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History of the document

Version	Date	Nature of revision
01	30 December 2011	This CCBA PDD is submitted in combination with an AR-CDM PDD, so some sections in the CCBA PDD briefly indicate which chapter of the AR-CDM PDD already contains the relevant information - avoiding in this manner the duplication of information.

I. Basic Data:

1) The title of the CCB Standards project activity:

>> Afforestation/Reforestation on Degraded Lands in Southwest Sichuan, China

2) The version number of the document:

>> Version 01

3) The date of the document:

>> Date of the document: 12/30/2011

II. General Section:

G.1 Original Conditions in the Project Area (Required)

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

>>

Location of the project: see AR-CDM PDD section A.4.1 for details.

Basic physical parameters: see AR-CDM PDD section A.5.1.1 to A.5.1.3 for details.

G.1.2 Describe the types and condition of vegetation within the project area:

>> Due to the vertical climatic feature, there is an apparent vertical vegetation spectrum; with the increase of the elevation, vegetation shifts one after another. Major vegetation types on the spectrum are subtropical evergreen broadleaf forest, evergreen coniferous forest, evergreen and deciduous broadleaf mixed forest, deciduous broadleaf forest, coniferous and broadleaf mixed forest, dark coniferous forest, subalpine shrub and meadow, alpine meadow.

Due to a large scale of commercial logging, fuelwood harvesting and agricultural cultivation during 1950s~1960s, a great amount of original forest vegetation were destroyed. Currently the lands to be planted in the proposed project activity are covered by grass, tiny bamboo weed, herbaceous plants and shrubs (see AR-CDM PDD Annex 3 for details). Because of this deforestation and steep slopes there is severe soil erosion, frequent localized droughts, poor soil with low water retention and severely degraded ecosystems.

G.1.3 The boundaries of the project area and the project zone:

>> The specific geographical positions (longitude, latitude) at each corner of each of 63 parcels are listed in AR-CDM PDD Annex 5, and the maps for project boundaries and geographical locations

are also presented in AR-CDM PDD Annex 6. The shp files produced by GIS will be provided to DOE for validation.

G.1.4 Current carbon stocks within the project area(s), using stratification by land-use or vegetation type and methods of carbon calculation (such as biomass plots, formulae, default values) from the Intergovernmental Panel on Climate Change’s 2006 Guidelines for National GHG Inventories for Agriculture, Forestry and Other Land Use (IPCC 2006 GL for AFOLU) or a more robust and detailed methodology:

>>The consolidated afforestation and reforestation baseline and monitoring methodology “Afforestation and reforestation of degraded land” (AR-ACM0001/Version 05.1.1) is applied.

The proposed project activity complies with the conditions under which the chosen methodology applies, which has been demonstrated in AR-CDM PDD section C.2.

Visual assessment was applied to estimate vegetation crown cover of each parcel of land, and dominated species of pre-project trees, shrubs and herbaceous plants were recorded. For lands with shrub crown cover over 5%, sampling were applied to measure crown cover of shrubs for each shrub crown cover class visualized, i.e., 5-30%, 30-60% and >60%. The size of sampling plots is 5 meters by 5 meters. Crown diameter of each shrub with sampling plot was measured, followed by calculating mean crown cover of shrub in sampling plot. At least one plot should be measured for every 50 ha of lands and at least 10 sampling plots for each class should be measured. The sampling plots were selected using extended module of random points in Arcview software.

Vegetation baseline survey indicates that the lands to be planted in the proposed project activity are currently non-forested, barren lands, covered by herbaceous plants (Gramineous weed), tiny bamboo weed and tiny shrubs (raspberry, rhododendron). There are no pre-project living trees. The total vegetation crown cover is 60-85%, including 3,605.7 ha of lands with shrub crown cover less than 5%, 47 ha of lands with shrub crown cover 32% in average (10 sampling plots, 5.51% precision level at 90% confidence level), and 675.3 ha of lands with shrub crown cover in a range 58-70% (61.8% in average, 23 sampling plots, 3.91% precision level at 90% confidence level). See AR-CDM PDD Table Annex 3 0 1 for details. The project lands are therefore stratified into three baseline strata based on shrub crown cover as shown in AR-CDM PDD Table C-0-1 and Figure C.0.5.

Pre-project carbon stock in living biomass of woody vegetation on project sites was estimated following the methodological tools for “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities” (Version 02.1.0), as below.

Trees

Based on baseline vegetation survey, no pre-project living trees were found, therefore, the pre-project carbon stock in living tree biomass ($C_{TREE_BSL,t=0}$) is set as zero, i.e.

$$C_{TREE_BSL,t=0} = 0$$

Shrubs

Pre-project carbon stock in living biomass of shrubs is estimated using equation (30) of the methodological tool applied,

$$C_{SHRUB,t=0} = \frac{44}{12} * CF_S * (1 + R_S) * \sum_i A_{SHRUB,i,t=0} * B_{SHRUB,i,t=0} \quad (G.1)$$

where:

$C_{SHRUB,t=0}$	Carbon stock in shrub biomass within the project boundary at the start of the project ($t=0$); t CO ₂ -e
CF_S	Carbon fraction of shrub biomass; t C (t.d.m.) ⁻¹ . IPCC default value of 0.50 t C (t.d.m.) ⁻¹ is used
R_S	Root-shoot ratio for shrubs; dimensionless. Default value 0.40 is used
$A_{SHRUB,i,t=0}$	Area of shrub biomass stratum i at the start of the project ($t=0$); ha
$B_{SHRUB,i,t=0}$	Shrub aboveground biomass per hectare in shrub biomass stratum i at the start of the project ($t=0$); t d.m. ha ⁻¹
i	1, 2, 3, ... shrub biomass strata delineated on the basis of shrub crown cover
t	1, 2, 3, ... years counted from the start of the AR project activity

Based on the methodological tool applied, aboveground shrub biomass per hectare ($B_{SHRUB,i,t=0}$) is estimated as follows:

(a) For those areas where the shrub crown cover is less than 5%, the aboveground shrub biomass per hectare is considered negligible and hence accounted as zero, i.e., $B_{SHRUB,i,t=0}=0$;

(b) For those areas where the shrub crown cover is 5% or more, aboveground shrub biomass per hectare is estimated as follows:

$$B_{SHRUB,i,t=0} = BDR_{SF} * B_{FOREST} * CC_{SHRUB,i,t=0} \quad (G.2)$$

Where:

BDR_{SF}	Ratio of shrub biomass per hectare in land having a shrub crown cover of 1.0 and default above-ground biomass content per hectare in forest in the region/country where the project is located; dimensionless. The default value 0.10 is used.
B_{FOREST}	Default above-ground biomass content in forest in the region/country where the project is located; t d.m. ha ⁻¹
$CC_{SHRUB,i,t=0}$	Crown cover of shrubs in shrub biomass stratum i at the start of the project ($t=0$) expressed as a fraction; dimensionless

There are 351,252 hectare of forests with a total standing volume 34,126,000 m³ in the five project counties where the proposed project is located¹. This gives 97.16 m³ standing volume per hectare. Mean biomass expansion factor (BEF=1.687) and wood density (0.37) are estimated based on major tree species in the project region (also the species to be planted in the proposed project activity) and the relevant parameters from national greenhouse gas inventory in forestry sector. This gives

¹ Data sources: annual report of forest resources in Sichuan Province in 2009.

$B_{FOREST} = 60.60 \text{ t d.m. ha}^{-1}$. Finally the pre-project carbon stock in living biomass of shrubs is estimated and summarized in Table G.1 below.

Table G.1 carbon stock in living biomass of shrubs

Baseline Stratum ID	Area (ha)	Crown cover of shrubs	Aboveground biomass of shrubs (t d.m. ha ⁻¹)	C stock in shrub biomass (t CO ₂)
BSL-1	3605.7	<0.05	0	0
BSL-2	47.0	0.32	1.94	234
BSL-3	675.3	0.618	3.75	6,491
Total	4,328.0			6,725

G.1.5 A description of communities located in the project zone, including basic socio-economic and cultural information that describes the social, economic and cultural diversity within communities (wealth, gender, age, ethnicity etc.), identifies specific groups such as Indigenous Peoples and describes any community characteristics.

>> The proposed project activity is located in 26 villages of 16 townships in five counties (i.e., Gaolu, Yuexi, Zhaojue, Meigu and Leibo) and three provincial nature reserves (e.g., Yuexi Shengguozhuang, Ganluo Maanshan and Leibo Mamize) in the Southwestern Sichuan Province, P.R.China, including 4 villages of 2 townships (Forestry Farm) in Zhaojue County, 5 villages of 3 townships in Yuexi County, 3 villages of 3 townships in Meigu County, 9 villages of 5 townships in Ganluo County, and 2 villages of 2 townships in Leibo Mamize Nature Reserve, 1 villages in Ganluo Maanshan Nature Reserve and 4 villages of 2 townships in Yuexi Shengguozhuang Nature Reserve.

Agriculture and husbandry are the main source of income for local communities in the project area. However, production is subjected to natural disasters such as droughts and floods. Food productivity is very low and the mean per capita annual income in the project areas is only US\$224 with the lowest around US\$ 94. Around 97 percent of rural people are ethnic minority YI and over 80 percent of population are living below national poverty lines² (see AR CDM PDD Table G-0-1 for detail). The annual income per capita of all project villages is lower than the average level of the relevant project towns/townships and counties. The low per capita incomes highlight the chronic and extreme poverty in rural China, and all project counties are among China's poorest.

All project areas are located in deep mountainous area. Roads to the project village are poor. Electricity and water resources for villagers and livestock are unavailable for most of project villages. For example, in Meigu County 90 per cent of project villages have no electricity and 60 percent of project villages lack water for livelihood and livestock. In addition, most of villages have little coverage of mobile network.

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

² The latest poverty line in China is RMB 2300 (US\$ 360) per capita per year.

and concerns, so that the proposed project activity would better respond to their desires for livelihood development. The procedures and methods applied for the PRA process is detailed in AR-CDM PDD section H.1, and the comments received is summarized in the AR-CDM PDD section H.2.

G.1.6 A description of current land use and customary and legal property rights including community property in the project zone, identifying any ongoing or unresolved conflicts or disputes and identifying and describing any disputes over land tenure that were resolved during the last ten years (see also G5)..

>> The lands to be afforested or reforested were mostly deforested in 1950s-1960s. Currently all 4,328.0 ha of project lands are defined for forestry purpose by local government. Among them 4,256.9 ha of lands are barren lands covered with grass and/or bushes, and 71.1 ha of lands are fallow lands illegally cultivated. 1,792.4 ha of barren lands have sporadic grazing. However, grazing is illegal activities because all lands within the project boundary are legally defined as forestry land. See AR-CDM PDD Table Annex 3-0-1 for details.

Among the 4,328.0 ha of lands, 1,370.8 ha of are state-owned accounting for 31.7%, and 2,957.2 ha of lands are collectively owned (by villages) amount to 68.3%. Among collectively owned lands, land use right of 2,571.0 ha lands were contracted to private (individuals) for a period 70 years with starting date from 1990 to 2010. See AR-CDM PDD Table Annex 3-0-1 for details. There is no ongoing or unresolved land ownership/tenure conflict or dispute. These has been no dispute or conflict in last ten years.

G.1.7 A description of current biodiversity within the project zone (diversity of species and ecosystems) and threats to that biodiversity, using appropriate methodologies, substantiated where possible with appropriate reference material.

>> See AR-CDM PDD section A.5.2.

G.1.8 An evaluation of whether the project zone includes any of the following High Conservation Values (HCVs) and a description of the qualifying attributes.

>> Please see AR-CDM PDD section A.5.2 for biodiversity HCVs.

The proposed project activity is implemented in the branches of the Jinshajiang River (the upper reach of the Yangtze River) and Daduhe River (the second order branch of the Yangtze River) watersheds. The project zone plays an important role in regulating hydrological flows of Yangtze River by which alleviating drought risk and reducing flooding risks. Due to the continued long-term deforestation, followed by subsequent agricultural cultivation, grazing and over collection of wood for fuel, most of the projects lands are severely degraded and suffers from serious soil erosion that directly threaten nearby croplands, drinking water sources, and downstream waterways.

There are no cultural relics and/or cultural reserve that have been identified in the project zone. The project zone is densely inhabited by “Yi”, one of China’s ethnic minorities. Yi’s livelihood, religious

and cultural traditions are closely relevant to forests. Yi people usually judge living environment in terms of the existence of forests and water resources or not. Forests are also the symbol of richness and criteria for Yi people to judge fortune. Forests and water resources hence the criteria for young Yi girl in the decision of marriage to a young man.

Yi has a unique building culture. Most of Yi houses are made of wood, so called “Pongwu”, “Muluoluo” or “Wabanwu”. Woods are also material for Yi people’s living and production tools, such as dishware, drink vessel, loricae, harness and tools for religious ceremonies. Cremation is a tradition of Yi people in which wood is the only fuel.

Yi people have a tradition of tree planting and forest protection. Local rich or distinguished households usually plant tree every years. To protect forests and water resources, local Yi people usually hold a ceremony on which incantation will be used to prevent forests and water from intervention.

G.2 Baseline Projections (Required)

G.2.1 Describe the most likely land-use scenario in the absence of the project following IPCC 2006 GL for AFOLU or a more robust and detailed methodology, describing the range of potential landuse scenarios and the associated drivers of GHG emissions and justifying why the land-use scenario selected is most likely

>> A/R Methodological tool “Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities” was followed to identify the baseline scenario.

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

- a) Analyzing the historical and existing land-use / land-cover changes and identifying key factors that influence the land-use / land-cover change over times: Collected information demonstrates that the lands to be afforested/reforested were primary forest in early 1950s. However, these forests were destroyed gradually in 1950s and 1960s, primarily due to a large scale of commercial logging, agricultural cultivation and fuelwood harvesting. In the following decades after destruction, continuous agricultural cultivation, fuelwood logging as well as overgrazing resulted in continuous degradation of vegetation. In early 1980s, all project lands were non-forested land and currently lands are covered by shrub and/or herbaceous plants.
- b) Interviews with local farmers and staff from forestry farm and nature reserves indicate that crown cover of both tree and non-tree vegetation has been decreasing in recent decades due to commercial logging followed by overgrazing, agricultural cultivation and collection of wood for fuel. Soil erosion and stony desertification have been increasing. Under the current conditions, the land will continue to degrade and soil erosion as well as stony desertification will accelerate. This will result either in the continued decrease of the carbon stocks both in living biomass and soils, or at least, maintenance of these stocks at a low level (see also AR-CDM PDD section C.2 for the demonstration of the land degradation).

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

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

The whole project area has been legally planned by local governments for forestry purposes on which other land uses such as agriculture and grazing are prohibited under China's well enforced forest law. Therefore, the identified realistic and credible land-use scenarios that would have occurred on the land within the proposed project boundary in the absence of the proposed project activity are:

- The proposed project not undertaken as an AR CDM project;
- Continuation of current barren lands with limited illegal grazing and agricultural cultivation on some lands.

G.2.2 Document that project benefits would not have occurred in the absence of the project, explaining how existing laws or regulations would likely affect land use and justifying that the benefits being claimed by the project are truly 'additional' and would be unlikely to occur without the project

>>>Both barriers and investment analysis indicate that project benefits (the land use scenario "the proposed project not undertaken as an AR CDM project" as identified in Section G.2.1) would not have occurred in the absence of the project, as elaborated below.

Barriers:

a) Investment barriers

- Lack of access to credit: Most of the project lands are collectively owned by local village. Among the collectively owned lands, most of land use right belong to private (individual household). No credit mechanisms exist for local communities to make long-term investment in plantation forestry. Agriculture and husbandry are the main income source for local communities in the project area. However, agricultural production is subjected to flooding, drought and other natural disasters. Food productivity is very low and the mean annual income per capita in the project areas is only US\$ 226, and even much lower in

many villages with lowest at US\$94 (see AR-CDM PDD Section G.1 for details). All project counties are categorized as “poverty counties” as assessed by the State Council with many farmers living below the provincial poverty level. It is extremely difficult for local communities to afford the high initial plantation establishment investment, especially because all income from wood and non-wood products will occur much later than the initial investment.

- The nature reserves and forestry farm participating in the proposed project activity are financially independent accounting enterprises. Funding from the government can only maintain the daily management and conservation and there are few alternative funding sources. Therefore they do not have funds available for forestation on these degraded lands in the absence of the proposed project activity.
 - Debt funding not available for this project activity: There is no opportunity to get long-term commercial loans from banks for the purpose of forestation in the project area due to the high risk and the economical unattractiveness of remote, degraded lands.
 - The Chinese government has been conducting large scale of tree planting campaigns since the 1980s. In particular, several large-scale forestry programs have been launched in last decade aiming to restore forest resources. The programs relevant to the project region include the Grain for Green initiated in 2001, Fast-growth Timber Plantation Program initiated in 2000, Natural Forest Conservation Program initiated in 1998 and Sheltering Forest Program in Middle and Upper Reaches of the Yangtze River initiated in late 1980s. Although these programs had set various overall goals for forestry development, and the project area is located in the upper reaches of the Yangtze River, few of the programs were implemented in the remote and severe degraded project area. Fast-growth Timber Plantation Program targets high financial return fast-growth plantation which require good site conditions and convenient transportation. The Grain for Green Program aims to convert steep croplands to forested lands by providing subsidy for farmers. The Natural Forest Conservation Program targets the protection of existing natural forests. In addition, realizing of goals of these programs depends on the availability of funds. These programs have a large financial gaps and very limited government investment has been accessible for forestation on these remote and degraded lands for many years.
- b) **Technological barriers:** Local communities usually do not have access to quality seed sources and also lack the necessary skills to produce high quality seedlings and to perform successful tree planting. In addition they lack the knowledge and experience to prevent planted trees from fire, and attack by pest and disease.

The alternative land use scenario “the proposed project not undertaken as an AR CDM project” identified above can be eliminated from land use scenarios due to barriers faced. The alternative land use (continued status as barren land with agricultural cultivation or grazing) does not face the above-mentioned barriers.

Investment analysis

The investment analysis (see AR-CDM PDD section C.6) indicates that the financial internal return rate (FIRR) of the proposed project activity, without and with carbon finance, and is -3.80% (NPV -

8,894,800 at 10% discount rate) and 0.22%, respectively (at \$7.50 per tonne of CO₂-e). Even when carbon benefit was included, the FIRR would not exceed the benchmark thereby making the proposed project activity financially not viable.

G.2.3 Calculate the estimated carbon stock changes associated with the ‘without project’ reference scenario described above. This requires estimation of carbon stocks for each of the land-use classes of concern and a definition of the carbon pools included, among the classes defined in the IPCC 2006 GL for AFOLU.

>> The carbon stock changes associated with the ‘without project’ reference scenario described above are estimated following the consolidated afforestation and reforestation baseline and monitoring methodology “Afforestation and reforestation of degraded land” (AR-ACM0001/Version 05.1.1). Under the applicability conditions of the methodology applied:

- Changes in carbon stock of above-ground and below-ground biomass of non-tree vegetation is conservatively assumed to be zero for all strata in the ‘without project’ reference scenario, i.e., $\Delta C_{SHRUB_BSL,t} = 0$;
- It is expected that the ‘without project’ dead wood and litter carbon pools will not show a permanent net increase. It is therefore conservative to assume that the sum of the changes in the carbon stocks of dead wood and litter carbon pools is zero for all strata in the ‘without project’ reference scenario, i.e., $\Delta C_{DW_BSL,t} = 0$, and $\Delta C_{LI_BSL,t} = 0$;
- Since carbon stock in SOC is unlikely to increase in the ‘without project’ reference scenario, the change in carbon stock in SOC may be conservatively assumed to be zero for all strata in the ‘without project’ reference scenario, i.e., $\Delta C_{SOC_BSL,t} = 0$.

Based on the baseline survey, there is no pre-project living trees, i.e., $\Delta C_{TREE_BSL,t} = 0$. Therefore

carbon stock changes associated with the ‘without project’ reference scenario ($\Delta C_{BSL,t}$) are:

$$\Delta C_{BSL,t} = \Delta C_{TREE_BSL,t} + \Delta C_{SHRUB_BSL,t} + \Delta C_{DW_BSL,t} + \Delta C_{LI_BSL,t} + \Delta C_{SOC_BSL,t} = 0$$

Where t represent 1, 2, 3, . . . t^* years elapsed since the start of the project activity

G.2.4 Describe how the ‘without project’ reference scenario would affect communities in the project zone, including the impact of likely changes in water, soil and other locally important ecosystem services.

>> Agriculture and husbandry are the main source of income for local communities in the project area. However, production is subjected to natural disasters such as droughts and floods. Food productivity is very low. Over 80 percent of population are living below national poverty lines. The low per capita incomes highlight the chronic and extreme poverty in rural China, and all project counties are among China’s poorest. The annual income per capita of all project villages is lower than the average level of the relevant project towns/townships and counties. All project area are

located in deep mountainous area. Roads to the project village are poor. Electricity and water resources for villagers and livestock are unavailable for most of project villages. In addition, most of villages have little coverage of mobile network. Without project the local communities would keep on maintaining the impoverished life.

Due to the consecutive deforestation, subsequent over-use of fuelwood collection and illegal grazing, most lands are severely degraded and suffer from serious soil erosions that directly threaten the streams and rivers downstream. Local communities suffer from drought, flood and other natural hazard. If the current situation remains as it has been, the lands will degrade further. The soil erosion, drought and flooding will become more and more severely.

G.2.5 Describe how the ‘without project’ reference scenario would affect biodiversity in the project zone (e.g., habitat availability, landscape connectivity and threatened species)

>> Without project the land-use will be continuation of current barren lands or illegal grazing lands, and the lands will degrade further. At the same time, the local communities in poverty will bring a higher pressure on the nature conservation. This will have the huge threat to habitat of wild animals and plants, and negatively impact the biodiversity.

G.3 Project Design & Goals (Required)

G.3.1 Provide a summary of the project’s major climate, community and biodiversity objectives.

>> The proposed project activity will be implemented in the branches of the Jinshajiang River (the upper reach of the Yangtze River) and Daduhe River (the second order branch of the Yangtze River) watersheds. Falling within the Southern Hengduan mountains priority conservation areas as listed in the China Biodiversity Conservation Strategy and Action Plan issued by the Ministry of Environmental Protection, The project area is a biodiversity hotspot home to many endangered species like the giant panda. Living in the remote steep mountains, local farmers/communities (mostly ethnic minority Yi) are living below the poverty level of China. To contribute to the local sustainable development, the proposed project activity, afforestation on Degraded Lands in Southwest Sichuan, China, aims to:

- Sequester carbon dioxide and mitigating climate change;
- Enhance biodiversity conservation and climate change adaptation 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 project activity with expected climate, community and biodiversity impacts and its relevance to achieving the project’s objectives

>> To achieve the objectives of the proposed project activity, 4,328.0 hectare (ha) of multiple-use forest will be established by direct planting on degraded lands in five counties (Zhaojue, Ganluo, Meigu, Yuexi and Lebo) in the Southwestern Sichuan Province, including 1649.0 ha of *Abies fabri*,

767.4 ha of *Picea asperata*, 1103.1 ha of *Pinus armandi*, 321.9 ha of *Populus deltoides* × *P. Maximowiczii*, 144.2 ha of *Alnus cremastogyne*, 342.3 ha of *Cryptomeria fortunei*. It is expected to produce 1.24 million tCO₂ equivalent of long-term CER within 30 years crediting period, with an annual mean of 41,265 tCO₂ equivalent. All species used are native to local, without any invasive alien species or genetically modified organisms.

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

In the proposed project activity, local farmers/communities and other land users will contribute lands and a part of labor input. The operating entity will invest in forest establishment (including site preparation, seedling, planting, 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. In return, the farmers/communities and land users own timbers and non-wood forest products to be produced by the project, as well as forests after the end of the crediting period.

<p>G.3.3 Provide a map identifying the project location and boundaries of the project area(s), where the project activities will occur, of the project zone and of additional surrounding locations that are predicted to be impacted by project activities (e.g. through leakage).</p>
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>> The project is located in five counties in the southwest Sichuan Province, China. See Figure G.1 below. The specific geographical positions (longitude, latitude) at each corner of each of 63 parcels are listed in AR-CDM PDD Annex 5, and the maps for project boundaries and geographical locations are also presented in AR-CDM PDD Annex 6. The shp files produced by GIS will be provided to DOE for validation.

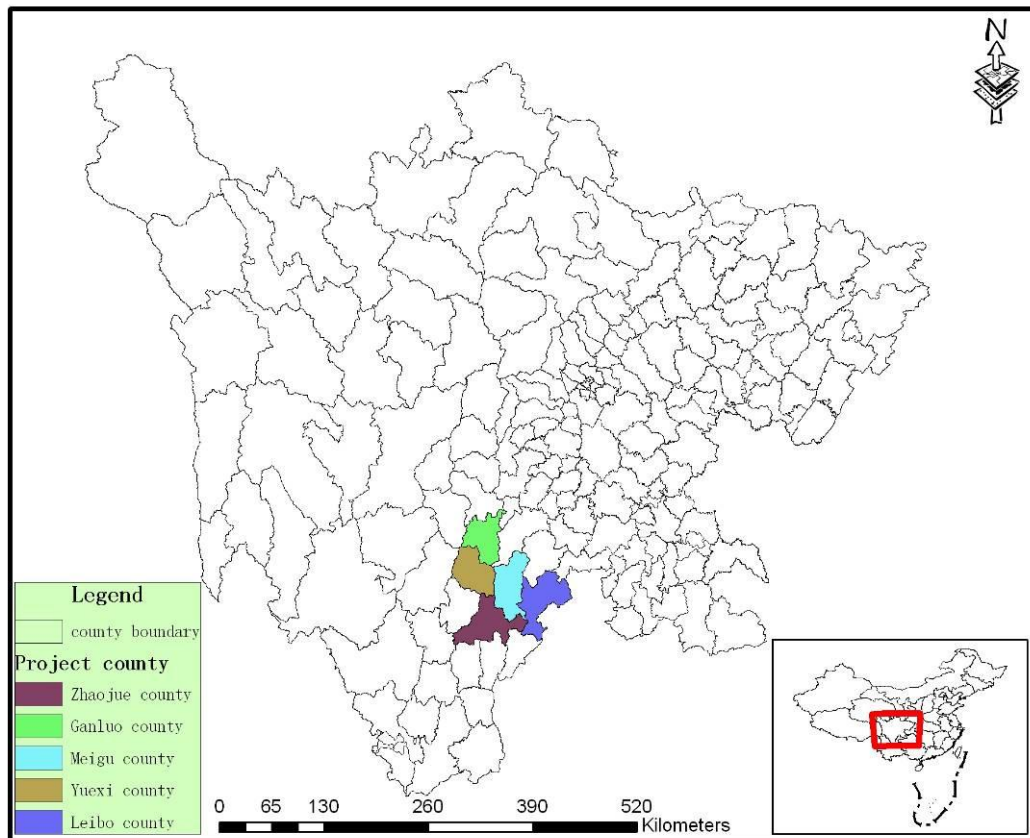


Figure G.1 Project zone of the proposed project activity

G.3.4 Define the project lifetime and GHG accounting period and explain and justify any differences between them. Define an implementation schedule, indicating key dates and milestones in the project's development.

>>

Starting date: August 1st 2011

Project lifetime: 30 years 0 month

GHG accounting period: 30 years 0 month, same as the project lifetime

Planting period: four years from the project starting date.

Forest management period: from 5th year to the end of the project.

Based on the site conditions, the proposed project activity will plant following tree species native to project area:

- Fir: *Abies fabri*
- Spruce: *Picea asperata*
- Armand pine: *Pinus armandi*

- Poplar: *P.Deltoides* × *P.Maximowiczii*
- Cryptomeria: *Cryptomeria fortunei*
- Alder: *Alnus cremastogyne*

2,500 trees/ha (2m by 2m) will be planted for coniferous tree species including fir, spruce, Cryptomeria and armand pine, and 1667 trees/ha (2m by 3m) for broadleaf tree species including poplar and alder³. Trees species will be planted in mixed block arrangements (different tree species in neighboring plots) so as to reduce risk of fire, disease and pest insect and enhance environmental and social benefits (

³ State Non-commercial Forest Construction-Technical regulation: GB/T 18337.3-2001;

Table G.2 for specific planting plan for each parcel of land, and

Figure G.2 for the example of the project design map). Site burning and overall tillage will not be employed during the site and soil preparation in order to prevent soil erosion, to minimize greenhouse gas emissions and to protect existing carbon stocks. Small pits (40 cm in diameter and 30 cm in depth) will be dug manually for tree planting. The pits will be laid out in a triangular pattern on the contours of slopes.

To ensure high survival rate and good growth of seedlings in the early stages, weeds will be cut manually in the planting year and two times (April-May and August-September) each year in the second and third year after planting. One weeding will be continued for fir and spruce in the fourth and fifth year. Survival rates will be checked and re-planting will be conducted six months after planting if the rate is lower than 85%. 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.

The established plantations will be thinned at 12-40 year-old, with thinning intensity 20% of suppressed trees, varying with tree species and site productivity (see Table G.3 for detailed thinning plan). Selective harvesting (25% of standing volume for each time) will be conducted with logging time depending on species. After harvesting, fir and spruce plantations will be left for natural regeneration, and other slash lands will be regenerated by direct planting through gap filling. Dead organic matter (litter and dead wood) will not be removed.

Table G.2 Planting plan

Land ID	Plot No	Species	Planting Plan (ha)				
			2011	2012	2013	2014	total
ZJ-ZP-01	1	Spruce			46.7		46.7
	2	Armand pine			10.3		10.3
	3	Spruce			68.2		68.2
	4	Armand pine			21.9		21.9
ZJ-ZP-02	3	Spruce		31.0			31.0
	4	Armand pine		20.9			20.9
ZJ-ZP-03	5	Spruce		15.3			15.3
ZJ-ZP-04	1	Spruce	35.9				35.9
	2	Armand pine	22.8				22.8
	6	Spruce		38.1			38.1
	7	Armand pine		48.8			48.8
ZJ-ZP-05	1	Spruce	55.8				55.8
	2	Armand pine	4.4				4.4
	3	Armand pine	7.9				7.9
	4	Armand pine	7.1				7.1
ZJ-WC-01	1	Spruce	6.7				6.7
YX-DJ-01	1	Fir			66.3		66.3
	2	Poplar		7.9			7.9
YX-DJ-02	3	Fir			45.4		45.4
YX-DJ-03	4	Fir			16.5		16.5
YX-DJ-04	8	Armand pine		19.4			19.4
YX-DJ-05	9	Armand pine		49.3			49.3
YX-DJ-06	5	Fir			11.9		11.9
YX-DJ-07	6	Fir			28.8		28.8
YX-DJ-08	7	Fir			54.8		54.8
	10	Armand pine		22.0			22.0
YX-DJ-09	1	Fir			65.5		65.5
	2	Poplar		3.7			3.7
	3	Poplar		11.7			11.7
	4	Armand pine		21.7			21.7
YX-DJ-10	5	Fir			55.5		55.5
	6	Armand pine		23.2			23.2
YX-XX-01	1	Armand pine	48.0				48.0
	2	Armand pine	24.0				24.0
	3	Armand pine	8.0				8.0
YX-ZAJ-01	2	Poplar		50.7			50.7
	4	Armand pine		22.0			22.0
YX-ZAJ-03	1	Armand pine		29.1			29.1
YX-ZAJ-04	3	Armand pine		18.4			18.4
	5	Poplar		8.6			8.6
	6	Armand pine		33.7			33.7
YX-ZAJ-02	1	Fir		7.4			7.4
	2	Armand pine		15.4			15.4
	3	Fir		32.8			32.8
	4	Fir		6.6			6.6
YX-LJ-01	1	Fir				61.8	61.8
YX-LJ-02	2	Fir				42.9	42.9
YX-LJ-03	1	Armand pine		8.5			8.5

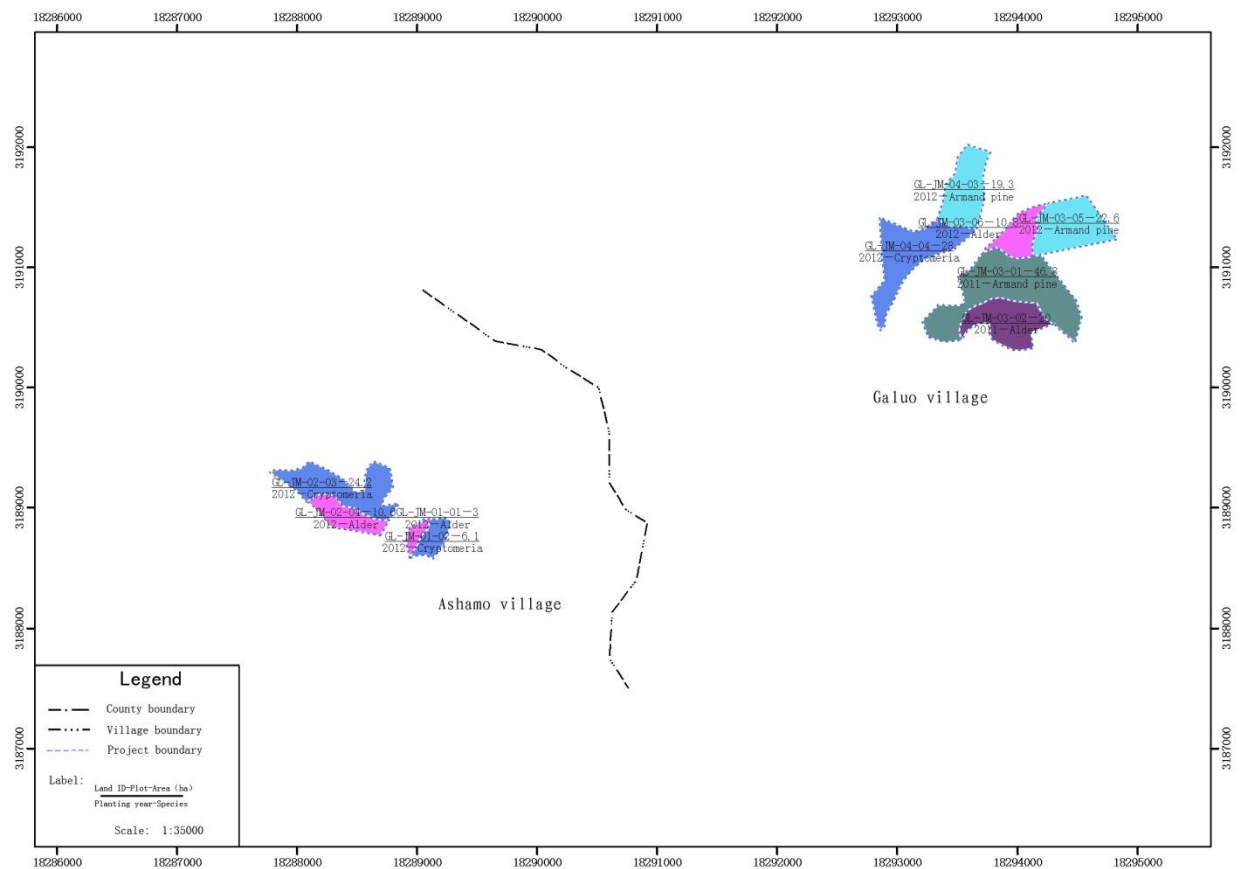
	2	Fir			45.8		45.8
	3	Poplar		11.0			11.0
	4	Armand pine		7.1			7.1
YX-LJ-04	5	Fir				22.5	22.5
YX-LJ-05	6	Poplar		13.3			13.3
	7	Armand pine		16.7			16.7
YX-LJ-06	8	Fir				28.9	28.9
YX-SG-01	1	Fir	8.2				8.2
	2	Fir	12.5				12.5
	3	Armand pine	12.6				12.6
	4	Poplar	13.8				13.8
	5	Armand pine	24.0				24.0
YX-SG-02	6	Armand pine		33.2			33.2
	7	Fir			16.7		16.7
YX-SG-03	2	Armand pine	13.0				13.0
	3	Armand pine	9.0				9.0
	4	Armand pine	4.9				4.9
YX-SG-04	1	Armand pine	4.0			4.0	
YX-SG-05	5	Fir	12.0				12.0
	6	Poplar	12.0				12.0
	7	Armand pine	26.3				26.3
MG-BG-01	1	Fir			52.8	52.8	
MG-BG-02	2	Fir			86.6	86.6	
MG-BG-03	3	Armand pine			84.4	84.4	
MG-LM-01	1	Fir				189.0	189
MG-LM-02	2	Fir				101.0	101
MG-LM-03	3	Fir				69.6	69.6
MG-WG-01	1	Armand pine			107.6		107.6
MG-WG-02	2	Fir			114.6		114.6
LB-CH-01	3	Spruce		49.8			49.8
LB-CH-02	1	Spruce		124.2			124.2
LB-CH-03	2	Armand pine		170.8			170.8
LB-GD-01	1	Fir			245.1		245.1
LB-GD-03	2	Spruce			65.5		65.5
LB-GD-02	3	Spruce			112.0		112
	4	Spruce			87.3		87.3
LB-GD-04	5	Spruce		30.9			30.9
GL-AE-01	3	Alder		7.2			7.2
	4	Cryptomeria		16.9			16.9
GL-AE-02	5	Cryptomeria		16.6			16.6
	6	Alder		35.4			35.4
GL-AE-03	1	Alder	6.0				6.0
	2	Cryptomeria	14.0				14.0
GL-AE-04	1	Armand pine	14.0				14.0
	2	Alder	33.0				33.0
GL-JM-01	1	Alder		3.0			3.0
	2	Cryptomeria		6.1			6.1
GL-JM-02	3	Cryptomeria		24.2			24.2
	4	Alder		10.6			10.6
GL-JM-04	3	Armand pine		19.3			19.3
	4	Cryptomeria		28.0			28.0
GL-JM-03	1	Armand pine	46.8				46.8

	2	Alder	20.0				20.0
	5	Armand pine		22.6			22.6
	6	Alder		10.8			10.8
GL-LM-02	3	Poplar		18.5			18.5
	4	Fir		41.7			41.7
GL-PB-01	1	Fir			19.2		19.2
	2	Poplar			8.5		8.5
GL-PB-02	3	Fir			26.3		26.3
	4	Poplar			11.4		11.4
GL-PB-03	5	Fir			25.3		25.3
	6	Poplar			10.7		10.7
GL-PB-04	1	Cryptomeria		70.1			70.1
	2	Poplar		30.3			30.3
GL-PB-05	1	Cryptomeria			141.2		141.2
	2	Poplar			94.8		94.8
GL-XSB-01	1	Cryptomeria		25.2			25.2
	2	Alder		18.2			18.2
GL-LM-01	1	Fir		35.1			35.1
	2	Poplar		15.0			15
Total			506.7	1458.0	1847.6	515.7	4328.0

Table G.3 Forest management plan

Tree species	Thinning		Selective harvesting	
	Time (year)	Intensity (% of trees)	Time (year)	Intensity each time (% of volume)
Fir	40	20%	101	25%
Spruce	40	20%	101	25%
Armand pine	20	20%	51	25%
Poplar	12	20%	31	25%
Cryptomeria	15	20%	31	25%
Alder	12	20%	31	25%

Figure G.2 Species combination and planting model arrangement in Jimi Town of Ganluo County



G.3.5 Identify likely natural and human-induced risks to the expected climate, community and biodiversity benefits during the project lifetime and outline measures adopted to mitigate these 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 small hole site preparation (40 cm in diameter), retaining the existing vegetation as much as possible. As a result, the surface area disturbed by site preparation is estimated to account for 2.1-3.1% of the total land surface. The hole will be dug along the landform contour in triangle form to reduce the soil loss.
- **Fertilization:** In the proposed project activity, no synthetic 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.

- **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 project 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 is considered to be significant.

G.3.6 Demonstrate that the project design includes specific measures to ensure the maintenance or enhancement of the high conservation value attributes identified in **G1** consistent with the precautionary principle

>>Following specific measures in the project design can ensure the maintenance or enhancement of the biodiversity and soil and water conservation of the project zone:

- Restoration of the degraded and degrading land within or surrounding the nature reserves will enhance the connectivity of habitats;
- Forests will be established by mixing multiple species;
- All species to be planted are native to local;
- Minimizing disturbance on original vegetation and soil by small hole site preparation;
- No synthetic fertilizer will be applied;
- All on-site activity will be conducted manually;
- Income to be created by the project will alleviate the pressure of local communities on forest ecosystems and wildlife conservation;
- Minimizing the use of chemical pesticide;
- Any seed used will be quarantined;
- All seedlings will be cultured at local.

Most of local communities are ethnic minority “Yi” whose living and culture are favour of forests. Therefore the restoration of native forest ecosystem will maintain and enhance their cultural heritage in addition to increase income.

G.3.7 Describe the measures that will be taken to maintain and enhance the climate, community and biodiversity benefits beyond the project lifetime.

>>There is no harvest within the project life, and most of plantation to be established has long rotations. For example, spruce and fir with a rotation 101 years accounts for 55.8 per cent of total area to be planted in the project. Armandi pine with a harvest rotation 51 years amounts to 25.5 per cent of the total project area (

Table G.2 and **Table G.3** above). Furthermore, selective harvesting (25% of standing volume for each time) will be conducted. After harvesting, fir and spruce plantations will be left for natural regeneration, and other slash lands will be regenerated by direct planting through gap filling. This ensure that plantation will remain for up to 100 years as a result to maintain and enhance the climate and biodiversity benefits long beyond the project lifetime.

In the proposed project activity, local farmers/communities and other land users own timbers and non-wood forest products to be produced by the project within and beyond the project lifetime. The timber revenue, majority of revenue from the project, will come gradually after the end of the project lifetime, up to 100 years.

G.3.8 Document and defend how communities and other stakeholders potentially affected by the project activities have been identified and have been involved in project design through effective consultation, particularly with a view to optimizing community and stakeholder benefits, respecting local customs and values and maintaining high conservation values.

>> To maximize the socio-economic and conservation benefit and respect local customs, the project was designed with a participatory approach. PRA methods were adopted in interviewing and consulting with farmer households and nature reserves within and beyond the project area to understand their preferences, wishes and concerns, so that the proposed project activity would better respond to their desires for livelihood development, nature conservation and ethnic culture. The concerns and comments received have been fully considered in the project design. The PRA process, method and comments and concerned received, and the response are summarized in AR-CDM PDD section H.

The local farmers and nature reserves will participate in the project activity throughout the project lifetime including site preparation, planting, weeding, thinning, harvesting, protection and other forest management activities, and earning direct benefits during the project lifetime. This ensures the frequent communication and consultation between project managers and all community groups about the project and its impacts to facilitate adaptive management throughout the life of the project. In addition, project stakeholders meeting will be hold at least once a year to facilitate the continuous communication and consultation.

G.3.9 Describe what specific steps have been taken, and communications methods used, to publicize the CCBA public comment period to communities and other stakeholders and to facilitate their submission of comments to CCBA.

>> The project implementation entity, Daduhe Forestation Bureau, will take a lead to distribute key project documents to affected communities and stakeholders (farmer households, villages, forestry farms, nature reserves, county and town/township government). A notification will be prepared in Chinese. The notification will include following information.

- **When:** starting date and deadline for comments;
- **Where:** path to access the CCB PDD and relevant information;
- **How:** the way to submit comments to CCBA

Sichuan Forestry Department and county forestry bureau will supervise and facilitate the information distribution. The forestry bureau of five counties involved in this project are the important regional offices. There is a forestry workstation in each town/townships, which is the most grass roots forestry administrative unit and deal with all of the forestry issues concerned local farmer. 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 and regulations from the national and provincial government and feedback from communities.

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

All stakeholders participated in the decision-making of investment and revenue sharing was transparent to each participator. So there is no confidential information between all participators includeing stakeholder, land owner, project antity, and local forest govermant.

One week before the deadline, stakeholders will be reminded.

G.3.10 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, nature reserves and other stakeholders in the entire lifetime of the project - from project development, 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, for an in-depth understanding of the socio-economics, landuse, 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 for identifying the conflicts and grievances that may potentially arise during project lifetime.
- (3) During the project design, the general opinions regarding selection of planting plots, tree species, afforestation techniques and management practise, as well as income sharing mechanism have been reviewed and adopted when deemed appropriate.
- (4) The completed project design was feedbacked 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 feedbacked 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 famers 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 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.

G.3.11 Demonstrate that financial mechanisms adopted, including projected revenues from emissions reductions and other sources, are likely to provide an adequate flow of funds for project implementation and to achieve the anticipated climate, community and biodiversity benefits.

>> In the proposed project activity, local farmers/communities and other land users will contribute lands and a part of labor input. The operating entity will invest in forest establishment (including site preparation, seedling, planting, weeding, etc.), provide technical inputs, project preparation (including PDD development, validation, registration, verification, etc.) and manage the plantations during the project lifetime, as well as take the natural and investment risks. In return, the farmers/communities and land users own timbers and non-wood forest products to be produced by the project, as well as forests beyond the project lifetime. The pre-payment of carbon credit at early stage of the project lifetime will provide an adequate flow of funds for the project implementation.

G4 Management Capacity and Best Practices (Required)

G.4.1 Identify a single project proponent which is responsible for the project's design and implementation. If multiple organizations or individuals are involved in the project's development and implementation the governance structure, roles and responsibilities of each of the organizations or individuals involved must also be described

>>**Project Design:**

The project is developed by The Nature Conservancy (TNC) China in cooperation with Beijing Shanshui Nature Conservation Center (BSNCC), Sichuan Forestry Inventory and Planning (SFIP), Sichuan Social Science Institute (SSSI), forestry bureaus of the project counties.

- **TNC China:** Responsible for the overall design of the project, coordinating the project development, training on A/R CDM rules and methodology and CCB standard, providing guidance for baseline survey, and PDD development.
- **BSNCC:** Responsible for coordinating the baseline survey and PRA process, including the development of relevant SOP of the survey;
- **SFIP:** Responsible for the historic land use map for demonstrating land eligibility, and the growth curve of the tree species to be planted in proposed project;
- **SSSI:** Responsible for the PRA process including method, field survey and summary report;
- **Forestry bureau at the project counties and involved nature reserves:** Responsible for planting and forest management design, providing logistic support and participating field work of the baseline survey and PRA process, and coordinating and communicating with local communities.

Project Implementation:

The project stakeholders include Novartis Coporate, Daduhe Forestation Bureau (DFB), Sichuan Forestry Department (SFD), Liangshan Prefecture Forestry Bureau, County Forestry Bureau of Yuexi, Ganluo, Meigu, Zhaojue and Leibo, and Mamize Nature Reserve, Maanshan Nature Reserve, Shenggezhuang Nature Reserve, and local communities involved. In addition, TNC China Program, BSNCC, SFIP and Sichuan Research Institute of Forestry will provide technical support and consultation for the implementation of the proposed project. To facilitate the development and implementation of the project, a project steering committee (PSC) and a project expert committee (PEC) have been established and are playing respective roles. A project coordination office (PCO) is establishing, which will be responsible for the daily management, coordination and communication among stakeholders, including data management and archives.

The PSC is composed of representatives from Novartis Corporate, Novartis China, DFB, SFD, TNC China and BSNCC. Novartis China and TNC China will serve as co-chairs of the PSC. The responsibility of PSC is to guide and supervise the overall implementation, make final decisions on the major activities and/or milestone events, review project progress and solve issues raised, approve annual work plan as well as technical design for annual forestation and forest management approved by the PEC, review and approve the project verification plan and the verification report, review and approve monitoring plan and monitoring report, and conduct quality assurance.

The responsibility of the PEC is to provide technical advice regarding project implementation, review annual tree-planting design and the implementation plan, develop procedures for the verification of outcomes at each project stage and review verification report, develop monitoring plan and review monitoring report.

The responsibilities of relevant stakeholders during the project implementation are described below:

- **DFB:** Daduhe Forestation Bureau will be the project implementation entity of the proposed project, responsible for domestic approval and international application for registration, and will sign an ERPA with Novartis Coporate. Under the guidance of SFD and by cooperating

with project county forestry bureaus, nature reserves and forestry enterprises, DFB takes a lead in implementing the project activities.

- **Local communities:** The local communities will offer lands for the proposed project and contribute part of labors needed for the project as equity. They will own all timber revenue produced on lands within the project lifetime. In addition they will earn income through forestation and forest management related labor. After the end of the proposed project all forests will be owned by local communities.
- **Nature reserves:** The nature reserves will offer their lands eligible for proposed afforestation/reforestation CDM project activities and directly implement the forestation and management activities for lands owned and contribute part of labor input as project equity. They will own all timber revenue produced on lands owned during project lifetime. After the end of the proposed project all relevant forests will be owned by respective nature reserves. Nature reserves shall assist surrounding communities for forestation and forest management aiming to reduce pressure of surrounding communities on the nature reserves, and to raise capacity and awareness of biodiversity conservation in these communities. In addition, nature reserves shall use the timber revenue for improving conservation management including daily patrolling to improve management of reserves.
- **SFD:** SFD will provide guidance for the implementation of the project activities, coordinate implementation entities, project counties and nature reserves for supervision and verification, as well as quality assurance.
- **Forestry bureau of project counties:** Under the supervision and guidance of the Sichuan Forestry Department and county government, forestry bureaus and their forestry posts will provide equity funds for the project, and by cooperating with implementation entities, will be responsible for organizing and guiding forestation and forest management activities in project area within their respective territory, organizing technical training and instruction and verification, and cooperating on the measuring and monitoring of emissions reductions.
- **Other stakeholders:** TNC China, BSNCC, SFID and Sichuan Institute of Forestry will provide technical guidance, consultation and training for the tree planting, forest management and the measuring and monitoring of emissions reductions.

G.4.2 Document key technical skills that will be required to implement the project successfully, including community engagement, biodiversity assessment and carbon measurement and monitoring skills. Document the management team's expertise and prior experience implementing land management projects at the scale of this project. If relevant experience is lacking, the proponents must either demonstrate how other organizations will be partnered with to support the project or have a recruitment strategy to fill the gaps.

>> Key technical skills include techniques for forest establishment and management including seedlings preparation, site and soil preparation, planting, weeding, forest management, and forest fire and pest insect and disease control, etc.

The project entity, DFB, is a state-owned company with major business on forestation and forest management. It has established over 100 thousands of forests in Sicuhua through directing tree

planting and aerial seeding and is currently managing over 200 thousands of forests distributed in about 40 counties all over Sichuan Province. As the project entity, DFB has been successfully implementing “Afforestation and Reforestation on Degraded Lands in Northwest Sichuan, China”, registered in CDM Executive Board and CCBA. Over past years it has accumulated rich experience and skill in tree planting, forest management and the implementation of AR-CDM and AR-CCB project.

The project county forestry bureaus and their forestry posts at town/township level have been implementing forestation, forest management, forestry administration and technical training for local communities, and have rich experience and skills for forest establishment and management including coordination with local communities.

TNC China and BSNCC have been working on biodiversity conservation for many years in China and have developed a set of methods and SOP for biodiversity conservation and accumulated rich experience in nature conservation.

G.4.3 Include a plan to provide orientation and training for the project’s employees and relevant people from the communities with an objective of building locally useful skills and knowledge to increase local participation in project implementation. These capacity building efforts should target a wide range of people in the communities, including minority and underrepresented groups. Identify how training will be passed on to new workers when there is staff turnover, so that local capacity will not be lost.

>>The implementation entity, project county forestry bureau and its forestry posts will organize training for local communities to extend the improved reforestation technologies and assist them in understanding and addressing problems during the implementation of the proposed project activity, both on-site and off-site, which mainly include seed and seedling selection, nursery management, site preparation, planting and pest and fire management. Local communities will also be trained through direct participating of the forest establishment and forest management.

G.4.4 Show that people from the communities will be given an equal opportunity to fill all employment positions (including management) if the job requirements are met. Project proponents must explain how employees will be selected for positions and where relevant, must indicate how local community members, including women and other potentially underrepresented groups, will be given a fair chance to fill positions for which they can be trained.

>> The proposed project activity will create about 1 million person-days of temporary employment opportunities from planting, weeding, thinning, etc. It will also create 51 long-term job positions for plantation maintenance and management during the project lifetime (see AR-CDM PDD Table G-0-3). Most employment opportunities will be taken by the local farmers/communities involved in the proposed project activity and others whose lands do not fall within the project boundary in case of insufficient labor supply from local communities. The ethnic minority groups and female will have equal rights to access the employment opportunities if the job requirements are met. At the same situation, priority will given to members from poor households, ethnic minority and women.

G.4.5 Submit a list of all relevant laws and regulations covering worker's rights in the host country. Describe how the project will inform workers about their rights. Provide assurance that the project meets or exceeds all applicable laws and/or regulations covering worker rights and, where relevant, demonstrate how compliance is achieved

>> Rrelevant laws and regulations covering worker's rights in China include "Labor Law of the People's Republic of China" and "China Company Law". At the time of the employment, a employment contract will be signed with employee, in which relevant laws and regulations will be mentioned as the basis of the contract, so that if there is conflict between the employers and workers, the worker has rights to complain and seek for the local county worker association for arbitration to protect their interests.

G.4.6 Comprehensively assess situations and occupations that pose a substantial risk to worker safety. A plan must be 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..

>> Possible risks for the workers include:

- Application of chemicals and pesticides for the control of pests and diseases may harm workers, specifically,
 - ✓ At the time of dilution of chemicals and pesticides, high concentration of original chemicals may harm workers without mask;
 - ✓ Leakage of chemicals and pesticides may burn skin of workers without protection clothes;
 - ✓ Leakage of chemicals and pesticides may pollute drinking water in case they are leaked to water sources
- Inappropriate operation during thinning and harvesting may injure workers;
- 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;

All these risks can be minimized by best practices. Safety operation regulations and technical guidelines will be formulated to copy with possible risks that may harm workers. Training courses will be organized to raise safety awareness of workers, including teaching workers the best practices and informing workers of relevant risks and the ways to minimize the risks. All workers shall be trained before performing specific work. Safety managers will full participate in the filed work to ensure that such internal control procedures as follow will play a role of avoiding the potential risks:.

- Measures for minimizing risk due to the application of chemicals and pesticides:
 - (a) training to forest management staff, local communities and workers on
 - ✓ Risk of specific types of chemicals and pesticides on health and environments;
 - ✓ Best practices in application of chemicals and pesticides;

- ✓ Know-how for equipment operation;
 - ✓ Know-how for clothes: long-sleeve clothes, mouth mask, gloves, shoes, etc;
 - ✓ Application of chemicals and pesticide only at windless period;
 - ✓ Store chemicals and pesticide at places in accessible for children;
 - ✓ Best practice for disposal of waste chemicals and pesticide and their package.
- (b) Monitoring the application of chemicals and pesticide, re-training in case of no best practice found.
- Countermeasure for inappropriate operation during thinning and harvesting:
 - (a) Developing specific thinning and harvesting technical guidelines based on National Regulations on forest harvesting and regeneration;
 - (b) training: all workers will be trained before signing employment contract for thinning and harvesting;
 - (c) Supervising harvesting and thinning activities on-site and correct any improper practices happened.
 - A safety assurance staff, which takes charge of safety supervision.
 - Safety manual will be distributed to workers.
 - During project implementation, the safety assurance staff will participate in full process of 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 works on a vertical line at the same time, including soil preparation, tree planting and weeding. Instead, all workers shall work on a same land contour.
 - All field works must avoid extreme weather such as in or after rainstorm, extremely high temperature, and strong wind.
 - Each working group will be equipped with a portable rescue package to deal with minor injury.
 - Provide good logistics to ensure that every worker have enough drinking water and food.

G.4.7 Document the financial health of the implementing organization(s) to demonstrate that financial resources budgeted will be adequate to implement the project.

>>

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

G5 Legal Status and Property Rights (Required)

G.5.1 Submit a list of all relevant national and local laws and regulations in the host country and all applicable international treaties and agreements. Provide assurance that the project will comply with these and, where relevant, demonstrate how compliance is achieved

>> China has successively issued and revised a series of laws and administrative regulations related to forestry. These have included, among others, the Forest Law, the Regulations for Implementing the Forest Law, the Regulations for Grain for Green, the Regulations for the Protection of Wild Animals, the Regulations for the Protection of Wild Plants, the Regulation for Nature Reserve, the Regulation for Forest Fire Control, and the Regulation for Forest Diseases and Pests Control, Facilitation for Land Tenure Reform of Collective-owned Forestry Land, etc. The recent land tenure reform policy allows collectively owned lands to be contracted to individual farmer household. The proposed project will not break relevant laws and regulations. Contrary, this project can help to facilitate the enforcement of regulations and policies for stopping illegal agricultural cultivation and grazing.

G.5.2 Document that the project has approval from the appropriate authorities, including the established formal and/or traditional authorities customarily required by the communities

>>The project proponent is applying for the Letter of Approval from National Development and Reform Commission.

G.5.3 Demonstrate with documented consultations and agreements that the project will not encroach uninvited on private property, community property, or government property and has obtained the free, prior, and informed consent of those whose rights will be affected by the project

>> Among the 4,328.0 ha of lands, 1,370.8 ha of are state-owned accounting for 31.7%, and 2,957.2 ha of lands are collectively owned (by villages) amount to 68.3%. Among collectively owned lands, land use right of 2,571.0 ha lands were contracted to private (individuals) for a period 70 years with starting date from 1990 to 2010. All of them have the right to use their own lands. Under the contractual arrangement in the proposed project activity, local communities, individuals and relevant entities that own the land use right will offer the lands for planting on 100 percent voluntary basis, as a return, they own all the timber and other wood and non-wood forest products benefit, and they should have the license, which is issued by the local government, to harvest the timber. After the end of the crediting period, they will continue to own the plantation and relevant products. The contractual arrangement will be established on voluntary basis and fixed by contracts. Therefore, the implementation of the project will not encroach uninvited on private and community property.

G.5.4 Demonstrate that the project does not require the involuntary relocation of people or of the activities important for the livelihoods and culture of the communities. If any relocation of habitation or activities is undertaken within the terms of an agreement, the project

proponents must demonstrate that the agreement was made with the free, prior, and informed consent of those concerned and includes provisions for just and fair compensation.

>> The project area is located in remote mountainous regions and lands to be planted are severely degraded barren lands on which local communities do not rely for their livelihood and culture of the communities. Therefore, the project will not cause any relocation of people.

G.5.5 Identify any illegal activities that could affect the project's climate, community or biodiversity impacts (e.g., logging) taking place in the project zone and describe how the project will help to reduce these activities so that project benefits are not derived from illegal activities..

>> Currently all 4,328.0 ha of project lands are defined for forestry purpose by local government. Among them 4,256.9 ha of lands are barren lands without any pre-project management activity, and 71.1 ha of lands are fallow lands. 1,792.4 ha of barren lands have sporadic grazing. Both the cultivation and grazing are illegal. As a result of the implementation of the proposed project, 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. Therefore the pre-project illegal activities would not affect the project's climate, community or biodiversity benefits.

G.5.6 Demonstrate that the project proponents have clear, uncontested title to the carbon rights, or provide legal documentation demonstrating that the project is undertaken on behalf of the carbon owners with their full consent. Where local or national conditions preclude clear title to the carbon rights at the time of validation against the Standards, the project proponents must provide evidence that their ownership of carbon rights is likely to be established before they enter into any transactions concerning the project's carbon assets..

>> 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 and revised on August 3 2011, 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. The right of access to the sequestered carbon belongs fully to participants after Chinese government taxes 2% of transfer value⁴.

III. Climate Section

CL1 Net Positive Climate Impacts (Required)

CL.1.1 Estimate the net change in carbon stocks due to the project activities using the methods of calculation, formulae and default values of the IPCC 2006 GL for AFOLU or using a more robust and detailed methodology. The net change is equal to carbon stock changes with the project minus carbon stock changes without the project (the latter having been estimated in G2). This estimate must be based on clearly defined and defensible

⁴ <http://cdm.ccchina.gov.cn/>

assumptions about how project activities will alter GHG emissions or carbon stocks over the duration of the project or the project GHG accounting period.

>> See Section G.2.3 for carbon stock changes without the project and AR-CDM PDD Section D.1 for carbon stock changes with the project.

CL.1.2 Estimate the net change in the emissions of non-CO₂ GHG emissions such as CH₄ and N₂O in the with and without project scenarios if those gases are likely to account for more than a 5% increase or decrease (in terms of CO₂-equivalent) of the project's overall GHG emissions reductions or removals over each monitoring period.

>> There will be no biomass burning during site preparation and forest management, and based on the methodology applied there will be no non-CO₂ GHG emissions from clearing, burning and decay of existing vegetation due to implementation of an A/R CDM project activity.

CL.1.3 Estimate any other GHG emissions resulting from project activities. Emissions sources include, but are not limited to, emissions from biomass burning during site preparation, emissions from fossil fuel combustion, direct emissions from the use of synthetic fertilizers, and emissions from the decomposition of N-fixing species.

>> There will be no biomass burning during site preparation, no machinery use, no synthetic fertilizer application as well as no N-fixing species to be used in the project. Therefore GHG emissions from these emission sources will not occur.

CL.1.4 Demonstrate that the net climate impact of the project is positive. The net climate impact of the project is the net change in carbon stocks plus net change in non-CO₂ GHGs where appropriate minus any other GHG emissions resulting from project activities minus any likely project-related unmitigated negative offsite climate impacts.

>> see AR-CDM PDD Section D.1 and table D-0-1 for the ex ante estimate of the actual net GHG removals by sinks.

CL.1.5 Specify how double counting of GHG emissions reductions or removals will be avoided, particularly for offsets sold on the voluntary market and generated in a country with an emissions cap.

>> The net GHG removals generated by the project will be sold on the voluntary market for voluntary purpose. The Host country (China) has no emission cap.

CL.2 Offsite Climate Impacts (“Leakage”) (Required)

CL.2.1 Determine the types of leakage that are expected and estimate potential offsite increases in GHGs (increases in emissions or decreases in sequestration) due to project activities. Where relevant, define and justify where leakage is most likely to take place.

>> See AR-CDM PDD Section D.2

CL.2.2 Document how any leakage will be mitigated and estimate the extent to which such impacts will be reduced by these mitigation activities..

>> See AR-CDM PDD Section E.5.1.

CL.2.3 Subtract any likely project-related unmitigated negative offsite climate impacts from the climate benefits being claimed by the project and demonstrate that this has been included in the evaluation of net climate impact of the project (as calculated in CL1.4).

>> See AR-CDM PDD Section A.9

CL.2.4 Non-CO2 gases must be included if they are likely to account for more than a 5% increase or decrease (in terms of CO2-equivalent) of the net change calculations (above) of the project's overall off-site GHG emissions reductions or removals over each monitoring period.

>> No off-site non-CO2 emissions likely occurs.

CL.3 Climate Impact Monitoring (Required)

CL.3.1 Develop an initial plan for selecting carbon pools and non-CO2 GHGs to be monitored, and determine the frequency of monitoring. Potential pools include aboveground biomass, litter, dead wood, belowground biomass, wood products, soil carbon and peat. Pools to monitor must include any pools expected to decrease as a result of project activities, including those in the region outside the project boundaries resulting from all types of leakage identified in CL2. A plan must be in place to continue leakage monitoring for at least five years after all activity displacement or other leakage causing activity has taken place. Individual GHG sources may be considered 'insignificant' and do not have to be accounted for if together such omitted decreases in carbon pools and increases in GHG emissions amount to less than 5% of the total CO2-equivalent benefits generated by the project. Non-CO2 gases must be included if they are likely to account for more than 5% (in terms of CO2-equivalent) of the project's overall GHG impact over each monitoring period. Direct field measurements using scientifically robust sampling must be used to measure more significant elements of the project's carbon stocks. Other data must be suitable to the project site and specific forest type..

>> Selected carbon pools and non-CO2 GHG to be monitored are presented in table CL.1 and table CL.2 below. The monitor frequency is once every 5 years after the initial monitoring.

Table CL.1 Carbon pools selection

Carbon pools	Accounted for	Justification/Explanation
Above-ground biomass	Yes	Major carbon pool subjected to project activity
Below-ground biomass	Yes	Major carbon pool subjected to project activity
Dead wood	Yes	Carbon stock in this pool is likely to increase in project compared to the baseline.
Litter	Yes	carbon stock in this pool is likely to increase in project compared to the baseline.
Soil organic carbon	Yes	carbon stock in this pool is likely to increase in project compared to the baseline.

Table CL.2 Emission sources and GHGs included in or excluded from accounting

Sources	Gas	Included/excluded	Justification/Explanation
Burning of woody biomass	CO2	Excluded	Carbon stock decreases due to burning are accounted as a change in carbon stock
	CH4	Included	Burning of woody biomass for the purpose of site preparation or as part of forest management can lead to significant levels of emissions of methane
	N2O	Included	Burning of woody biomass for the purpose of site preparation or as part of forest management can lead to significant levels of emissions of nitrous oxide

CL.3.2 Commit to developing a full monitoring plan within six months of the project start date or within twelve months of validation against the Standards and to disseminate this plan and the results of monitoring, ensuring that they are made publicly available on the internet and are communicated to the communities and other stakeholders.

>> See AR-CDM PDD Section E for the full monitoring plan.

IV. Community Section

CM.1 Net Positive Community Impacts (Required)

CM.1.1 Use appropriate methodologies to estimate the impacts on communities, including all constituent socio-economic or cultural groups such as indigenous peoples (defined in G1), resulting from planned project activities. A credible estimate of impacts must include changes in community well-being due to project activities and an evaluation of the impacts by the affected groups. This estimate must be based on clearly defined and defensible assumptions about how project activities will alter social and economic well-being, including potential impacts of changes in natural resources and ecosystem services identified as important by the communities (including water and soil resources), over the duration of the project. The ‘with project’ scenario must then be compared with the ‘without project’ scenario of social and economic well-being in the absence of the project (completed in G2). The difference (i.e., the community benefit) must be positive for all community groups.

>> See AR-CDM PDD Sectopm G.

CM.1.2 Demonstrate that no High Conservation Values identified in G.1.8.4-6 will be negatively affected by the project

>> As described in section G.1.8, the project zone is important for regulating hydrological flows of Yangtze and suffered from severely soil erosion. Reforestation on these degraded lands would enhance hydrological service and soil erosion control, rather than negatively impacted.

As also presented in section G.1.5, most of the communities in the project zone are under the national poverty line. Compared to almost no income under without project scenario, the project will largely increase income of the local communities through employment, timber and non-timber forest products, etc (see AR-CDM PDD section G.1).

As explained in section G.1.8 above, reforestation of degraded barren lands is consistent with and will enhance culture and tradition of local ethnic minority.

CM.2 Offsite Stakeholder Impacts (Required)

CM.2.1 Identify any potential negative offsite stakeholder impacts that the project activities are likely to cause.

>> No potential negative offsite stakeholder impacts have been identified. In contract the project will bring benefits to the offsite communities, e.g., providing additional employment opportunity, improving local environment, controlling soil erosion of the project zone as well as regulating hydrological flow beyond the project zone.

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 Demonstrate that the project is not likely to result in net negative impacts on the well-being of other stakeholder groups.

>> The project does not create any negative social and economic impacts within and 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 economic benefits. The project will also bring offset environmental benefits including improving local environment, controlling soil erosion of the project zone as well as regulating hydrological flow. Therefore, this project will create positive offsite impacts for both the communities within and beyond the project sites.

CM3 Community Impact Monitoring (Required)

CM.3.1 Develop an initial plan for selecting community variables to be monitored and the frequency of monitoring and reporting to ensure that monitoring variables are directly linked to the project's community development objectives and to anticipated impacts (positive and negative).

>> Indicators in table CM.1 and table CM.2 will be applied to assess the changes as a result of implementation of this project.

Table CM.1 Monitoring Indicators for villages

Natural village: _____ Administrative Village: _____ Town/Township: _____
County: _____.

Monitoring Indicators	At the start of project	At the time of monitoring
Number of households		
- Ethnic minority		
- Households in poverty		
- Households with lands within the project		
- Households that benefits from the project		
Population:		
- Ethnic minority		
- In poverty		
- Numbers that benefit from the project		
Income per capita (Yuan)		
Forestation area (ha)		
- Project forestation area (ha)		
Grazing land (ha)		
Number of livestock (head)		
- grazing livestock (head)		
- Livestock in lot (head)		
Road (km)		
Participation of project activities (person-day)		
- Site and soil preparation		
- planting		
- weeding		
- tending		
- forest protection:		
- thinning		
- harvesting		
- other activities		
Participating in training (person-time)		
Income from project employment (Yuan)		
Income from non-timber forest products (Yuan)		
Income from timber products (Yuan)		
Income from carbon credit (Yuan)		
Participating in training (person-time)		
Percentage of households who use fuel wood as main energy source (%)		
Percentage of participation of ethnic minority groups in project activities (%)		
Percentage of women's participating in project		

activities (%)		
Changes in soil erosion in project zone (ha)		
Affected agriculture lands caused from natural disaster (ha)		
Affects on local culture and tradition		

Table CM.2 Monitoring Indicators for Household

Name: _____ Ethnic: _____ Natural Village: _____ Administrative Village: _____
Town/Township: _____ County : _____.

Monitoring Indicators	At the start of project	At the time of monitoring
Per capita income (Yuan)		
fuel wood consumption (ton)		
Number of grazing livestock (head)		
Number of livestock in lot (head)		
Area of lands owned within the project (ha)		
Participation of project activities (person-day)		
- Site and soil preparation		
- planting		
- weeding		
- tending		
- forest protection:		
- thinning		
- harvesting		
- other activities		
Income from project employment (Yuan)		
Income from non-timber forest products (Yuan)		
Income from timber products (Yuan)		
Income from carbon credit (Yuan)		
Participating in training (person-time)		
Soil erosion in the project area		
Comments and concerns:		

CM.3.2 Develop an initial plan for how they will assess the effectiveness of measures used to maintain or enhance High Conservation Values related to community well-being (G1.8.4-6) present in the project zone.

>> Indicators relevant to community-related HCVs have been included in Section CM.3.1 above and these indicators will be monitored (see Section CM.3.3 below)

CM.3.3 Commit to developing a full monitoring plan within six months of the project start date or within twelve months of validation against the Standards and to disseminate this plan and the results of monitoring, ensuring that they are made publicly available on the internet and are communicated to the communities and other stakeholders.

>> As the Chinese government organizes nationwide annual statistical surveys on the demography, economics, production and livelihood, medical care, education and transport activities, using bottom-up approach from household interview in each village to statistics at village, town/township, county, city, provincial and national level. The survey will basically cover all the project communities. Therefore, the annual village statistic data will be used directly for the communities monitoring.

Meanwhile, to in-depth track the socio-economic changes resulted from the project activities in the rural communities and households, and understand issues raised and difficulties encountered during the project implementation, as well as their opinions and comments on the project activities, so as to adjust and improve the project activities in a timely manner, a PRA process will be conducted once every five years (at the same time of the climate impact monitoring), as described below.

Procedures:

- a) **Establishing PRA team:** The teams will be set up to conduct the PRA process, which consists of social experts, project officers, local government officials and technical staff with various background (forestry, sociology and ecology) from county forestry bureaus and township forestry posts;
- b) **Developing SOPs for the field PRA process;**
- c) **Training:** A training workshop will be held for discussing and training of PRA teams in order to ensure all PRA members fully understand the purposes, contents, procedures and specific methods of the PRA field survey;
- d) **Preparation:** Developing detail PRA field survey plan including responsibility of each member of PRA team; and contacting with relevant project counties, nature reserves, forestry farms, towns/townships and local NGOs and informing them PRA plan.
- e) **PRA survey:** conducting PRA survey following SOPs.

Methods

- a) **Village meeting:** A meeting of farmer representatives will held in villages sampled. The general agenda are:
 - (i) Introducing PRA team members and the purpose, procedures, methods and time schedules of the PRA process;
 - (ii) Explaining the way of villagers' participation;
 - (iii) Collecting information regarding the project progress, social-economic and environmental benefits shared from the projects, existing problems/difficulties encountered by local communities during the project implementation, as well as comments and suggestions on improvement of the project.
- b) **Semi-structured interviews:** This includes VIP interview, farmer household interview and group interview
 - (i) Interviewing of VIP: including villager leaders, distinguished villagers, elder villagers and head of ethnic minority.

- (ii) Interviewing of household: Some farmer households will be selected for the interview. The interviewed households shall cover rich household, poor household, new inhabitant household, etc.
- (iii) Group interview: Villagers are grouped based on gender, age classes or land use types. The group interviews were conducted together with village meeting.
- c) **Questionnaire:** Questionnaire forms will be developed and distributed among different stakeholders, including farmer households, village committees, forest farms, township governments, local forest stations and forestry bureaus and nature reserves.

V. Biodiversity Section

B.1. Net Positive Biodiversity Impacts (Required)

B.1.1 Use appropriate methodologies to estimate changes in biodiversity as a result of the project in the project zone and in the project lifetime. This estimate must be based on clearly defined and defensible assumptions. The 'with project' scenario should then be compared with the baseline 'without project' biodiversity scenario completed in G2. The difference (i.e., the net biodiversity benefit) must be positive.

>> See AR-CDM PDD Section A.5.2 and Section F.1.

B.1.2 Demonstrate that no High Conservation Values identified in G1.8.1-348 will be negatively affected by the project.

>> 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 (see AR-CDM PDD Section A.5.2).

B.1.3 Identify all species to be used by the project and show that no known invasive species will be introduced into any area affected by the project and that the population of any invasive species will not increase as a result of the project.

>> All the tree species as listed in Section G.3.4 above are native to local. These species have been selected through community participation and none of them belongs to invasive species.

B.1.4 Describe possible adverse effects of non-native species used by the project on the region's environment, including impacts on native species and disease introduction or facilitation. Project proponents must justify any use of non-native species over native species..

>> No invasive species will be used in the project.

B.1.5 Guarantee that no GMOs will be used to generate GHG emissions reductions or removals.

>> All seedlings used in the proposed project activities will be bred in local nurseries using seed

collected from local seed orchard or parent trees. No GMOs will be used in the project.

B2 Offsite Biodiversity Impacts (Required)

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

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

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

>> No potential 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 potential 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 Develop an initial plan for selecting biodiversity variables to be monitored and the frequency of monitoring and reporting to ensure that monitoring variables are directly linked to the project's biodiversity objectives and to anticipated impacts (positive and negative).

>> 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.

Flora

5 randomly selected sub-plots (2m×2m) within permanent sampling plots for carbon stock change monitoring will be used to monitor the species, population, coverage density or abundance, and frequency (table B.1) to assess the changes of plant diversity, and the following evaluation index will be used:

Simpson's diversity index, D

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

Where N_i is the population of species i , N is the total population of all plants in the sample plot.

Shannon-Weiner index, H

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

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

Table B.1 Field Monitoring Template for Flora Sample Plots

- (1) **Location:** ___Village___Town/township___County
 ___Compartment ___Sub-compartment; GPS Coordinates: Longitude _____,
 Latitude _____.
- (2) **Serial No. of sample plot:** _____, area of sample plot: ___m²;
- (3) **Landform and physiognomy: physiognomy:** _____ altitude: ___; slope aspect: ___; degree
 of slope :___;location of slope:
- (4) **Type of vegetation** _____; **species:**__ (filling in the following table)
- (5) **Traces of wild animals** (including footmarks, dejecta, caves and footprints of rodent animals
 and etc):_____;
- (6) **The status that rodent animals damage to the project land:** _____.

Serial No.	shrub				herbage			
	Name	Number (plants/clump)	Average height (m)	Average coverage (%)	Name	Number (plants/clump)	Average height (m)	Average coverage (%)
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

Surveyor: _____ **date:** _____

Fauna

Based on the wild animal baseline survey, and the types and numbers of wild animals and their features that are closely related to the flora, typical and permanent sample strips will be selected from different vegetation types. The selected sample strips should meet the criterion of typical, permanent and practical, so as to ensure the comparability of the data, and to realize the long-term and precise monitoring of the distribution and changes of the wild animals in the project areas.

Under the help of GPS, surveyors move along with the route used for wild animal baseline survey at a speed of 1.5-2 km per hour, and record the findings on the way. The record include the species and numbers of animals, the sound of howl/chirp, remnants, traces and etc., and the distance and angles between the recorded place and the place that animals are appeared, should be also recorded (table B.2 below). Special attention should be put on the selected monitoring species.

V. Golden Level Section

GL.1 Climate Change Adaptation Benefits (Optional)

GL.1.1 Identify likely regional climate change and climate variability scenarios and impacts, using available studies, and identify potential changes in the local land-use scenario due to these climate change scenarios in the absence of the project

>> Based on the second National Assessment Report of Climate Change in China⁵, the mean air temperature in China increased by 0.5-0.8⁰C per 100 years since 1880, and it was 0.23 ⁰C per 10 years from 1951 to 2009. There was no significant change of precipitation in China in last 50 years. The magnitude and trend of climate changes vary with geographical area. The warming in South China is much less than North China. Since 1951 the mean air temperature increased by 0.37 ⁰C per 10 years in the Northwest China, 0.30⁰C per 10 years in the Northeast China and 0.22 ⁰C per 10 years in the North China, while it was 0.12-0.16⁰C per 10 years in the Central and South China. At the same time, annual precipitation in the North and Northeast China decreased gradually, showing an apparent increasing trend of temperature and aridity. The intensity and frequency of extreme climatic events (heatwave, snowstorm, rainstorm, drought, etc) increased significantly. Especially in the Southwest China, disasters such as extreme drought, rainstorm, snowstorm and landslide accounted for 30-40 per cent of the national total. In the north part of China, drought is the dominant climatic disaster.

By the end of the 21st century, mean air temperature in China will increase by 2.5-4.6 ⁰C, more significant than global changes. No significant change of precipitation in South China is expected but intensity and frequency of rainstorm is expected to increase significantly.

Since 1961, the mean annual temperature in the project counties increased, particularly in last 20 years. The mean annual temperature increased by 0.31⁰C and 0.52⁰C in 1990s and early this century, respectively. There is no significant change in precipitation (Figure V.1). This indicates a more arid trend in the project area.

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 landslide that may not likely occur in a century. Extreme drought occurred in 2006 and 2010, and in-between extreme snow/ice storm occurred in the winter 2007-2008. Local governments have made records and conducted 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.

It was projected that compared to current situation, the mean annual temperature in the project counties will increase by 2.5⁰C and 4.4⁰C by 2050 and 2100, and the annual precipitation will increase by 8mm and 36mm (Figure V.2 and Figure V.3).

⁵ The Editorial Board of the Second National Assessment Report of Climate Change in China. 2011. The Second National Assessment Report of Climate Change in China. Chinese Science Press

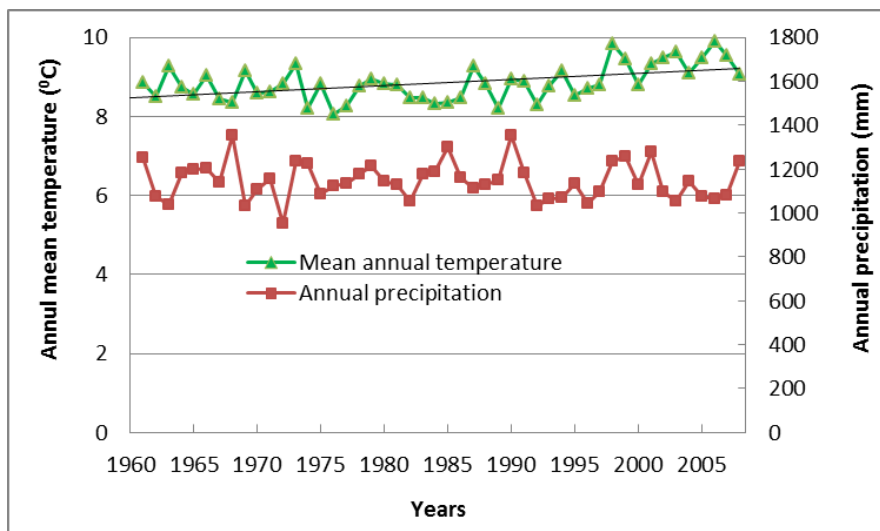


Figure V.1 Changes in temperature and precipitation in last 50 years⁶

⁶ Derived from: Xu Y, Gao X J, Shen Y, et al. 2009. A daily temperature dataset over China and its application in validating a RCM simulation. *Adv Atmos Sci.*, 26 (4): 763–772. Xie P P, Yatagai A, Chen M Y, et al. 2007. A gauge-based analysis of daily precipitation over East Asia. *J Hydrol.* 8 (3): 607–626.

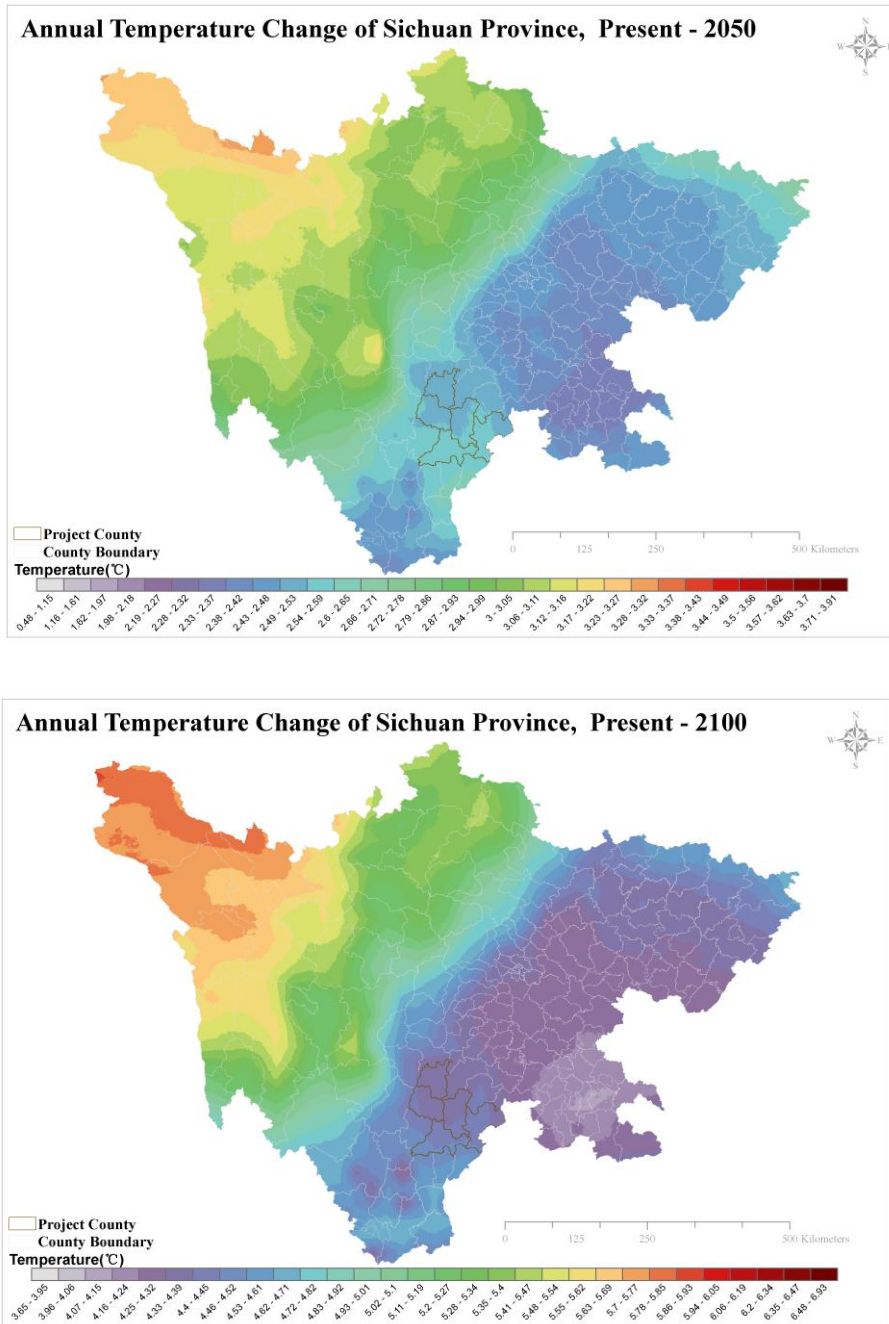


Figure V.2 Changes in temperature in project counties in 2050 and 2100 as compared to present⁷

⁷ Data sources: Gao X J, Shi Y, Zhang D F, et al. 2011. Uncertainties in monsoon precipitation projections over China: results from two high resolution RCM simulations. Climate Res., Submitted. Gao, X.J., Shi, Y., Zhang, D.F., Giorgi, F. A high resolution climate change simulation of the 21st century over China by RegCM3. China Science (in press)

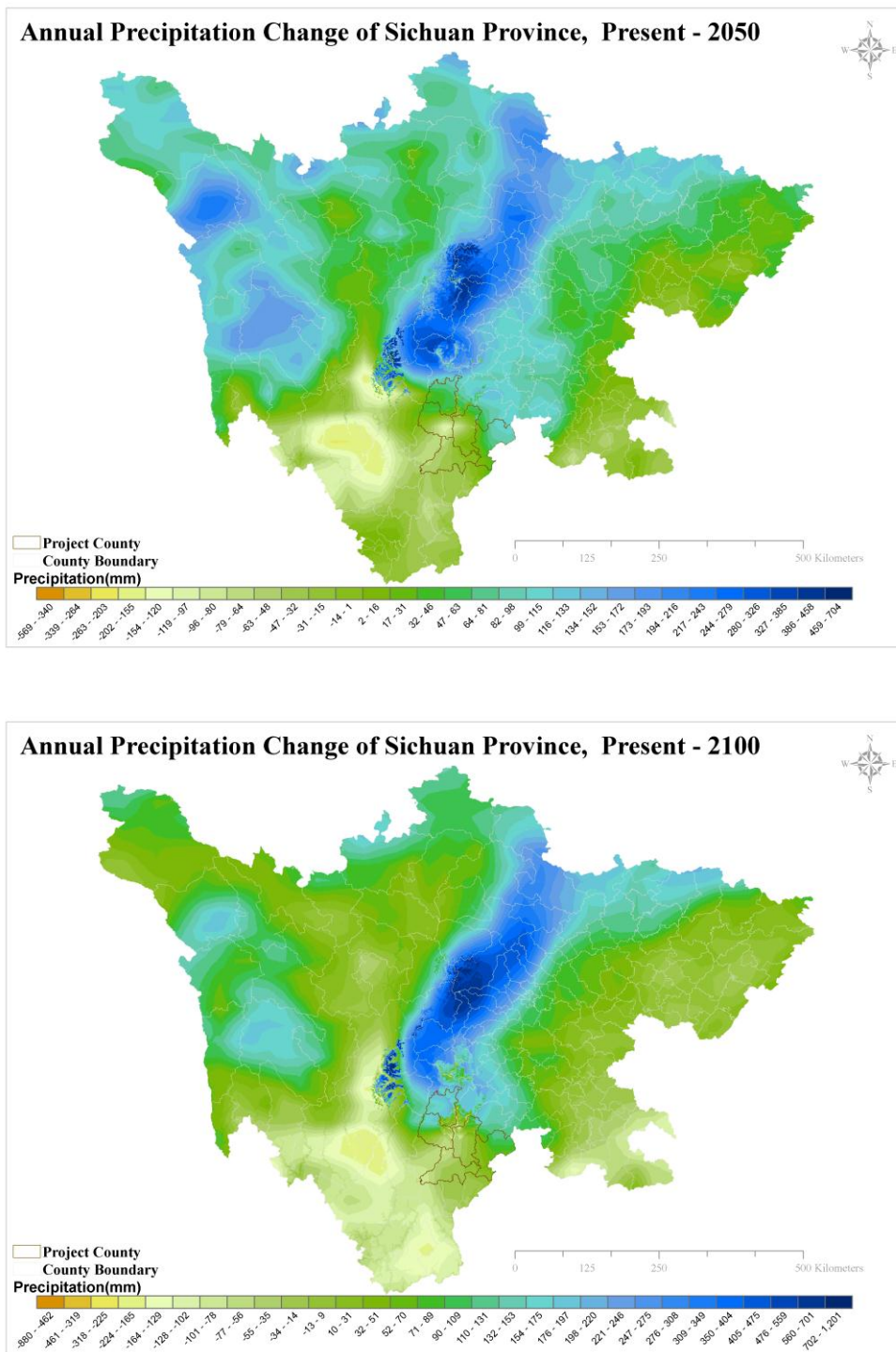


Figure V.3 Changes in precipitation in the project counties in 2050 and 2100 as compared to present⁷

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GL.1.2 Identify any risks to the project's climate, community and biodiversity benefits resulting from likely climate change and climate variability impacts and explain how these risks will be mitigated.

>> Identified risks to the project's climate, community and biodiversity benefits resulting from likely climate change and climate variability impacts include:

- Extreme drought may negatively impact the survival rate of young trees, plantation productivity (growth rate and timber output) , and increase fire risk and pest risk of forest to be implemented;
- Extreme snow/ice storm may reduce growth rate of forests, even damage forests to be planted;
- Increasing temperature and aridity may increase forest fire and pest risks.

During the project development, 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, have been conducted. We come to understand that such natural disasters as landslide, draughts and floods, and snow/ice storms, etc., as a result of extreme climatic changes, are the critical factors that can affect the project implementation and its benefits. Countermeasures against these risks include:

- Those native tree species that are most adaptable to local climatic, soil, water and temperature conditions will be chosen for the forestation.
- Primary forests that share the same conditions as those in the project zone 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.
- According to site conditions, tree species will be planted in pattern of mixed patches to enhance soil and water conservation, mitigate fire and disease risk.
- During planting operations, minimal-disturbance planting pits will be prepared. Neither slash-and-burn nor full-tillage will be applied to avoid damaging primary vegetation. No canals will be opened and gravity irrigation will not be applied 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.

GL.1.3 Demonstrate that current or anticipated climate changes are having or are likely to have an impact on the well-being of communities and/or the conservation status of biodiversity in the project zone and surrounding regions.

>> See AR-CDM PDD Section A.5.2 and Section F.1.

The increasing extreme weathers and aridity may 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

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GL.1.4 Demonstrate that the project activities will assist communities and/or biodiversity to adapt to the probable impacts of climate change.

>> Correspondingly, countermeasures against these issues have been taken to minimize such negative impacts, such as:

- Most of the project areas are located within or surrounding the nature reserves, forestation of these degraded barren using native species will enhance the connectivity of forest ecosystems and habitats of wildlife, as a result will enhance adaptation of biodiversity to climate change impacts.

GL.2 Exceptional Community Benefits (Optional)

GL.2.1 Demonstrate that the project zone is in a low human development country OR in an administrative area of a medium or high human development country in which at least 50% of the population of that area is below the national poverty line.

>> See AR-CDM PDD Section A.5.2 and Section F.1.

GL.2.2 Demonstrate that at least 50% of households within the lowest category of well-being (e.g., poorest quartile) of the community are likely to benefit substantially from the project.

>> See AR-CDM PDD Section A.5.2 and Section F.1.

GL.2.3 Demonstrate that any barriers or risks that might prevent benefits going to poorer households have been identified and addressed in order to increase the probable flow of benefits to poorer households.

>> See AR-CDM PDD Section A.5.2 and Section F.1.

GL.2.4 Demonstrate that measures have been taken to identify any poorer and more vulnerable households and individuals whose well-being or poverty may be negatively affected by the project, and that the project design includes measures to avoid any such impacts. Where negative impacts are unavoidable, demonstrate that they will be effectively mitigated.

>> See AR-CDM PDD Section A.5.2 and Section F.1.

GL.2.5 Demonstrate that community impact monitoring will be able to identify positive and negative impacts on poorer and more vulnerable groups. The social impact monitoring must take a differentiated approach that can identify positive and negative impacts on poorer households and individuals and other disadvantaged groups, including women.

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>> See AR-CDM PDD Section A.5.2 and Section F.1.

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GL.3 Exceptional Biodiversity Benefits (Optional)

GL.3.1 Vulnerability.

>> Regular occurrence of a globally threatened species (according to the IUCN Red List) at the site:

1.1. Critically Endangered (CR) and Endangered (EN) species - presence of at least a single individual; or

1.2. Vulnerable species (VU) - presence of at least 30 individuals or 10 pairs..