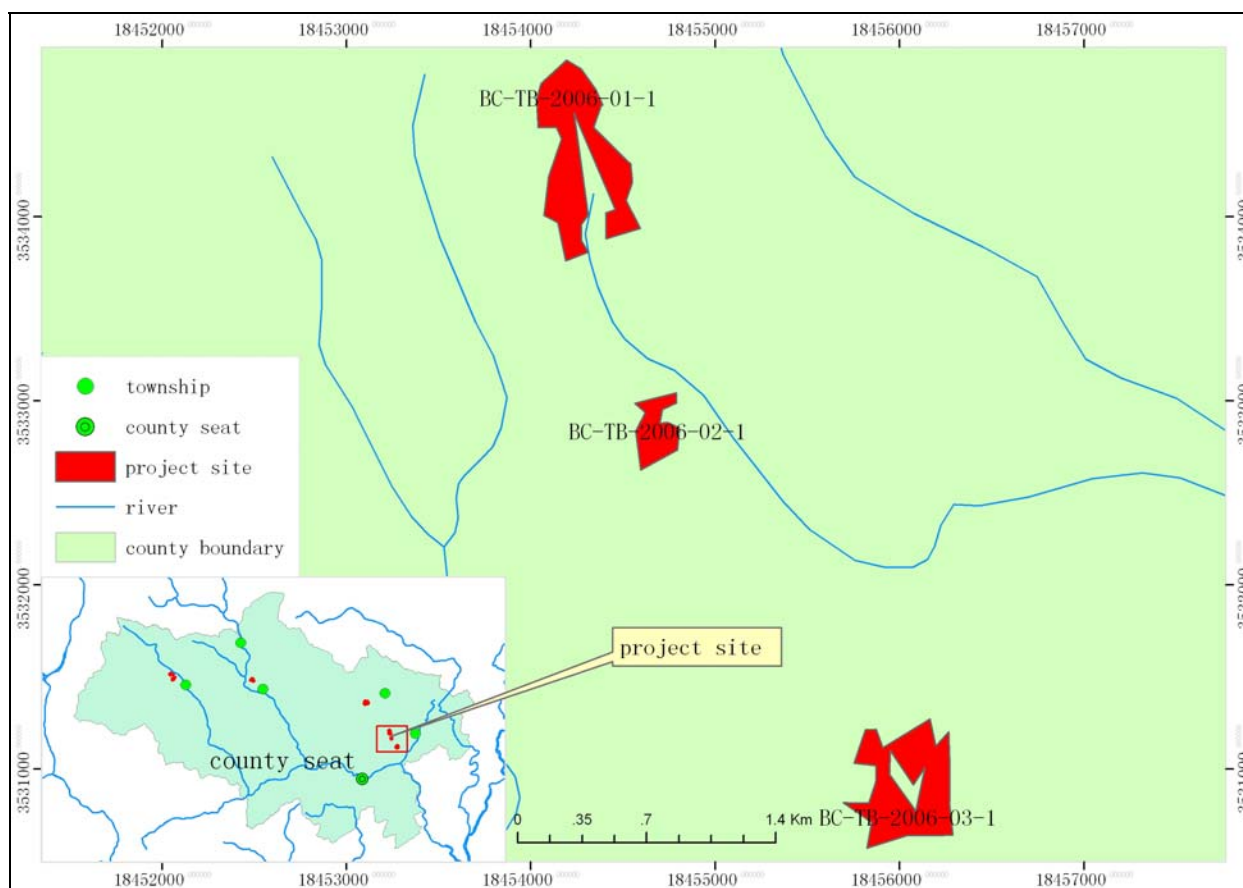


Fig. G.5.1. Project sites in Pingwu County-I:

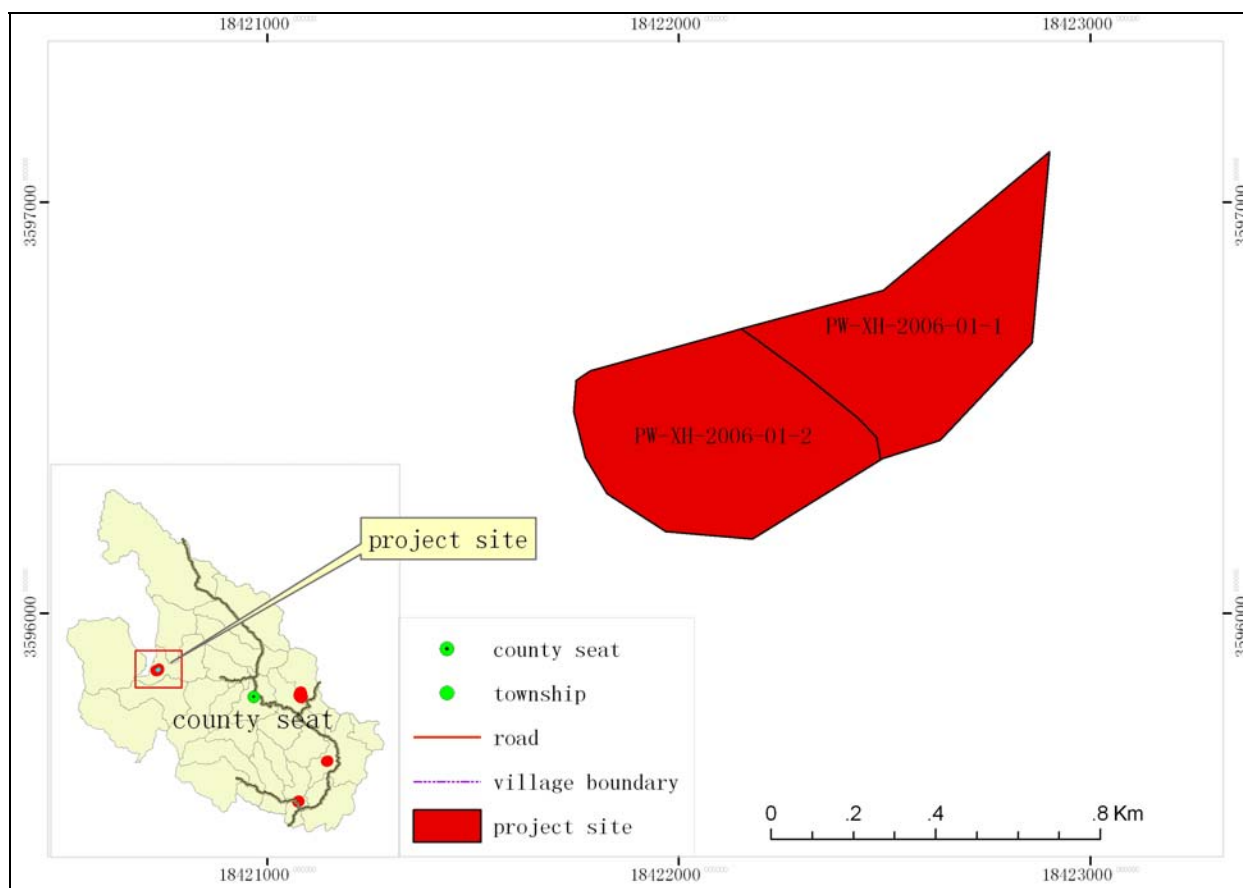
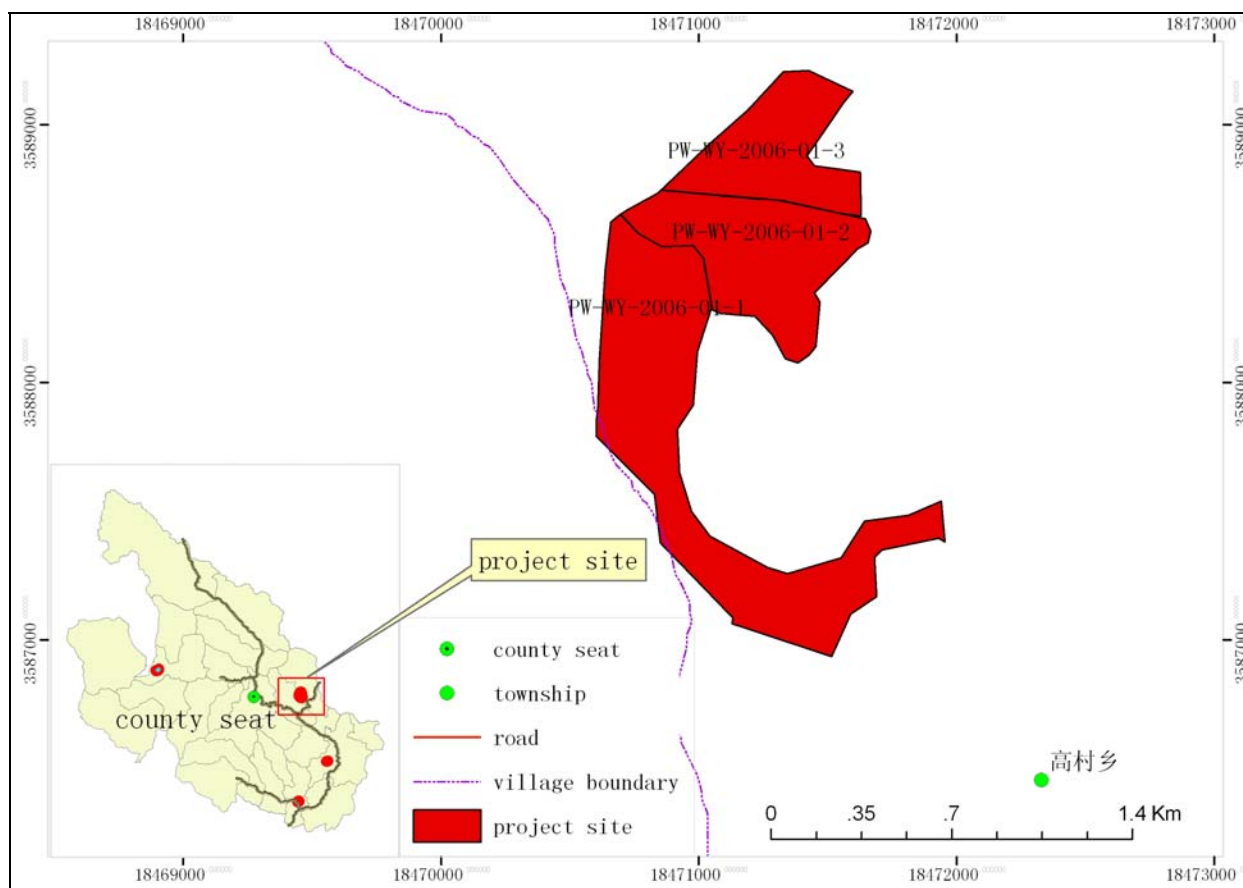


Fig. G.5.2. Project sites in Pingwu County-II:



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Fig. G.5.3. Project sites in Pingwu County-III:

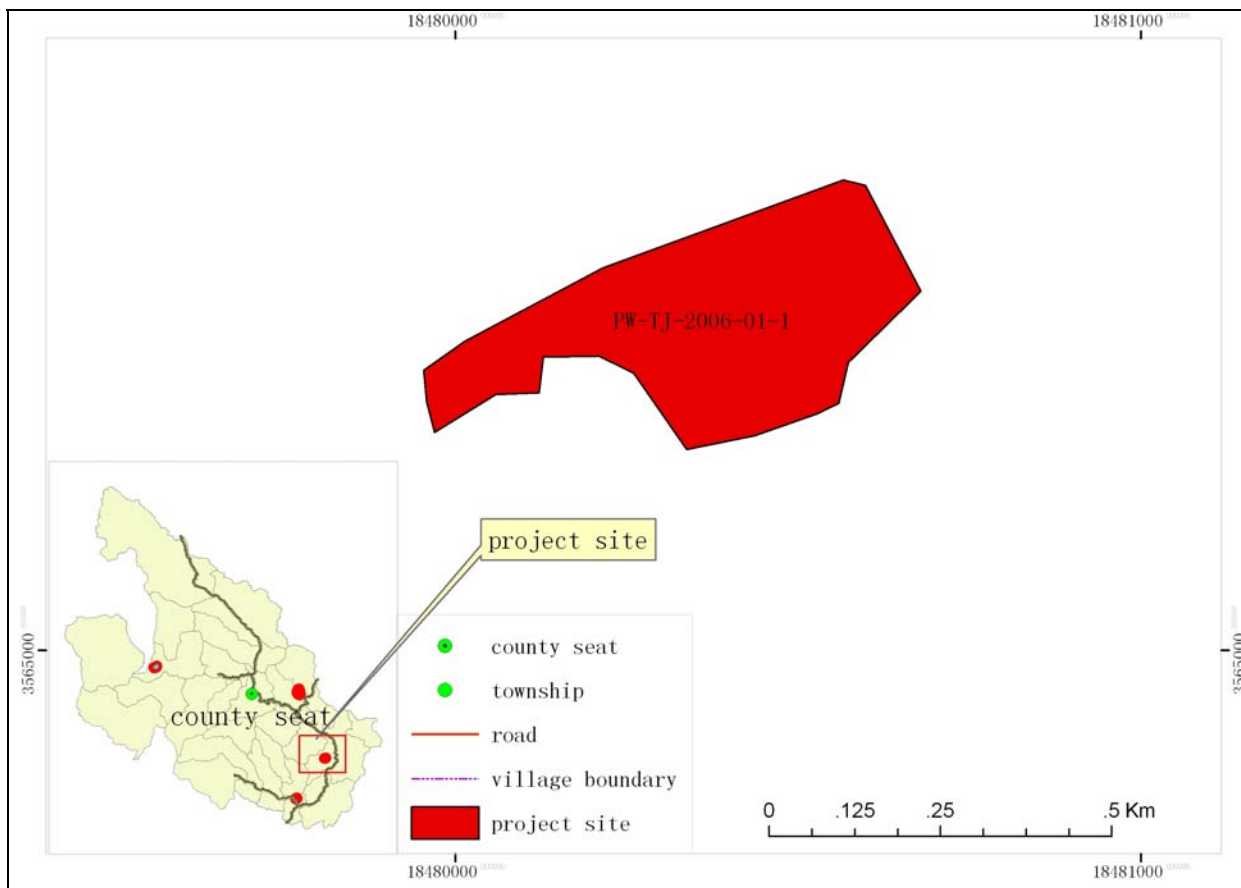


Fig. G.5.4. Project sites in Pingwu County-IV:

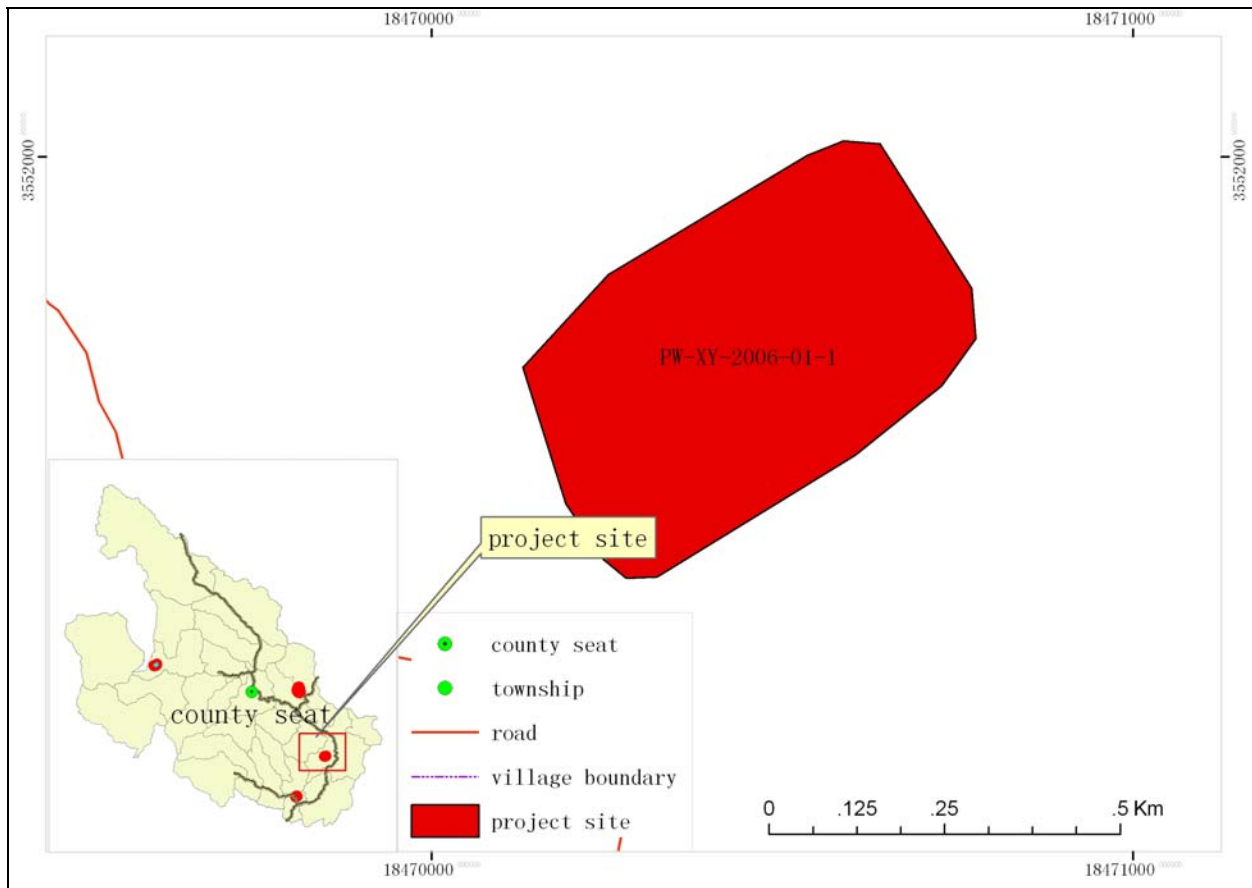
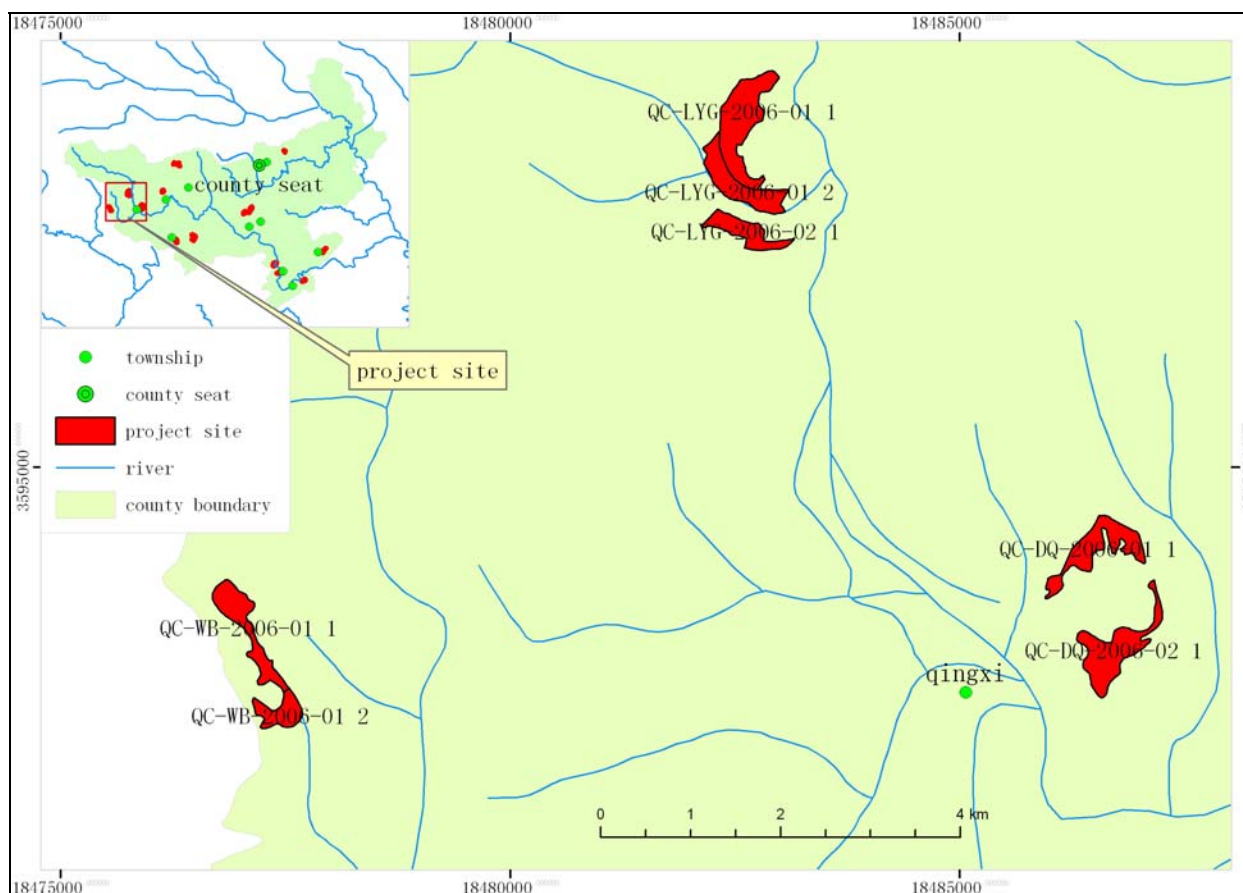


Fig. G.6.1. Project sites in Qingchuan County-I:



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Fig. G.6.2. Project sites in Qingchuan County-II:

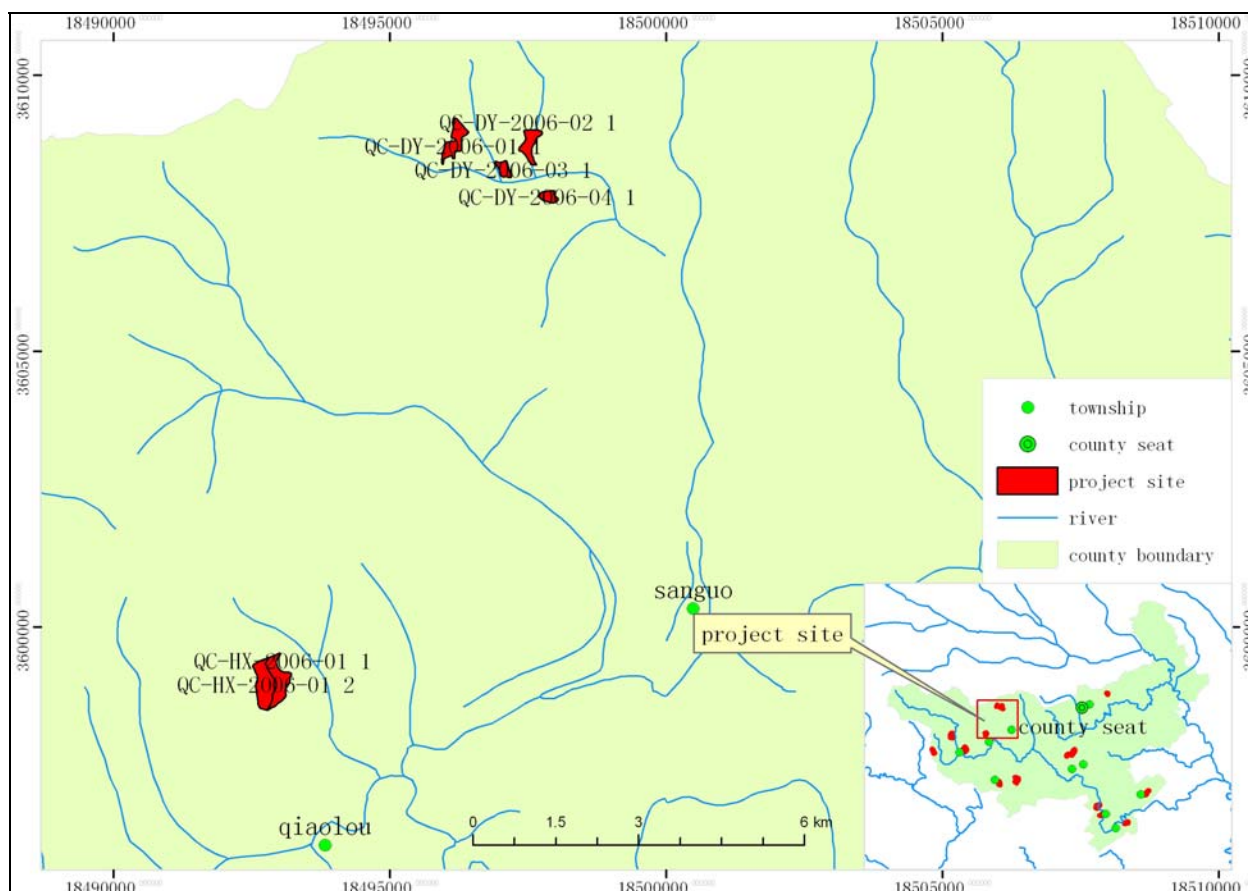
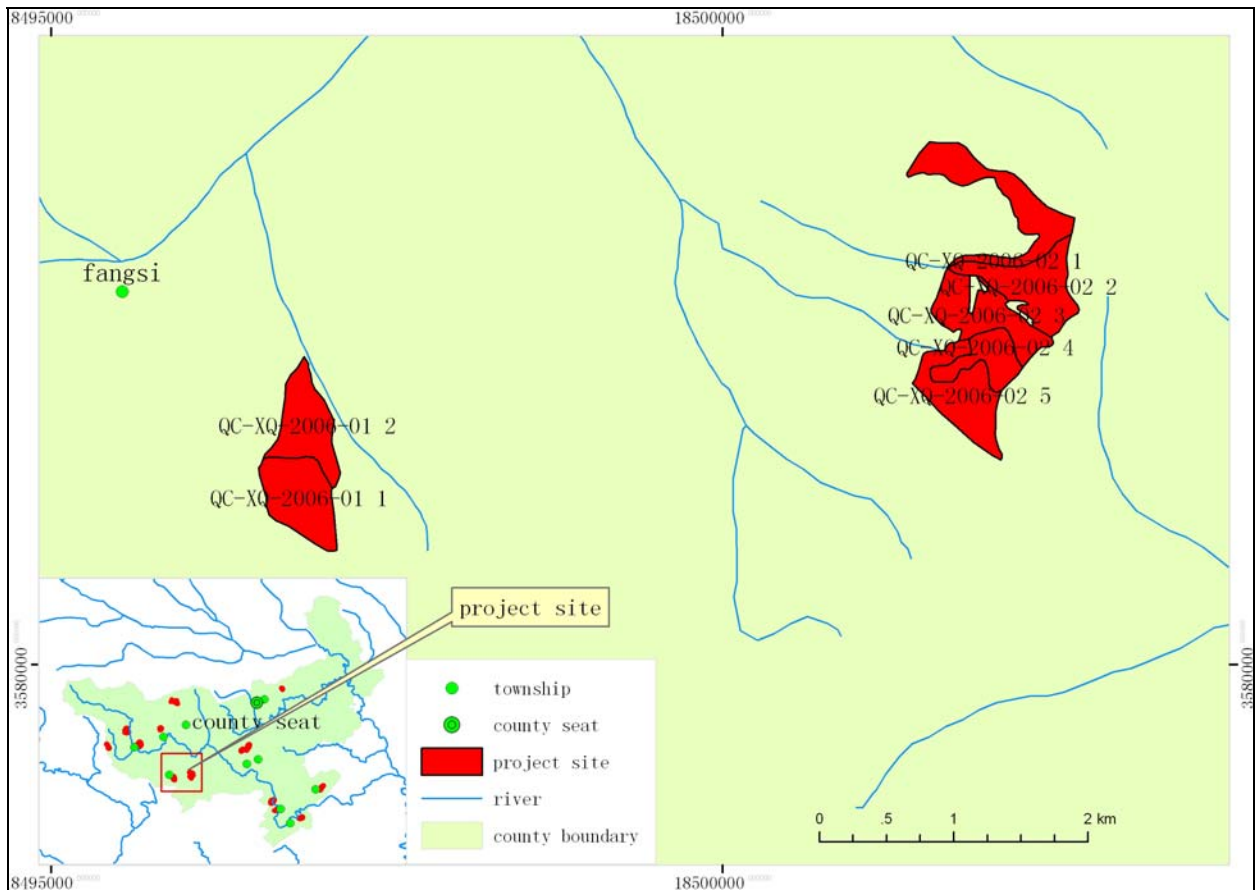


Fig. G.6.3. Project sites in Qingchuan County-III:



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Fig. G.6.4. Project sites in Qingchuan County-IV:

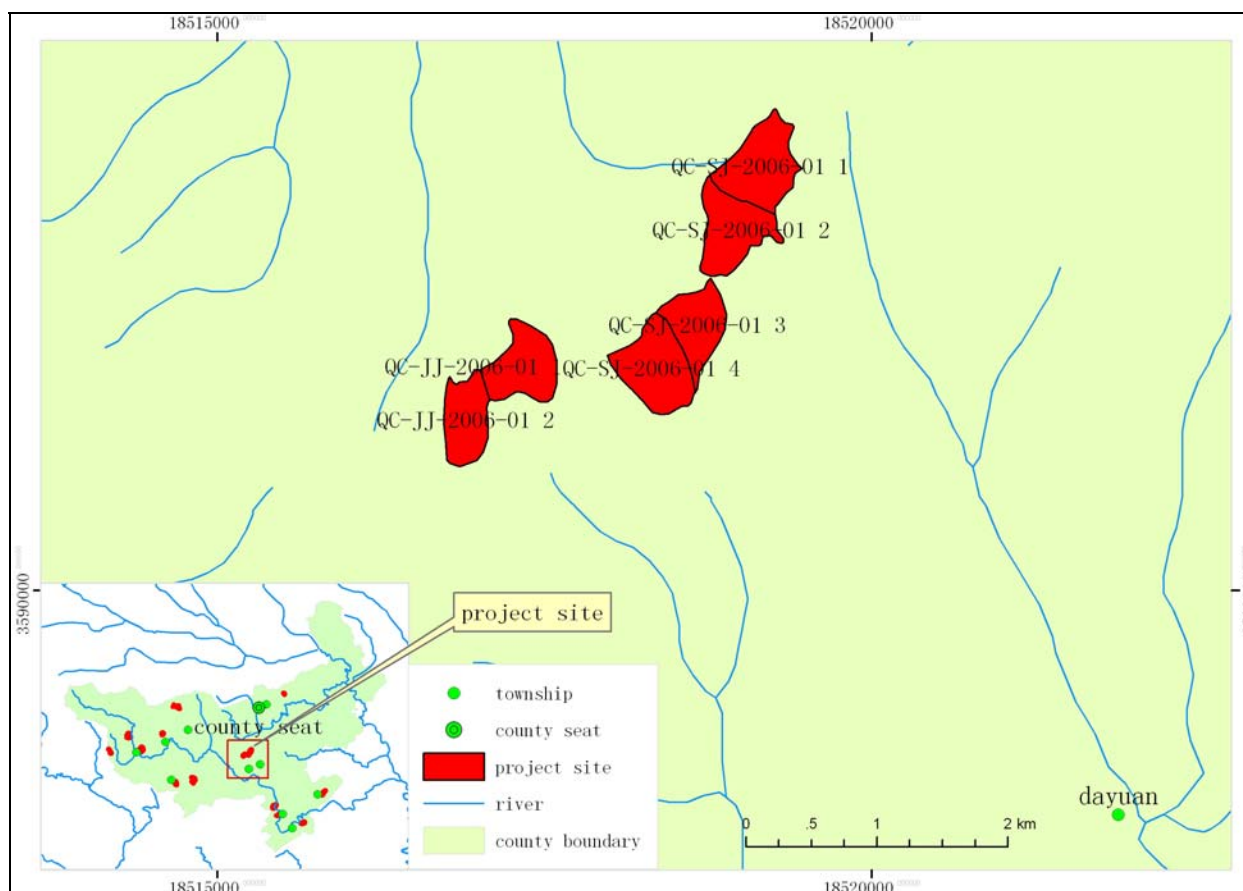


Fig. G.6.5. Project sites in Qingchuan County-V:

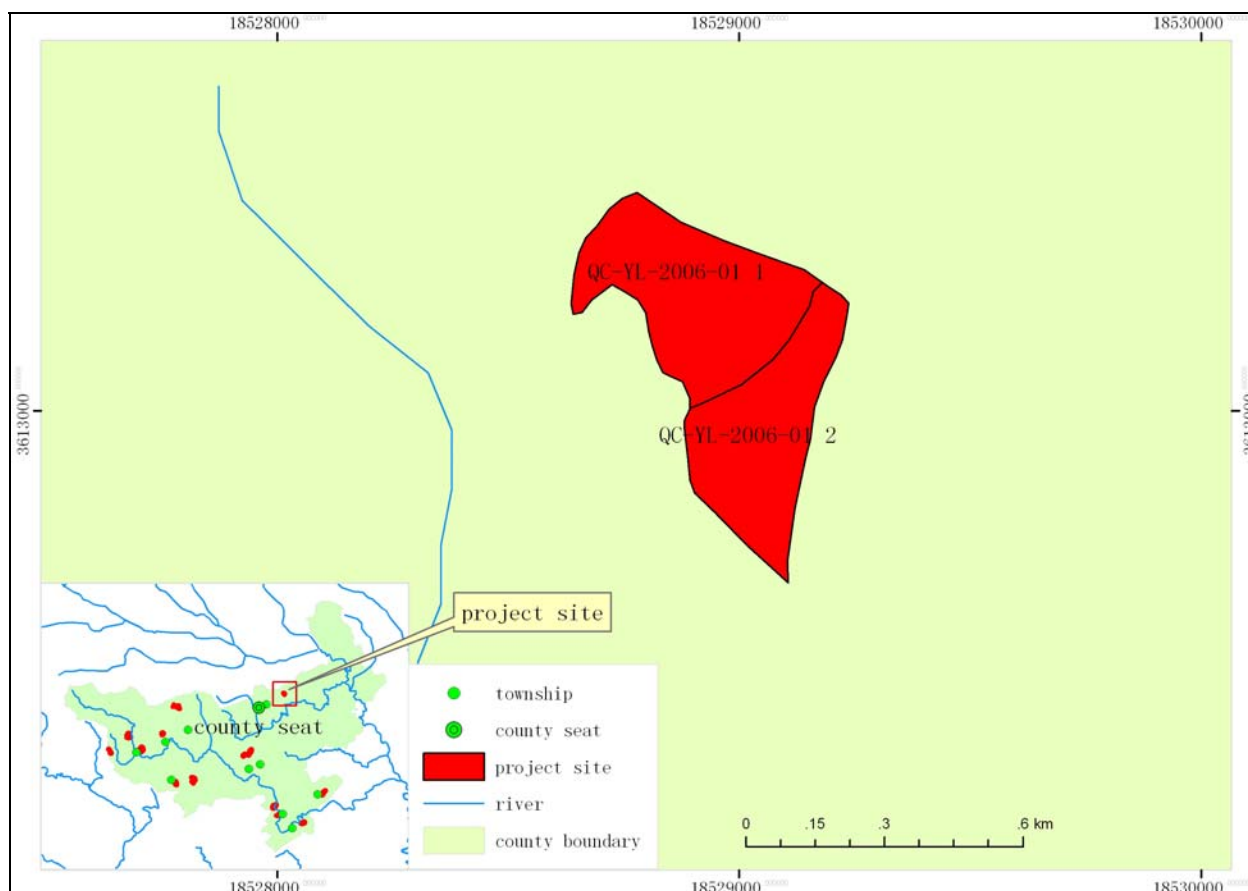
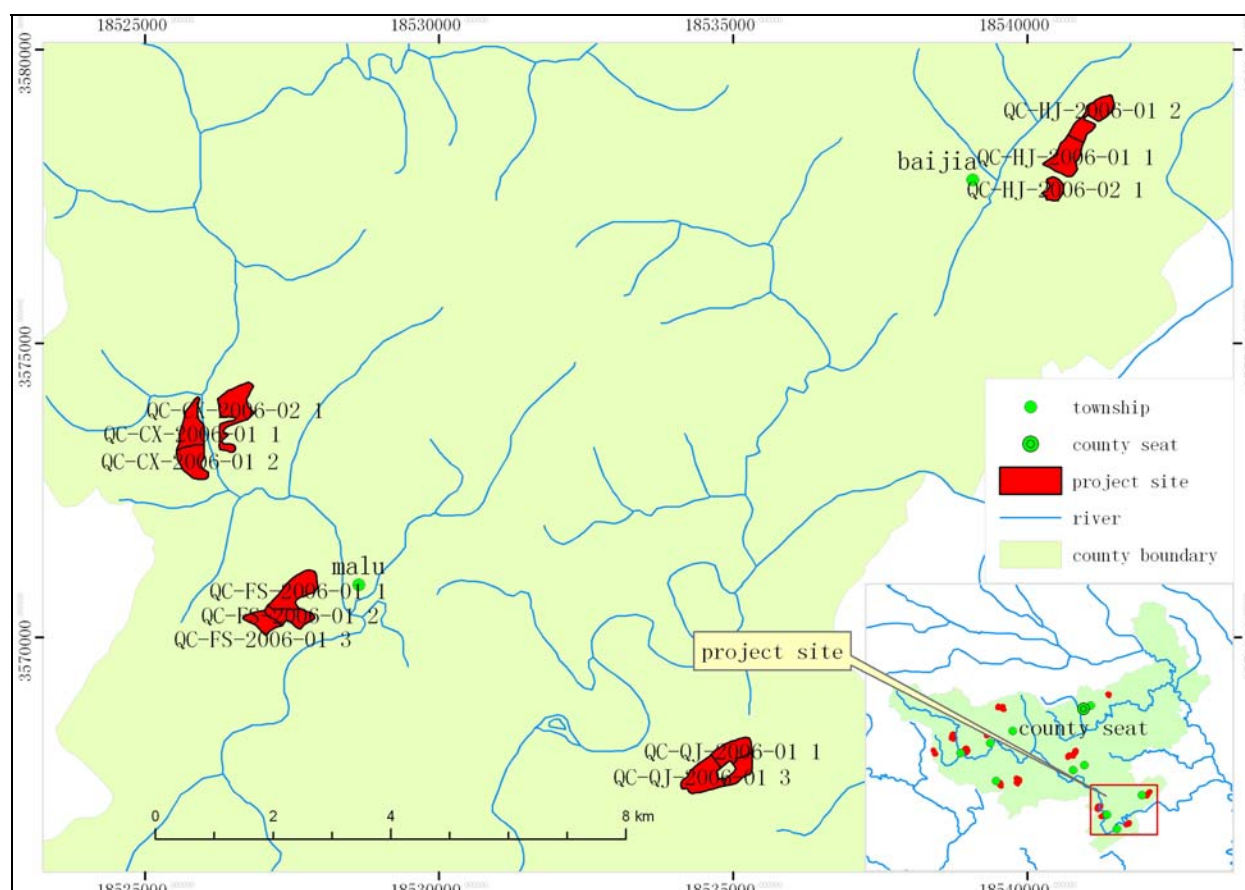


Fig. G.6.6. Project sites in Qingchuan County-VI:



G.3.4 Provide a timeframe for the project's duration. Describe the rationale used for determining the Project lifetime. If the accounting period for carbon credits differs from the project lifetime, explain.

>> time to be planted for each land parcel

Trees will be planted within 2 years starting in the spring 2007.

Table G-10 Species arrangement and time to be planted for each land parcel

County	Land ID	Area (ha)	Species arrangement	Time to be planted
Beichuan	BC-HDM-2006-01	56.8	<i>Magnolia officinalis</i> + <i>Betula luminifera</i>	Spring 2008
	BC-AM-2006-01	19.0	<i>Betula luminifera</i> + <i>Betula albo-sinensis</i>	Spring 2008
	BC-YX-2006-01	29.1	<i>Magnolia officinalis</i>	Spring 2008
	BC-ZH-2006-01	37.0	<i>Betula luminifera</i> + <i>Betula albo-sinensis</i>	Spring 2008
	BC-TB-2006-01	28.4	<i>Magnolia officinalis</i>	Spring 2008
	BC-TB-2006-02	6.3	<i>Magnolia officinalis</i>	Spring 2008
	BC-TB-2006-03	23.6	<i>Magnolia officinalis</i>	Spring 2008
Lixian	LX-XE-2006-01	140.9	<i>Cupressus chengiana</i>	Spring 2007
	LX-XE-2006-02	217.1	<i>Cupressus chengiana</i>	Spring 2007
	LX-XE-2006-01	28.9	<i>Cupressus chengiana</i> + <i>Platycladus orientalis</i>	Spring 2008

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	LX-XE-2006-02	90.4	<i>Cupressus chengiana</i> + <i>Platycladus orientalis</i>	Spring 2008
	LX-XE-2006-03	98.7	<i>Cupressus chengiana</i> + <i>Platycladus orientalis</i>	Spring 2008
	LX-XE-2006-01	30.6	<i>Pinus tabulaeformis</i> + <i>Betula albo-sinensis</i>	Spring 2008
	LX-XE-2006-02	71.0	<i>Pinus tabulaeformis</i> + <i>Betula albo-sinensis</i>	Spring 2008
	LX-XE-2006-03	70.2	<i>Pinus tabulaeformis</i> + <i>Betula albo-sinensis</i>	Spring 2008
Maoxian	MX-BL-2006-01	63.0	<i>Populus szechuanica</i>	Spring 2008
	MX-BL-2006-01	171.9	<i>Picea asperata</i> + <i>Pinus tabulaeformis</i>	Spring 2008
Pingwu	PW-WY-2006-01	109.8	<i>Larix gmelinii</i> + <i>Quercus acutissima</i>	Autumn 2007
	PW-XH-2006-01	16.5	<i>Magnolia officinalis</i>	Autumn 2007
	PW-XH-2006-01	25.7	<i>Larix gmelinii</i> + <i>Quercus acutissima</i>	Autumn 2007
	PW-TJ-2006-01	14.5	<i>Larix gmelinii</i> + <i>Quercus acutissima</i>	Autumn 2007
	PW-XY-2006-01	24.1	<i>Magnolia officinalis</i>	Autumn 2007
	QC-HJ-2006-01	50.5	<i>Pinus manssoniana</i> + <i>Quercus acutissima</i>	Autumn 2007
Qingchuan	QC-HJ-2006-02	9.8	<i>Pinus manssoniana</i> + <i>Quercus acutissima</i>	Autumn 2007
	QC-SJ-2006-01	107.1	<i>Cunninghamia lanceolata</i> + <i>Betula luminifera</i>	Autumn 2007
	QC-XQ-2006-02	125.0	<i>Cunninghamia lanceolata</i> + <i>Betula luminifera</i>	Autumn 2007
	QC-XQ-2006-01	52.9	<i>Cunninghamia lanceolata</i> + <i>Betula luminifera</i>	Autumn 2007
	QC-YL-2006-01	23.3	<i>Cunninghamia lanceolata</i> + <i>Betula luminifera</i>	Autumn 2007
	QC-CX-2006-02	34.4	<i>Pinus manssoniana</i> + <i>Quercus acutissima</i>	Autumn 2007
	QC-CX-2006-01	45.5	<i>Pinus manssoniana</i> + <i>Quercus acutissima</i>	Autumn 2007
	QC-FS-2006-01	60.2	<i>Pinus manssoniana</i> + <i>Quercus acutissima</i>	Autumn 2007
	QC-JJ-2006-01	45.2	<i>Cunninghamia lanceolata</i> + <i>Betula luminifera</i>	Autumn 2007
	QC-HX-2006-01	44.0	<i>Cunninghamia lanceolata</i> + <i>Betula luminifera</i>	Autumn 2007
	QC-DQ-2006-01	39.2	<i>Pinus manssoniana</i> + <i>Quercus acutissima</i>	Autumn 2007
	QC-DQ-2006-02	28.8	<i>Pinus manssoniana</i> + <i>Quercus acutissima</i>	Autumn 2007
	QC-LYG-2006-01	58.2	<i>Cunninghamia lanceolata</i> + <i>Betula luminifera</i>	Autumn 2007
	QC-LYG-2006-02	16.2	<i>Cunninghamia lanceolata</i> + <i>Betula luminifera</i>	Autumn 2007
	QC-WB-2006-01	38.4	<i>Cunninghamia lanceolata</i> + <i>Betula luminifera</i>	Autumn 2007
	QC-DY-2006-01	15.5	<i>Cunninghamia lanceolata</i> + <i>Betula luminifera</i>	Autumn 2007
	QC-DY-2006-02	12.0	<i>Cunninghamia lanceolata</i> + <i>Betula luminifera</i>	Autumn 2007
	QC-DY-2006-03	5.0	<i>Cunninghamia lanceolata</i> + <i>Betula luminifera</i>	Autumn 2007
	QC-DY-2006-04	5.3	<i>Cunninghamia lanceolata</i> + <i>Betula luminifera</i>	Autumn 2007
	QC-QJ-2006-01	61.8	<i>Pinus manssoniana</i> + <i>Quercus acutissima</i>	Autumn 2007

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Part of the established plantations will be thinned at 15-40 year-old. The plantation to be planted in Maoxian County will not be harvested for the purpose of the watershed protection. The other species and cases will be harvested at the age of 10-80 years. All plantations will be regenerated by direct planting after harvesting. Both the thinning and harvesting will be conducted manually without any mechanical equipment.

Table G-11 Plantation management

Counties	Tree species	Thinning age	Thinning Intensity (% of standing trees)	Harvest age
Beichuan	<i>Betula luminifera</i>	15 and 25-yr-old	30%	30-yr-old
	<i>Betula albo-sinensis</i>	15 and 25-yr-old	30%	30-yr-old
	<i>Magnolia officinalis</i>	15 and 25-yr-old	30%	30-yr-old
Lixian	<i>Betula albo-sinensis</i>	40-yr-old	20%	80-yr-old
	<i>Platycladus orientalis</i>	40-yr-old	20%	80-yr-old
	<i>Cupressus chengiana</i>	40-yr-old	20%	80-yr-old
	<i>Pinus tabulaeformis</i>	40-yr-old	20%	60-yr-old
Maoxian	<i>Populus szechuanica</i>			No harvesting
	<i>Pinus tabulaeformis</i>			No harvesting
	<i>Picea asperata</i>			No harvesting
Pingwu	<i>Quercus acutissima</i>			10-yr-old
	<i>Magnolia officinalis</i>	15 and 25-yr-old	30%	30-yr-old
	<i>Larix gmelinii</i>	15 and 25-yr-old	30%	30-yr-old
Qingchuan	<i>Betula luminifera</i>	15 and 25-yr-old	30%	30-yr-old
	<i>Quercus acutissima</i>			10-yr-old
	<i>Pinus massoniana</i>	15 and 25-yr-old	30%	30-yr-old
	<i>Cunninghmya lanceolata</i>	15 and 25-yr-old	30%	30-yr-old

The accounting period for carbon credits is the same as the project lifetime.

G.3.5 Identify likely risks to climate, community and biodiversity benefits during the project lifetime. Outline measures that the project plans to undertake to mitigate the risks.

>> Risk analysis and countermeasures:

- **Fire and pest risk:** This can be alleviated through technical and awareness training to local farmers/communities, strengthening patrolling and monitoring, as well as building the fire-break belt. Furthermore, a mixed species arrangements will be adopted to reduce fire and pest risks.
- **Site preparation:** The site preparation will disturb the vegetation and soil in the planting sites. The main technical measures to be employed in mitigating the impacts are to plant the trees with low density (1667-2500 trees per hectare), limited hole site preparation (30-60 cm in diameter or 0.07-0.28 m²), retaining the existing vegetation as much as possible (see also Section A.5.4). As a result, the surface area disturbed by site preparation is estimated to account for 7.1% of the total land surface. The hole will be dug along the landform contour in triangle form to reduce the soil loss. Therefore the site and soil preparation will have minor negative impacts on original soil and vegetation.
- **Fertilization:** In the proposed A/R CDM project activity, no artificial fertilizers (not only N-fertilizers) will be applied. Farmyard manure will be applied within the small planting hole rather than overall dispersing, so that the potential risk of the fertilization application can be reduced to minimum.

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- **Pesticide:** improper pesticide application would be harmful to natural environment, including polluting soil, water and air conditions, as well as the habitat of the wildlife. However under the proposed A/R CDM activity, the environmental friendly measures will be adapted such as mixed species arrangement, seed and seedling quarantine. Especially the biological measures to control pests and diseases will be adopted. Therefore, the pesticide application will be limited.

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

G.3.6 Document and defend how local stakeholders have been or will be defined.

>> To maximize the socio-economic benefit, the afforestation/reforestation design was prepared with a participatory approach. PRA methods were adopted in interviewing and consulting with farmer households in the project areas to understand the local farmers/communities' preferences, wishes and concerns, so that the proposed A/R CDM project activity would better respond to their desires for livelihood development. The local farmers will participate the project activity such as site preparation, planting, weeding, thinning, harvesting, etc. and earning direct benefits during the crediting period. It is expected that 28 villages of 21 towns/townships from 5 counties will benefit from the proposed project. The total income is estimated at US\$ 9.2 million within the 30 years period, including about US\$ 6.1 million from employment, US\$ 2.5 million from sales of wood and non-wood products and US\$ 5.5 million from sales of CERs. The mean net annual income per capita will be increased by US\$ 24 or by 10.3% compared to the year 2006.

Table G-13 Employment created by project activities

County	Townships	Villages	Temporary position created by the project				Long term position
			planting	Weeding & tending	thinning	total	
Beichuan	Qingpian	Zhenghe	3,330	2,775	22,570	28,675	1
		Anmian	1,710	1,425	11,590	14,725	1
	Xiaoba	Yongxin	2,619	2183	40,536	45,338	1
	Chenjiaba	Tongbao	5,247	4373	81,212	90,832	1
	Duba	Huangdimiao	5,112	4,260	56,885	66,257	1
Lixian	Ganbao	Ganbao	7,434	6,195	0	13,629	8
		Lianhe	22,245	18,555	0	40,800	
		Rierzhu	6,849	5708	0	12,557	
		xiong'er	15,267	12,960	0	28,227	
		Xuecheng	14,586	12,330	0	26,916	
	State owned		405	338	0	743	
Maoxian	Nanxin	Bieli	16,889	17,618	0	34,507	4
Pingwu	Gaochun	Wuyi	11,529	8,235	55,226	74,990	2
	Nanba	Tongjiang	1,523	1,088	7,296	9,907	1
	Shuijing	Xinhua	4,184	3,165	35,942	43,291	1
	Pingtong	Xinyuan	2,169	1808	33,571	37,548	1
Qingchuan	Qiaolou	Hexi	3,960	3,300	27,698	34,958	1
	Baijia	Huajian	6,332	4,523	7,599	18,454	2
	Malu	Fangshi	6,321	4,515	7,536	18,372	1

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	caiqi	8,390	5,993	10,048	24,431	1
Fangshi	Xinqiao	16,011	13,343	111,990	141,344	2
Zhuyuan	Qingjiang	6,489	4,635	7,787	18,911	1
	Weiba	3,456	2,880	24,173	30,509	1
Qingqi	Dongqiao	7,140	5,100	8,541	20,781	1
	Luoyigou	6,696	5,580	46,835	59,111	1
Dayuan	Shuojia	9,639	8,033	67,421	85,093	1
Kongqi	Yaolin	2,097	1,748	14,669	18,514	1
Maoba	Jinjia	4,068	3,390	28,453	35,911	2
Sanguo	Dongyang	3,402	2,835	23,795	30,032	1
Total		205,099	168,891	731,373	1,105,363	38

Table G-14 Ethnic minorities that benefit from the project

County	Townships	Villages	Number of households that benefit	Number of Beneficiaries	Number of Minority beneficiaries			
					Tibet	Qiang	Hui	total
Beichuan	Qingpian	Zhenghe	35	125		120		120
		Anmian	42	159		152		152
	Xiaoba	Yongxin	19	72		61		61
	Chenjiaba	Tongbao	29	108		59		59
	Duba	Huangdimiao	29	129		81		81
Lixian	Ganbao	Ganbao	215	895	850			850
		Lianhe	37	243	243			243
		Rierzhu	164	678	663			663
		xiong'er	102	465	465			465
	Xuecheng	Shajin	172	608	382			382
State owned								
Maoxian	Nanxin	Bieli	318	1560	1560			1560
Pingwu	Gaochun	Wuyi	233	780				
	Nanba	Tongjiang	22	102				
	Shuijing	Xinhua	60	292				
	Pingtong	Xinyuan	15	66				
Qingchuan	Qiaolou	Hexi	117	424			154	154
	Baijia	Huajian	281	1081				
	Malu	Fangshi	262	990				
		caiqi	100	420				
	Fangshi	Xinqiao	279	1044				
	Zhuyuan	Qingjiang	37	143				
	Qingqi	Weiba	41	131				
		Dongqiao	224	879			438	438
		Luoyigou	254	840				
	Dayuan	Shuojia	48	163			156	156
	Kongqi	Yaolin	21	84				
	Maoba	Jinjia	42	144				
	Sanguo	Dongyang	33	120				
Total			3,231	12,745	4,163	473	748	5,384

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G.3.7 Demonstrate transparency by: making all project documentation publicly accessible at, or near, the project site; only withholding information when the need for confidentiality is clearly justified; informing local stakeholders how they can access the project documentation; and making key project documents available in local or regional languages, where applicable.

>> The five counties involved in this project are the important regional of forestry resource. There is a forestry workstation in each village, which is the most grass roots forestry administrative department and deal with all of the forestry matters concerne local famer. The workstation always maintains a close relationship with local community to ensure their management more effective, so as to form a propaganda and exchange platform of policy, statute from the nation and feedback from communiment.

In order to make an easy channel for local forest farmers, public notice boards and community broadcasts are always used to promulgate project information, and some public services counters will be setup to offer project documentation and publicity material to the local stakeholders. In some devious community involved in this project, the project documentation will be delivered by forestry workstation workers. All of project documentation for local stakeholder will be compiled in Chinese.

All stakeholders participated in the decision and tactic making of this proposed project thoroughly, investment and bonus form was transparent to each participator. So there is no confidential information between all participators includeing stakeholder, land owner, project antity, and local forest govermant.

G4 Management Capacity (Required)

G.4.1 Document the management team's experience implementing land management projects. If relevant experience is lacking, the proponents must demonstrate how other organizations will be partnered with to support the project.

>>Daduhe Forestation Bureau (DDH) was approved to register in May 2001 with a registered capital of RMB 10,000,000 *yuan*. It belongs to a public service unit (PSU) affiliated to Sichuan Provincial Forestry Department. DRBA builds its technical support for implementing the *Natural Forest Protection Program* and overall industrial development of the forestry sector on the expertise of Beijing Forestry University, Sichuan Agricultural University, Sichuan Provincial Academy of Forestry, Sichuan Provincial Institute for Forest Inventory, Planning and Design, and other institutes. Thanks to the reliance on science and technology, great achievements have been made in the fields of seedling production, afforestation, tending and industrialized development of the forestry sector. As of the end of 2006, a cumulative acreage of 1,278,400 *mu* plantation forest have been established, 935,800 *mu* established by aerial sowing, 2,368,600 *mu* closed for natural regeneration, and 797,000 *mu* of forests have been thinned and tended. In total, 3,084,800 *mu* of forest have been patrolled and protected which is distributed in about 40 counties (cities, districts) in 13 cities (prefectures), including Ganzhi, Aba, Liangshan, Pangzhihua, Leshan, Ya'an, Zigong, Neijiang, Yibin and Mianyang, respectively.

G.4.2 Demonstrate that management capacity is appropriate to the scale of the project.

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>>DDH administers the four forestry corporations of Fulin, Tianquan, Fulu and Mabian, and two secondary-level institutes, namely, the Inspection & Acceptance Division for Planning & Design of Forest Management and Leshan Ecology & Science Garden. DRAB has a total in-service forestry staff of 2,332 and retired staff of 4,560 persons. Amongst the in-service staff, 25 hold above BA/BS degree (inclusive), 237 college diplomas, and 719 vocational diplomas. The rest 1,351 persons have received education below the high school level (junior school and primary education).

G.4.3 Document key technical skills that will be required to successfully implement the project and identify members of the management team or project partners who possess the appropriate skills.

>> Environmental-friendly techniques will be employed through direct planting on degraded lands in the proposed A/R CDM project activity. The following technical standards will be strictly followed:

- State Technical Standards for Afforestation/Reforestation: GB/T 15776-1995;
- State Technical Standards for Establishing Eironmental Service Forests: GB/T 18337.1-2001, GB/T 18337.2-2001, GB/T 18337.3-2001;
- State Technical Standards for Designing of Afforestation/Reforestation: LY/T 1607-2003;
- State Technical Standards for Watershed Management: GB/T 16453.1-16453.6-1996
- State Technical Standards for Forest Management: GB/T 15781-1995;
- State Quality Standard for Seed of Trees: GB 7908-1999
- Standards for Seedling Qualification: GB 6000-1999;
- Technical Standard for Seedling Breeding: GB/T 6001-1985;
- Technical Standard for Container Seedling Breeding: LY1000-1991.

The local forestry agencies, i.e., Sichuan Provincial Forestry Department, Forestry Bureaus at county level, China Office of The Nature Conservancy, China Office of the Conservation International and the Chinese Academy of Forestry will provide technical consultation and guidance, including training courses, and conduct quality control to the preparation and implementation of the proposed A/R CDM project activity. Project participants will also seek advice from other local, national, and international forestry experts. The most up-to-date technologies and silvicultural models will be adopted.

Species arrangements

Tree species will be planted in mixed block arrangements (mixed at landscape level, same species within each subcompartment) to minimize risks (fire, pest insects and disease) and maximize environmental and social benefits. Please see table G-10 for species and model to be planted in each County.

Genetic Sources and Nursery Practices

All seedlings used in the proposed A/R CDM project activity will be bred in local nuseries using seed collected from local seed orchard or parent trees. All seedlings used shall be certified, quarantined and tagged, i.e., each batch of seedlings should have quality certificate, quarantine certificate and tag indicating the production area and quality grade. The seedlings are qualified according to standard GB 6000-1999. Only the quality grade I and II can be used. Table A-6 lists

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the standard for seedling grading for tree species used in the proposed A/R CDM project - 44 - activity.

Table G-15 Standard for seedling grading³

Species	Seedling age	Standard for grade I and II			
		Minimum diameter at base (cm)	Minimum height (cm)	Minimum length of main root (cm)	Root Minimum number of lateral roots with length over 5cm
<i>Platycladus orientalis</i>	<1	0.30	15		
<i>Cunninghamia lanceolata</i>	<1	0.30	16	15	10
<i>Betula luminifera</i>	<1	0.35	30	18	7
<i>Magnolia officinalis</i>	<1	0.40	30	20	5
<i>Betula albo-sinensis</i>	<1	0.35	30	18	7
<i>Larix gmelinii</i>	<1	0.30	15		
<i>Cupressus chengiana</i> (transplanted seedlings)	2-5	1.00	100	40	20
<i>Cupressus chengiana</i> (bag seedling)	1	0.30	20	15	6
<i>Pinus tabulaeformis</i>	<1	0.30	12		
<i>Pinus massoniana</i>	<2	0.30	16		
<i>Quercus acutissima</i>	<1	0.70	60	18	4
<i>Picea asperata</i>	2	0.3	16	20	7

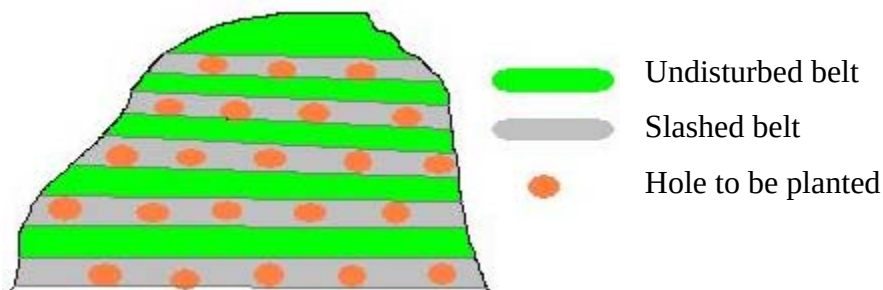
Plastic bag (5 cm in diameter and 15 cm length) that hold soils mixed with 20 percent of organic soil will be used to seedlings of *Platycladus orientalis*, *Cupressus chengiana*, *Pinus tabulaeformis*, *Pinus massoniana*, and *Larix gmelinii*. This technique ensures the control of the growing conditions in the initial stage after planting, and thus increases the survival rate and early growth. *Quercus acutissima* will be reforested by direct seeding. *Populus szechuanica* will be planted by clone cutting. Transplanted seedlings of *Cupressus chengiana* will be used.

Site and Soil Preparation

To prevent soil erosion and protect existing carbon stocks, site burning and overall tillage will not be employed during the site and soil preparation. Existing non-tree vegetation will be slashed manually along landform contour with a width 100 cm and piled on-site. Small holes (with 40 cm in diameter and 30 cm in depth for *Magnolia officinalis*, *Larix gmelinii*, *P. massoniana*, *P. tabulaeformis*, *Cunninghamia lanceolata*; with 60 cm in diameter 50 cm in depth for *Betula albo-sinensis*, *Betula luminifera*, *Cupressus chengiana* and *Platycladus orientalis*); and with 30 cm in diameter and 20 cm in depth for *Quercus acutissima*) will be dug manually along slashed belts in autumn or winter. Especially 2-3 cm in diameter of hole will be bored for clone cutting of *Populus szechuanica*. The holes will be arranged in a triangle form on slope (Fig. G-7). Even though, the limited removal of pre-existing vegetation will be accounted as carbon stock decrease.

³ Data source: Standards for Seedling Qualification: GB 6000-1999

Fig G-7 Sketch map for the planting holes



Forest Establishment

Trees will be planted within 2 years starting in the spring 2007 (see Table 6 for the planting plan of each species and site). The planting is preferably conducted in the cloudy days. No machinery will be used in the planting. *Quercus acutissima* will be reforested by direct seeding and other species will be planted by direct planting.

The number of trees to be planted per hectare is determined based on the State Technical Standards for Establishing Eironmental Service Forests (GB/T 18337.1-2001) as follows:

- *Magnolia officinalis*, *Poplus szechuanica* , *Betula luminifera* and *Betula albo-sinensis*: 2.0 m × 3.0 m, 1667 trees per hectare;
- *Quercus acutissima*: 1.5 m × 1.5 m, 4444 trees per hectare;
- *Cunninghmia lanceolata*, *Platycladus orientalis*, *Cupressus chengiana*, *Pinus tabulaeformis*, *P.massoniana*, *Larix gmelinii* and *Picea asperata*: 2.0m × 2.0m, 2500 trees per hectare.

Revetment will be built at lower slope side of planting holes to hold soil and rain water for planted young trees.

To ensure high survival rates and good growth in the early stages, weeding and scarification will be implemented manually twice a year in the first 3 years after planting, and weed slashing once in 4th 5th year. Weeding and scarification shall not be conducted in raining season. Survival rates will be checked 6 months after planting and re-planting will be conducted using bigger seedlings if the survival rate is lower than 85 percent.

The land parcels will be enclosed after planting to prevent planted young trees from being disturbed by human activities or illegal grazing, until the stand canopy closure.

G.4.5 Document the financial health of the implementing organization(s).
--

>>

1. Management letter
2. Recent financial reports (within last 3 months)
3. Latest Audit Report
4. Balance Sheet and Revenue and Expense Statement for your prior fiscal or calendar year

G5 Land Tenure (Required)

G.5.1 Guarantee that the project will not encroach uninvited on private property, community

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property, or government property.

>> Except for 4.5 ha of lands in Lixian County is state-owned, all other lands to be planted in the proposed project activity are collective owned by villages, most of land tenure belongs to local villages or villagers group (in section G.1.5 and see table G-8). Although there are 58.2 ha of lands in Tongbao village of Chenjiaba Township that are contracted to individual farmers for a period 2004-2053 (50 years) and 56.8 ha of lands in Huangdimiao village of Duba Township in Beichuan that are contracted to individual farmers for a period 2001-2030 (30 years). Under the contractual arrangement in the proposed A/R CDM project activity, local communities and the implementing entity involved have the right to use the lands. They own the timber and other wood and non-wood forest products, and have the legal right to harvest and sell the products. However, they should have the license, which is issued by the local government, to harvest the timber.

This project will not encroach uninvited on private property, community property and government property. There is no land ownership/tenure conflict.

G.5.2 Guarantee that the project does not require the relocation of people or any relocation is 100% voluntary and fundamentally helps resolve land tenure problems in the area.

>>The project does not require the relocation of people.

G.5.3 Describe potential “in-migration” of people from surrounding areas, if relevant, and explain how the project will respond.

>>There will be no potential “in-migration” people from surrounding areas.

G6 Legal Status (Required)

G.6.1. Guarantee that no laws will be broken by the project.

>> Based on the design of this project, every steps will be good law.

G.6.2. Document that the project has, or expects to secure, approval from the appropriate authorities.

>> 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 Oct 12, 2005, effective immediately. Based on the *Measures*, the Chinese Government allows any sponsor to apply, invest in, and implement a CDM project activity as long as it meets basic requirements stipulated in the *Measures*.

G7 Adaptive Management for Sustainability (1 Point)

G.7.1 Demonstrate how management actions and monitoring programs are designed to generate reliable feedback that is used to improve project outcomes.

>> **Monitoring of forest establishment**

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To ensure that the planting quality conforms to the practice described in AR-CDM-PDD and is well implemented, the following monitoring activities will be conducted in the first three years after planting: - 47 -

- To confirm that site and soil preparations are implemented based on practice documented in PDD, e.g., no slash and burn, no overall plough. If slash and burn of pre-existing vegetation occur, emissions associated shall be accounted for based on monitoring methodology applied;
 - ✓ Slash and burn: date, location, area, biomass removed, burning and other measures undertaken;
 - ✓ Overall plough: date, location and area for each stratum
- Planting: date, location, area, tree species (establishment of the stand models);
- Fertilization: date, location, area, tree species, amount and type of fertilizer applied, etc, in the first 3 years;
- Survival checking:
 - ✓ The initial survival rate of planted trees shall be counted three months after the planting, and re-planting shall be conducted if the survival rate is lower than 85 percent of the final planting density;
 - ✓ Final checking three years after the planting;
 - ✓ The checking of the survival rate.
- Weeding and fertilization checking: check and confirm that the weeding and fertilization practice is implemented as described in the PDD;
- Survey and check that species and planting for each stratum are in line with the PDD;
- Document and justify any deviation from the planned forest establishment.

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;
- Coppicing: date, location, area, tree species, volumes or biomass removed;
- Fuel wood collection: date, location, area, tree species, volumes or biomass removed;
- Checking and confirming that harvested lands are re-planted, re-sowed or coppiced as planned or as required by forest law;
- Checking and ensuring that good conditions exist for natural regeneration if harvested lands are allowed to regenerate naturally;
- Monitoring of disturbances: 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.

Monitoring of the project boundary

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To demonstrate that the actual area afforested or reforested conforms to the afforestation or reforestation area outlined in the project plan. The following activities are foreseen:

- Field surveys concerning the actual project boundary within which A/R activity has occurred, land by land;
- Measuring geographical positions (latitude and longitude of each corner polygon land) using GPS;
- Checking whether the actual boundary is consistent with the description in the CDM-AR-PDD;
- Input the measured geographical positions that are in conformity with the description in the CDM-AR-PDD into the GIS system and calculate the area of each stratum and stand;
- The project boundary shall be monitored periodically all through the crediting period, including through remote sensing as applicable. If the forest area changes during the crediting period, for instance, because deforestation occurs on the project area, the specific location and area of the deforested land shall be identified. Similarly, if the planting on certain lands within the project boundary fails these lands will be documented.

G.7.2 Describe the a management plan for documenting decisions, actions and outcomes and sharing this information with others within the project team, so experience is passed on rather than being lost when individuals leave the project.

>> To ensure that this project could maintain a good running status for a long time, the following plan for documenting decisions, actions and outcomes and sharing this information with others will be conducted in the project execution period:

a) Reliable field measurements

To ensure the reliable field measurements,

- Standard Operating Procedures (SOPs) for each step of the field measurements, including all detail phases of the field measurements and provisions for documentation for verification purposes, will be developed and adhered to over time.
- Training courses on the field data collection and data analyses will be held for persons involving in the field measurement work. The training courses should ensure that each field-team member is fully aware of all procedures and the importance of collecting data as accurately as possible. To achieve this, both classroom examination and field examination will be conducted, and only those that have passed the examination can join the team. Test plots will be established and used for the field examination in which all measurements of pertinent components and procedures will be examined.
- A document that shows that these steps have been followed will be presented as a part of the monitoring report. The document will list all names of the field team and the project leader will certify that the team is trained;
- Any new staff will be adequately trained.

b) Verification of field data collection

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

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- 15% of randomly selected plots will be re-measured by another team
- Key re-measurement elements include the location of plots, DBH and tree height of all trees present.
- 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 error above 5%. Any errors found will be corrected and recorded. Any errors discovered will be expressed as a percentage of all plots that have been rechecked to provide an estimate of the measurement error.

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 the possible errors in the process 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 are 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 there are any problems with the monitoring plot data that cannot be resolved, the plot should not be used in the analysis.

d) Data maintenance and archiving

Data archiving will take both electronic and paper forms, and copies of all data will be provided to each project participant. All electronic data and reports will also be copied on durable media such as CDs and copies of the CDs are stored in multiple locations. The archives include:

- Copies of all original field measurement data, laboratory data, data analysis spreadsheet;
- Estimates of the carbon stock changes in all chosen pools and non-CO₂ GHG and corresponding calculation spreadsheets;
- GIS products;
- Copies of the measuring and monitoring reports.

G.7.3 Demonstrate how the project design is sufficiently flexible to accommodate potential changes and that the project has a defined process in place to adjust project activities as needed.

>> Located in far away mountainous area, the land-use of afforestation/reforestation sites has no any changes, since deforested in 1950s-1980s. As the lands to be afforested or reforested are histie, there willn't be any other use except foresting. Once the project started, the fire and pest risk will most possibly cause changes. This can be alleviated through technical and awareness training to local farmers/communities, strengthening patrolling and monitoring, as well as building the fire-break belt. Furthermore, a mixed species arrangements will be adopted to reduce fire and pest risks.

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 project failure and farmers' loss. This risk will be mitigated by providing technical assistance and training to farmers and communities, by local forestry agencies, forestry research and design institutions, as well as by the extension network of the forestry sector. The operating entity is experienced in afforestation and reforestation, which will also provide the technical assistance to the farmers/communities.

G.7.4. Demonstrate an early commitment to the long-term sustainability of project benefits once initial project funding expires, including e.g. a new project; securing payments for ecosystem services; promoting micro-enterprise; and establishing alliances to continue sustainable land management.

>> The development and registration of this project as a CDM-AR project on UNFCCC CDM-EB and planting working have been completed, and all financing of this phase, the most investment of a CDM-AR project, has been charged by the project entity. Now, this project has accessed to the carbon markets, from which all the carbon income will maintain the sustainability of this project benefits.

Also, based on the policy of “natural forest protection project” and “payment for ecological service of forest” in China, the payment of forest protection and management (more than RMB 150 yuan per ha annuly) from nation will be another additional financing used to maintain the sustainability of this project, during the project credit period, even after the project term. Because, more than 95% land of this project is national public welfare forest-use land, and all trees on this project land will be protected forever.

“Natural forest protection project” is mainly the protection of the upper reaches of Yangtze river, middle and upper reaches of Yellow river, northeast of China and Inner Mongolia. The first stage of Natural forest protection project is from 2000 to 2010. 17 provinces, 734 counties and 167 forestry bureaus that located in the upper reaches of Yangtze river, Middle and upper reaches of Yellow river and the northeast of Inner Mongolia are included. One of the purpose and mission of the project is protecting 918 million mu existing forest including this proposed project. The total invest of the first stage of Natural forest protection project is 96.2 billion yuan. Among it, 53.3 billion yuan for upper reaches of Yangtze river and middle and upper reaches of Yellow river, 42.9 billion yuan for northeast of China and Inner Mongolia. And the invest is used to improve the forest management based on a payment standard of 10000 yuan per year to manage 5700 mu forest. And the second stage of Natural forest protection project is on the way⁴.

In order to protect the nature forest, Chinses government promulgate a police to offer ecological service parment to the forest owner based a payment standard of 10 yuan/mu per year to arouse forest protection. All the households related in this project can gain the payment to protect and manage their owned prirest included in this proposed project⁵.

G8 Knowledge Dissemination (1 Point)

G.8.1. Describe how they will document the relevant or applicable lessons learned.

>> In each critical stage of project development, number of participatory training have been carried out, including the promotion of forest carbon project concept and community participation wills investigation before project activities, technical training and field guidance about CDM-AR program in the project development process, and Community Forestry knowledge training in the project construction phase. Such materials, training materials, presentations, documents used in training promotional have been properly preserved by the project entity. At the same time, other form of medio as video, pictures, will be used to record all activities, quizzes, discussion, lessons learned, etc.

⁴ <http://www.sdpc.gov.cn/fzgh/ghwb/115zxgh/W020071009585564773595.doc>

⁵ http://www.mof.gov.cn/mofhome/gp/nongyesi/200806/t20080624_50354.html

G.8.2. Describe how they will disseminate this information in order to encourage replication of successful practices. Examples include: undertaking and disseminating research that has wide-reaching applications; holding training workshops for community members from other locales; promoting “farmer to farmer” knowledge-transfer activities; linking to regional databases; and working with interested academic, corporate, governmental or non-governmental organizations to replicate successful project activities.

>> The project entity carried out some research about the growth equation of Sichuan common shrubs biomass and the project selected species biomass. The research results not only can be used for the baseline study directly, but also these equations have published in some domestic forestry scientific journals to fill gaps in this study areas, which can be used directly in some new project development.

For all the nature reserves in Liangshan Prefecture and the line-agencies for forest management in Pangzhihua City, the CDM-A/R project development training was conducted. Assistance was also provided for them to prepare the project idea note for the afforestation/reforestation project on degraded lands in the xerothermic valleys and the project for vegetation rehabilitation in the wildlife habitats in the nature reserves in Liangshan Prefecture. And also, all experience from this project will be shared with government, to help them carry out national forest carbon project programming, and promote development of new AR project.

With the assistance from Sichuan Provincial Carbon Information Centre and Sichuan Provincial Institute for Forest Resources Inventory, Planning and Design, the carbon resources information database for Sichuan Province has been constructed. This information database system has pulled together not only the information about the land resources adaptable for forestry, and the natural, social and economic information, but also that information relevant to the newly-developed CDM-A/R projects.

Project experience has been shared on Lessons Learned Workshop from Forest Carbon Projects held by Conservation International in Colombia, and this project will be embodied in a forest carbon case study report. A newsreel about the climate change and human's mitigation and adaptation, cooperating with the Phoenix Satellite Television, will choose this project as model of forest carbon project in China. Also, much more channel will be used to use to replicate successful project activities.



Several trainings and workshops had been hold.

III. Climate Section

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CL1 Net Positive Climate Impacts (Required)

CL.1.1 Estimate the net change in carbon stocks due to the project activities. The net change is equal to carbon stock changes with the project minus carbon stock changes without the project (G2). Alternatively, any methodology approved by the CDM Executive Board may be used. Define and defend assumptions about how project activities will alter carbon stocks over the duration of the project or the project accounting period.

>> 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-CO₂ GHG emissions measured in CO₂ equivalents by sources that are increased as a result of the implementation of the proposed project activity, while avoiding double counting, within the project boundary, attributable to the project activity.

a. Estimate of carbon stock changes in living biomass:

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

It is conservatively assumed that all pre-project tree and non tree vegetation will be died out. Therefore, the carbon stock loss of pre-project tree and non-tree vegetation equals to the carbon stock at the start of the proposed project activity, table CL.1.

Table CL.1. carbon loss of pre-project tree and non-tree vegetation:

Baseline strata ID	Area (ha)	Carbon loss (tCO ₂)								
		Non-tree vegetation			Trees			Total		
		AGB	BGB	Sub-total	AGB	BGB	Sub-total	AGB	BGB	Total
BLS-BC- I	90.7	532.4	553.7	1,086.1	31.9	7.4	39.2	564.3	561.0	1,125.3
BLS-BC- II	109.5	1,607.1	922.2	2,529.3	104.3	24.1	128.3	1,711.4	946.2	2,657.6
BLS-LX- I	626.8	3,880.1	2,728.4	6,608.4	0.0	0.0	0.0	3,880.1	2,728.4	6,608.5
BLS-LX- II	121.0	1,564.2	972.8	2,537.0	0.0	0.0	0.0	1,564.2	972.8	2,537.0
BLS-MX- I	234.9	1,584.4	1,237.9	2,822.2	30.3	7.0	37.3	1,614.7	1,244.9	2,859.6
BLS-PW- I	70.1	720.9	1,211.1	1,932.0	3.2	0.7	3.9	724.1	1,211.8	1,935.9
BLS-PW- II	120.5	1,706.5	3,073.8	4,780.2	10.3	2.4	12.7	1,716.8	3,076.1	4,792.9
BLS-QC- I	107.1	668.8	853.2	1,522.0	42.8	9.9	52.7	711.6	863.1	1,574.7
BLS-QC-II	83.0	421.7	746.5	1,168.2	0.0	0.0	0.0	421.7	746.5	1,168.2
BLS-QC-III	125.0	2,097.3	1,928.7	4,026.0	67.9	14.9	82.8	2,165.2	1,943.5	4,108.7
BLS-QC-IV	164.9	2,980.3	2,279.6	5,259.8	11.9	2.4	14.3	2,992.2	2,281.9	5,274.1
BLS-QC-V	120.5	2,153.8	2,274.4	4,428.2	0.0	0.0	0.0	2,153.8	2,274.4	4,428.2
BLS-QC-VI	141.7	3,026.5	2,612.9	5,639.3	47.2	11.5	58.7	3,073.7	2,624.4	5,698.1
BLS-QC-VII	136.1	4,131.6	2,504.3	6,635.9	28.6	6.6	35.2	4,160.2	2,510.9	6,671.1
Total	2251.8	27,075.4	23,899.3	50,974.7	378.3	86.8	465.1	27,454.0	23,986.2	51,440.2

*AGB: aboveground biomass; BGB: belowground biomass

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

Stock change method presented in Section II.5 and II.7.1 of the approved methodology applied is used. The only difference within each project stratum is tree species. Since tree species are planted in a way of block mixture, stand within each single block can be treated as pure plantation. Therefore we define the stand models within each project stratum based on tree species, i.e., the subscript k in formula (20) of the approved methodology applied represents tree species in our calculation.

Local growth curves are used to estimate the average merchantable volume of each species (V_{ikt}), assuming that the curves can apply to all strata (Table CL.2.).

Table CL.2. Local growth curves for species planted in the proposed project activity:

<i>Platycladus orientalis</i> and <i>Cupressus chengiana</i> ⁶	$V = NT_{(A)} \cdot 0.334267111595 \cdot (1 - e^{-0.0473470306465 \cdot A})^{2.289912305617}$
<i>Cunninghamia lanceolata</i> ⁶	$V = NT_{(A)} \cdot 0.31225810398 \cdot (1 - e^{-0.07402135899476 \cdot A})^{2.527119706049}$
<i>Pinus massoniana</i> ⁶	$V = NT_{(A)} \cdot 0.2903179349968 \cdot (1 - e^{-0.07526212201956 \cdot A})^{2.380556958577}$
<i>Quercus acutissima</i> ⁶	$V = NT_{(A)} \cdot 0.1363196248518 \cdot (1 - e^{-0.06436380714486 \cdot A})^{2.425820624933}$
<i>Larix gmelinii</i> ⁶	$V = NT_{(A)} \cdot 0.3032245111661 \cdot (1 - e^{-0.09092308039843 \cdot A})^{3.84121196496}$
<i>Picea asperata</i> ⁶	$V = NT_{(A)} \cdot 0.33050596446 \cdot (1 - e^{-0.029683022346463 \cdot A})^{3.094640905157}$
<i>Pinus tabulaeformis</i> ⁶	$V = NT_{(A)} \cdot 0.200346 \cdot (1 - e^{-0.054764 \cdot A})^{2.978562}$
<i>Magnolia officinalis</i> ⁷	$V = NT_{(A)} \cdot 0.151 / (1 + 265.2323 \cdot e^{-0.4144 \cdot A})$
<i>Populus szechuanica</i> ⁶	$V = NT_{(A)} \cdot 0.3057 \cdot (1 - e^{-0.1444 \cdot A})^{2.3398}$
<i>Betula luminifera</i> and <i>Betula albo-sinensis</i> ⁶	$V = NT_{(A)} \cdot 0.30583851880298 \cdot (1 - e^{-0.08987338464923 \cdot A})^{1.5875471045008}$

Note. For equations in Table CL.2.

V	stem volume at time t for the project scenario, $m^3 \text{ ha}^{-1}$
$NT_{(A)}$	Number of trees at age A , tree ha^{-1}
A	Stand age, year

These curves were derived from local forestry inventories data that have been carried out every five years since the 1990s, or publications. Taken into account natural mortality, the number of trees is assumed to be 80% of initial planting density (the survival rate in third year after planting usually reaches to 85-90% in the project area). There will be no fuelwood gathering of living trees. Thinning and harvesting will also be accounted based on forest management plan for each project stratum. The average merchantable volume is then converted into carbon stock via wood density (WD) and Biomass Expansion Factors (BEF)

⁶ Derived using plot data of national forestry inventory in Sichuan that conducted once every 5 years.

⁷ Zhao T, Fu D, Tian G et al. 1993. Studies on the growth model for *Magnolia officinalis*. Journal of Central South Forestry College, 13(1).

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and root-shoot ratio (R) (Table D.3.) based on equation (10)-(11) presented in the approved methodology applied, using LULUCF Sequestration Input Tools developed by the World Bank BioCarbon Fund (www.biocarfund.org). The carbon stock and carbon stock changes of the planted trees for each project stratum are presented in Table CL.5. and Table CL.6. respectively. Please see attached spreadsheet for the detail calculation.

Table CL.3. Wood density, BEF and Root-shoot ratio for species used in the proposed project activity⁸:

Tree species	Wood Density (tonnes d.m.m⁻³)	BEF	Root-shoot ratio
<i>Cunninghamia lanceolata</i>	0.307 (54, 0.009)	1.74 (251, 0.08)	0.219 (261, 0.004)
<i>Betula sp.</i>	0.541 (62, 0.018)	1.37 (15, 0.04)	0.231 (21, 0.018)
<i>Magnolia officinalis</i>	0.598 (482, 0.012)	1.67 (133, 0.04)	0.260 (146, 0.010)
<i>Cupressus chengiana</i> and <i>Platycladus orientalis</i>	0.478 (32, 0.015)	1.77 (45, 0.06)	0.244 (50, 0.009)
<i>Populus szechuanica</i>	0.378 (144, 0.009)	1.59 (108, 0.03)	0.291 (107, 0.012)
<i>Pinus tabulaeformis</i>	0.360 (15, 0.012)	1.62 (74, 0.04)	0.231 (89, 0.006)
<i>Larix gmelinii</i>	0.490 (13, 0.039)	1.37 (106, 0.02)	0.236 (129, 0.006)
<i>Pinus massoniana</i>	0.380 (43, 0.019)	1.54 (221, 0.03)	0.200 (202, 0.007)
<i>Picea asperata</i>	0.342 (15, 0.012)	2.05 (49, 0.14)	0.201 (49, 0.005)
<i>Quercus sp.</i>	0.676 (82, 0.012)	1.57 (74, 0.05)	0.277 (77, 0.009)

Note. data in parentheses represent number of samples and standard error respectively. Parameters for *Magnolia officinalis* are those for hardwood broadleaf species.

⁸ Institute of Forest Ecology and Environment, CAF, Updated Database for China GHG Inventory in Forestry Sector.

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Table CL.4. Estimated amount of net anthropogenic GHG removals by sinks in the first crediting period:

Summary of results obtained in Sections G.2.2, CL.2.1.				
Year	Estimation of baseline net GHG removals by sinks (tonnes of CO ₂ e)	Estimation of actual net GHG removals by sinks (tonnes of CO ₂ e)	Estimation of leakage (tonnes of CO ₂ e)	Estimation of net anthropogenic GHG removals by sinks (tonnes of CO ₂ e)
2007	-170	1,496	-6	-50,120
2008	-164	6,155	1	5,989
2009	-158	14,174	0	14,016
2010	-151	21,529	0	21,378
2011	-144	27,627	0	27,483
2012	-137	32,847	0	32,710
2013	-129	37,341	0	37,212
2014	-122	41,227	0	41,105
2015	-115	44,613	0	44,498
2016	-108	47,599	0	47,490
2017	-102	50,263	0	50,161
2018	-95	-30,225	0	-30,320
2019	-89	28,956	0	28,867
2020	-84	43,874	0	43,790
2021	-78	45,856	-35	45,742
2022	-73	18,838	12	18,752
2023	-68	-7,895	0	-7,963
2024	-64	13,367	0	13,303
2025	-60	38,603	0	38,543
2026	-56	38,021	0	37,965
Total (tonnes of CO ₂ e)	2168	514,265	-55	460,603

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Table CL.5. Ex ante estimates of carbon stock in living biomass of planted trees (tC):

Year	PS-BC-I	PS-BC-II	PS-BC-III	PS-LX-I	PS-LX-II	PS-LX-III	PS-MX-I	PS-MX-II	PS-PW-I	PS-PW-II	PS-QC-I	PS-QC-II	Total
2007	0	0	0	0	389	0	0	0	19	0	0	0	408
2008	0	41	14	0	751	0	0	0	29	14	129	1,108	2,087
2009	212	63	128	133	1,270	3	91	2	44	89	639	3,278	5,952
2010	594	94	332	388	1,959	28	392	18	66	268	1,575	6,109	11,824
2011	1,055	142	582	720	2,825	99	864	56	100	585	2,922	9,408	19,358
2012	1,557	214	860	1,112	3,871	237	1,450	125	150	1,062	4,644	13,036	28,317
2013	2,077	321	1,158	1,556	5,093	457	2,102	227	223	1,706	6,692	16,889	38,501
2014	2,598	478	1,473	2,042	6,489	774	2,781	366	330	2,514	9,019	20,880	49,744
2015	3,111	708	1,809	2,565	8,048	1,193	3,458	544	484	3,475	11,573	24,944	61,912
2016	3,610	1,037	2,169	3,119	9,763	1,720	4,113	759	699	4,572	14,309	29,024	74,893
2017	4,089	1,497	2,562	3,700	11,620	2,357	4,733	1,012	988	5,783	17,184	33,077	88,601
2018	4,546	2,118	2,997	4,302	9,526	3,102	5,310	1,300	1,361	5,198	3,531	37,068	80,358
2019	4,979	2,917	3,477	4,362	11,000	2,766	4,089	1,136	1,814	6,327	4,420	40,968	88,255
2020	5,387	3,887	4,001	4,880	12,547	3,431	4,427	1,384	2,325	7,539	5,655	44,757	100,221
2021	5,771	4,981	4,553	5,399	14,158	4,161	4,732	1,653	2,856	8,817	7,227	48,418	112,727
2022	6,131	6,120	5,107	5,918	15,824	4,953	5,005	1,940	3,364	10,142	7,509	45,853	117,864
2023	6,466	7,208	5,632	6,434	17,535	5,801	5,249	2,245	2,669	8,234	9,514	38,725	115,711
2024	4,746	5,718	4,273	5,698	19,283	6,698	5,465	2,565	2,926	9,257	11,747	40,981	119,357
2025	4,949	6,270	4,556	6,149	21,060	7,640	5,656	2,899	3,125	10,285	14,166	43,129	129,885
2026	5,137	6,696	4,791	6,597	22,858	8,621	5,825	3,245	3,272	11,309	16,733	45,168	140,254

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Table CL.6. Ex ante estimates of carbon stock changes in living biomass of planted trees (t CO₂ yr⁻¹):

Year	PS-BC-I	PS-BC-II	PS-BC-III	PS-LX-I	PS-LX-II	PS-LX-III	PS-MX-I	PS-MX-II	PS-PW-I	PS-PW-II	PS-QC-I	PS-QC-II	Total
2007	0	0	0	0	1,425	0	0	0	71	0	0	0	1,496
2008	0	152	50	0	1,329	0	0	0	36	52	475	4,061	6,155
2009	777	78	419	489	1,903	11	334	9	54	274	1,868	7,957	14,174
2010	1,401	117	748	934	2,526	92	1,103	57	82	656	3,431	10,384	21,529
2011	1,692	175	916	1,217	3,175	260	1,729	141	123	1,163	4,941	12,095	27,627
2012	1,841	263	1,019	1,440	3,833	505	2,151	250	182	1,747	6,313	13,304	32,847
2013	1,904	391	1,093	1,625	4,484	810	2,391	376	269	2,361	7,513	14,125	37,341
2014	1,911	577	1,158	1,783	5,116	1,159	2,489	511	393	2,964	8,530	14,637	41,227
2015	1,882	842	1,229	1,918	5,719	1,538	2,481	650	563	3,524	9,366	14,900	44,613
2016	1,828	1,207	1,321	2,033	6,286	1,933	2,401	790	787	4,021	10,032	14,961	47,599
2017	1,757	1,687	1,442	2,129	6,810	2,334	2,273	926	1,062	4,441	10,541	14,861	50,263
2018	1,676	2,277	1,593	2,207	-7,679	2,731	2,116	1,058	1,368	-2,144	-50,059	14,632	-30,225
2019	1,588	2,932	1,763	221	5,405	-1,231	-4,476	-602	1,660	4,139	3,257	14,301	28,956
2020	1,498	3,556	1,921	1,898	5,673	2,438	1,239	910	1,872	4,446	4,532	13,892	43,874
2021	1,407	4,012	2,023	1,905	5,907	2,679	1,118	985	1,948	4,686	5,761	13,424	45,856
2022	1,317	4,173	2,030	1,903	6,107	2,903	1,002	1,055	1,862	4,858	1,035	-9,407	18,838
2023	1,230	3,990	1,926	1,893	6,274	3,107	894	1,117	-2,549	-6,997	7,353	-26,133	-7,895
2024	-6,307	-5,461	-4,981	-2,702	6,410	3,291	793	1,174	944	3,749	8,186	8,272	13,367
2025	745	2,022	1,038	1,657	6,516	3,455	701	1,224	730	3,770	8,871	7,875	38,603
2026	691	1,565	861	1,643	6,593	3,597	618	1,267	540	3,756	9,413	7,477	38,021
total	18,837	24,554	17,568	24,191	83,813	31,612	21,357	11,897	11,998	41,466	61,355	165,616	514,265

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CL.1.2 Factor in the non-CO₂ gases CH₄ and N₂O to the net change calculations (estimated in CL.1.1.) if they are likely to account for more than 15% (in terms of CO₂ equivalents) of the project's overall GHG impact.

>> There will be no biomass burning, no machinery and fertilizers to be used either for site preparation, planting, or for forest management. Therefore, emissions due to biomass burning, Fossil fuel burning from machinery using and fertilization are not taken into account (see Table G-3 and G-4).

CL.1.3 Demonstrate that the net climate impact of the project (including changes in carbon stocks, and non-CO₂ gases where appropriate) will give a positive result in terms of overall GHG benefits delivered.

>> see Section CL.1.1

CL.2 Offsite Climate Impacts ("Leakage") (Required)

CL.2.1 Estimate potential offsite decreases in carbon stocks (increases in emissions or decreases in sequestration) due to project activities.

>> All seedlings used in the proposed project activity will be bred either in local nurseries or bought from nurseries nearby and transported to the project lands. There is also a need for transporting thinned or harvested timber. A medium size track, heavy track, livestock and manpower will be used, depending on the location of the project lands. Based on the amount of seedlings and seed needed for afforestation/reforestation and the expected output of thinned or harvested timber, the leakage caused by vehicle uses is estimated using equation (32)-(34) in Section II.8.1 of the approved methodology AR-AM0003/version 03 applied for each parcel of lands and each species. The emission factor is 2.6353 kg CO₂ litre⁻¹ for diesel and 2.49 kg CO₂ litre⁻¹ for gasoline for all vehicle (from China's national initial national communication). The expected leakage is 55 t CO₂-e by the end of the crediting period.

Table CL-1 Estimates of leakage

Year No.	Year	Annual Leakage (t CO ₂ -e yr ⁻¹)	Cumulative Leakage (t CO ₂ -e)
1	2007	6	6
2	2008	1	8
3	2009		8
4	2010		8
5	2011		8
6	2012		8
7	2013		8
8	2014		8
9	2015		8
10	2016		8
11	2017		8
12	2018		8
13	2019		8
14	2020		8
15	2021	35	43

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16	2022	12	55
17	2023		55
18	2024		55
19	2025		55
20	2026		55

CL.2.2 Document how negative offsite impacts resulting from project activities will be mitigated and estimate the extent to which such impacts will be reduced. Estimate the extent to which the negative offsite impacts will be reduced adequately.

>> The site preparation, thinning as well as the logging in the proposed project activity will be conducted manually, and labors used for the proposed A/R CDM project activity are from local villages, hence transportation for labors is not needed, without using machinery tools that consume fossil fuel.

All lands to be planted in the proposed A/R CDM project activity are subjected to fuelwood collection, and some parcels of lands have grazing animals although this is illegal. Thus, as the result of the project activity, grazing and fuelwood collection may be temporarily or permanently displaced from the project sites to other locations. However there are sufficient existing grazing lands under the control of the project participants that are far from its maximum animal holding capacity, i.e., even if all pre-project animals are displaced to the existing grazing lands outside the project boundary but under the control of the project participants, the existing grazing lands are still under the grazing capacity.

Any harvesting of trees (including harvesting for fuelwood) should be approved by local government ex ante, including harvest as fuelwood. However, local government usually do not issue harvest licence for the purpose of harvesting fuelwood. This has been well-enforced all over China. Therefore, local communities usually collect shrub, deadwood and living branches of trees for cooking and heating although these are the main energy sources (see also table H-1 for fuelwood consumption). Only a few of fuel are collected from the project lands. Moreover, local farmers will be able to collect fuel within the project boundary without compromising the growth of trees established under the proposed A/R CDM project activity, including dead wood and branches and shrubs growing between the trees during the early stages of succession. Therefore, as the result of the proposed A/R CDM project activity, leakage from the displacement of fuelwood collection is nil.

No wood post will be used in the proposed A/R CDM project activity.

Leakage associated with the proposed A/R CDM project activity, in terms of the use of vehicles for the transportation of staff and products outside the project area, is small. This leakage will be monitored at daily bases and accounted following steps described in Section III.7 of the approved methodology applied.

CL.2.3 Subtract any likely project-related unmitigated negative offsite climate impacts from the climate benefits being claimed by the project. The total net effect, equal to the net increase in on-site carbon stocks (calculated in the third indicator in CL1) minus negative offsite climate impacts, must be positive

>>See section GL.1.1,

CL.3 Climate Impact Monitoring (Required)

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CL.3.1a Describe the initial plan for how they will select carbon pools and non-CO₂ GHGs to be monitored.

>> As there will be no slash and burn site preparation, overall ploughing, N-fertilizer application and flood irrigation as well as no machinery tools to be used within the project boundary, hence no significant GHG emissions by sources as results of the proposed project activity.

Table CL-2 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	Conservatively omitted by the approved methodology applied
Litter	No	Conservatively omitted by the approved methodology applied
Soil organic carbon	No	Conservatively omitted by the approved methodology applied

Table CL-3 GHG emissions by sources other than those resulting from changes in carbon pools

Source	Gas	Included/excluded	Justification / Explanation
Combustion of fossil fuels used for vehicles	CO ₂	Included	Potential significant emission source due to transportation
	CH ₄	Excluded	Potential emission is negligibly small as the methodology applied
	N ₂ O	Excluded	Potential emission is negligibly small as the methodology applied

CL.3.1b State if the corresponding measurements and the sampling strategy (including monitoring frequency) are set in the monitoring plan.

>> **stratification**

The ex-ante project stratification presented in baseline survey will be used as a basis for monitoring. However, since there is usually diversion of planned forest establishment and management practice as well as unexpected disturbance, this ex ante stratification shall be updated regularly based on (ex post stratification):

- Unexpected disturbances occurring during the crediting period (e.g. due to fire, pests or disease outbreaks), affecting differently different parts of an originally homogeneous stratum or stand;
- 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;
- Eligible land areas as defined in the AR-CDM-PDD not yet under the control of the project participant at the start of the project activity have become under the control of the project participants;
- Two different strata may be similar enough to allow their merging into one stratum. If one of the above occurs, ex-post stratification may be required. The possible need for ex-post stratification shall be evaluated at each monitoring event and changes in the strata should be reported to the DOE for verification.

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Sampling size and plot allocation among strata

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 (62) and (63) in Section III.2.2.1 of the approved methodology applied 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 have been calculated based on growth curves (Table D-2). The standard deviation of each stratum (st_i) is set as the 20% of the standing volume. The precision level was set as 10%. To ensure statistically independence for each stratum, minimum 3 plots are 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 disturbance.

Table CL-4 Number of monitoring plots for each stratum

Stratum ID	Area (ha)	Number of plots
PS-BC-I	56	3
PS-BC-II	87.4	3
PS-BC-III	56.8	4
PS-LX-I	171.8	4
PS- LX-II	358	8
PS- LX-III	218	5
PS-MX-I	63	3
PS-MX-II	171.9	3
PS-PW-I	40.6	3
PS-PW-II	150	5
PS-QC-I	330.2	7
PS-QC-II	548.1	21
total	2251.8	69

The stands to be established are relative dense (1600-2500 trees per hectare). The size of plots is hence set as 400 m^2 (including 64-100 trees within each sampling plot). Following the guidance in the Section 2.2.1 of the approved methodology applied, the permanent sample plots will be located systematically with a random start.

Monitoring frequency

The planting activity started in 2007. *Betula luminifera*, *Betula albo-sinensis*, *Magnolia officinalis*, *Larix gmelinii*, *Pinus massoniana* and *Cunninghania lanceolata* will be thinned at age 15 and 25. *Quercus acutissima* will be harvested at age 10. To avoid the coincidence with peaks in carbon stocks, the first monitoring will be conducted in the year 2012, with a subsequent monitoring interval of 5 years, i.e., in 2017, 2022, and 2027 respectively. Verification will be conducted in 2012, 2017, 2022, 2027 (table E-2).

Table CL-5 Monitoring times versus harvest and thinning time

Year No	Year	Monitoring	Verification	Harvesting	Thinning
1	2007				
2	2008				
3	2009				
4	2010				

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5	2011			
6	2012	X	X	
7	2013			
8	2014			
9	2015			
10	2016			X
11	2017	X	X	
12	2018			
13	2019			
14	2020			
15	2021			X
16	2022	X	X	
17	2023			
18	2024			
19	2025			
20	2026			X
21	2027	X	X	

Measuring and estimating carbon stock changes over time

The growth of individual trees on plots will be measured at each monitoring event. Pre-existing trees will not be measured and accounted for as a conservative manner. 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 living biomass of trees on each plot are then estimated through Biomass Expansion Factors (BEF) method.

Step-wise procedures (BEF method) and equation (66)-(73) in Section III.5.1 of the approved baseline and monitoring methodology (AR-AM0003/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.

The volume of the commercial component of trees in equation (68) is calculated based on locally derived equations as follows⁹:

- *Pinus tabulaeformis*: $V = 0.0000664924 \cdot DBH^{1.8655617} \cdot H^{0.93768879}$
- *Pinus massoniana*: $V = 0.0000600491 \cdot DBH^{1.8719753} \cdot H^{0.97180232}$
- *Cupressus chengiana* and *Platycladus orientalis*: $V = 0.000057173591 \cdot DBH^{1.8813305} \cdot H^{0.99568845}$
- *Quercus acutissima*: $V = 0.000059599784 \cdot DBH^{1.8564005} \cdot H^{0.98056206}$
- *Betula sp.*: $V = 0.000048941911 \cdot DBH^{2.0172708} \cdot H^{0.88580889}$
- *Cunninghmya lanceolata*: $V = 0.000058777042 \cdot DBH^{1.9699831} \cdot H^{0.89646157}$

⁹ Sichuan Forestry Department. 1984. Yield table and growth curve for forestry inventory in Sichuan.

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- *Picea asperata*: $V = 0.00005679 \cdot 0543 \cdot DBH^{1.8517320} \cdot H^{0.334624}$
- *Larix gmelinii*: $V = 0.00006832 \cdot 0 \cdot DBH^{1.74136} \cdot H^{1.11525}$
- *Other broadleaf trees*: $V = 0.00005275 \cdot 0716 \cdot DBH^{1.9450324} \cdot H^{0.93885330}$

Where

V	Commercial volume of tree, m ³ .tree ⁻¹
DBH	diameter at breast height, cm
H	tree height, m

The commercial volume is then summed for all trees within a plot and expresses as volume per unit area (m³.ha⁻¹), and the mean merchantable volume per unit area for stratum i and species j, MV_{ij} , is then calculated from plot value.

The species-specific biomass expansion factor for conversion of biomass of merchantable volume to above-ground biomass (BEF_j), wood density (D_j) and root-shoot ratio (R_j) used in Equation (68) and (69) are listed in Table CL-6 below. These parameters are estimated from published data. However, the average value of BEF may result in significant errors because BEF usually decreases with the increase of plantation age. Therefore effort will be made to analyze the data so as to derive age-dependent equations for BEF_j. IPCC default value (0.5) for the carbon fraction (CF) will be used. These value shall be updated every five years if the value from national inventory is updated in the future.

Table CL-6 Wood density, BEF and Root-shoot ratio for species used in the proposed A/R CDM project activity¹⁰

Tree species	Wood Density (tonnes d.m.m ⁻³)	BEF	Root-shoot ratio
<i>Cunninghamia lanceolata</i>	0.307 (54, 0.009)	1.74 (251, 0.08)	0.219 (261, 0.004)
<i>Betula sp.</i>	0.541 (62, 0.018)	1.37 (15, 0.04)	0.231 (21, 0.018)
<i>Magnolia officinalis</i>	0.598 (482, 0.012)	1.67 (133, 0.04)	0.260 (146, 0.010)
<i>Cupressus chengiana</i> and <i>Platycladus orientalis</i>	0.478 (32, 0.015)	1.77 (45, 0.06)	0.244 (50, 0.009)
<i>Populus szechuanica</i>	0.378 (144, 0.009)	1.59 (108, 0.03)	0.291 (107, 0.012)
<i>Pinus tabulaeformis</i>	0.360 (15, 0.012)	1.62 (74, 0.04)	0.231 (89, 0.006)
<i>Larix gmelinii</i>	0.490 (13, 0.039)	1.37 (106, 0.02)	0.236 (129, 0.006)
<i>Pinus massoniana</i>	0.380 (43, 0.019)	1.54 (221, 0.03)	0.200 (202, 0.007)
<i>Picea asperata</i>	0.342 (15, 0.012)	2.05 (49, 0.14)	0.201 (49, 0.005)
<i>Quercus sp.</i>	0.676 (82, 0.012)	1.57 (74, 0.05)	0.277 (77, 0.009)

Note: data in parentheses represent number of samples and standard error respectively. Parameters for *Magnolia officinalis* are those for hardwood broadleaf species.

CL.3.1c Show that all potential pools are included (aboveground biomass, litter, dead wood, belowground biomass and soil carbon). Pools to monitor must include any pools expected to decrease as a result of project activities.

¹⁰ Institute of Forest Ecology and Environment, CAF, Updated Database for China GHG Inventory in Forestry Sector.

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>> Step-wise procedures (BEF method) and equation (66)-(73) in Section III.5.1 of the approved baseline and monitoring methodology (AR-AM0003/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. This monitoring plane will include all pools, as bellow table.

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
2.1.1.01	Project stratum ID	Alpha numeric	defined	At stand establishment	100%	Each stand has a particular year to be planted under each stratum
2.1.1.02	Stand ID	Alpha numeric	defined	At stand establishment	100%	Each stand has a particular year to be planted under each stratum
2.1.1.04	Desired level of precision (p)	%	defined	Before the start of the project	100%	10% will be used for the purpose of QA/QC and measuring and monitoring precision control
2.1.1.05	Standard deviation for each stratum i (st _i)		e	At each monitoring event	100%	Used for estimating numbers of sample plots of each stratum and stand
2.1.1.07	Sample plot ID	Alpha numeric	defined	Before the first monitoring event	100%	Numeric series ID will be assigned to each permanent sample plot (e.g., 1, 2, 3, ... pl, ...)
	Ration of molecular weights of carbon and CO ₂	Dimensionless	Universal constant			=44/12
	Total number of plots in stratum i, stand model k	Dimensionless	m	5 years	100%	

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	<i>Sample plot area (AP)</i>	m^2	m	<i>5 years</i>	<i>100%</i>	
	<i>Allowable error</i>		c	<i>5 years</i>	<i>100% of stand models</i>	<i>Equation (59)</i>
	<i>Confidence level</i>	$\%$	<i>defined</i>	<i>Before the first monitoring event</i>	<i>100%</i>	<i>=95%</i>
	<i>Total size of all strata (A), e.g. the total project area</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 stratum i (A_i)</i>	<i>hectare</i>	m	<i>Before the start of the project and adjusted thereafter every 5-year</i>	<i>100%</i>	
	<i>Maximum possible number of sample plots in the project area (N)</i>	<i>Dimensionless</i>	c	<i>5 years</i>	<i>100%</i>	<i>Equation (59)</i>
	<i>Sample size (total number of sample plots required) in the project area (n)</i>	<i>Dimensionless</i>	c	<i>5 years</i>	<i>100%</i>	<i>Equation (62)</i>
	<i>Maximum possible number of sample plots in stratum i (N_i)</i>	<i>Dimensionless</i>	c	<i>5 years</i>	<i>100%</i>	<i>Equation (59)</i>
	<i>Sample size for stratum i (n_i)</i>	<i>Dimensionless</i>	c	<i>5 years</i>	<i>100%</i>	<i>Equation (63)</i>
2.1.1.08	<i>Plot location (latitude/longitude)</i>		m	<i>5 years</i>	<i>100% sample plots</i>	<i>Using GPS to locate before start of each field measurement</i>
2.1.1.09	<i>Tree species (j)</i>		m	<i>5 years</i>	<i>100%</i>	
2.1.1.10	<i>Age of plantation</i>	<i>year</i>	m	<i>5 years</i>	<i>100%</i>	<i>Counted since the planted year</i>
2.1.1.12	<i>Diameter at breast height of living and standing dead trees (DBH)</i>	<i>cm</i>	m	<i>5 years</i>	<i>100% trees in plots</i>	<i>Measuring at each monitoring time per sampling method</i>
2.1.1.13	<i>Tree height</i>	m	m	<i>5 years</i>	<i>100%</i>	<i>Measuring at</i>

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					trees in plots	each monitoring time per sampling method
2.1.1.16	Mean merchantable volume per unit area for stratum <i>i</i> , species <i>j</i> , time <i>t</i> (MV_{ijt})	$m^3 \cdot ha^{-1}$	<i>c</i>	5 years	100% trees in plots	
2.1.1.17	Wood density of species <i>j</i> (D_j)	$t \cdot d \cdot m \cdot m^{-3}$	<i>e</i>	5 years	100% of species or species group	Species-derived from China national GHG inventory in LUCF sector
2.1.1.18	Biomass expansion factor (BEF)	Dimensionless	<i>e</i>	5 years	100% of sampling plots	Species-derived from China national GHG inventory in LUCF sector
2.1.1.19	Carbon fraction of species <i>j</i> (CF_j)	dimensionless	<i>e</i>	Once per species	100% of species or species group	IPCC default (0.5) is used
2.1.1.20	Root-shoot ratio	Dimensionless	<i>e</i>	5 years	100%	Species-derived from China national GHG inventory in LUCF sector
2.1.1.21	Carbon stock in above-ground biomass for stratum <i>i</i> , species <i>j</i> , time <i>t</i> ($C_{AB,ijt}$)	tonnes C	<i>c</i>	5 years	100%	Equation (70)
2.1.1.22	Carbon stock in below-ground biomass for stratum <i>i</i> , species <i>j</i> , time <i>t</i> ($C_{BB,ijt}$)	tonnes C	<i>c</i>	5 years	100%	Equation (71)
2.1.1.23	Mean carbon stock in aboveground biomass per unit area for stratum <i>i</i> , species <i>j</i> , time <i>t</i> ($MC_{AB,ijt}$)	tonnes C $\cdot ha^{-1}$	<i>c</i>	5 years	100%	Equation (68)
2.1.1.24	Mean carbon stock in belowground biomass per unit area for stratum <i>i</i> , species <i>j</i> , time <i>t</i>	tonnes C $\cdot ha^{-1}$	<i>c</i>	5 years	100%	Equation (69)

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	$(MC_{BB,ijt})$					
2.1.1.25	Area of stratum i , stand model k , at time t (A_{ikt})	hectare	m	yearly	100%	Measured for different strata and stands
2.1.1.28	Annual carbon stock change in above-ground biomass for stratum i , stand model k , time t ($\Delta C_{AB,ikt}$)	tonnes $C.yr^{-1}$	c	5 years	100%	Equation (72)
2.1.1.29	Annual carbon stock change in below-ground biomass for stratum i , stand model k , time t ($\Delta C_{BB,ikt}$)	tonnes $C.yr^{-1}$	c	5 years	100%	Equation (73)
	Annual carbon stock change in living biomass in the project scenario for stratum i , stand model k , time t ($\Delta C_{P,ikt}$)	tonnes $CO_2-e.yr^{-1}$	c	5 years	100%	Equation (67)
	Sum of the changes in living biomass carbon stocks in the project scenario (above- and below-ground) ($\Delta C_{P,LB}$)	tonnes CO_2-e	c	5 years	100%	Equation (66)

CL.3.1d Describe if relevant non- CO_2 gases are monitored if they account for more than 15% of the project's net climate impact expressed in terms of CO_2 equivalents.

>> As there will be no slash and burn site preparation, overall ploughing, N-fertilizer application and flood irrigation as well as no machinery tools to be used within the project boundary, hence no significant GHG emissions by sources as results of the proposed project activity.

CL.4 Adapting to Climate Change & Climate Variability (1 Point)

CL.4.1 Identify likely regional climate change and climate variability impacts, using available studies.

>> In the recent years, occurrences of extreme climatic conditions due to climate change have become more and more frequent, for example, in some localities of the project areas, heavy-precipitation weather in short timespan causing the worst floods and debris flows that may not likely occur in a century. Extremely cold frost and freezing weathers also causes enormous disasters to agricultural production in the project areas and its adjacent areas which may severely affect the normal daily living of community villagers. Local governments have made records and conducted

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studies on such natural disasters as a result of the extreme climate changes. It helps to clarify the trend of climate change and to develop responsive and preventive measures. - 68 -

CL.4.2 Demonstrate that the project has anticipated such potential impacts and that appropriate measures will be taken to minimize these negative impacts.
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>> Before project implementation, we have conducted thorough inventories and surveys on the climate, vegetations, site conditions of the project areas, as well as the economy, cultures, production and livelihood practices in the adjacent communities of the project areas. Some of the grievances that we may encounter in the course of project implementation are projected. We come to understand that such natural disasters as landslide, debris flow, draughts and floods, and snowstorms, etc., as a result of extreme climatic changes, are the critical factors that can affect the project implementation and its effectiveness. Correspondingly, we have also developed countermeasures against these issues.

- Those indigenous tree species that are most adaptable to local climatic, soil, water and temperature conditions will be chosen for afforestation. Primary forests that share the same conditions as those in the planting plots of the project will be chosen as seed trees. The nursery sites will also be located in the vicinity of the planting sites where the conditions are very much the same.
- Based on the actual site conditions, afforestation will be implemented in patterns of mixed patches.
- During planting operations, minimal-disturbance planting pits will be prepared. Neither slash-and-burn nor full-tillage will be practices to avoid damaging primary vegetation. No canals will be opened and gravity irrigation will not be practiced so as to avoid changing surface runoff.
- After planting operations are completed, soils will be timely recovered in the planting pits to reduce and avoid erosion.
- In the case of unavoidable natural disasters, rescue measures, such as enrichment planting will be done in areas where young trees and seedlings are affected so that the loss from such damages will be minimized to the maximum extent.

CL5 Carbon Benefits Withheld from Regulatory Markets (1 Point)

CL.5.1 Demonstrate that at least 10% of the total carbon benefits generated by the project into regulated GHG markets will not be sold. Projects can sell these carbon benefits in a voluntary market or retire them.

>>No. There is no valid documentation provided by this project avowing that at least 10% of the total carbon benefits generated by the project into regulated GHG markets will not be sold.

IV. Community Section

CM1 Net Positive Community Impacts (Required)

CM.1.1a Describe the appropriate methodologies used (e.g. the livelihoods framework) to estimate the net benefits to communities resulting from planned project activities.

>> To maximize the socio-economic benefit, the afforestation/reforestation design was prepared with a participatory approach. PRA methods were adopted in interviewing and consulting with farmer households in the project areas to understand the local farmers/communities' preferences, wishes and concerns, so that the proposed project activity would better respond to their desires for livelihood development.

Conducting PRA by various groups. Each group was lead by an expert. Specific PRA method includes:

Semi-Structure Interview with key persons, farmer households, villages, town/township governments, local forest posts and forestry bureau and nature reserves.

Hold Seminar of farmers' representatives.

CM.1.1b Include a credible estimate of net benefits changes in community wellbeing given project activities. This estimate must be based on clearly defined and defendable assumptions about how project activities will alter social and economic wellbeing over the duration of the project.

>> **Income generation:** About 12,745 local farmers of 3,231 households will benefit from the project, including 5,384 people of ethnic minorities. The total income is estimated at US\$ 9.2 million within the 30 years period, including about US\$ 6.1 million from employment, US\$ 2.5 million from sales of wood and non-wood products and US\$ 5.5 million from sales of CERs. The mean net annual income per capita will be increased by US\$ 24 or by 10.3% compared to the year 2006 (table G-2 below). The income generation is especially important for ethnic minorities in Beichuan, Lixian and Maoxian County and some villages in Qingchuan County, where the ethnic minority groups take the majority in the villages. With two third of population being Qiang, Beichuan County is the only Qiang autonomous county in China (Table CM-1).

Employment: The proposed A/R CDM project activity will create over 1 million person-days of temporary employment opportunities from planting, weeding and tending, thinning, harvesting, etc. It will also create 38 long-term job positions during the crediting period (Table G-3). Most employment opportunities will be taken by the local farmers/communities involved in the proposed A/R CDM project activity and beyond (whose lands do not fall within the project boundary).

Strengthening social cohesion: As indicated earlier, individual farmer households/ communities are too weak to successfully manipulate the chain from investment, production to market especially for the timber and non-wood forest products which will take a much longer period than food and livestock production. In addition, the lack of organizational instruments also prevents them from overcoming technological barriers. Overall the proposed A/R CDM project activity will entail close interaction between individuals, communities, companies and government, with intensified communication among them and supporting networks for social and productive services, especially for the ethnic minorities.

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Technical training and demonstration: Interview with local communities indicated that local farmers/communities are usually short of access to quality seed sources and lack skills for producing high quality seedlings and for successful tree planting, as well as for preventing planted trees from being subject to fire, pest and disease attack. This is one of the important barriers of local communities in planting trees on their lands. In the proposed A/R CDM project activity, the local forestry agencies as well as companies/farms will organize the 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 such as seed and seedling selection, nursery management, site preparation, planting models and Integrated Pest Management.

CM.1.1c Compare the “with project” scenario with the baseline scenario of social and economic wellbeing in the absence of the project. The difference (i.e., the net community benefit) must be positive.

>> The local farmers will participate the project activity such as site preparation, planting, weeding, thinning, harvesting, etc. and earning direct benefits during the crediting period. It is expected that 28 villages of 21 towns/townships from 5 counties will benefit from the proposed project. The total income is estimated at US\$ 9.2 million within the 30 years period, including about US\$ 6.1 million from employment, US\$ 2.5 million from sales of wood and non-wood products and US\$ 5.5 million from sales of CERs. The mean net annual income per capita will be increased by US\$ 24 or by 10.3% compared to the year 2006.(See table CM-1)

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Table CM-1 Income generated by project activities

County	Townships	Villages that benefit	Number of households that benefit	Number of Beneficiaries	Net income within lifetime of the project (US\$ '000)				Added annual net income (US\$'000)	Added annual net income per capita (US\$)	Net income per capita in 2006(US\$)	Income increase compared to 2006 (%)
					Labours	Wood & non-wood product	CERs	total				
Beichuan	Qingpian	Zhenghe	35	125	130.3	84.0	14.2	228.6	7.6198	0.0610	0.3761	16.21%
		Anmian	42	159	66.9	43.1	7.3	117.4	3.9130	0.0246	0.2652	9.28%
	Xiaoba	Yongxin	19	72	206.1	169.5	11.2	386.8	12.8929	0.1791	0.2732	65.53%
	Chenjiaba	Tongbao	29	108	412.9	339.6	22.4	774.9	25.8299	0.2392	0.2674	89.44%
	Duba	Huangdimiao	29	129	301.2	229.9	21.8	552.9	18.4313	0.1429	0.3912	36.53%
Lixian	Ganbao	Ganbao	215	895	62.0	0.0	31.8	93.7	3.1239	0.0035	0.1948	1.79%
		Lianhe	37	243	185.5	0.0	95.1	280.6	9.3530	0.0385	0.1295	29.73%
		Rierzhu	164	678	57.1	0.0	29.3	86.3	2.8780	0.0042	0.1688	2.51%
		xiong'er	102	465	128.3	0.0	66.4	194.8	6.4919	0.0140	0.2987	4.67%
	Xuecheng	Shajin	172	608	122.4	0.0	63.2	185.6	6.1856	0.0102	0.2018	5.04%
	State owned	State owned			3.4	0.0	1.7	5.1	0.1703	0.0000	0.0000	0
Maoxian	Nanxin	Bieli	318	1560	156.9	0.0	90.3	247.2	8.2392	0.0053	0.1104	4.78%
Pingwu	Gaochun	Wuyi	233	780	340.9	238.7	42.2	621.8	20.7252	0.0266	0.2857	9.30%
	Nanba	Tongjiang	22	102	45.0	31.5	5.6	82.1	2.7373	0.0268	0.3377	7.95%
	Shuijing	Xinhua	60	292	196.8	152.0	16.2	365.0	12.1652	0.0417	0.2364	17.63%
	Pingtong	Xinyuan	15	66	170.7	140.4	9.3	320.3	10.6776	0.1618	0.3321	48.72%
Qingchuan	Qiaolou	Hexi	117	424	158.9	103.6	16.9	279.4	9.3127	0.0220	0.2474	8.88%
	Baijia	Huajian	281	1081	83.9	152.0	23.2	259.1	8.6365	0.0080	0.1987	4.02%
	Malu	Fangshi	262	990	83.5	151.8	23.1	258.5	8.6151	0.0087	0.1948	4.47%
		caiqi	100	420	111.0	201.5	30.7	343.2	11.4415	0.0272	0.2558	10.65%
	Fangshi	Xinqiao	279	1044	642.5	418.7	68.4	1129.6	37.6532	0.0361	0.2987	12.07%
	Zhuyuan	Qingjiang	37	143	86.0	155.8	23.8	265.5	8.8512	0.0619	0.2558	24.19%

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Qingqi	Weiba	41	131	138.7	90.4	14.8	243.8	8.1275	0.0620	0.1429	43.43%
	Dongqiao	224	879	94.5	171.5	26.1	292.1	9.7354	0.0111	0.2013	5.50%
	Luoyigou	254	840	268.7	175.1	28.6	472.4	15.7470	0.0187	0.1818	10.31%
Dayuan	Shuojia	48	163	386.8	252.1	41.2	680.1	22.6686	0.1391	0.2052	67.78%
Kongqi	Yaolin	21	84	84.2	54.8	9.0	147.9	4.9316	0.0587	0.2587	22.69%
Maoba	Jinjia	42	144	163.2	106.4	17.4	287.0	9.5667	0.0664	0.2442	27.21%
Sanguo	Dongyang	33	120	136.5	89.0	14.5	240.0	8.0006	0.0667	0.1532	43.51%
Total		2387.0	9263.0	5024.4	3551.4	865.9	9441.7	314.7219	0.0247	0.2313	10.68%

CM.1.2a Document local stakeholder participation in the project's planning. If the project occurs in an area with significant local stakeholders, the project must engage a diversity of stakeholders, including appropriate sub-groups, underrepresented groups and women living in the project vicinity.

>>**Hold Semi-Structure Interview and Seminar** with key persons, farmer households and representatives, villages, town/township governments, local forest posts and forestry bureau and nature reserves to let local stakeholder participation in the project's planning:

Interviewing with key persons such as village head, senior villagers and VIPs that are familiar with local social-economy, land and forest resources, land use and land tenure, fuelwood consumption, grazing activities, important historic events and environment conditions, and based on the interview developing resource map of local communities, agricultural seasoning and historic event-records.

Questionnaire forms were developed and distributed among different stakeholders, including 10-15 households from each of 29 project villages of 5 counties, 348 households in total, villages, town/township governments, local forest posts and forestry bureau and nature reserves. The questionnaire forms were collected and analyzed to understand the local socio-economic profiles, land use, land tenure, income and sources, land management ways, awareness, technical know-how, favorable tree species, technical and financial barriers, need and desire of farmers in the ways to participating in the proposed project activity from relevant stakeholders.

To briefly introduce the concept, benefits and risks, procedures and modalities of CDM afforestation/reforestation project, to get comprehensive information of the historic and current situation and existing problems in local communities, as well as to understand the need and desire of local farmers, a meeting of farmer representatives was held in each village. Favorable tree species were also discussed.



CM.1.2b Describe how stakeholders in the project's area of influence will have an opportunity before the project design is finalized, to raise concerns about potential negative impacts, express desired outcomes and provide input on the project design. Project developers must document stakeholder dialogues and indicate if and how the project proposal was revised based on such input.

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

1. Primary stakeholders

(2) Farmers/communities

Local farmers are well acquainted with the environmental benefits of forests. They understand that forests can contribute to sustainable environmental and socio-economic development through controlling soil erosion, cleaning air, protecting cropland and mitigating flood and drought. They also have a good conservation awareness of rare and endangered wild animals and plants. Most of them can tell the names of some protected animals in the vicinity and can voluntarily and actively participate the wildlife conservation.

At the time of the interview, local farmers had little knowledge on the concept of the carbon credit, even had not heard the terms. After the introduction by the team, local farmers/communities expresses their strong interests to participate in the proposed A/R CDM project activity because they thought that through participating in the proposed A/R CDM project activity they can obtain the following benefits:

- ✓ Employment chance: They do not have to find jobs far away from hometown, which make it possible to look after their cropland and/or livestock at the same time.
- ✓ Income increase from selling wood and non-woody forest products and CER trade in addition to direct products.
- ✓ Greening their non-forested lands that can improve local environment, shelter cropland and reduce drought, flood, land slide and other natural disasters.
- ✓ Learning good practice on tree planting and forest management from technical training.

Many farmers regard the carbon trade invisible and intangible, hence still suspect the trueness of the carbon transaction. More training work s are necessary.

The survey showed the proposed production arrangements: the household offer lands for forest establishment as equity. The operating entity will invest in forest establishment (including site preparation, seedling, weeding, etc.), provide technical inputs, project preparation (including PDD preparation, validation, registration, verification, etc.) and manage the plantations during the crediting period, as well as take the natural and investment risks. The operating entity invests in seedlings, fertilizer, pesticide and forest management, and provide technical inputs and undertake related risks. Local farmers/communities indicated that without the proposed small-scale A/R CDM project activity it is impossible for them to plant trees on the project area due to huge pre-investment, technical unknown how, organizational barriers and low economic return in terms of the degraded remote lands.

During the PRA process, the assessment on tree species also indicates that local farmers/communities like native species and prefer tree species in orders as listed in Table H-2. However they would like to accept the recommendation of experts concerning the choice of tree species.

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Counties	Preference Order of Tree Species (From High to Low)
Qingchuan	<i>Cunninghamia lanceolata</i> , <i>Betula sp.</i> , <i>Liquidambar formosana</i> , <i>Quercus acutissima</i> , <i>Pinus massoniana</i>
Pingwu	<i>C. lanceolata</i> , <i>Betula sp.</i> , <i>larix sp.</i> , <i>Quercus acutissima</i>
Beichuan	<i>Magnolia officinalis</i> , <i>Betula sp.</i> , <i>Alder sp.</i> , <i>Larix sp</i>
Maoxian	<i>Betula sp.</i> , <i>Acer sp.</i> , <i>C. lanceolata</i> , <i>Quercus sp.</i> , <i>Pinus tabulaeformis</i> , <i>poplar sp.</i>
Lixian	<i>Cupressus chengiana</i> , <i>Platycladus orientalis</i> , <i>Ulmus sp.</i> , <i>Pinus tabulaeformis</i> , <i>Quercus sp.</i>

(3) The operating entity

The operating entity, Daduhe Forestation Administration, that focuses its business on afforestation/reforestation and forest management in Western Sichuan Province, is very interested in participating in the proposed A/R CDM project activity. They would like to invest in the afforestation/reforestation on the economically unattractive lands because:

- They can share part of income from sale of CERs that have no market risk, in addition to wood products;
- The commercial loan can alleviate their financial pressure from pre-investment, without the proposed project activity such loans is difficult to obtain in the context of remote degraded lands.
- Without the proposed project activity, they would be unwilling to invest in the afforestation or reforestation on the degraded lands due to the unacceptably low economic revenues.

With regard to the financing arrangements, the operating entity prefers to rent lands from local farmers/communities and pay labor costs in addition to land lease costs. However, they would also accept the share holder arrangement as the project promoted.

2. Secondary stakeholders

(1) Local government: 17 questionnaire forms have been received from local government or governmental department. County Forestry Bureaus and forestry posts view that the proposed project activity will increase forest resources, improve the local environment and increase income of local farmers/communities, as well as demonstrate best practice of watershed management to other watershed areas. 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/town governments consider that the proposed A/R CDM project activity can improve local economy and alleviate local poverty especially for the ethnic minorities, and at the same time benefit to globally climate change mitigation and biodiversity conservation as well as improve watershed management. Therefore, the proposed A/R CDM project activity would have great impacts as if technical best practices developed by the proposed A/R CDM project activity are extended to neighbouring areas or local communities that do not involve in the project. They proposed to apply environmental-friendly pesticide or biological measures to control pest insect and disease, and over 90 percent of governments recommend to use organic manure as fertilizers rather than chemical fertilizers.

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CM.1.3a Formalize a clear process for handling unresolved conflicts and grievances that arise during project planning and implementation.

>> Corresponding plans have been formulated to cope with the conflicts and opinions that may arise amongst the community villagers in the entire course of the project - from project preparation, to project implementation and completion.

- (1) Before project implementation starts, experts will be invited to conduct in-depth surveys on the socio-economics, cultures and histories, ethnic folkways and customs, as well as the production and livelihood practices in the proposed project areas. They will also project potential conflicts and grievances that may be encountered during project implementation.
- (2) To conduct community surveys, through participatory community interviews and villager meetings, to acquire an in-depth understanding of the socio-economics, land use, land tenure, income sources, status of land resources management, awareness, technical know-how, tree species of preferences, technology, financial difficulties, farming household participation and project needs, etc in the communities; and also to identify the conflicts and grievances that may potentially arise during project implementation.
- (3) In project design, the general opinions regarding selection of planting plots, tree species, afforestation techniques and management practice, as well as income sharing mechanism will be reviewed and adopted when deemed appropriate.
- (4) The completed project design plans will be feedback to the communities to solicit their comments and suggestions, and to necessitate timely adjustments.
- (5) The planting operations, and tending and management of established plantations will avail community labour. This will allow the community villagers to participate in project implementation themselves and find out, and seek for solutions to, the conflicts and grievances in the projects.
- (6) Through those cooperative and supervisory agencies for project implementation, including the forestry bureaus, involved forestry stations and community groups in the project counties, the conflicts and grievances arising in the course of the project will be timely feedback and resolved. |
- (7) During the project implementation phase, especially after the project design and planting period, when the project entity can not keep in touch with all stakeholders, land owners and forest farmers always. But forest rangers engaged by project entity in each project site will play an important role of treating with ordinary conflicts and grievances, and communicating with forest station, bureau and project entity about serious issues. In the same way, the communities can express their conflicts and grievances to the forest ranger directly, or to local forest station.
- (8) Before the launch of this project, the project entity has come to an agreement with all stakeholders and land owners to guarantee that either party should undertake an obligation and legal liability to make this project shape up. So, if there is any conflict or grievance that can not be solved by negotiation, judicial process should be adopted.

CM.1.3b Include a process for hearing, responding to and resolving community grievances within a reasonable time period. This grievance process must be publicized to local stakeholders.

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>> During project design and before project implementation, participatory RRAs were carried out in the communities selected for project implementation. In-depth surveys on the socio-economics, land use, land tenure, income level and sources, status of land resources management, technical know-how, tree species of preferences, technical and financial difficulties, as well as the needs of local households for participating project implementation were conducted. Opinions of involved communities were solicited on a broad basis and feedback and solutions to the issues raised were offered in a timely manner. (See section CM.1.2 and section CM.1.3c)

CM.1.3c Describe how the project management will attempt to resolve all reasonable grievances raised, and provide a written response to grievances within 30 days. Document Grievances and project responses.

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

- More intensive training courses will be held at local communities so that local farmers can fully understand the carbon credit and the truthfulness of the transaction.
- Participation of local farmers/communities and companies/farms is on a voluntarily basis.
- Choice of financing arrangements was based on the preference of local farmers/communities.
- Preferences of local farmers/communities were taken into account in the selection of tree species;
- All tree species used are native to local, and a mixed species arrangements will be used;
- Compound and/or organic fertilizers will be applied through small holes rather than overall dispersion;
- Use of chemical pesticides will be limited. Rather, disease and pest will be controlled by mixed tree species arrangement and other biological measures;
- Slash and burn site preparation and overall ploughing for soil preparation will not be used.

CM2 Offsite Community Impacts (Required)

CM.2.1 Identify potential negative offsite community impacts that the project is likely to cause.

>> No significant negative offsite community impacts have been identified.

CM.2.2 Describe how the project plans to mitigate these negative offsite social and economic impacts.

>> Although there is no significant negative offsite community impact, the monitoring plan including the mitigation measures to address any potential risks will be implemented.

CM.2.3 Evaluate likely unmitigated negative offsite social and economic impacts against the social and economic benefits of the project within the project boundaries. Justify and demonstrate that the net social and economic effect of the project is positive.

>> The project does not create any negative offsite social and economic impacts beyond the project areas. On the contrary, as part of the seeds and seedlings, as well as labour forces will be mobilized from the adjacent communities of the project sites, these opportunities will bring them substantial

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economic benefits. Therefore, this project will create positive impacts on the social and economic aspects for both the communities in and outside the project sites.

CM3 Community Impact Monitoring (Required)

CM.3.1 Define the initial plan for how they will select community variables to be monitored, and the frequency of monitoring. Potential variables include income, health, roads, schools, food security, education and inequality. Include in the monitoring plan, community variables at risk of being negatively impacted by Project activities.

>> As the Chinese government organizes nationwide annual statistical surveys on the demography, economics, production and livelihood, medical care, education and transport activities. These survey activities will basically cover all of the project communities, and all cruising data, which will be collected at different administrative hierarchy, come from household interviews one by one. The cruising data and statistics therefrom can then be used directly for the communities monitoring. The following practical guideline and parameter will be used to monitor the social and economy change in project community:

Organizing assessment team and specific PRA method including Semi-Structure Interview and Seminar of farmers' representatives will be used to collect following social-economic data.

Data variable	Data unit	Surveyed (s) calculated (c) estimated (e) or default (d)	Recording frequency	Number of sample plots at which the data will be monitored	Comment
<i>Village</i>	<i>Dimensionless</i>	<i>defined</i>	<i>At stand establishment</i>	<i>100%</i>	<i>Village name, where project lands located in, and it is the monitoring unit element</i>
<i>Family</i>	<i>Number</i>	<i>surveyed</i>	<i>5 years</i>	<i>100%</i>	<i>Local families related to the project</i>
<i>Population</i>	<i>Number</i>	<i>surveyed</i>	<i>5 years</i>	<i>100%</i>	<i>Local people related to the project</i>
<i>Population of ethnic minority</i>	<i>Number</i>	<i>surveyed</i>	<i>5 years</i>	<i>100%</i>	<i>ethnic minority people related to this project</i>
<i>Labors</i>	<i>Number</i>	<i>surveyed</i>	<i>5 years</i>	<i>100%</i>	<i>Local people can provide labor to the project</i>
<i>migrant worker</i>	<i>Number</i>	<i>surveyed</i>	<i>5 years</i>	<i>100%</i>	<i>Migrant worker can provide labor to the project</i>
<i>Forest</i>	<i>Hectares</i>	<i>surveyed</i>	<i>5 years</i>	<i>100%</i>	<i>Forest area in the project region</i>
<i>Farm land</i>	<i>Hectares</i>	<i>surveyed</i>	<i>5 years</i>	<i>100%</i>	<i>Farm land area of</i>

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					<i>the related villages</i>
<i>Number of livestock</i>	<i>Head</i>	<i>surveyed</i>	<i>5 years</i>	<i>100%</i>	<i>Livestocks owned by the families above</i>
<i>family income</i>	<i>\$/family</i>	<i>surveyed</i>	<i>5 years</i>	<i>100%</i>	<i>from crops, stockbreeding,</i>
<i>special industry</i>	<i>Dimensionless</i>	<i>surveyed</i>	<i>5 years</i>	<i>100%</i>	<i>e.g. handcraft industry, mining</i>
<i>family expense</i>	<i>\$/family</i>	<i>surveyed</i>	<i>5 years</i>	<i>100%</i>	<i>medical treatment, education, basic food and clothing, etc</i>
<i>Community meeting</i>	<i>Dimensionless</i>	<i>surveyed</i>	<i>5 years</i>	<i>100%</i>	<i>Collecting data of the times of community meeting. And how many natives had attended the meeting.</i>
<i>Famer's cooperation</i>	<i>Dimensionless</i>	<i>surveyed</i>	<i>5 years</i>	<i>100%</i>	<i>How many famer's cooperations are built up.</i>
<i>Public infrastructure</i>	<i>Dimensionless</i>	<i>surveyed</i>	<i>5 years</i>	<i>100%</i>	<i>The amount of temple, school, electricity facilities and roadway.</i>
<i>Natural resource utilization in community</i>	<i>Dimensionless</i>	<i>surveyed</i>	<i>5 years</i>	<i>100%</i>	<i>The amount of firewood forest cutting, medical material picking, non-forest product collection, the land use change.</i>

As a result of implementation of this project, some change will take place in these villages involved in this project. So, more additional survey should be carry out in the Community Impact Monitoring as follow:

Data variable	Data unit	Surveyed (s) calculated (c) estimated (e) or default (d)	Recording frequency	Number of sample plots at which the data will be monitored	Comment
<i>Village</i>	<i>Dimensionless</i>	<i>defined</i>	<i>At stand establishment</i>	<i>100%</i>	<i>There are project lands located in these villages, and village is the monitoring unit element</i>
<i>households benefited in the project</i>	<i>Number</i>	<i>defined</i>	<i>At stand establishment</i>	<i>100%</i>	<i>How many household benefited from this project?</i>

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<i>Community meeting</i>	<i>Dimensionless</i>	<i>defined</i>	<i>5 years</i>	<i>100%</i>	<i>Collecting data of the times of community meeting. And how many natives had attended the meeting.</i>
<i>Natural resource utilization in community</i>	<i>Dimensionless</i>	<i>defined</i>	<i>5 years</i>	<i>100%</i>	<i>Changes in water source utilization, firewood forest cutting, medical material picking, non-forest product collection, etc</i>
<i>Changing livelihood into a sustainable way</i>	<i>Dimensionless</i>	<i>defined</i>	<i>5 years</i>	<i>100%</i>	<i>Way of production and living such as ways of cultivation and chopping fuelwood etc through survey.</i>
<i>Science and Technology used in forest management</i>	<i>Dimensionless</i>	<i>defined</i>	<i>5 years</i>	<i>100%</i>	<i>Use of advanced technology</i>
<i>Community conflicts</i>	<i>Dimensionless</i>	<i>defined</i>	<i>5 years</i>	<i>100%</i>	<i>Survey from local government of new conflicts caused by this project.</i>
<i>Net income from this project</i>	<i>\$</i>	<i>Surveyed</i>	<i>5 years</i>	<i>100%</i>	<i>Income from labours, Wood & non-wood product, CERs</i>
<i>Percentage of net income from this project in total family income</i>	<i>%</i>	<i>calculated</i>	<i>5 years</i>	<i>100%</i>	<i>Net income from this project and total family income per year.</i>
<i>Increase in the amount of income from this</i>	<i>%</i>	<i>calculated</i>	<i>5 years</i>	<i>100%</i>	<i>Net income from this project and income without the project</i>

Meanwhile, as the project does not create any negative impacts, it is not necessary to monitor. Therefore, it is not necessary to develop special community monitoring plans as the surveys and statistics from the government departments can be used for the assessment of social and economic impacts.

All the data above will be measured and monitored in the form of table. All survey tables will be bound into the book, and distributed to the participants for futural monitoring.

CM4 Capacity Building (1 Point)
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CM.4.1 Explain how the capacity building is structured to accommodate the needs of communities, not only of the project.

>>The project sites are located in the mountain regions in NW Sichuan province where forestry production and non-timber forest products (NTFPs) take an important share in the cash income of local communities. During project implementation, various types of training courses covering seedling raising, transplanting, tending and stand management, pests and diseases control, forest fire prevention and suppression, etc will be offered to each community. Such technical know-how will be applied extensively not only in the project development, but also in other projects for forestry development. The project will also select some communities where the climatic conditions are adaptable for cultivating NTFPs to cultivate edible mushrooms. Specialists and technicians will be invited to visit these households to provide technical assistance.

CM.4.2 Explain how the capacity building is targeted to a wide range of groups, not just elites.

>>All the training activities regarding forestry techniques will be conducted for the community villagers through village meetings. This will help to benefit the most stakeholder groups in terms of training production skills in forestry.

CM.4.3 Explain how the capacity building is targeted to women to increase their participation.

>>In all the project sites, women often play an important role in the production activities for agriculture, forestry and other sideline industries. Women will participate as much as possible in various types of training for production skills. It is particularly so in NTFP production, as women plays a dominant role in the later-stage management.

CM.4.4 Explain how the capacity building is aimed to increase community participation in project implementation.

>>All of the training courses are specific to the needs. Meanwhile, the production and livelihood activities of the communities depend, to a considerable extent, on the project implementation. In particular, NTFP production (cultivation of edible mushrooms) demands for more forest resources. Therefore, all these capacity building activities will contribute to promoting community participation in project implementation.

CM5 Best Practices in Community Involvement (1 Point)

CM.5.1 Demonstrate that the project was developed with a strong knowledge of local customs and that, where relevant, project activities are compatible with local customs.

>>During project design, participatory interviews were conducted with key figures. The surveys on the folkways and customs of the communities, agricultural seasonality calendars and historical events were also carried out. The distribution of community resources is clarified, and so is the distribution of the land parcels for religious purposes. Participatory approaches were also employed to select the project sites and tree species for afforestation to make sure that the project activities are compatible with local customs and practices. See section CM.1.2 and section CM.1.3c)

CM.5.2 Show that local stakeholders will fill all employment positions (including management) if

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the job requirements are met. Explain how stakeholders will be selected for positions and where relevant, must indicate how traditionally underrepresented stakeholders and women, will be given a fair chance to fill positions for which they can be trained.

>> In the course of project implementation, through such project activities as planting, weeding, tending, thinning and logging, about 1,000,000 workdays of job opportunities will be created. Besides, 38 long-term positions for forest patrolling will be provided. These job positions will be equitably filled up through full participation of the stakeholder groups in the communities, including the women and those stakeholders who have been under-represented in traditional practices. These stakeholder groups all have their own community organizations. All the wage jobs and long-term positions will be allocated to the stakeholder groups in accordance with the reasonable request, identity and their own conditions of the participants.

CM.5.3 Demonstrate that the project complies with international rules on worker rights.

>> The project will conclude labor agreements that comply with international rules on worker rights to clarify the rights and obligations of both contracting parties.

CM.5.4 Comprehensively assess situations and occupations that pose a substantial risk to worker safety

>> Possible risks for the workers for the project:

- Falling rocks triggered during site preparation, transplanting, tending and patrolling may cause personal injuries;
- Forest fires and the suppression operations may bring risks to workers;
- Application of chemicals and pesticides for pests & diseases control may cause poisoning of people;
- Tools and falling trees during thinning operations may injure people.

CM.5.5 Describe the plan in place to inform workers of risks and to explain how to minimize such risks. Where worker safety cannot be guaranteed, project proponents must show how the risks will be minimized using best work practices.

>> Safety operation regulations and instruction will be formulated to cope with possible risks that may endanger the health of workers. Safety managers will fully participate in the field work to ensure that such internal control procedures as follow will play a role of avoiding the potential dangers:

- A safety assurance staff, which takes charge of safety supervision and assumes all responsibility for safety will be assigned in construction team.
- Safety manual will be sent in handy to carry out safety education for workers¹¹.
- Implementation of each work should comply with national safety regulations.

¹¹ <http://www.ms.gov.cn/InforSend/UploadFile/FileAttach/20098710382752895.pdf>

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- Before performing each work procedures, the safety assurance staff of the project will call on all the people to conduct safety publicity and awareness education and inform people of the potential risks and effective measures to avoid such risks in the jobs.
 - During project implementation, the safety assurance staff will participate in full length the supervision of project implementation so that the potential risks can be detected in time and accidents avoided.
 - In the field work, it's prohibited to carry out all kinds of forestation work of soil preparation, trenching, tree planting and soil backfill in a vertical line at the same time.
 - All workers should be in a horizontal line.
 - All field work must avoid inclement weather such as in or after rainstorm, extremely high temperature, and strong wind.
 - Each construction team will be equipped with a portable rescue package to deal with minor trauma.
 - provide good logistics to ensure that every worker have enough drinking water and food.



V. Biodiversity Section

B1. Net Positive Biodiversity Impacts (Required)

B.1.1 Describe the appropriate methodologies used to estimate changes in biodiversity as a result of the project. Base this estimate on clearly defined and defendable assumptions. Compare the “with project” scenario with the baseline “without project” biodiversity scenario completed in G2. The difference (i.e., the net biodiversity benefit) must be positive.

>>

This project locates in Minshan Mountains, the transition zone from Sichuan Basin to the Qinghai-Tibet Plateau, the key areas for biodiversity conservation in south-west of China, where the giant panda as a flagship species and umbrella species is the symbol of biodiversity. All the project lands distribute in the corridor of different population, vegetation restoration is valuable for exchanging among them. Field survey in the secondary plantation shows that with the formation of plantations the diversity of vegetation communities will restore gradually. And we can find some trace of giant

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panda in the secondary plantation near the project site. The migration lagship and umbrella - 84 -
specie will help to enhance wildlife vitality through fostering genetic exchange, to enhance the
connectivity between forest areas so that the ecosystem integrity and health can be improved, and
the conservation of threatened species and biodiversity enhanced.

Through a systematic field investigation based on seting comparison plot in project land, nearby
virgin forest, and secondary plantation with the same climate and geographical character, critical
species habitat analysis and corridor analysis shows, through establishing 2,251.8 ha of multiple use
forests in the eroded lands in the adjacent areas of nature reserves located in the upper reaches of
the main tributaries of the Yangtze River, this afforestation/reforestation project will be able to raise
forest cover effectively and to establish the biological corridor in the adjacent areas of the nature
reserve.



The following methodologies will be used in the biodiversity monitoring:

1. plant

Random sample and criterion fixed sample will be used to survey the species, population, coverage
density or abundance, and frequency to appraise the biodiversity of plant in and around this project
range, and the following evaluation index will be used:

Simpson's diversity index, D

$$D=1-\sum_{i=1}^S p_i^2=1-\sum_{i=1}^S \left(\frac{N_i}{N}\right)^2$$

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There: N_i is the population of species i , N is the total population of all plant in the sample plot.

Shannon-Weiner index, H

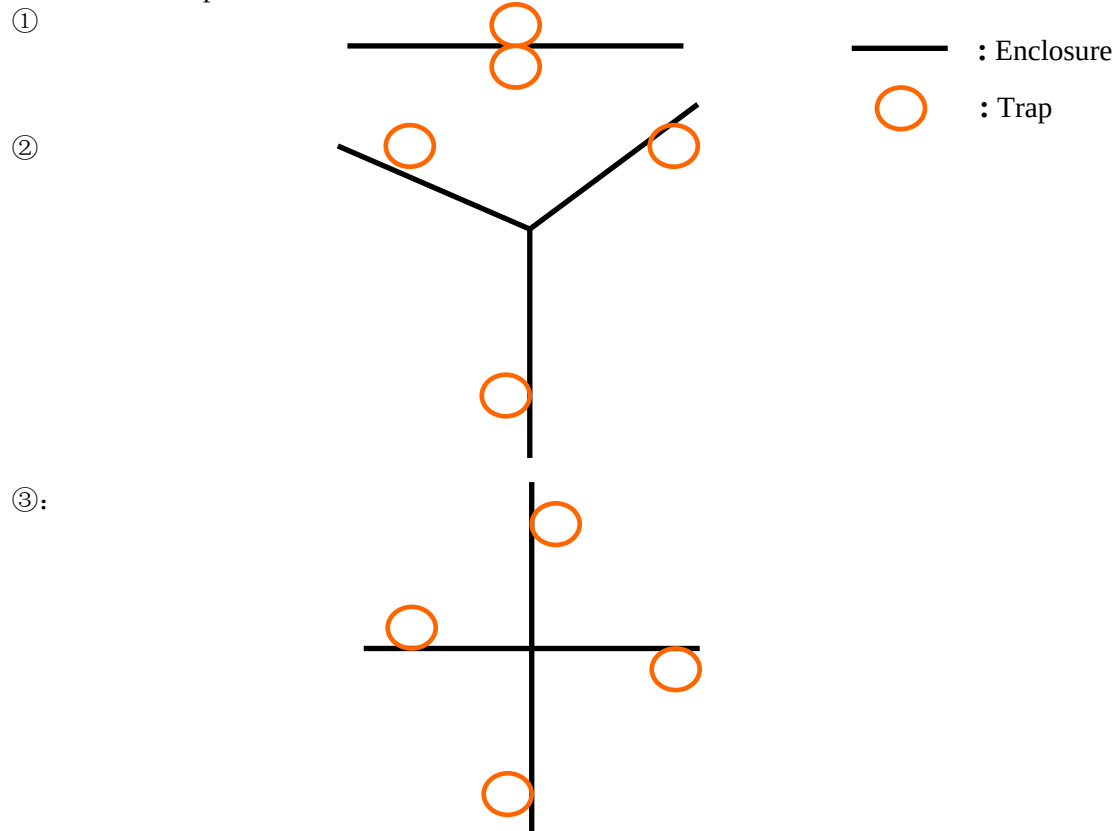
$$H = - \sum_{i=1}^S P_i \ln P_i$$

There, S is the total amount of species, P_i is the population the inverse proportion of species i in all plant species.

2. Amphibian and Reptiles

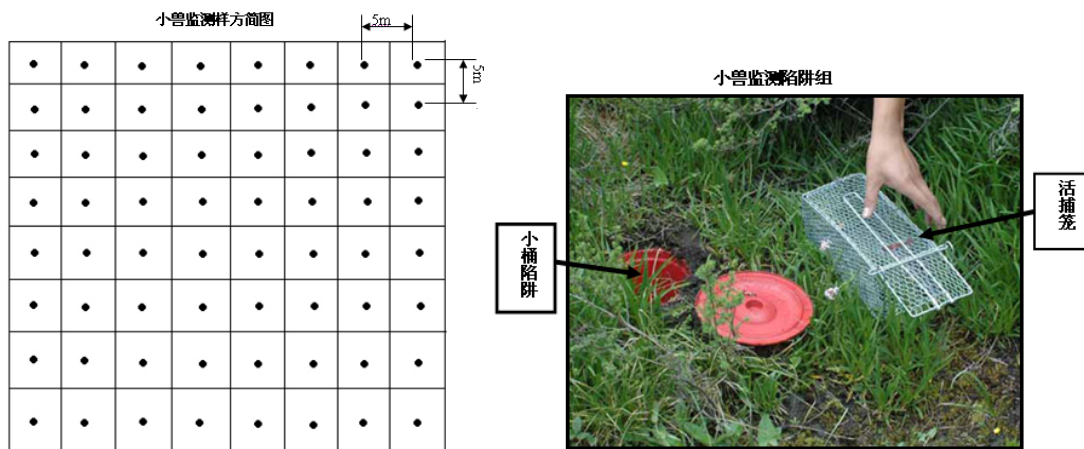
Enclosure and trap will be used to catch and survey the species and population of amphibian and reptiles. The survey content includes habitat types, weather, species, amount, sex, body length, and weight.

Enclosure - Trap mode:



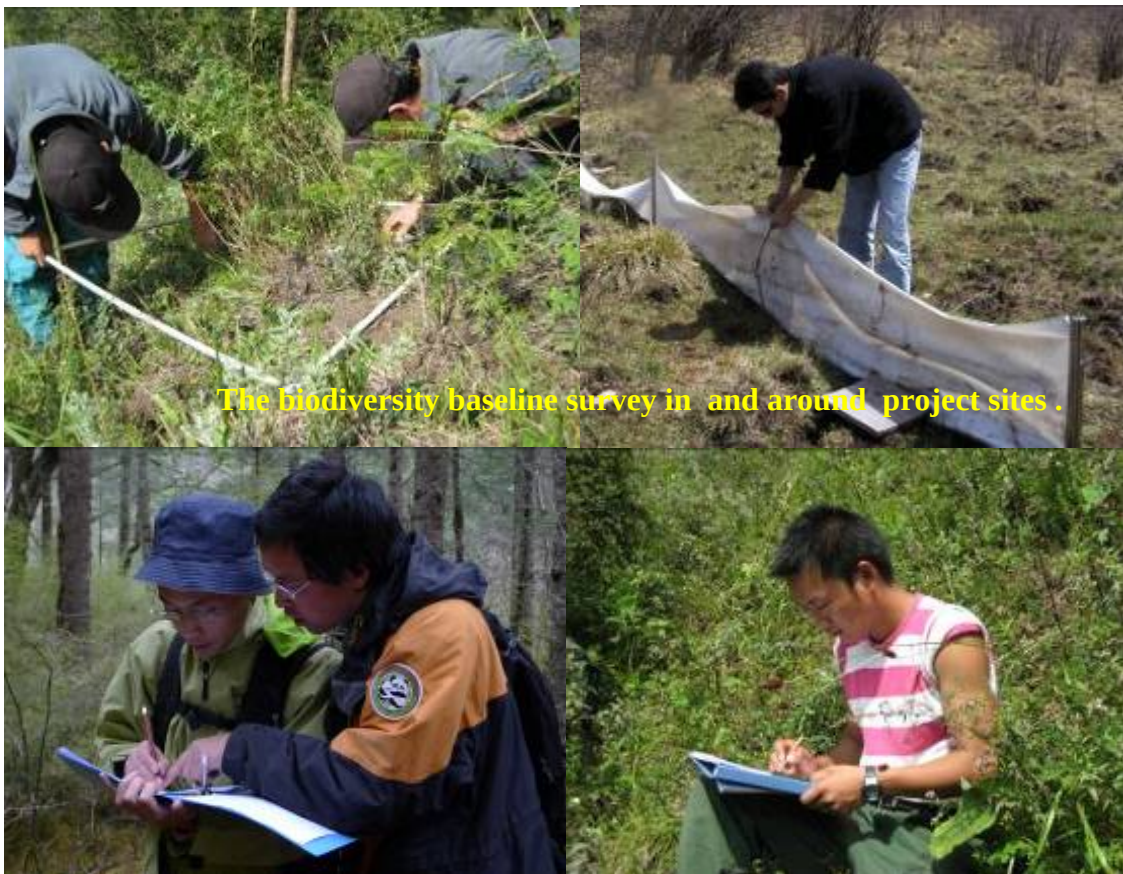
3. Small mammals

Species and the populations and distributions trends of small mammal will be monitored to reflect the change of environment and ecosystem function by the populations dynamic of small mammals. The mousetrap sample will be used to survey the species, amount, sex, body length and weight.



4. Large mammals

Two “diagonal” monitoring sample line in each project land will be carried out to observe and survey the species and amount of mammals appeared in the project area. All kinds of trace will be recorded to describe the distribution of mammals, from which we can analyse the effect of the planting and management activities.



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Location of sample plots:

Sample NO.	Township	village	longitude	latitude
lx010104	Ganbao	Lianhe	18332800	3490980
lx010105	Xuecheng	Jinsha	18334100	3491560
lx010116	Xuecheng	Jinsha	18333600	3492440
lx010118	Ganbao	Lianhe	18332200	3491870
Lx010140	Xuecheng	Jinsha	18336400	3492830
Lx010159	Ganbao	Ganbao	18330600	3489800
Lx010160	Ganbao	Rierzu	18329500	3487670
Lx010167	Ganbao	Rierzu	18329400	3487640
Lx010168	Ganbao	Lianhe	18333000	3491060
lx020117	Xuecheng	Jinsha	18334500	3492550
Lx020184	Ganbao	Xionger	18330500	3491220
Lx020193	Ganbao	Xionger	18330400	3491290
Lx020195	Ganbao	Xionger	18329700	3489670
Lx020197	Xuecheng	Jinsha	18334500	3492550
mx010100	Nanxin	Bieli	18383681	3495123
mx010105	Nanxin	Bieli	18383608	3495049
mx010119	Nanxin	Bieli	18384704	3494696
PW010128	Nanba	Tongjiang	18480141	3565471
PW010210	Gaocun	Wuyi	18471285	3588509
PW010222	Gaocun	Wuyi	18471229	3588452
PW010218	Gaocun	Wuyi	18471047	3588491
PW010333	Shuijing	Xinhua	18421931	3596485
PW010335	Shuijing	Xinhua	18421789	3596519
PW020444	Pingtong	Xinyuan	18470392	3551549
PW020445	Pingtong	Xinyuan	18470415	3551874
QC011553	Maoba	Jinjia	18517345	3591729
QC011557	Maoba	Jinjia	18517437	3591697
QC011461	Sanguo	Dongyang	18497563	3608868
QC011462	Sanguo	Dongyang	18497080	3608352
QC020350	Dayuan	Suojia	18518869	3592973
QC020345	Dayuan	Suojia	18519142	3593295
QC030427	Fangshi	Xinqiao	18501882	3583672
QC030428	Fangshi	Xinqiao	18502463	3583275
QC040719	Qiaolou	Hexi	18492729	3598852
QC040720	Qiaolou	Hexi	18493123	3599095
QC040915	Qingxi	Dongqiao	18486525	3592920
QC041322	Qinxi	Dongqiao	18486775	3594270
QC050166	Baijia	Huajian	18540713	3578216
QC050268	Malu	Fangshi	18527677	3570950
QC050210	Malu	Fangshi	18526910	3570283

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QC060800	Malu	Caixi	18525804	3573809
QC060801	Malu	Caixi	18525832	3573164
QC061611	Zhuyuan	Qingjiang	18534559	3567775
QC061612	Zhuyuan	Qingjiang	18534549	3567454
QC071036	Qingxi	Weiba	18477366	3592216
QC071038	Qingxi	Weiba	18477237	3592828
QC071241	Qingxi	Luoyigou	18482319	3598406
QC071243	Qingxi	Luoyigou	18482729	3599174
BC020414	Duba	Huangdimiao	18449064	3541322
BC020415	Duba	Huangdimiao	18448806	3541143
BC020212	Xiaoba	Yongxing	18422719	3546216
BC020213	Xiaoba	Yongxing	18422920	3546124
BC020319	Chenjiaba	Tongbao	18455971	3530849
BC020320	Chenxiaba	Tongbao	18455984	3530657
BC010102	Qingpian	Zhenghe	18403987	3547847
BC010103	Qingpian	Zhenghe	18403762	3547834
BC010104	Qingpian	Anmian	18404168	3546634
BC010105	Qingpian	Anmian	18404465	3546706

B.1.2 Describe possible adverse effects of non-native species on the area's environment, including impacts on native species and disease introduction or facilitation. If these impacts have a substantial bearing on biodiversity or other environmental outcomes, the project proponents must justify the necessity of using non-native species over native species.

>> No non-native species/invasive species will be used.

B.1.3 Identify all IUCN Red List threatened species and species deemed threatened on nationally recognized lists that may be found within the project boundary. Project proponents must document how project activities will not be detrimental in any way to these species.

>> All the project plots are degraded lands. There is no presence of any endangered species on the annexes to the IUCN Red Books, nor the presence of any rare and endangered species listed for key national/local protection.

B.1.4 Identify all species to be used by the project and show that no known invasive species will be used.

>> Table B.1 Species used in the proposed project

<i>Platycladus orientalis</i>
<i>Betula luminifera</i>
<i>Populus Szechuanica</i>
<i>Betula albo-sinensis</i>
<i>Magnolia officinalis</i>
<i>Larix gmelinii</i>
<i>Quercus acutissima</i>

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Pinus massoniana

Cupressus chengiana

Cunninghamia lanceolata

Pinus tabulaeformis

Picea asperata

All the tree species are native ones selected through community participation and none of them belongs to invasive species.

B.1.5 Guarantee that no genetically modified organisms will be used to generate carbon credits.

>> All species used in this project are native species, and the seeds used in breeding were collected in nearby the virgin forest. In order to reduce project cost and improve the survival rate, all seedlings were nurseryed in the project site or nearby farmland by local community. It is absolute that no genetically modified organisms will be used.

B2 Offsite Biodiversity Impacts (Required)

B.2.1 Identify potential negative offsite biodiversity impacts that the project is likely to cause.

>> No significant negative offsite biodiversity impacts have been identified.

B.2.2 Describe how the project plans to mitigate these negative offsite biodiversity impacts.

>> No significant negative offsite biodiversity impacts have been identified.

B.2.3 Evaluate likely unmitigated negative offsite biodiversity impacts against the biodiversity benefits of the project within the project boundaries. Justify and demonstrate that the net effect of the project on biodiversity is positive.

>> No significant negative impacts have been identified due to the environmental-friendly techniques adopted in the proposed project activity, e.g., avoidance of slash and burn and overall tillage, choice of native tree species and their mixed spatial arrangement, etc.

B3 Biodiversity Impact Monitoring (Required)

B.3.1 Describe the initial plan for how they will select biodiversity variables to be monitored.

Potential variables include species abundance and diversity, landscape connectivity, forest fragmentation, habitat area and diversity, etc. Clarify the frequency of monitoring. Include in the monitoring plan, biodiversity variables at risk of being negatively impacted by project activities.

>> It is planned that biodiversity monitoring will be carried out based on a five-year cycle to cover plants, amphibians, small and large mammals, birds and insects. Various biodiversity indicators for different biotic communities will be used for analysis as follow.

Floristics and plants communities quantity:

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Data variable	Data unit	Surveyed (s) calculated (c) estimated (e) or default (d)	Recording frequency	Number of sample plots at which the data will be monitored	Comment
Arbor:			5years	1 sample plots in each project land	sample plot size: 20m×20m
species	<i>dimensionless</i>	s		100% of each sample plots	
number of each species	<i>number</i>	s		100% of each sample plots	
total canopy	<i>%</i>	s		100% of each sample plots	
canopy of each species	<i>%</i>	s		100% of each sample plots	
high of each tree	<i>m</i>	s		100% of each sample plots	
DBH of each tree	<i>cm</i>	s		100% of each sample plots	
Frutex:			5years	3 small sample plats in each arbor plots	sample plot size: 5m×5m
species	<i>dimensionless</i>	s			
number of each species	<i>number</i>	s			
total canopy	<i>%</i>	s			
canopy of each species	<i>%</i>	s			
Herbage:			5years	One sample plot in each frutex plot	sample plot size: 1m×1m
species	<i>dimensionless</i>	s			
total canopy	<i>%</i>	s			

Amphibians, small and large mammals, and birds:

Data variable	Data unit	Surveyed (s) calculated (c) estimated (e) or default (d)	Recording frequency	Number of sample plots at which the data will be monitored	Comment
Amphibians: (Drift Fences and Pitfall Traps)			5years	1 sample plot in each project land	At the same location with the plants monitoring
species	<i>dimensionless</i>	s			
number of each species	<i>number</i>	s			
Small mammals: (rodent hole stat.)			5years	1 sample plot in each project land	1/4 hectare
hole munber	<i>number</i>	s			
number of small mammals	<i>number</i>	c			

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Bird:			5years	1 fixed observation plot in each project land	observe with telescope at fixed plot
species	<i>dimensionless</i>	\$			
number of each species	<i>number</i>	\$			
large mammals			5years	1 fixed monitoring sample line in each project land	search trace and individual of large mammals
trace type	<i>dimensionless</i>	\$			
trace number	<i>number</i>	\$			
mammal specie	<i>dimensionless</i>	e			
location	<i>coordinate</i>	\$			

B4. Native Species Use (1 Point)

B.4.1 Show that the project will only use species that are native to the region, or justify that any non-native species used by the project are superior to native species for generating concrete biodiversity benefits.

>> All the tree species selected for this project are native species.

B5 Water & Soil Resource Enhancement (1 Point)

B.5.1 Identify project activities that are likely to enhance water and soil resources.

>> Afforestation activities are one of the effective measures for erosion control.

B.5.2 Credibly demonstrate that these activities are likely to improve water and soil resource compared to the baseline, using justifiable assumptions about cause and effect, and relevant studies.

>> Due to the consecutive deforestation, subsequent over-use of fuelwood collection, illegal grazing and frequent fire, most lands are severely degraded and suffer from serious soil erosions that directly threaten the streams and rivers below. If the current situation remains as it has been, the lands will degrade further and the soil erosion will become more and more severely. Environmental Impact Assessment from local Environmental Protection Agency shows that the forest restoration will enhance the role of vegetation to conserve water and reduce soil erosion in this area.