

QIANBEI AFFORESTATION PROJECT



Document Prepared By Shanghai Libra Investment & Management Co., Ltd

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GHG Accounting/ Crediting Period	01-January-2016 ~ 31-December-2044; A total period of 29 years
Monitoring Period of this Report	01-January-2022 ~ 31-December-2022
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Gold Level Criteria	N/A

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1 SUMMARY OF PROJECT BENEFITS

1.1 Unique Project Benefits

Outcome or Impact	Achievements during the Monitoring Period	Section Reference	Achievements during the Project Lifetime
1) Improve local production conditions and ecological environment, enhance the quality of life, create a good investment and development environment and play a leading and demonstration role.	During the fourth monitoring period, because of the continuous and healthy growth of 50,061 hectares of trees, the air quality around the forest land has been improved, and due to the indirect impact and secondary effects of the project implementation, the soil quality of the agricultural land with poor soil environment beside the forest land has also been improved. By planting some cash crops to bring additional economic income can help to improve the living conditions of local villagers. These crops are native to the ecosystem which means their presence is the result of naturally occurring acts before the project implementation and these crops does not affect and disturb the ecosystem.	5.2	Forests have improved local soil environment and climatic conditions. Increased rainfall and improved soil brought more types of crops and their growth were faster than before. These endeavors are good for the improvement of ecological environment and economic development of the entire village. At the same time, a stable and good living environment has been created for the villagers.
2)Improved biodiversity	During the monitoring period, there were 12 species of animals and plants were discovered. Among these 12 species, there were 7 species of	5.3	Through the development of the project, the biodiversity of the project area was improved, so that more and more kinds of animals and plants could be reproduced and inhabited.

	animals and 5 species of plants. The aforementioned result is the manifestation of achievements since the implementation of this project help boost biodiversity by providing animals and plants with the ideal habitat.		
3) Provide experience of forest planting and management in Karst region.	Due to the serious soil erosion in karst area and the lack of technology and management experience, it is difficult to plant trees. During the monitoring period, some experiences in afforestation and management in planting China fir, Cypresses, Pinus yunnanensis and Masson pine in the areas of Karst were accumulated.	5.2	Accumulated experience of forest planting and management in Karst areas.
4) Improve the climate and prevent natural disasters.	During the monitoring period, the natural disasters such as mudslides and floods have been reduced.	4.1	The growth of trees builds a forest, which conserve water and soil, prevent flood and drought, sandstorm and dust to avoid a series of natural disasters.
5) Raise the status of women	During the implementation of the project, a total of 110 villagers were employed as the technicians, among them women accounted for 55%. Female workers were participating in the project monitoring to gain the working experience and their social status were also raised.	2.3	Through the project, women were encouraged and invited to participate in both tree planting activities and monitoring activities. Employment opportunities and training courses were also provided, which raised the women's social status in local communities

1.2 Standardized Benefit Metrics

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
GHG emission reductions & removals	Net estimated emission removals in the project area, measured against the without-project scenario	699,033tCO ₂ e	3.2.4	2,753,915 tCO ₂ e ¹
	Net estimated emission reductions in the project area, measured against the without-project scenario	N/A	N/A	N/A
Forest ² cover	For REDD ³ projects: Number of hectares of reduced forest loss in the project area measured against the without-project scenario	N/A	N/A	N/A
	For ARR ⁴ projects: Number of hectares of forest cover increased in the project area measured against the without-project scenario	1 st MP: 50,061Ha 2 nd MP: 0Ha 3 rd MP: 0Ha 4 th MP: 0Ha ⁵	2.1	50,061Ha
Improved land management	Number of hectares of existing production forest land in which IFM ⁶ practices have occurred as a result of the project's activities, measured against the without-project scenario	N/A	N/A	N/A
	Number of hectares of non-forest land in which improved land management has occurred as a result of the	N/A	N/A	N/A

¹ Achievement during the Project Lifetime: The emission reduction is the first monitoring period (01-January-2016 to 31-December-2019) plus the emission reduction of the second monitoring period (01-January-2020 to 31-December-2020) plus the emission reduction of the third monitoring period (01-January-2021 to 31-December-2021) and this monitoring period. It is calculated as 2,753,915 tCO₂e=930,831 tCO₂e+507,101tCO₂e+616,950tCO₂e+699,033tCO₂e.

² Land with woody vegetation that meets an internationally accepted definition (e.g., UNFCCC, FAO or IPCC) of what constitutes a forest, which includes threshold parameters, such as minimum forest area, tree height and level of crown cover, and may include mature, secondary, degraded and wetland forests (*VCS Program Definitions*)

³Reduced emissions from deforestation and forest degradation (REDD) - Activities that reduce GHG emissions by slowing or stopping conversion of forests to non-forest land and/or reduce the degradation of forest land where forest biomass is lost (*VCS Program Definitions*)

⁴Afforestation, reforestation and revegetation (ARR) - Activities that increase carbon stocks in woody biomass (and in some cases soils) by establishing, increasing and/or restoring vegetative cover through the planting, sowing and/or human-assisted natural regeneration of woody vegetation (*VCS Program Definitions*)

⁵ Compared to the first monitoring period, there is no newly-added forest coverage in this monitoring period. Therefore, the value is 0.

⁶Improved forest management (IFM) - Activities that change forest management practices and increase carbon stock on forest lands managed for wood products such as saw timber, pulpwood and fuelwood (*VCS Program Definitions*)

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
	project's activities, measured against the without-project scenario			
Training	Total number of community members who have improved skills and/or knowledge resulting from training provided as a part of project activities	110 long-term, part time technicians	2.3	16,339 temporary planting workers ⁷ and 110 long-term, part time technicians ⁸
	Number of female community members who have improved skills and/or knowledge resulting from training provided as part of project activities of project activities	60 long-term, part time technicians	2.3	11,437 temporary planting workers and 60 long-term, part time technicians
Employment	Total number of people employed in of project activities, ⁹ expressed as number of full time employees ¹⁰	110 long-term, part time technicians	2.3	16,339 temporary planting workers and 110 long-term, part time technicians
	Number of women employed in project activities, expressed as number of full time employees	60 long-term, part time technicians	2.3	11,437 temporary planting workers and 60 long-term, part time technicians
Livelihoods	Total number of people with improved livelihoods ¹¹ or income generated as a result of project activities	110 long-term, part time technicians	2.3	16,339 temporary planting workers and 110 long-term,

⁷ The temporary planting period of the project is from 30-April-2015 to 17-October-2017. Temporary planting period is not involved in this monitoring period. However, since the temporary planting workers are also the villagers who own forest land tenure of this project, they are also included during this monitoring period. According to the Carbon Sink Cooperation Agreement, 60% of carbon profits will be distributed to villagers who own forest land tenure of this project.

⁸ Due to the implementation of the project, the local forest area has increased, and the original number of technicians is not enough to meet the new forest management and protection work. Therefore, the Forestry Bureau has hired 110 technicians as forestry technical management and protection personnel. Their main job is to complete the task of forest management and maintenance designated by the local Forestry Bureau, with a salary of CNY 200 per month. On the other hand, because the project is a carbon sink project, it is necessary to carry out tree monitoring, field survey, daily communication with villagers and form a feedback mechanism with PP, so Guizhou Xinzhanxin hired the above 110 technicians as long-term and part-time project monitoring technicians, and paid an additional salary of CNY 200 per month.

⁹ Employed in project activities means people directly working on project activities in return for compensation (financial or otherwise), including employees, contracted workers, sub-contracted workers and community members that are paid to carry out project-related work.

¹⁰ Full-time equivalency is calculated as the total number of hours worked (by full-time, part-time, temporary and/or seasonal staff) divided by the average number of hours worked in full-time jobs within the country, region or economic territory (adapted from UN System of National Accounts (1993) paragraphs 17.14[15.102];[17.28])

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
				part time technicians
	Number of women with improved livelihoods or income generated as a result of project activities	60 long-term, part time technicians	2.3	11,437 temporary planting workers and 60 long-term, part time technicians
Health	Total number of people for whom health services were improved as a result of project activities, measured against the without-project scenario	N/A	N/A	N/A
	Number of women for whom health services were improved as a result of project activities, measured against the without-project scenario	N/A	N/A	N/A
Education	Total number of people for whom access to, or quality of, education was improved as a result of project activities, measured against the without-project scenario	N/A	N/A	N/A
	Number of women and girls for whom access to, or quality of, education was improved as a result of project activities, measured against the without-project scenario	N/A	N/A	N/A
Water	Total number of people who experienced increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	N/A	N/A	N/A
	Number of women who experienced increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	N/A	N/A	N/A

¹¹Livelihoods are the capabilities, assets (including material and social resources) and activities required for a means of living (Krantz, Lasse, 2001. *The Sustainable Livelihood Approach to Poverty Reduction*. SIDA). Livelihood benefits may include benefits reported in the Employment metrics of this table.

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
Well-being	Total number of community members whose well-being ¹² was improved as a result of project activities	110 long-term, part time technicians	2.3	16,339 temporary planting workers and 110 long-term, part time technicians
	Number of women whose well-being was improved as a result of project activities	60 long-term, part time technicians	2.3	11,437 temporary planting workers and 60 long-term, part time technicians
Biodiversity conservation	Change in the number of hectares significantly better managed by the project for biodiversity conservation, ¹³ measured against the without-project scenario	50,061	5.2	50,061
	Number of globally Critically Endangered or Endangered species ¹⁴ benefiting from reduced threats as a result of project activities, ¹⁵ measured against the without-project scenario	1 ¹⁶	5.2	1

¹²Well-being is people's experience of the quality of their lives. Well-being benefits may include benefits reported in other metrics of this table (e.g. Training, Employment, Health, Education, Water, etc.), but could also include other benefits such as empowerment of community groups, strengthened legal rights to resources, conservation of access to areas of cultural significance, etc.

¹³ Biodiversity conservation in this context means areas where specific management measures are being implemented as a part of project activities with an objective of enhancing biodiversity conservation.

¹⁴Per IUCN's Red List of Threatened Species

¹⁵In the absence of direct population or occupancy measures, measurement of reduced threats may be used as evidence of benefit

¹⁶ The one endangered species, what inhabited in the project area, was not found during the monitoring period, but some specific measures have been adapted to reduce the threat of human and nature to the endangered species: 1. Increase publicity efforts in various communities to prevent illegal hunting activities 2. Give proper consideration to the establishment of breeding ranches for the endangered species; 3. Preach the protection of the endangered species to local villagers, and how to rescue them if they encounter endangered species; 4. Further strengthen the requirements for the work of technicians and pay attention when inspecting forests. Intensity of inspections of habitats for the endangered species.

2 GENERAL

2.1 Project Description

2.1.1 Implementation Description

Until the end of this monitoring period (December 2022), the planted trees grew well and healthily. The local species China fir (*Cunninghamia lanceolata* (Lamb.) Hook.), Cypresses (*Cupressus funebris* Endl.), *Pinus yunnanensis*¹⁷ and Masson pine (*Pinus massoniana* Lamb.) are selected for afforestation because of their prominent characters in Karst rocky desertification areas due to their fast growth rate, shallow rooting and strong adaptability to poor soil conditions. These species are especially suitable for Afforestation in limestone mountainous areas of subtropical monsoon climate zone. Since planting trees, there was no natural disaster. Because of good forestry practice, the percentage of forest coverage rate has increased in the project area, as well as mitigating the impacts of rocky desertification and climate change expanding habitat for flora and fauna in the project area. During this monitoring period, no events affecting emission reduction and monitoring occurred in the project area.

All risk factors have been monitored and managed (According to the registered PD, leakage is considered to be zero for this project. Thus, there is no need to manage the leakage.):

For non-permanence risk factors, during the monitoring period, all the technicians were doing regular forest inspection monthly, especially strictly checked the stranger who entered into the forest; In the fire-prone season, they were doing forest inspection every day, preventing all sources of fire from entering into forest. If there are any emergencies, they will inform the superior leadership and project contact person of Guizhou Xinzhanxin Agricultural Technology Co., Ltd. (hereinafter referred to as Guizhou Xinzhanxin) at once and stay where the emergency happens until anyone come for help.

Strictly obeying the Forest Management Manual, technicians inspect the occurrence of diseases and insect pests in spring and autumn and use insecticides and pesticides according to the national standards.

-There have not been any regular pests that have damaged the forest.

-There have not been any fires that have damaged the forest.

-There have not been any climatic disasters (floods, droughts, tornadoes, frosts, etc.) that have damaged the forest.

-There have not been any earthquakes.

¹⁷ The local name of *Pinus yunnanensis* is consistent with its scientific name.

The detailed results of the monitoring and evaluation were summarized in the relevant non-permanence risk report.

The GHG emissions reduction generated are 699,033 tCO₂e from 01-January-2022 to 31-December-2022.

There are no changes in the Project Proponent, Project Owner, Landowner and other entities.

2.1.2 Project Category and Activity Type

The project is developed under VCS scope 14 'Agriculture, Forestry and Other Land Use (AFOLU)' with a project category of Afforestation, Reforestation and Revegetation (ARR). The project is not a grouped project.

2.1.3 Project Proponent (s)

Organization name	Guizhou Xinzhanxin Agricultural Technology Co., Ltd.
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2.1.4 Other Entities Involved in the Project

Organization name	Shanghai Libra Investment & Management Co., Ltd
Role in the project	Consultants
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2.1.5 Project Start Date (G1.9)

According to VCS standard v4.4, the project start date is the date on which activities that lead to the generation of GHG emission reductions or removals are implemented, for this project, the project start date is 30-April-2015 when the planting started.

2.1.6 Project Crediting Period (G1.9)

The project crediting period is 29 years from 01-January-2016 to 31-December-2044¹⁸, and the project lifetime is 30 years from 30-April-2015 to 29-April-2045.

The fourth monitoring period is from 01-January-2022 to 31-December-2022.

2.1.7 Project Location

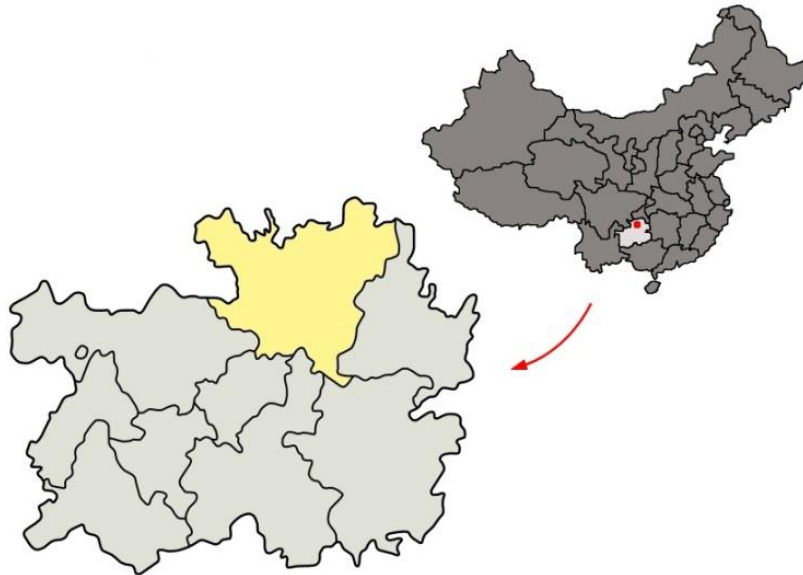
The project is located in Zunyi City, including 1 district and 7 counties: Bozhou district, Tongzi county, Suiyang county, Zheng'an county, Daozhen county, Wuchuan county, Meitan county, Xishui county. The geographical coordinates of the project are between 105°50' and 107°41' east longitude and between 25°06' and 29°13' north latitude

The location of the project zone in Guizhou Province is illustrated in map 01. Project zone the 1 district and 7 counties are illustrated in map 02, and the location of the Project Zone (blue shadow) and Project Area illustrated in map 03. The geographical coordinates of the project zone are listed below.

Table 1 Geographical Coordinates of the Project Activity in Zunyi city

	East longitude	North latitude
Zunyi city	105°50'-107°41'	25°06'-29°13'
Bozhou District	106°17'-107°26'	27°13'-28°04'
Tongzi County	106°26'-107°17'	27°57'-28°54'
Suiyang County	106°57'-107°31'	27°49'-28°49'
Zheng'an County	107°04'-107°41'	28°09'-27°51'
Daozhen County	107°21'-107°26'	28°36'-29°13'
Wuchuan County	107°30'-108°13'	28°10'-29°05'
Meitan County	107°15'-107°41'	27°20'-28°12'
Xishui County	105°50'-106°44'	25°06'-28°50'

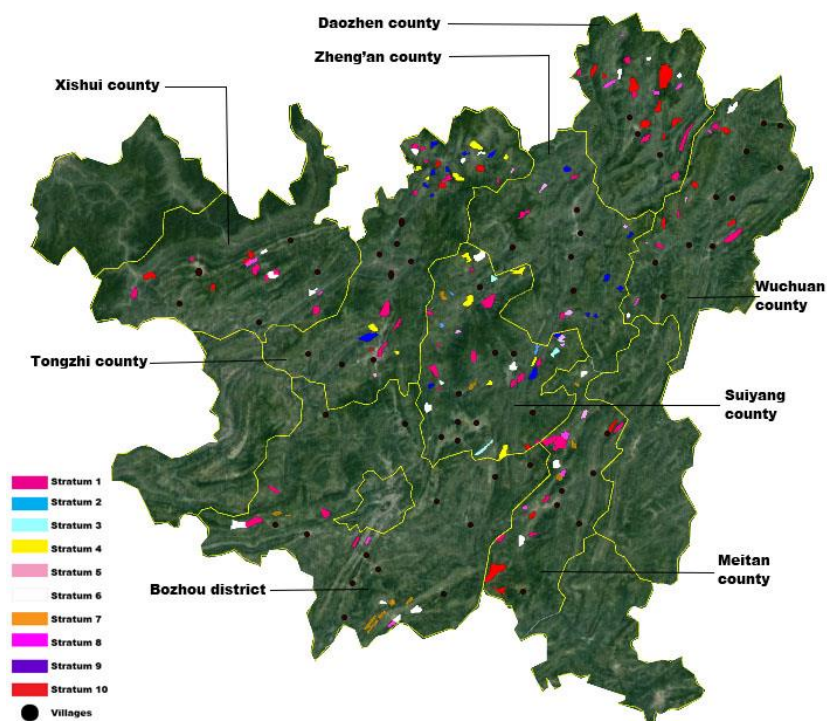
¹⁸ Due to the special requirements of the buyer of the project on the generation time of the project emission reduction, the emission reduction from 30-April-2015 to 31-December-2015 has been determined to be abandoned in the project registration stage. Therefore, the crediting period of the registered PD is from 01-January-2016 to 31-December-2044. In the project verification stage, according to the conservative principle, from the first monitoring period, the emission reduction calculated in MR is the total emission reduction generated by the project minus the emission reduction generated from 30-April-2015 to 31-December-2015. The emission reductions from 30-April-2015 to 31-December-2015 are 32,100 tCO₂ which is calculated based on the height and DBH of the trees in the project measured in January 2016. The specific calculation is reflected in the ER table for the 1st, 2nd and 3rd monitoring periods.



Map 01: Location of the Project Zone 'Zunyi city' in map of Guizhou Province, China.



Map02: Location of the Project zone, Bozhou district, Tongzi county, Suiyang county, Zheng'an county, Daozhen county, Wuchuan county, Meitan county, Xishui county in Zunyi City



Map 03: Project Zone and Project Area.

In Map 03, the pink areas within the boundaries of Bozhou district, Tongzhi county, Suiyang county, Zheng'an county, Daozhen county, Wuchuan county, Meitan county and Xishui county represent the 50 villages involved in the project. In this area, China fir is the main species planted in 2015 that is indicated the stratification of Pro-1.

The blue areas within the boundaries of Suiyang county and Tongzhi county represent the 11 villages involved in the project. In this area, China fir is the main species planted in 2016 that is indicated the stratification of Pro-2.

The light blue areas within the boundaries of Bozhou district and Meitan county and Suiyang county represent the 11 villages involved in the project. In this area, China fir is the main species planted in 2017 that is indicated the stratification of Pro-3.

The yellow areas within the boundaries of Suiyang county represent the 4 villages involved in the project. In this area, Cypress is the main species planted in 2015 that is indicated the stratification of Pro-4.

The light pink areas within the boundaries of Tongzhi county, Suiyang county, Zheng'an county, Wuchuan county, Meitan county represent the 8 villages involved in the project. In this area, Cypress is the main species planted in 2016 that is indicated the stratification of Pro-5.

The white areas within the boundaries of Bozhou district, Daozhen county, Wuchuan county, Meitan county and Xishui county represent the 13 villages involved in the project. In this area, Cypress is the main species planted in 2017 that is indicated the stratification of Pro-6.

The khaki areas within the boundaries of Suiyang county represent the 3 villages involved in the project. In this area, Pinus yunnanensis is the main species planted in 2015 that is indicated the stratification of Pro-7.

The pinkish purple areas within the boundaries of Bozhou district, Tongzi county, Suiyang county, Daozhen county, Wuchuan county, Meitan county and Xishui county represent the 24 villages involved in the project. In this area, Pinus yunnanensis is the main species planted in 2016 that is indicated the stratification of Pro-8.

The purple areas within the boundaries of Tongzi county, Suiyang county and Zheng'an county represent the 18 villages involved in the project. In this area, Pinus yunnanensis is the main species planted in 2017 that is indicated the stratification of Pro-9.

The red areas within the boundaries of Tongzi county, Suiyang county, Daozhen county, Wuchuan county, Meitan county and Xishui county represent the 27 villages involved in the project. In this area, Masson pine is the main species planted in 2015 that is indicated the stratification of Pro-10.

2.1.8 Title and Reference of Methodology

Consolidated afforestation and reforestation baseline and monitoring methodology AR-ACM0003/Version 2.0.0 'Afforestation and reforestation of lands except wetlands' is applied.

<http://cdm.unfccc.int/methodologies/DB/C9QS5G3CS8FW04MYXXDFOQDPXWM4OE>

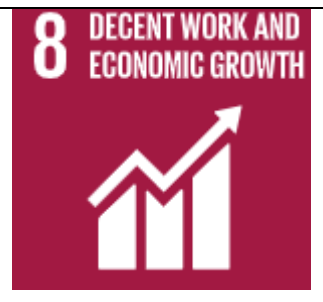
The following methodological tools, to which the selected methodology refers to, are used:

- Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities (Version 01)
- Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities (Version 01.0)
- Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities (Version 04.2).
- Calculation of the number of sample plots for measurements within A/R CDM project activities' (Version 02.1.0)

2.1.9 Other Programs (G5.9)

The project was not involved in other emission trading programs or any other mechanism that includes GHG allowance trading. The project has not sought or received another form of GHG-related environmental credit. The project was not registered under any other GHG programs.

2.1.10 Sustainable Development

		The implementation of the project provides employment to both women and men without any restrictions. Both male and female employees play their part in the afforestation project. The benefits concerning the female group is closely monitored during this monitoring period. For more information, please refer to Section 4.
		The project has generated decent employment through formal recruiting. To date, the project has provided 110 full-time and long-term job opportunities. The benefits concerning the employee are monitored. For specific information, please refer to Section 4.
		Afforestation remains to be one of the most effective means of tackling climate change. During this monitoring period, the project has removed 699,033 tCO₂e of GHG emissions.
		Afforestation helps to ensure that wildlife remains preserved in the region. Therefore, for this reason, afforestation helps to preserve wildlife and preventing them from becoming endangered and extinct. During this monitoring period, increase in animal and plant species has been witnessed.

2.2 Project Implementation Status

2.2.1 Implementation Schedule (G1.9)

Date	Milestone(s) in the project's development and implementation
17-September-2014	The baseline survey was started.
10- January-2015	The Project Design for Afforestation Operation in 2015 was finished.

19- January-2015	The afforestation project design in 2015 was approved by Zunyi City Forest Bureau.
17-February-2015	Biodiversity survey report of the project was completed.
26-February-2015	Participatory Rural Appraisal (PRA) report of the project was completed.
30-April-2015	Planting trees was started.
01-January-2016	Start date of crediting period
20-January-2016	The Project Design for Afforestation Operation in 2016 was finished.
22-February-2016	The afforestation project design in 2016 was approved by Zunyi City Forest Bureau.
10-January-2017	The Project Design for Afforestation Operation in 2017 was finished.
20-January-2017	The afforestation project design in 2017 was approved by Zunyi city Forest Bureau.
17-October-2017	Planting was completed.
12- October -2018	Training technical worker yearly.
08-October-2019	Training technical worker
20-September-2019	Stakeholders' meeting
03-August-2020	Completed registration as a VCS-CCB project
10-October-2020	Training technical worker
25-November-2020	VCU issued during the first monitoring period of the project
10-December-2020	Stakeholders' meeting
10-October-2021	Training technical worker
25-October-2021	Stakeholders' meeting at the forestry bureau of Zunyi City, in order to prepare for the project verification and collect the views of stakeholders before the project verification
October-2021	The project proponent conducted a stakeholder questionnaire survey in 60 villages involved in the project.
24-December-2021	VCU issued during the second monitoring period of the project.
01- January -2022 to 18- January -2022	Field survey and results were finished
October-2022	Yearly training for technicians

19-December-2022	Third issuance of emission reductions
11-March-2023	Draft MR for this monitoring period finished

2.2.2 Methodology Deviations

N/A.

2.2.3 Minor Changes to Project Description (Rules 3.5.6)

N/A.

2.2.4 Project Description Deviations (Rules 3.5.7 – 3.5.10)

N/A.

2.2.5 Grouped Projects

This is not a grouped project.

2.2.6 Risks to the Project (G1.10)

For the identification of probable natural risks and those induced by man, the tool approved by the VCS Standard was used: 'Tool for the Risk of Non-Permanence of the Agriculture, Forestry and Other Land Uses' sector.

Identify Risk	Potential impact of risk on climate, community and/or biodiversity benefits	Actions needed and designed to mitigate the risk
Fire	The planting area is mostly land suitable for afforestation, thus the risk of fire is quite low in the early phase of the project. After the trees grow to a certain age (about 30 years), the risk of fire may increase, and the project owner adopts the necessary measures for fire prevention. There is no fire outbreak happened during this monitoring period.	The forest fire prevention propaganda and education work were strengthened during this monitoring period, which also raised the awareness of forest fire prevention of the whole society. We have actively carried out educational activities with the forest law and regulations on forest fire prevention as the main contents to popularize basic knowledge of fire control.
Diseases and Insects	Diseases and insects can damage leaves, crowns and stems, which may further reduce tree growth. The community's environment may be affected by the declined tree quality once the number of	During this monitoring period, the supervision of serious insect pests has been strengthened. If any insect pests occur, chemical pesticides can only be used in accordance with the national pesticide policy

	dead woods and trees goes up. In addition, some harmful insects may extend their population and cause extensive damage to project forests, which means, to certain degree, the plantation diversity can be affected accordingly. No diseases or insects occurred during the monitoring period..	in serious cases.
Pesticide	The drinking water of the community may be contaminated due to the use of pesticide. Additionally, the use of pesticides can reduce biodiversity in the ecosystem because it may destroy habitat of certain species and do damage to the food chain.	The use of pesticides during the monitoring period was strictly prohibited. Only in case of insect pests occur, and as above, no diseases or insects occurred during the monitoring period, therefore, no pesticides were used.
Human-induced risks	In recent decades, climate change featuring global warming, is mainly caused by the emission of greenhouse gases generated by human. This has brought a profound impact and a huge threat on human survival and development. There may exist the risks related to the adaptability of climate change for humans, etc. Several measures will be taken to mitigate the risk.	First of all, the implementation of the project will generate GHG emission removals through growing of the trees, which will improve local ecological environment and mitigate regional climate change in the project zone. Secondly, the project proponent will conduct training sessions for the community on the knowledge and skills of adaptability to climate change, such as continuously carrying out ecological environment construction to improve the regional climate. In addition, forest rangers are trained to conduct patrolling in good weather and avoid patrolling in severe weather.

2.2.7 Benefit Permanence (G1.11)

Project area is a relatively severe rocky desertification area. The implementation of the project will effectively control rocky desertification in this area and significantly improve the ecological environment. First of all, even after the end of the project's life cycle is over, the local government and forestry bureau

will continue to supervise and manage according to the PRC Forest Law¹⁹ and the PRC Forest Law Implementing Regulations²⁰. It is illegal to cut down trees planted by this project, so the trees will continue to be protected. At the same time, the local government and forestry bureau shall continuously supervise and patrol the plants and animals in the project area according to the Law of the People's Republic of China on the Protection of Wild Animals²¹, so the local plant and animal population will continue to maintain or increase. Besides, during the 29 years of the project implementation process, the project proponent regular management measures, such as training, patrol, publicity, etc., will further enhance the ecological protection consciousness of residents. So, after the project, they can still protect the forest and animals.

Secondly, during the 29 years of the project life period, the project proponent will provide annual training for the technicians hired to ensure that they can acquire rich professional experience and the ecological protection consciousness. After the end of the project, a part of them will continue to implement the supervision and management work, the others will be paid by the relevant forestry bureau even beyond the project lifetime because they will train other staff by the knowledge and experience mastered.

Finally, the women involved in this project activity not only increase the family income but also learn extra skills during the project implementation period, which equipped them with well ecological environment protection consciousness and improved their social status. After the 29-years project lifetime, they still have relevant professional ability to play a role in forestry, such as working for the forestry bureau, or choosing to work in forestry companies, seeding companies and other social organizations, so as to continue to reflect the value of women in society.

To enhance the improvement of ecological environment, the use of fertilizer and pesticides will be strictly monitored. There is no room for indiscriminate use of fertilizer and pesticides. Therefore, the training sessions on the moderate use and soil management for local people will be organised periodically.

As the fire control and prevention is crucial for forest areas, measures are needed accordingly. After the project life cycle, it is still important to obey local laws regarding fires. Besides, forest rangers will continue to play its role and be vigilant about flammable objects and will never leave a fire unattended. This good mechanism is actually the result of forest fire control management manual, which include the emergency plan.

To consolidate the biodiversity, the tree species selected for plantation needed to prove to be adaptable to the local conditions and can help support the local ecosystem. And the project also strictly prohibits the

¹⁹ http://www.gov.cn/xinwen/2019-12/28/content_5464831.htm

²⁰ http://www.gov.cn/gongbao/content/2016/content_5139476.htm

²¹ http://www.gov.cn/xinwen/2016-07/03/content_5087722.htm

plantation and introduction of invasive species since this can bring harm to the local ecosystem. This practice is to be carried out beyond the project lifetime according to the national law. In terms of the protection of wild animals, the afforestation project itself can give wild animals shelter and a place to raise families. Besides, due to the implementation of the project, the local community is increasingly aware of the importance of animal protection thanks to the publicity and training sessions. This is actually one of the most effective ways to help wildlife preserve the environment in which the animals live and thrive.

To bring the local community sustainable and long-lasting benefits, trainings on forest management, soil management, fire control and other forestry-related topics will be conducted beyond the project lifetime. This is a way to help increase the employability in the future since it can help the local people sharpen their soft skills and a showcase of their skills and experiences. In addition, with the skills and knowledge gained, these good management practices can be continued, and this is also the embodiment of benefit permanence.

All in all, the community benefits will be maintained beyond the lifetime of the project. Moreover, all the skills and trainings will help these workers to continue working in the forestry-related sector and in the project region. GHG removals will continue beyond the lifetime of the project and probably sequestered carbon stocks will be higher thanks to the constantly improved planting techniques. Concerning biodiversity, with the continuous improvement of ecological improvement, the biodiversity can be richer after the project lifetime.

2.3 Stakeholder Engagement

2.3.1 Stakeholder Access to Project Documents (G3.1)

The project-related document such as project description, monitoring report and corresponding supporting materials had been published on VCS and CCB website for public comments, as well as the project summary in the Chinese version, and the local communities and other stakeholders can download these documents from the website. For those who cannot get access to the Internet, paper-based monitoring report summary (Chinese version) has been posted on bulletin boards. Besides, the periodic project development progress had been published on the notice boards to keep stakeholders updated. If there is any negative feedback, a meeting will be immediately held in the village. Since the beginning of the project, there is no feedback has been received. The physical copy of draft monitoring report for this monitoring period (Simplified Chinese version) will be made publicly available in village committees and the local forestry bureaus upon completion.

The details of on-site verification and stakeholders' interviews will be made available once determined and confirmed. Villagers who own forest land tenure, technicians, local villagers, representatives from local forestry bureaus, and project leaders of Shanghai Libra Investment & Management Co., Ltd and

Guizhou Xinzhanxin were invited to participate the stakeholder meeting. To further understand the attitudes and input from stakeholders, questionnaires were distributed to help grasp the bigger picture during the project verification. Opinions were collected from the questionnaires. Meanwhile, the content of monitoring procedures and provided monitoring documents were thoroughly explained.

2.3.2 Dissemination of Summary Project Documents (G3.1)

A brief project progress including project location, project registered date, annual emission reductions, monitoring period and future plan for the fourth verification period has already been posted for stakeholders. The project verification documentation for the third monitoring period has already been made available on the VCS and CCB websites from 23-March-2022 to 22-April-2022 for all stakeholders to obtain detailed project information. Once the verification of the fourth monitoring period is completed, the monitoring report, MR summary, monitoring manuals and other relevant documents in Chinese version will be posted on the village bulletin board by the contact person of each village committee on so that villagers can be informed.

2.3.3 Informational Meetings with Stakeholders (G3.1)

Before the project began, the socio-economic and environmental conditions around the project area were obtained through PRA surveys conducted by the Guizhou Academy of Social Sciences. PRA is a way of learning the local community members and investigating. Besides, it can also facilitate to make timely decisions regarding project development.

During this monitoring period, informative meetings have been convened in a bid to inform the local community of the impact of project implementation and the results being achieved. Besides, this is also part of the preparation work done for the upcoming on-site verification for the fourth monitoring period. The following preparation has been done for the meetings: 1) Before the meetings, relevant actors were identified. These included project leaders from Shanghai Libra and Guizhou Xinzhanxin, representatives from the governments, forestry bureaus, village committees and the local villagers. 2) Informative meetings were held in the conference room of the forestry bureau. The meeting site and meeting agenda has been made available to relevant actors one week prior to meetings. 3) For the purpose of effectiveness, the meeting plan is set up to define the key information presentation during the meeting. 4) The informative meetings share the information on the situations during the last monitoring period including the current project progress, the achieved biodiversity results, the estimated issuance date of the second phase emission reduction and the preparation needs to be done for the fourth verification. Besides, Q&A sessions were established for everyone to understand the key milestones. All the participants were encouraged to voice their opinions and make input.

The informative meetings presented to be fruitful and effective. All the meeting participants expressed their continuous support for the project and aired no grievance over the project.

The informative meetings or consultation meetings serve as just one part of stakeholder consultation. Information on other means of stakeholder consultation is written in Section 2.3.7 of the MR.

2.3.4 Community Costs, Risks, and Benefits (G3.2)

Communication with the community has always been the priority and is conducted in a participatory, transparent, and timely manner. Communication is achieved through proper channels prior to any decision they may have been asked to make with respect to participation in the project.

Prior to the implementation of the project, potential costs, risks, and benefits to the community identified during the PRA survey had been communicated to the community.

During the stakeholder meetings for different monitoring periods, key project milestones, objectives and results achieved were presented to the relevant actors. If they have doubts over the project implementation, they are free to express their dissatisfaction or suggestion any time through different channels.

Since the initiation of the project, the PP has ensured that information is available for different community groups based on the type of information and the actual scenario. To facilitate the understanding of the project, different literacy levels are taken into consideration. Key project documents are presented in the simple and local language to guarantee the transparency of information.

Besides, continuous communication channel is in place during the lifetime of the project. The ongoing mechanism can allow the local community to express their concerns, questions, comments, or requests. Please refer to Section 2.3.8 for more information.

2.3.5 Information to Stakeholder on Verification Process (G3.3)

When project proponent knows the on-site visit time for the fourth verification, the technicians will begin to inform the local villagers. Besides, the mobile phone number of contact person of the project was published alongside with the meeting notice so the villagers can directly call or send text message in case they have any problem or doubts about the future project verification.

The latest progress of project implementation has also been informed to all stakeholders through meetings, and bulletin boards.

2.3.6 Site Visit Information and Opportunities to Communicate with Auditor (G3.3)

During the third on-site verification, all the participants expressed their feelings and experiences to the auditor about the project. Auditor also asked the villagers whether the implementation of the project had a significant impact on their lives and whether they had any complaints. The project proponent and auditor provided detailed answers to stakeholder representatives for all the questions. After the meeting, the auditor interviewed each participant separately and asked for their opinions and suggestions. The villagers have all expressed the willingness to continue to participate in the project, not only because of the employment opportunities that have been created for local rural communities but also the increasing incomes and improved living conditions. Officials also demonstrated their support for the project implementation.

The detailed site visit information and the actual status of the communication among different parties will be made complete once it is finished. The local community and relevant stakeholders will be informed of the time and location of the fourth on-site verification once it is determined. During the on-site visit, the auditor will have the opportunity to interview stakeholders relevant to the project and if required by the auditor or the stakeholders, consultation meetings can be held directly with the community and stakeholders.

2.3.7 Stakeholder Consultation (G3.4)

Stakeholder consultations can range from questionnaire-based surveys, stakeholder meetings to opinion logbook, and stakeholders are encouraged to exchange their opinions on the project and their willingness to participate. To fully and comprehensively grasp the impact exerted on the stakeholders, three ways are adopted namely stakeholder meeting, questionnaires and opinion logbook.

For detailed information on informational meetings, please refer to Section 2.3.3 of the MR.

To further understand the impact of the project on stakeholders after the implementation, in July 2022, the project owner distributed a total of 100 questionnaires. The distribution of the questionnaires was done with the assistance of the village committees, and as many stakeholders as possible were invited to actively participate in the questionnaires through village committee broadcasts and other means.

Besides, for wider scopes of consultation and attitude measurement, project owners posted questionnaires and feedback hotline telephone numbers on the bulletin boards of the village committees and appointed relevant personnel in each village to collect and summarize everyone's feedback and suggestions, which were eventually registered in the opinion register book. Finally, after a 1-month public survey period, some stakeholders provided their feedbacks on the project, the project owner summarized the feedbacks and concluded that 100% of the villagers expressed their support for the project and believed that the project would bring benefits to the local environment and their own living standards.

During the auditor on-site verification, the survey result summary and supporting evidence will be given to VVB.

2.3.8 Continued Consultation and Adaptive Management (G3.4)

At the beginning of the project, the project proponent has identified a fixed contact person, which is referred to as a technician in this project. A technician is responsible for the communication of 2 to 3 villages, collecting all the suggestions and problems from the villagers. The task of these technicians is not only to provide feedback the villagers' suggestions and problems directly to the project manager of Guizhou Xinzhanxin, but also to enable the project manager of Guizhou Xinzhanxin to communicate the progress of the project to all the villagers through the technicians, and timely post and distribute project materials. When the technicians passed the problems from villagers to the project proponent, project proponent positively responded and solved them. For example, during the planting process, when some villagers reported that their farming tools were old, the project proponent decided timely replaced them with new tools. At the same time, there is a Suggestion Book published on the notice board in each of the 169 villages throughout the lifetime of the project. Stakeholders can write their comments or suggestions in the book anytime anonymously if they wish in order to feel free when expressing their disagreements. The project proponent will check the book regularly and collect all the comments received.

On the other hand, 110 technicians have been working on forest management and tree and CCB monitoring. Since the start of this project, the technicians have been trained annually in forest management and monitoring, and have been kept in touch with the project proponent. When the project needs to measure the monitoring data, they can complete the measurement work in a timely and accurate manner. The technicians pass the information on tree growth, diseases, pests and weather conditions to the proponent. In turn, the proponent regularly imparts knowledge and skills of tree management to the technicians.

The technicians as the project monitoring executor have surveyed the project area. The distance from one village to another is so short that villagers can talk directly to the technicians even the local forestry bureaus if the locals have any opinions. Meanwhile, technicians will also do a regular visit to the villages and collect comments if any.

Before the project began, Guizhou Xinzhanxin and Libra company developed a perfect Adaptive Management plan, which specifically involved how to determine the contact person of each village, how to contact the project manager of Xinzhanxin, daily routine communication matters, problem solving measures, etc. So far, the design and implementation of the project have not been modified, as comment received do not affected the design of the project.

2.3.9 Stakeholder Consultation Channels (G3.5)

Stakeholder consultation meetings have been held with stakeholders on issues related to the implementation status and progression and key issues of the project. During these meetings, the community and stakeholders had the chance to make inputs. To the convenience of the local community and the stakeholders, the date, time and place of meeting is stipulated in advance. The detailed information concerning the meetings had been made available through bulletin boards and megaphone.

Besides, for the measurement of attitudes and collection of both qualitative and quantitative data, questionnaire-based survey and opinion register book are employed. The distribution of questionnaires is done with the assistance of relevant personnel and each survey participants were provided with guidance and after the completion of the questionnaire, relevant personnel had collected all the questionnaire and made sure all the questions were answered.

Lastly, key documents, for example, the report summary is compiled in plain language for better facilitation of understanding the project. And all the key documents will be made publicly available to stakeholders by posting them on the bulletin board.

2.3.10 Stakeholder Participation in Decision-Making and Implementation (G3.6)

During the plantation period of this project, the farmers were fully involved in the land selection, planting pattern selection through routine village committee meetings.

All the critical information regarding decision-making was already published to local stakeholders and the decision should be revised according to further discussion in case there is any feedback from stakeholders. During this monitoring period, the opinions and suggestions of stakeholders were obtained through questionnaires, logbooks, and stakeholders' meeting, and they were involved in decision-making and involved stakeholders are invited to participate regardless gender.

Necessary measures have been taken to enable the effective participation of the local community and stakeholders. As mentioned before, the selection of the meeting date, duration and place is made beforehand. The meeting sites are places that are accessible to the community. The meeting date was determined on the basis of the convenience to the stakeholders.

As the afforestation involves female group, the PP has always ensured women have decision-making roles. During this monitoring period, women were given priority to participate in consultation and community-level activities. Besides, it is always important to maintain dialogue between women and other parties. These actions all involve seeking ways to increase women's participation in areas such as forest monitoring and management.

2.3.11 Anti-Discrimination Assurance (G3.7)

The project proponent should obey Labor Law of the People's Republic of China with anti-discrimination assurance, and workers have signed up voluntarily regardless of gender, race, religion or any other basis. In case any discrimination proved to be true, the person who is responsible for the discrimination shall be fired immediately and the project proponent will find someone else to take over his/her job. During the current monitoring period, 60 women were employed as technicians.

2.3.12 Grievances (G3.8)

As set out in registered PD, the project proponent nominated a specific staff in charge of recording and collecting conflicts and grievances of local communities and villagers. Forest patrollers in each project site play an important role in treating with ordinary conflicts and grievances and report to the forest stations or bureau. Firstly, once getting the reports, project proponent and local forest agency shall contact and discuss with relevant community or other stakeholders within 3 days. Secondly, the specific staff of project proponent should propose a solution and mediation within a week based on all collected information from relevant parties. Finally, the complications or grievances shall be dealt within 30 days. If the dispute cannot be settled by the forestry bureau, then it can be submitted to the county's first-level arbitration department or court. Under the circumstances, the judgment or the arbitration result would be taken as the final solution and it should be signed by both parties and then they should keep a copy respectively. The time limit for submitting the dispute to the arbitration commission or appealing to the court is 30 days.

No grievances received during this monitoring period.

2.3.13 Worker Training (G3.9)

Annual training for 110 technicians was held in October 2022 during this monitoring period. The 110 technicians are those who have been working from second monitoring period towards this monitoring period. The training was divided into two sessions in order to facilitate the technicians to participate and ensure the attendance of all the technicians. One session was held within the county Forestry Bureau while the other one was held in the conference room of the village where the project is located. For the training held in the conference room of the village, the villagers could also take part in if they are interested in. In addition to the Xinzhaxin project manager, the experts from the local forestry bureau were also invited to participate in teaching for each training session. These 110 technicians who were consist of 33 technicians conducting field measurement while the other 77 technicians conducting community surveys were the core of the entire monitoring team in the project. In this monitoring period, the field measurement work was mainly conducted by 33 people while 77 peoples cooperated with them. The principle of 'seasoned technicians help the green hand' was adopted, which means technicians who are familiar with the work process should help unseasoned technicians to become accustomed to the

working procedures and then an auxiliary technician is assigned to keep records. These 110 technicians should attend the training every year and new technicians could have the opportunity to attend the training together so that local capacity lost will not be generated because of the replacement of new and old. The training is mainly in the aspects of physical safety, health and monitoring technology, such as measuring tree height and DBH, etc. The training is to provide orientation and training for the project's technicians. These technicians are all from the villages where the project is located. They are very familiar with the local villagers and the natural environment, and also have the ability to learn the knowledge of forest monitoring, so they represent local capacity. Priority is given to the following training topics:

-Forest land inspection

Firstly, fire is the most concerning factor. Forest inspections shall be conducted regularly to strictly check the purpose of strangers entering the forest and to prevent the phenomenon of cutting and logging furtively. Also, pesticides should be used following the national standards, although the occurrence of pests and diseases should be strictly controlled in the spring and autumn. In addition, the survival rate of forest land should be ensured to meet the national requirements by observing and reporting constantly if the saplings use nutrition bags. If there are endangered plants, protective action should be taken in time, such as hanging warning signs, pulling warning lines, and then the circumstance should be reported to relevant departments by taking photos, videos and recordings. The wild animals in the forest must be protected and recorded by taking photos and photographing as far as possible, which can strengthen publicity and raise the villagers' awareness of animal protection. With respect to the growth and situation of plants and animals in the forest lands, reporting and keeping in touch with the contact person of Guizhou Xinzhanxin should be timely and constantly. When necessary, guarding in the forest and waiting for the contact person of Guizhou Xinzhanxin to protect the forest lands together.

-The use of monitoring and measuring instruments

Monitoring and measuring instruments were used during the inspection. The height of the tree can be measured by altimeter while the circumference of the tree can be measured by tape measure. For precisely locating the fixed monitoring sample, the GPS measuring instrument shall be used. Records information including the geographic location of the site, latitude and longitude, the site number, the carbon layer, the height of each tree and the perimeter of the 1.3-meter site, survival rate, shrub growth, and the presence or absence of animals.

-Data records

During the training each year, the technicians were taught monitoring methods and rules in the form of physical demonstrations, especially the equipment use, data recording, unit conversion, etc. The score data measurement team consists of 33 technicians who should prepare all the instruments and materials

for monitoring within a week after the monitoring period was determined. They conducted the measurement of tree height and diameter separately and all the measurements and data recording were completed in 1 month. In the end, the data summary statistics was submitted to Guizhou Xinzhanxin for verification.

-Safety measures

Technicians are required to wear protective tools such as hard hats and gloves.

-community surveys

Through community engagement, the trained technicians learned the opportunities for communication, villagers' happiness index, women's social status, carbon credit payment status, living conditions and how villagers obtain project-related information through public channels.

2.3.14 Community Employment Opportunities (G3.10)

The Project mobilized the participation of the entire community, including women, minorities and financially-strapped people. The working conditions provided everyone with equal opportunities to get a job.

During the implementation of the project, the total number of local villagers involved in planting was approximately 16,339 of which 70% were women. In addition, approximately 110 locals were employed for project management as technicians for both project management and monitoring survey, with 55% of women and they were regularly trained in relevant skills. The 110 technicians are long-term employees. The relevant interests of temporary planting workers and long-term technicians have been involved in the first monitoring period, only 110 long-term technicians are involved in this monitoring period. As mentioned in 2.3.13, these 110 technicians have been working from the third monitoring period to the fourth monitoring period. There are no new technicians during this monitoring period.

As mentioned previously, there are 110 technicians for project management. These 110 technicians are hired by local forestry bureau who are familiar with local villagers and forestry-related situations, therefore, Guizhou Xinzhanxin, after communication with the forestry bureau, decided to pay CNY 200 per person per month for hiring them as technicians for this project on a long-term, part-time basis. They are responsible for project-related management and monitoring, and the villagers' daily communication, field survey, the formation of feedback mechanism with Guizhou Xinzhanxin, etc.

2.3.15 Relevant Laws and Regulations Related to Worker's Rights (G3.11)

The local people would be under the protection of Labor Law of the People's Republic of China, Labor contract and no forced labor is allowed, and they are free to establish and join any labor organizations as

they wish. In addition, by posting the labor law propaganda materials in the village, the villagers are aware of their right to participate in the work. There was regular new-employee training provided to workers before they started the job, which clearly indicates their rights and mechanism for grievance appeal, and the worker's rights are guaranteed in the labor contracts for each worker. The new employee training was in accordance with the *Labor Law of People's Republic of China* which guarantees the protection of employee's rights and benefits.

2.3.16 Occupational Safety Assessment (G3.12)

The project owner has referenced Safety and Healthy in Forestry Work published by ILO and Labor Law of the People's Republic of China. The workers' health and safety policy, including items covering the health insurance scheme for workplace accidents and evacuation plan is made available for workers and implemented by the village committee.

The annual technicians' training introduces cases for the participating technicians to explain in detail how to complete the construction or monitoring work under the premise of ensuring safety. Besides, in order to reduce security risks to the lowest ratings, the project manager of Guizhou Xinzhanxin reminded the importance of safe operation repeatedly in daily communication with technicians. The technicians were told that they should contact and inform the Guizhou Xinzhanxin if special circumstances happened. Guizhou Xinzhanxin, as the project proponent, would take measures for technicians timely, for example, to replace the old farming tools, to help them arrange another patrol to make up for the routine patrols that are suspended during extreme weather or when they were ill.

2.4 Management Capacity

2.4.1 Required Technical Skills (G4.2)

The following skills are required for the development of the project:

- Ability to interact with different actors: since there involves a large amount of communication, the PP should be able to interact with different actors and get the information and ideas across successfully. Since the project is in rural area with scattered stakeholder distribution, the developer should have the ability to get the authorization from stakeholders. If there is any intense dispute, the PP shall have the ability to deal with any dissatisfaction and grievance in a timely manner. Moreover, the organizing and coordination ability are essential skills during the process of the stakeholders' meetings and relevant surveys.
- Community engagement promotes collaboration between different stakeholders. This improves the chances of understanding and addressing the right problems and making contributions. In this light, it is required that the project developer can have the ability to involve every stakeholder. Embracing community engagement can pave way for good engagements. Besides, stakeholders are encouraged to share skills and collaborate to create integrated and effective community engagement processes.

-Skills on afforestation: what kinds of trees is suit for the land? How many trees should be planted? How to manage the forest and so on

- Skills in the development of carbon projects and environmental services: how to draft PD, what evidence was collected, how to hold the stakeholders meeting, how to conduct the monitoring plan, how to calculate GHG, sink and so on.

- Skills on the evaluation and monitoring of biodiversity: how to do CCB monitoring is the main skill for the developer such as whether the animal increased, their living range enlarged, the number of plants and species increased.

2.4.2 Management Team Experience (G4.2)

Local Forestry Bureaus and Shanghai Libra Investment & Management Co., Ltd. acted as the expert group (Management team) who is in charge of guiding and coordinating the project's overall implementation and decision-making. The project management team has been engaged in community-related work for a long time, such as the staff of the Forestry Bureau and the afforestation technicians. They have rich experience in communicating with local communities and villagers, so that team can better grasp the work of the community. The team not only has technical capabilities, but also has a high level of community communication skills, which plays an important role in the CCB aspect of the project. Although their responsibilities are slightly different, the synergy between them has made the effective management possible.

Local Forestry Bureau already set up an expert pool on the land, soil, vegetation, animals and other natural resources affected by forests. Besides, forestry bureaus fed massive data to the biodiversity report and the experts from that pool provided assistance and share experience during the biodiversity monitoring. The project proponent has rich experience in forest management in Guizhou Province, including artificial afforestation, forest protection and management, forest damage control and technical training.

Shanghai Libra Investment & Management Co., Ltd. is experienced in carbon measurement and monitoring. In the past, Shanghai Libra Investment & Management Co., Ltd. has successfully developed many different kinds of carbon projects in China, including validation and verification under GS, VCS and CDM standards. These experiences have been applied to the implementation and management of the Project.

Overall, both Shanghai Libra Investment & Management Co., Ltd. and the local Forestry Bureau have specialized skills and domain knowledge. The local Forestry Bureau has strong community management skills, as its job responsibilities can include coordination and management of all types of forestry work within different village committees. Shanghai Libra Investment & Management Co., Ltd. has extensive experience in various types of projects, so the company is capable of coordinating and organizing

community work in various community settings.

2.4.3 Project Management Partnerships/Team Development (G4.2)

The management team of the project experienced in forest project management and carbon project development. Also, local Forestry Bureau provided instruction of reforestation and forest management, conducted the specific supervision of the implementation, and collected specific activity data at a routine basis. During this monitoring period, the measurement of data and the monitoring of biodiversity are mainly undertaken by 110 technicians employed by Guizhou Xinzhanxin. The local Forestry Bureau and local government provided technical support for community engagement and biodiversity assessment. The project manager of Guizhou Xinzhanxin was responsible for on-site verification, continuously guiding the tasks and specifications of these technicians, and the final data collection and inspection.

Therefore, the project management team and monitoring team has sufficient experience and skills required by the project.

2.4.4 Financial Health of Implementing Organization(s) (G4.3)

All the project participators are legally registered company in China, and according to the public information listed in National Enterprise Credit Information Publicity System, none of them were involved in nor complicit in any form of corruption such as bribery, embezzlement, fraud, favoritism, cronyism, nepotism, extortion, and collusion.

During this monitoring period, according to a third-party financial audit report provided by Guizhou Xinzhanxin Company and Shanghai Libra, there were no financial problems with Guizhou Xinzhanxin Company and Shanghai Libra in the Year 2022. There is no financial problem, so they can support the finance of the project and keep the project running normally.

2.4.5 Avoidance of Corruption and Other Unethical Behavior(G4.3)

In the institutional policy, in its code of ethics, all types of acts of corruption such as bribery, embezzlement, fraud, favoritism, patronage, nepotism, extortion, and collusion are rejected. During this monitoring period, any interest issues of the project have been made public and transparent, and any information and documents could be obtained from public channels. For preventing the occurrence of corruption, in stakeholder meetings, technical training meetings, villagers' opinion survey, and other personnel gathering occasions, project proponent and village committee leaders have repeatedly reiterated the serious consequences of corruption and immoral behavior, so that project participants have been awakened and paid attention to this. In addition, project proponent set up a mechanism for villagers to report violations if they are found. The contact between stakeholders is two-way feedback, and project information can be shared at all levels of platforms, so there is no corruption in any form.

2.4.6 Commercially Sensitive Information (Rules 3.5.13 – 3.5.14)

None of the project documents will be considered as commercially sensitive information, and all of the documentations are available to any stakeholders.

2.5 Legal Status and Property Rights

2.5.1 Recognition of Property Rights (G5.1)

The ownership of the forest land of the Project belongs to the village collective, and local villagers have the right to use the land within the project boundary. The land is the land suitable for planting trees. The number of the landowners is so big that they authorized Guizhou Xinzhanxin as project proponent. The authorization process flows in this way: Both Guizhou Xinzhanxin and 169 village collectives that own the forest land tenure of the project have signed Carbon Sink Project Development Agreement respectively, which stipulates that the village collectives entrust Guizhou Xinzhanxin as the project owner to apply for carbon sink projects for them. The development of the project will not, under any circumstances, transfer the ownership of the forest land tenure of the village collective and the villagers. Therefore, Guizhou Xinzhanxin has the right to handle all matters related to the development of this project. The project proponent and forestry department are responsible for the comprehensive implementation and management of the project.

The local government proved that the land belongs to all the villagers so no one can encroach as private property and change the land usage. No matter whether the Project is applied for the VCS project or not, the land is own by the village collective. The local government is responsible for all local villagers if there is anything relating to the encroachment of the locals' rights to the land.

Village committee also have right to authorize Guizhou Xinzhanxin as a representative of project owner and Guizhou Xinzhanxin only has right related to carbon sink project including decide to develop the Project under which standard, who to sell, selling price, etc²².

During this monitoring period, the trees were growing well, and the ownership of the trees has not changed. Therefore, the villagers received the carbon credit profits paid by Guizhou Xinzhanxin Company. Guizhou Xinzhanxin Company will keep on completing the work of this monitoring period in accordance with the contract to ensure that the villagers can receive the payment on time. According to the Carbon Sink Project Cooperation Agreement, 60% of profit from the previous VCUs issuance have been distributed to all village committees and villagers who own forest land tenure of this project. The preparation work for the future profit distribution of VCUs issuance from this monitoring period will be well underway.

²²Source: carbon sink project cooperation agreement signed between village committee and Guizhou Xinzhanxin.

2.5.2 Free, Prior and Informed Consent (G5.2)

Prior to the project initiation, all the project lands are collectively own by local villagers. In September 2014, the project participant and local Forest Bureau held a consultant meeting with local village committees during the PRA survey before the project start. PRA surveys and stakeholder meetings collected stakeholders' opinions on project design and their willingness to participate. To make sure the successful development of the project, Guizhou Xinzhanxin Agriculture and Forestry Co., Ltd. and the village collective which had the ownership of forest land had signed a carbon sink afforestation cooperation and development agreement, which clarifies the forest land rights by all parties during the project crediting period. The agreement also provides that villagers or collectives who have title to the wasteland on which the project is located received the benefits specified in the agreement when the project generates revenue. So, the project will not encroach on private property, community property or government property. Furthermore, all lands are wastelands and no occupation involved so no compensation or return would happen. According to carbon sink project cooperation agreement signed between village committee and Guizhou Xinzhanxin, 60% of profit gained from the previous issuance has been distributed to all village committees and villagers, which can be proved by the receipt from villagers.

The project documents on the information of the project such as the nature, size, pace, the scope of the project, the reason for it, and its duration are presented in the native language to villagers.

2.5.3 Property Right Protection (G5.3)

Prior to the project implementation, the project area is mainly land suitable for afforestation, villagers voluntarily use these lands to plant trees, therefore, the project activities have not led to involuntary removal or relocation of property rights holders from their lands or territories, and does not force rights holder to relocate activities important to their culture or livelihood.

2.5.4 Identification of Illegal Activity (G5.4)

Under the current law of China, any illegal logging activities will be fined or sentenced to punishment. Currently, all project lands are defined for forestry purposes by the local government. Deforestation must be carried on under the approval of the local Forestry Bureau, and the forests are nursed by project staff regularly as a result of the implementation of the project, so there will not be illegal deforestation. The project benefits are gained from legal activities. Therefore, the project's climate, community and biodiversity impacts will not be affected by the illegal activities.

2.5.5 Ongoing Disputes (G5.5)

Because the project proponent signed a carbon sink cooperation agreement with the village committees, the forest land was developed reasonably and legally. 60% of profit from the previous three monitoring periods have already been distributed to all village committees and villagers who own forest land tenure

of this project according to the *Carbon Sink Cooperation Agreement*. Besides, village committees and villagers who own forest land tenure of this project are satisfied with the implementation of the project and agreed with the continuation of carbon asset development. Therefore, there was no ongoing disputes during this monitoring period.

2.5.6 National and Local Laws (G5.6)

The project conforms to all kinds of regulations in the forestry field, as listed below:

Law	Description	Compliance
PRC Constitution	The Constitution of the People's Republic of China, as the fundamental law of China, is the general charter for governing the country and the state. It not only confirms and guarantees the rights of citizens, but also regulates the setting and exercise of state power, and it is the fundamental norm for maintaining the harmony and balance between public power and citizens' rights.	The project recognizes and respects the rights of all the affected community and does not allow any form of infringement.
PRC Forest Law	In the field of the People's Republic of China engaged in forest, forest protection, cultivation, utilization and forest, forest, forest land management activities and other activities are applicable to this law.	The project activity is carried within the territory of China and all the afforestation activities are carried out according to the regulations.
PRC Forest Law Implementing Regulations	Collectively owned forests, trees and forest land, by the owner to the local county people's government forestry department to apply for registration, the county people's government to	This project has confirmed the right to use forest land in accordance with the law.

	register the book, issue a certificate to confirm ownership.	
PRC Wildlife Protection Law	To protect wildlife, save precious and endangered wildlife, maintain biodiversity and ecological balance, and promote the construction of ecological civilization, this law should be abided by.	The afforestation project contributes to the biodiversity and train personnel to make regular patrols at project zone to ensure there is no occurrence of illegal animal trafficking activities. Anyone who breaks the law is subject to severe punishment.
Forest Fire Prevention Regulations	Local people's governments at or above the county level according to the actual needs of the establishment of forest fire command institutions, responsible for organizing, coordinating and guiding the work of forest fire prevention in the administrative region.	The project has designated dedicated personnel responsible for the supervision and management of forest fire prevention in the project area
Pest Control Regulation	Pest control referred to in this regulation refers to the disease, insects, grass, rodents and other pests that harm crops and their products.	This project involves forecasting, prevention and control, emergency response and other mitigation measures to make sure the forest areas will not be disrupted.
PRC Production Safety Law	Safety work should be people-oriented and firmly establish the concept of safety development, adhere to the priority of safety.	The project complies with this law and other laws and regulations on production safety and strengthens production safety management.
PRC Labour Law	Workers enjoy the rights of equal employment and choice of occupation, the right to receive	The afforestation project pays special attention to the employer's right and make sure

	labour remuneration, the right to rest and vacation, the right to obtain labour safety and health protection, the right to receive vocational skill training, the right to enjoy social insurance and welfare, the right to apply for settlement of labour disputes and other labour rights stipulated by law	they get their salary timely and there is no gender-based discrimination since the project aims to contribute to the improvement of women social status.
Non-commercial forest construction technical regulation	This regulation aims to regulate ecological public welfare forest construction techniques, improve the quality and effectiveness of construction, maintain and improve the ecological environment, maintain ecological balance, protect biodiversity, and meet the ecological and social needs of human society and sustainable development.	For this project, tree species with strong adaptability, vigorous growth and well-developed root systems were selected. Besides, the project determines the appropriate afforestation density of the water conservation forest according to the construction type area, site conditions and biological characteristics of the tree species.
Non-commercial forest construction—Verification regulation	The local forestry authorities at all levels should organize inspection and acceptance.	According to the Inspection and Acceptance Report of the project, the project has complied with the regulations and laws during construction period and will be subject to regular inspection by local government during the implementation period to ensure the continuous compliance.
The main provisions of technical design and investigation of forest resources	The provision mainly aims to find out the type, quantity, quality and distribution of forest, forest land and forest resources and distribution, objectively reflect the	The specifications of forest land, forest species and tree species of this project are in accordance with the regulations

	natural and socio-economic conditions of the survey area, comprehensively analyse and evaluate the forest resources and management.	
Measurement and monitoring guide to afforestation project carbon sinks	The regulation takes the methodology of the United Nations Framework Convention on Climate Change (UNFCCC) for afforestation and reforestation project activities under the Clean Development Mechanism (CDM) as the main framework and combines with China's carbon sink forestry practices and experience.	The selection of carbon pool, stratification, sampling design and the changes of carbon stock are all in strict compliance with the guidance.
Design code for afforestation operation	This standard specifies the organization and management of afforestation operation design, preparation unit, preparation method, afforestation operation design text.	The afforestation activity is conducted in accordance with the code.
Seedling quality classification of main afforestation tree species	These rules specify the definition of the main afforestation tree seedlings, grading requirements, test methods and inspection rules.	The stock type, stock age and other specifications of the seedling of the project is in compliance with the guidance.

3 CLIMATE

3.1 Monitoring GHG Emission Reductions and Removals

3.1.1 Data and Parameters Available at Validation

Data / Parameter	A _i																																															
Data unit:	ha																																															
Description:	Area of strata i																																															
Source of data:	Field measurement																																															
Value applied:	The difference among planting category is sapling size of China fir, Cypressess, Pinus yunnanensis and Masson pine. Tree plantation within each category is the same. The area of each category (A_i) is listed below. <table><tr><th>Project Stratifications number</th><th>Category of tree</th><th>Year to plant</th><th>Area (ha)</th></tr><tr><td>proj-1</td><td>China fir</td><td>2015</td><td>19245.27</td></tr><tr><td>proj-2</td><td>China fir</td><td>2016</td><td>8477.07</td></tr><tr><td>proj-3</td><td>China fir</td><td>2017</td><td>3121.00</td></tr><tr><td>proj-4</td><td>Cypressess</td><td>2015</td><td>500.00</td></tr><tr><td>proj-5</td><td>Cypressess</td><td>2016</td><td>2345.00</td></tr><tr><td>proj-6</td><td>Cypressess</td><td>2017</td><td>2226.40</td></tr><tr><td>proj-7</td><td>Pinus yunnanensis</td><td>2015</td><td>500.00</td></tr><tr><td>proj-8</td><td>Pinus yunnanensis</td><td>2016</td><td>8204.40</td></tr><tr><td>proj-9</td><td>Pinus yunnanensis</td><td>2017</td><td>2441.93</td></tr><tr><td>proj-10</td><td>Masson pine</td><td>2015</td><td>3,000</td></tr></table> The total area is 50,061ha.				Project Stratifications number	Category of tree	Year to plant	Area (ha)	proj-1	China fir	2015	19245.27	proj-2	China fir	2016	8477.07	proj-3	China fir	2017	3121.00	proj-4	Cypressess	2015	500.00	proj-5	Cypressess	2016	2345.00	proj-6	Cypressess	2017	2226.40	proj-7	Pinus yunnanensis	2015	500.00	proj-8	Pinus yunnanensis	2016	8204.40	proj-9	Pinus yunnanensis	2017	2441.93	proj-10	Masson pine	2015	3,000
Project Stratifications number	Category of tree	Year to plant	Area (ha)																																													
proj-1	China fir	2015	19245.27																																													
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proj-7	Pinus yunnanensis	2015	500.00																																													
proj-8	Pinus yunnanensis	2016	8204.40																																													
proj-9	Pinus yunnanensis	2017	2441.93																																													
proj-10	Masson pine	2015	3,000																																													
Justification of choice of data or description of measurement methods and procedures applied:	N/A																																															
Purpose of Data	The parameter is used to calculate actual net GHG removals.																																															
Comments	N/A																																															

Data / Parameter	$BEF_{2,j}$
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Data unit	Dimensionless
Description	Biomass expansion factor for conversion of stem biomass to above-ground biomass
Source of data	The People's Republic of China Second National Communication on Climate Change, issued by NDRC, 2013
Value applied:	See Table 4-1 for details
Justification of choice of data or description of measurement methods and procedures applied	National authority data
Purpose of Data	The parameter is used to calculate actual net GHG removals.
Comments	N/A

Data / Parameter	CF _{TREE}
Data unit	t C t ⁻¹ d.m.
Description	Carbon fraction of tree biomass for species or group of species j
Source of data	The People's Republic of China Second National Communication on Climate Change, issued by NDRC, 2013
Value applied:	See Table 4-1 for details
Justification of choice of data or description of measurement methods and procedures applied	National authority data
Purpose of Data	The parameter is used to calculate actual net GHG removals.
Comments	N/A

Data / Parameter	D _j
Data unit	t d.m.m ⁻³
Description	Basic wood density
Source of data	The People's Republic of China Second National Communication on Climate Change, issued by NDRC, 2013
Value applied:	See Table 4-1 for details
Justification of choice of data or description of measurement methods and procedures applied	National authority data

Purpose of Data	The parameter is used to calculate actual net GHG removals.
Comments	N/A

Data / Parameter	R_j
Data unit	Dimensionless
Description	Root-shoot ratio
Source of data	The People's Republic of China Second National Communication on Climate Change, issued by NDRC, 2013
Value applied:	See Table 4-1 for details
Justification of choice of data or description of measurement methods and procedures applied	National authority data
Purpose of Data	The parameter is used to calculate actual net GHG removals.
Comments	N/A

Data / Parameter	t_{VAL} (for calculation of n)
Data unit	Dimensionless
Description	Two-sided Students t-value, at infinite degrees of freedom for the required confidence level
Source of data	Students t-distribution table in the tool 'Calculation of the number of sample plots for measurements within A/R CDM project activities' (Version 02.1.0)
Value applied	1.645
Justification of choice of data or description of measurement methods and procedures applied	Use the 90% confidence level for determination of biomass stock in A/R CDM project activities
Purpose of data	The parameter is used to calculate number of sample plots for measurements
Comments	This parameter was not included in the registered PD since it is only applicable for calculating number of sample plots during verification

3.1.2 Data and Parameters Monitored

Data / Parameter	V _{TREE,j} ; V _{TREE,l,p,j,i}				
Data unit	m ³				
Description	Stem volume of tree species j; Stem volume of tree l of species j in sample plot p of stratum i				
Source of data	Calculated				
Description of measurement methods and procedures to be applied	The ex-post estimation during this monitoring period has used allometric equations of each tree species to calculate the stem volume.				
Frequency of monitoring/recording	Before every verification event				
Value applied:		Project Stratifications number	Category of tree	sample plot ID	V _{TREE,l,p,j,i} (m ³)
	Proj -1	China fir	ID-M12	3.70694	
			ID-M13	3.75587	
			ID-S31	3.67840	
			ID-W5	3.74033	
			ID-D7	3.60683	
			ID-D19	3.65502	
			ID-S2	3.61534	
			ID-T17	3.69408	
			ID-X2	3.59052	
			ID-X12	3.61724	
	ID-B3	3.71570			
	Proj -2	China fir	ID-S33	2.74188	
			ID-S11	2.75958	
			ID-T9	2.72703	
			ID-T1	2.59243	
			ID-T32	2.87626	
	Proj -3	China fir	ID-B16	1.87187	
			ID-S37	1.84178	
			ID-M19	1.87301	

	Proj -4	Cypresses	ID-S36	3.94955
			ID-S25	3.89913
			ID-S13	3.97225
	Proj -5	Cypresses	ID-S16	2.69938
			ID-Z5	2.70400
			ID-W8	2.72483
	Proj -6	Cypresses	ID-B13	2.21690
			ID-W13	2.29590
			ID-M3	2.24171
	Proj -7	Pinus yunnanensis	ID-S3	3.44533
			ID-S4	3.46291
			ID-S14	3.49469
	Proj -8	Pinus yunnanensis	ID-B15	2.23531
			ID-M11	2.29001
			ID-T24	2.27981
	Proj -9	Pinus yunnanensis	ID-T7	2.16942
			ID-Z11	2.26811
			ID-T25	2.13242
	Proj -10	Masson pine	ID-W4	3.75547
			ID-X10	3.86375
			ID-T10	3.78146
Monitoring equipment	N/A			
QA/QC procedures to be applied	Quality control/quality assurance (QA/QC) procedures prescribed under National Forest Inventory are applied. In absence of these, QA/QC procedures from published handbooks or from IPCC GPG LULUCF 2003 may be applied.			
Purpose of data	The parameter is used to calculate actual net GHG removals.			
Calculation method	For the ex-post estimation during the following verification, using allometric equations based on tree dimensions to calculate the stem volume. The tree dimensions usually comprise of height and diameter at breast height.			

	Cypresses: $V_{TREE,j}=0.000085626 \times D^{(1.9148-0.0045828 \times (D+H))} \times H^{(0.74041+0.00668 \times (D+H))}$ China fir: $V_{TREE,j}=0.000088296 \times D^{(1.94097-0.0044583 \times (D+H))} \times H^{(0.76012+0.0056841 \times (D+H))}$ Pinus yunnanensis: $V_{TREE,j}=0.00010729 \times D^{(1.95029-0.0047643 \times (D+H))} \times H^{(0.63241+0.0075891 \times (D+H))}$ Masson pine: $V_{TREE,j}=0.000094602 \times D^{(1.88156-0.0030651 \times (D+H))} \times H^{(0.76840+0.0046574 \times (D+H))}$
Comments	N/A

Data / Parameter	$H_{l,p,j,i}$; $DBH_{l,p,j,i}$				
Data unit	m; cm				
Description	Height of tree l of species j in sample plot p of stratum i; Diameter at breast height of tree l of species j in sample plot p of stratum i				
Source of data	Field measurements in sample plots				
Description of measurement methods and procedures to be applied	Standard operating procedures (SOPs) prescribed under national forest inventory are applied. In absence of these, SOPs from published handbooks or the IPCC GPG LULUCF 2003, may be applied.				
Frequency of monitoring/recording	Before every verification event				
Value applied:		Project Stratifications number	Category of tree	Average DBH (cm)	Average H(m)
		Proj -1	China fir	7.81	8.21
		Proj -2	China fir	7.03	7.64
		Proj -3	China fir	5.81	6.32
		Proj -4	Cypresses	8.06	7.89

	Proj -5	Cypresses	7.63	7.43
	Proj -6	Cypresses	7.02	6.92
	Proj -7	Pinus yunnanensis	7.25	7.72
	Proj -8	Pinus yunnanensis	6.64	7.03
	Proj -9	Pinus yunnanensis	6.25	6.71
	Proj -10	Masson pine	7.92	7.96
Monitoring equipment	DBH_{i,p,j,i}: Vinyl tape, wooden stake H_{i,p,j,i}: Hypsometer metric tape The equipment mentioned above has a state-recognized certificate of qualification and no need to be calibrated.			
QA/QC procedures to be applied	Quality control/quality assurance (QA/QC) procedures prescribed under National Forest Inventory are applied. In absence of these, QA/QC procedures from published handbooks or IPCC GPG LULUCF 2003 may be applied. The measure is in line with LY/T 2253-2014 <Guidelines on carbon accounting and monitoring for afforestation project> issued by National Forest Bureau²³ & HJ 710.1-2014 'Technical guidelines for biodiversity monitoring—terrestrial vascular plants' ²⁴ issued by Ministry of environmental protection.			
Purpose of data	The parameter is used to calculate actual net GHG removals.			
Calculation method	These two parameters are four trees dimensions used as entry data into the volume equations for the calculation of stem volume of trees.			
Comments	For the ex-post estimation during the following verification, the allometric equations of each tree species will be used to calculate the stem volume, and the allometric equation used will be demonstrated to be appropriate for the purpose of estimation of tree biomass by applying the tool 'Demonstrating appropriateness of allometric equations for estimation of above-ground tree biomass in A/R CDM project activities' in the project monitoring report.			

²³<https://www.renrendoc.com/p-20779950.html>

²⁴<http://www.doc88.com/p-4512190031524.html>

Data / Parameter	A _i ; A _{PLOT,i}																																			
Data unit	ha																																			
Description	Area of stratum i; Size of sample plot in stratum i																																			
Source of data	Field measurement																																			
Description of measurement methods and procedures to be applied	Standard operating procedures (SOPs) prescribed under national forest inventory are applied. In absence of these, SOPs from published handbooks or the IPCC GPG LULUCF 2003, may be applied.																																			
Frequency of monitoring/recording	Before every verification event																																			
Value applied:	A_i:<table><thead><tr><th>Project Stratifications number</th><th>Category of tree</th><th>Area (ha)</th></tr></thead><tbody><tr><td>Proj -1</td><td>China fir</td><td>19245.27</td></tr><tr><td>Proj -2</td><td>China fir</td><td>8477.07</td></tr><tr><td>Proj -3</td><td>China fir</td><td>3121</td></tr><tr><td>Proj -4</td><td>Cypresses</td><td>500</td></tr><tr><td>Proj -5</td><td>Cypresses</td><td>2345</td></tr><tr><td>Proj -6</td><td>Cypresses</td><td>2226.4</td></tr><tr><td>Proj -7</td><td>Pinus yunnanensis</td><td>500</td></tr><tr><td>Proj -8</td><td>Pinus yunnanensis</td><td>8204.4</td></tr><tr><td>Proj -9</td><td>Pinus yunnanensis</td><td>2441.93</td></tr><tr><td>Proj -10</td><td>Masson pine</td><td>3000</td></tr></tbody></table> A_{PLOT,i}:0.07065²⁵(ha)			Project Stratifications number	Category of tree	Area (ha)	Proj -1	China fir	19245.27	Proj -2	China fir	8477.07	Proj -3	China fir	3121	Proj -4	Cypresses	500	Proj -5	Cypresses	2345	Proj -6	Cypresses	2226.4	Proj -7	Pinus yunnanensis	500	Proj -8	Pinus yunnanensis	8204.4	Proj -9	Pinus yunnanensis	2441.93	Proj -10	Masson pine	3000
Project Stratifications number	Category of tree	Area (ha)																																		
Proj -1	China fir	19245.27																																		
Proj -2	China fir	8477.07																																		
Proj -3	China fir	3121																																		
Proj -4	Cypresses	500																																		
Proj -5	Cypresses	2345																																		
Proj -6	Cypresses	2226.4																																		
Proj -7	Pinus yunnanensis	500																																		
Proj -8	Pinus yunnanensis	8204.4																																		
Proj -9	Pinus yunnanensis	2441.93																																		
Proj -10	Masson pine	3000																																		
Monitoring equipment	GPS measuring equipment																																			
QA/QC procedures to be	Standard operating procedures (SOPs) prescribed under national																																			

²⁵ The sample plot is a circular plot with a radius of 15 meters, with an area of 706m². When the unit is converted into hectare, the sample plot area is 0.07065 hectare.

applied	forest inventory are applied. The measure is in line with LY/T 2253-2014 <Guidelines on carbon accounting and monitoring for afforestation project> ²⁶
Purpose of data	The parameter is used to calculate actual net GHG removals
Calculation method	N/A
Comments	N/A

Data / Parameter	$N_{i,j}$
Data unit	tree/ha
Description	Number of the tree species j of strata i(except for trees planted in baseline scenario)
Source of data	Field measurement
Description of measurement methods and procedures to be applied	Standard operating procedures (SOPs) prescribed under national forest inventory are applied. In absence of these, SOPs from published handbooks, or from the IPCC GPG LULUCF 2003, may be applied.
Frequency of monitoring/recording	Before every verification event
Value applied:	Please refer to ER calculation sheet for details
Monitoring equipment	Counter
QA/QC procedures to be applied	Standard operating procedures (SOPs) prescribed under national forest inventory are applied. The measure is in line with LY/T 2253-2014 <Guidelines on carbon accounting and monitoring for afforestation project>
Purpose of Data	The parameter is used to calculate actual net GHG removals
Calculation method	N/A
Comments	The trees planted in the project have been marked by hanging tree number signs, and original trees before the project do not hanging signs, which means that these original trees do not counted in the monitoring of the project, that is to say, the parameter of $N_{i,j}$ does not contain the trees in the baseline scenario.

Data / Parameter	n
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²⁶<https://www.renrendoc.com/p-20779950.html>

Data unit	Dimensionless
Description	The number of sample plots
Source of data	Calculation
Description of measurement methods and procedures to be applied	This value is estimated based on a pre-sampling developed in the Project Area before monitoring.
Frequency of monitoring/recording	Before first verification.
Value applied:	26
Monitoring equipment	/
QA/QC procedures to be applied	$n = \left(\frac{t_{VAL}}{E} \right)^2 \times \left(\sum_i w_i \times s_i \right)^2$
Purpose of Data	The parameter is used to calculate actual net GHG removals
Calculation method	See § 3.1.3 - Number of sample plots
Comments	/

Data / Parameter	n _i				
Data unit	Dimensionless				
Description	Number of sample plots allocated to strata i				
Source of data	Calculation				
Description of measurement methods and procedures to be applied	This value is estimated based on a pre-sampling developed in the Project Area before monitoring.				
Frequency of monitoring/recording	Before first verification				
Value applied:	Project Stratifications	Category of tree	n _i	number of sampling plots	
	PROJ-1	China fir	11	11	

	PROJ-2	China fir	5	5
	PROJ-3	China fir	2	3
	PROJ-4	Cypresses	0	3
	PROJ-5	Cypresses	1	3
	PROJ-6	Cypresses	1	3
	PROJ-7	Pinus yunnanensis	0	3
	PROJ-8	Pinus yunnanensis	3	3
	PROJ-9	Pinus yunnanensis	1	3
	PROJ-10	Masson pine	2	3
Monitoring equipment	/			
QA/QC procedures to be applied	$n_i = n \times \frac{w_i \times s_i}{\sum_i w_i \times s_i}$			
Purpose of Data	The parameter is used to calculate actual net GHG removals			
Calculation method	See § 3.1.3 - Number of sample plots			
Comments	/			

Data / Parameter	W _i			
Data unit	Dimensionless			
Description	Relative weight of the area of stratum i; dimensionless			
Source of data	Calculation			
Description of measurement methods and procedures to be applied	The relative weight of the area of a stratum i is equal to the area of the stratum i divided by the project area.			
Frequency of monitoring/recording	Before first verification.			
Value applied:		Project Stratifications	Category of tree	W _i
		PROJ-1	China fir	0.38444
		PROJ-2	China fir	0.16933
		PROJ-3	China fir	0.06234
		PROJ-4	Cypresses	0.00999
		PROJ-5	Cypresses	0.04684

		PROJ-6	Cypresses	0.04447	
		PROJ-7	Pinus yunnanensis	0.00999	
		PROJ-8	Pinus yunnanensis	0.16389	
		PROJ-9	Pinus yunnanensis	0.04878	
		PROJ-10	Masson pine	0.05993	
Monitoring equipment	/				
QA/QC procedures to be applied	The relative weight of the area of stratum i is equal to the area of the stratum i divided by the project area				
Purpose of Data	The parameter is used to calculate number of sample plots				
Calculation method	See § 3.1.3 - Number of sample plots				
Comments	/				

Data / Parameter	S _i			
Data unit	Dimensionless			
Description	Estimated standard deviation of biomass stock per unit area in strata i			
Source of data	Calculation			
Description of measurement methods and procedures to be applied	Accordance with the tool, known from existing data related to the project area or existing data related to a similar area. According to the evidence issued by Zunyi city Forestry Bureau, the standard deviation of forestry survey and sampling in this area requires a commonly used coefficient of variation C, which is 30% in Zunyi city ²⁷ .			
Frequency of monitoring/recording	Before first verification.			
Value applied:	Project Stratifications	Category of tree	S _i	
	PROJ-1	China fir	38.996	

²⁷ Evidence on variable coefficient data provided by Zunyi Forestry Bureau.

	PROJ-2	China fir	37.945
	PROJ-3	China fir	36.831
	PROJ-4	Cypresses	30.712
	PROJ-5	Cypresses	28.896
	PROJ-6	Cypresses	27.078
	PROJ-7	Pinus yunnanensis	26.570
	PROJ-8	Pinus yunnanensis	25.778
	PROJ-9	Pinus yunnanensis	24.948
	PROJ-10	Masson pine	40.638
Monitoring equipment	/		
QA/QC procedures to be applied	The variable coefficient times biomass carbon reserves at the end of Period (t.d.m•ha-1)		
Purpose of Data	The parameter is used to calculate number of sample plots		
Calculation method	See § 3.1.3 - Number of sample plots		
Comments	/		

Data / Parameter	E
Data unit	t d.m. ha ⁻¹
Description	Acceptable margin of error (i.e. one-half the confidence interval) in estimation of biomass stock within the project boundary
Source of data	A default value equal to 10% of the mean biomass stock within the project boundary was used, and the mean biomass stock within the project boundary was estimated from the preliminary sample plots.
Description of measurement methods and procedures to be applied	The project monitoring team set 3 preliminary sample plots for each strata and calculated the mean value of the biomass stock in each strata, and the mean value of biomass stock within the project boundary was the weighted average of all strata.
Frequency of monitoring/recording	Before every verification event
Value applied	Please see Table 2 for details
Monitoring equipment	N/A
QA/QC procedures to be applied	N/A
Purpose of data	The parameter is used to calculate number of sample plots for

	measurements
Calculation method	N/A
Comments	This parameter was not included in the registered PD since it is only applicable for calculating number of sample plots during verification

Data / Parameter	u_c
Data unit	Dimensionless
Description	Uncertainty in carbon change
Source of data	Calculated
Description of measurement methods and procedures to be applied	Calculated as described in Section 3.1.3
Frequency of monitoring/recording	Before every verification event
Value applied	0.578%
Monitoring equipment	N/A
QA/QC procedures to be applied	N/A
Purpose of data	The parameter is used to determine the uncertainty discount. The uncertainty is 0.578%, less than 10%, therefore no discount of the mean biomass should be applied according to the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"
Calculation method	$u_c = \frac{t_{VAL} \times \sqrt{\sum_{i=1}^M w_i^2 \times \frac{s_i^2}{n_i}}}{b_{TREE}}$
Comments	This parameter was not included in the registered PD since it is only applicable for calculating uncertainty discount

Data / Parameter	b_{TREE}
Data unit	t d.m.ha ⁻¹

Description	Mean change in tree biomass per hectare within the biomass estimation strata
Source of data	Calculated
Description of measurement methods and procedures to be applied	Calculated based on sample plots
Frequency of monitoring/recording	Before every verification event
Value applied	30.35586
Monitoring equipment	N/A
QA/QC procedures to be applied	N/A
Purpose of data	The parameter is used to calculate uncertainty in carbon stock
Calculation method	N/A
Comments	This parameter was not included in the registered PD since it is only applicable for calculating uncertainty in carbon stock

Data / Parameter	t_{VAL} (for calculation of u_C)
Data unit	Dimensionless
Description	Two-sided Students t-value for a confidence level of 90 per cent and degrees of freedom equal to $n - M$, where n is total number of sample plots within the tree biomass estimation strata and M is the total number of tree biomass estimation strata
Source of data	Students t-distribution table in the tool 'Calculation of the number of sample plots for measurements within A/R CDM project activities' (Version 02.1.0)
Description of measurement methods and procedures to be applied	N/A
Frequency of monitoring/recording	Before every verification event

Value applied	1.697 ²⁸
Monitoring equipment	N/A
QA/QC procedures to be applied	N/A
Purpose of data	The parameter is used to calculate uncertainty in carbon stock
Calculation method	N/A
Comments	This parameter was not included in the registered PD since it is only applicable for calculating uncertainty in carbon stock

3.1.3 Monitoring Plan

Monitoring team

The monitoring team consists of project proponent, Shanghai Libra, technicians and the forestry bureau. Firstly, Shanghai Libra sets the monitoring boundary, the number of plots, and drafts monitoring manual and tables. Secondly, project proponent and technicians select the sample plots at random and mark out the plots with ropes. Thirdly project proponent and Shanghai Libra confirm the monitoring frequency and notify the technicians and the forestry bureaus. Lastly, the monitoring results will be double-checked by experts of the forestry bureaus.

²⁸During this monitoring period, $n=40$, $M=10$, therefore $n-M=30$, so t_{VAL} is the two-sided Students t-value for a confidence level of 90 per cent and degrees of freedom of 30 which is 1.697 according to the t-distribution Table.

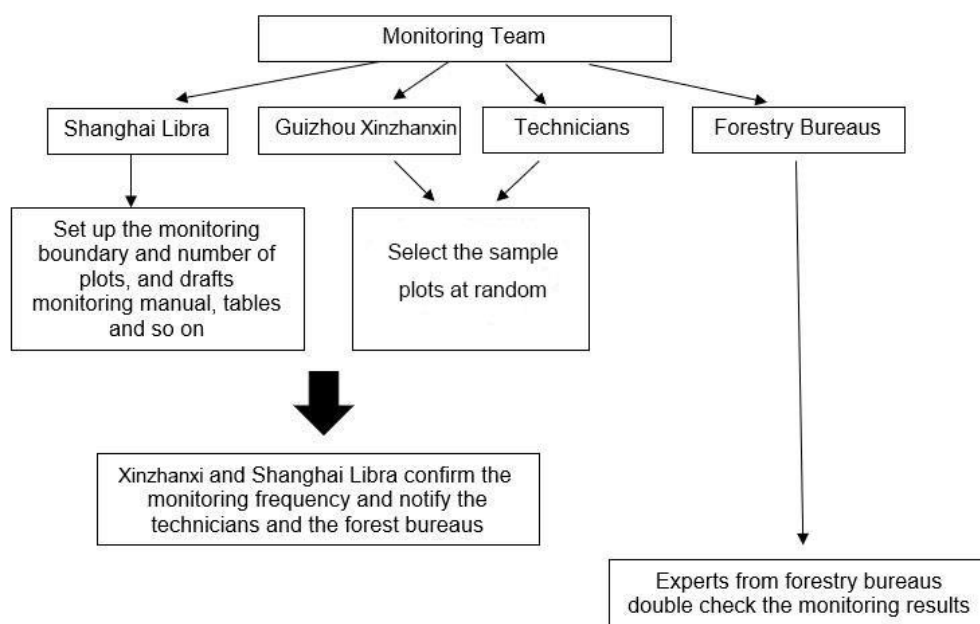


Figure 2 The figure of the monitoring team

Drafted by Shanghai Libra, Monitoring Manual has been provided to each member of the monitoring team with a specific explanation to make sure they fully understand all the monitoring processes and issues concerned.

For this monitoring period, the monitoring task was assigned in December 2022, and the monitoring team started the field measurement and recording work from 01-January to 30-January 2023.

Monitoring process

i) Monitor the applicability conditions listed in methodology and tools, and VCS standard v4.2 have been met

As mentioned in Section 3.1.2, the methodology AR-ACM0003 (version 2.0.0) is applicable under the following conditions:

- a) The land subject to the project activity does not fall in the wetland category.
- b) Soil disturbance attributable to the project activity does not cover more than 10 percent of the area in each of the following types of land when these lands are included within the project boundary:
 - i. Land containing organic soils.
 - ii. The land which, in the baseline, is subjected to land-use and management practices and receives inputs listed in Appendix 1 and Appendix 2 in the methodology.

To monitor the applicability conditions, the following steps have been taken:

Step 1 Monitoring of boundary

During this monitoring period, technicians are strictly following the monitoring plan in PD, which stipulates the measurement and management of project boundary coordinates. Boundary information such as original records has been retained and backed up by electronic and paper documents until the end of this monitoring period.

The monitoring team used GPS or other methods to verify project boundaries and determine afforestation boundaries. The actual boundary does not exceed the design boundary after verification.

In the project area, the trees planted before the project have been marked and excluded by the technicians, which means that these trees do not counted in the monitoring of the project, that is to say, the parameter of N_{ij} does not contain the trees in the baseline scenario. While the trees planted in the project are marked separately by the technicians, and their growth is recorded in the subsequent monitoring, in other words, only the height and DBH of the trees actually planted in the project will be measured to calculate the carbon sink.

Step 2 Applicability of Methodology

Consolidated afforestation and reforestation baseline and monitoring methodology AR-ACM0003/Version 2.0.0 'Afforestation and reforestation of lands except wetlands' is applicable under the following conditions:

- a) The land subject to the project activity does not fall in the wetland category.
- b) Soil disturbance attributable to the project activity does not cover more than 10 percent of the area in each of the following types of land when these lands are included within the project boundary:

- i. Land containing organic soils.

The soil disturbance due to this project is in line with the requirements of soil and water conservation. Afforestation density was 2,148 plant/ha, soil disturbance area ratio was 3.44%²⁹, less than 10%, and there was no repeated disturbance.

- ii. The land which, in the baseline, is subjected to land-use and management practices and receives inputs listed in Appendix 1 and Appendix 2 in the methodology.

The afforestation plot of this project belongs to the forestry land stipulated by the state, and there is no agricultural activity before or after the afforestation activity of this project; therefore, there is no situation where existing agricultural activities have been transferred.

Therefore, AR-ACM0003 (Version 2.0.0) is applicable to the proposed project.

²⁹Proportion of soil disturbed area: $0.16 \text{ m}^2 \times 2148 / 10000 \text{ m}^2 = 3.44\%$. Among them, 0.16 m^2 was derived from the surface area calculated from the specification of artificial afforestation cavities in the Project Design (40cm*40cm)

Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities (Version 01) is applicable under the following conditions:

- a) Forestation of the land within the proposed project boundary performed with or without being registered as the VCS project activity shall not lead to violation of any applicable law even if the law is not enforced.

The forestation of the land within the project boundary does not lead to violation of any applicable law.

- b) The tool does not apply to small-scale afforestation and reforestation project activities.

The proposed project is a large-scale afforestation project.

Therefore, the combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities (Version 01) is applicable for the proposed project.

Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities (Version 04.2) has no internal applicability conditions.

ii) Post-stratification and determining the number of plots

The first time of monitoring, if there are changes in the area and boundary, the carbon stratification of the project needs to update. In addition, if the number of carbon stratum and the area change, the number of sample plots need to be recalculated.

Prior stratification from the baseline survey is the basis for project monitoring in the future. But the variables in the project implementation make the actual situation deviate from the plan. Therefore, the project needs to consider tree species, patterns and other factors in actual planting, and update stratification to post-stratification.

During this monitoring period, the area and boundary of the project have not changed, and the carbon layer is consistent with the carbon layer in the project description, so the number of sample plots has not changed.

Step 1 Calculation of the number of sample plots

Using tool 'Calculation of the number of sample plots for measurements within A/R CDM project activities (Version 02.1.0)' gets the number of plots within each stratum. In order to ensure the statistical independence of each stratum, the number of sample plots is at least 3. The calculation process is as follows:

$$n = \left(\frac{t_{FAL}}{E} \right)^2 * \left(\sum_i w_i * s_i \right)^2 \quad (1)$$

$$n_i = n \cdot \frac{w_i \cdot S_i}{\sum_i w_i \cdot S_i} \quad (2)$$

Where:

- n Number of sample plots required for estimation of biomass stocks within the project boundary, dimensionless
- n_i Number of sample plots allocated to stratum i for estimation of biomass stocks within the project boundary, dimensionless
- t_{VAL} Two-sided Student's t-value, at infinite degrees of freedom, for the required confidence level; dimensionless
- N Total number of possible sample plots within the project boundary (i.e. the sampling space or the population); dimensionless
- W_i Relative weight of the area of stratum i (i.e. the area of the stratum i divided by the project area); dimensionless
- S_i Estimated standard deviation of biomass stock in stratum i; t d.m. ha⁻¹
- E Acceptable margin of error (i.e. one-half the confidence interval) in estimation of biomass stock within the project boundary; t d.m. ha⁻¹

The standard deviation of biomass stock for each stratum (s_i) was conservatively determined as 30%. This was determined based on the 90% confidence level. A default value equal to 10% of the mean biomass stock was used as the acceptable margin of error. The mean biomass stock is the expected biomass at the time of monitoring.

The calculated results of the above monitoring parameters are shown in the following table:

Table 2 Number of sample plots

Project Stratifications	Category of tree	W _i	S _i	t _{VAL}	E	n	n _i	Number of sample plots
PROJ-1	China fir	0.38444	38.996	1.645	11.563	26	11	11
PROJ-2	China fir	0.16933	37.945				5	5
PROJ-3	China fir	0.06234	36.831				2	3
PROJ-4	Cypresses	0.00999	30.712				0	3
PROJ-5	Cypresses	0.04684	28.896				1	3
PROJ-6	Cypresses	0.04447	27.078				1	3
PROJ-7	Pinus	0.00999	26.570				0	3

	yunnanensis							
PROJ-8	Pinus yunnanensis	0.16389	25.778				3	3
PROJ-9	Pinus yunnanensis	0.04878	24.948				1	3
PROJ-10	Masson pine	0.05993	40.638				2	3

Step 2 Setting sample plots

There are 169 plots in this project, and 40 of the 169 plots with 10 carbon layers should be randomly selected as the sample plots. Random sampling was to list 169 plots containing ID Numbers of 10 carbon layers in the Excel table, and then set a random number formula in the table for random calculation. According to the number of sample plots of each carbon layer, the sample plots of each carbon layer were randomly calculated and selected. Finally, 40 sample plots were obtained, including the ID Numbers of the sample plots.

The monitoring agency needs to set fixed sample plots due to measuring requirements at regular intervals. Plot size is set to be a circular area with a diameter of 30m. The plot needs to determine the location at the center point of the plot. The location of the fixed sample plot should be set systematically, but the starting fixed sample plot needs to be set randomly use GPS in field work. The location, administrative positions, number of carbon stratum and carbon sub-stratum of each plot should be documented to ensure that the distribution of fixed sample plots is uniform. Fixed plots measuring methods and procedures must be in strict accordance with the technical details of Forest Resources Planning and Design Technical Regulations.

Table 3 The Sample plots table

Sample plots ID	Project Stratifications	Latitude and longitude	Category of tree	Year
ID-M12	PROJ-1	27°55'57"N107°30'48"E	China fir	2015
ID-M13	PROJ-1	27°55'56"N107°28'23"E	China fir	2015
ID-S31	PROJ-1	28°09'45"N107°20'51"E	China fir	2015
ID-W5	PROJ-1	28°30'08"N107°39'47"E	China fir	2015
ID-D7	PROJ-1	28°45'11"N107°44'49"E	China fir	2015
ID-D19	PROJ-1	28°43'22"N107°43'38"E	China fir	2015
ID-S2	PROJ-1	28°16'22"N106°58'57"E	China fir	2015
ID-T17	PROJ-1	28°21'13"N106°51'27"E	China fir	2015
ID-X2	PROJ-1	28°22'35"N106°11'41"E	China fir	2015
ID-X12	PROJ-1	28°13'36"N106°14'09"E	China fir	2015
ID-B3	PROJ-1	27°36'21"N106°29'24"E	China fir	2015

ID-S33	PROJ-2	27°12'03"N107°21'10"E	China fir	2016
ID-S11	PROJ-2	28°14'19"N107°01'44"E	China fir	2016
ID-T9	PROJ-2	28°08'36"N106°53'39"E	China fir	2016
ID-T1	PROJ-2	28°45'04"N107°10'41"E	China fir	2016
ID-T32	PROJ-2	28°46'24"N107°04'30"E	China fir	2016
ID-B16	PROJ-3	27°20'50"N106°54'28"E	China fir	2017
ID-S37	PROJ-3	27°53'11"N107°12'32"E	China fir	2017
ID-M19	PROJ-3	27°50'07"N107°28'36"E	China fir	2017
ID-S36	PROJ-4	27°53'27"N107°16'58"E	Cypresses	2015
ID-S25	PROJ-4	28°26'55"N107°05'02"E	Cypresses	2015
ID-S13	PROJ-4	28°05'13"N107°12'42"E	Cypresses	2015
ID-S16	PROJ-5	28°13'27"N107°26'18"E	Cypresses	2016
ID-Z5	PROJ-5	28°40'32"N107°18'45"E	Cypresses	2016
ID-W8	PROJ-5	28°41'16"N107°47'35"E	Cypresses	2016
ID-B13	PROJ-6	27°21'06"N106°58'46"E	Cypresses	2017
ID-W13	PROJ-6	28°57'52"N107°54'42"E	Cypresses	2017
ID-M3	PROJ-6	27°38'17"N107°22'18"E	Cypresses	2017
ID-S3	PROJ-7	28°19'45"N107°01'09"E	Pinus yunnanensis	2015
ID-S4	PROJ-7	28°18'50"N107°06'27"E	Pinus yunnanensis	2015
ID-S14	PROJ-7	28°04'16"N107°09'08"E	Pinus yunnanensis	2015
ID-B15	PROJ-8	27°22'29"N106°56'31"E	Pinus yunnanensis	2015
ID-M11	PROJ-8	27°57'44"N107°28'50"E	Pinus yunnanensis	2016
ID-T24	PROJ-8	28°43'21"N107°02'07"E	Pinus yunnanensis	2016
ID-T7	PROJ-9	28°10'24"N106°47'30"E	Pinus yunnanensis	2016
ID-Z11	PROJ-9	28°44'09"N107°23'06"E	Pinus yunnanensis	2017
ID-T25	PROJ-9	28°44'48"N107°07'19"E	Pinus yunnanensis	2017
ID-W4	PROJ-10	28°30'39"N107°41'56"E	Masson pine	2015
ID-X10	PROJ-10	28°23'26"N106°24'33"E	Masson pine	2015
ID-T10	PROJ-10	28°08'44"N106°48'25"E	Masson pine	2015

Step 3 Determine the sample location

The sample is a fixed circular area with a diameter of 30m each. When a sample on a slope is to be selected, the gradient must be monitored, and the horizontal long should be converted into oblique long. The management methodology (irrigation, fertilization, etc.) within the samples must be the same as those outside the samples.

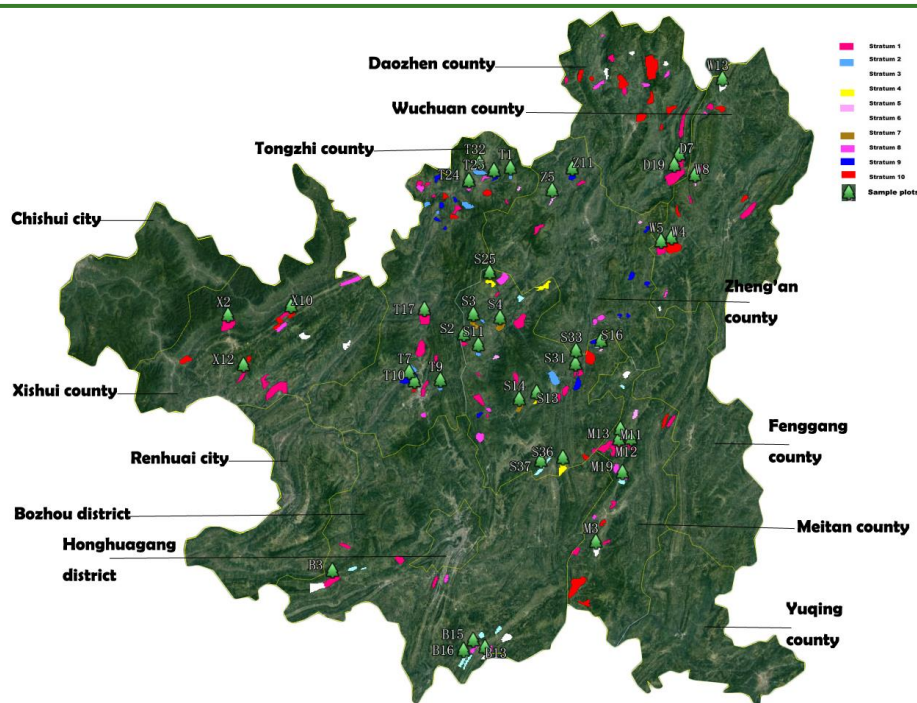


Figure 3 The Sample plots location with flags

iii) Method for estimation of the change in carbon stock

The actual net GHG removals by sinks are calculated by the equation (3):

$$\Delta C_{p,t} = \Delta C_{TREE_PROJ,t}$$

Where:

$\Delta C_{p,t}$ = Change in the carbon stocks in project, occurring in the selected carbon pools, in year t; t CO₂-e

$\Delta C_{TREE_PROJ,t}$ = Change in carbon stock in tree biomass in project in year t, as estimated in the tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities”; t CO₂-e

And the tool ‘Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activity (Version 04.2)’ is used to estimate the change in carbon stock above the ground, and Method (b) (Direct estimation of change by re-measurement of sample plots), this method (b) is estimated change in carbon stock in trees between two points of time in Section 6 of the tool has applied for the monitoring during the following verification.

Mean carbon stock in trees within the tree biomass estimation strata and the associated uncertainty is estimated as follows (all time-dependent quantities relate to the time of measurement):

$$C_{TREE} = \frac{44}{12} \times CF_{TREE} \times B_{TREE} \quad (4)$$

$$B_{TREE} = A \times b_{TREE} \quad (5)$$

$$b_{TREE} = \sum_{i=1}^M w_i \times b_{TREE,i} \quad (6)$$

$$u_C = \frac{t_{VAL} \times \sqrt{\sum_{i=1}^M w_i^2 \times \frac{s_i^2}{n_i}}}{|b_{TREE}|} \quad (7)$$

Where:

C_{TREE} = Change in carbon stock in trees between two successive measurements; t CO₂-e

CF_{TREE} = Carbon fraction of tree biomass; t C/t d.m.

B_{TREE} = Change in biomass within the biomass estimation strata; t d.m.

A = Sum of the area of the biomass estimation strata; ha

b_{TREE} = Mean change in tree biomass per hectare within the biomass estimation strata; t d.m./ha

w_i = Ratio of the area of stratum i to the sum of areas of biomass estimation strata (i.e. $w_i = A_i/A$); dimensionless

$b_{TREE,i}$ = Mean change in tree biomass per hectare in strata i; t d.m./ha

u_C = Uncertainty in ΔC_{TREE}

t_{VAL} = Two-sided Student's t-value for a confidence level of 90 percent and degrees of freedom equal to $n - M$, where n is total number of sample plots within the tree biomass estimation strata, and M is the total number of tree biomass estimation strata

s_i^2 = Variance of mean change in tree biomass per hectare in stratum i; (t d.m. ha⁻¹)²

n_i = Number of sample plots, in stratum i, in which tree biomass was re-measured

Mean tree biomass per hectare in a stratum and the associated variance are estimated as follows:

$$b_{TREE,i} = \frac{\sum_{p=1}^{n_i} b_{TREE,p,i}}{n_i} \quad (8)$$

$$s_i^2 = \frac{n_i \times \sum_{p=1}^{n_i} b_{TREE,p,i}^2 - \left(\sum_{p=1}^{n_i} b_{TREE,p,i}\right)^2}{n_i \times (n_i - 1)} \quad (9)$$

Where:

$b_{TREE,i}$ = Mean change in tree biomass per hectare in strata i; t d.m./ha

$b_{TREE,p,i}$ = Change in tree biomass per hectare in plot p in stratum i; t d.m. ha⁻¹

s_i^2 = Variance of mean change in tree biomass per hectare in stratum i; (t d.m. ha⁻¹)²

n_i = Number of sample plots, in stratum i, in which tree biomass was re-measured

Mean tree biomass per hectare within the project boundary and its variance were estimated as follows (Equation (14) in methodological tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities”(Version 04.2):

$$b_{TREE} = \sum_{i=1}^M w_i \times b_{TREE,i} \quad (10)$$

$$s_{b_{TREE}}^2 = \sum_{i=1}^M w_i^2 * \frac{s_i^2}{n_i} \quad (11)$$

Where:

$b_{TREE,t}$ Mean tree biomass per hectare within the project boundary at a given point of time in year t; t d. m. ha⁻¹

w_i Ratio of the area of stratum i to the sum of areas of biomass estimation strata; dimensionless

$b_{TREE,i,t}$ Mean tree biomass per hectare in stratum i at a given point of time in year t; t d. m. ha⁻¹

$s_{b_{TREE}}^2$ Variance of mean tree biomass per hectare within the project boundary at a given point of time in year t; (t d. m. ha⁻¹)²

s_i^2 Variance of tree biomass per hectare in stratum i at a given point of time in year t; (t d. m. ha⁻¹)²

n_i Number of sample plots in stratum i

M Number of tree biomass estimation strata within the project boundary

Uncertainty of the mean tree biomass per hectare within the project boundary was estimated as (Equation (15) in methodological tool 'Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities' (Version 04.2):

$$u_c = \frac{t_{VAL} \times \sqrt{\sum_{i=1}^M w_i^2 \times \frac{s_i^2}{n_i}}}{b_{TREE}} \quad (12)$$

Where:

u_c Margin of error of the mean tree biomass per hectare within the project boundary; t d. m. ha⁻¹

t_{VAL} Two-sided Student's t-value for: (i) Degrees of freedom equal to $n - M$, where n is total number of sample plots within the project boundary, and M is the total number of tree biomass estimation strata; and (ii) The confidence level required by the methodology applying this tool (e.g. 90% or 95%); dimensionless.

E.g. Two-sided Student's t-value for a probability value of 10% (which implies a 90% confidence level) and. Two-sided Student's t-value for a confidence level of 90 per cent and degrees of freedom equal to $n - M$, where n is total number of sample plots within the tree biomass estimation strata, and M is the total number of tree biomass estimation strata. According to the Two-sided Student's t-value, n is 40 and M is 10 while $n-m$ is 30 with the corresponding t_{VAL} value of 1.697.

iv) Methods of plot biomass measurement

Tree biomass per hectare in a sample plot is estimated by applying one of the plot measurement methods provided in Appendix 1 of the Tool. For the project, the measurement of fixed area plots for the calculation.

In this method, sample plots of the same size (e.g. or of a hectare) are installed in a stratum. All trees in a sample plot above a minimum dimension are measured and the biomass of each tree is estimated. The biomass of the individual trees is added and the sum is divided by the area of the sample plot to obtain the plot biomass value.

The plot biomass value (i.e. per-hectare tree biomass at the centre of the plot) is estimated as follows (all time-dependent variables relate to the time of measurement):

$$b_{TREE,p,i} = \frac{B_{TREE,p,i}}{A_{PLOT,i}} \quad (13)$$

$$B_{TREE,p,i} = \sum_j B_{TREE,j,p,i} \quad (14)$$

$$B_{TREE,j,p,i} = \sum_l B_{TREE,l,j,p,i} \quad (15)$$

Where:

$b_{TREE,p,i}$	=	Tree biomass per hectare in sample plot p of stratum i; t d.m./ha
$B_{TREE,p,i}$	=	Tree biomass in sample plot p of stratum i; t d.m.
$A_{PLOT,i}$	=	Size of sample plot in stratum i; ha
$B_{TREE,j,p,i}$	=	Biomass of trees of species j in sample plot p of stratum i; t d.m.
$B_{TREE,l,j,p,i}$	=	Biomass of trees l of species j in sample plot p of stratum i; t d.m.

Biomass of a tree in a sample plot is estimated by using the following equation:

$$B_{TREE,l,j,p,i} = V_{TREE,l,p,j,i} \times D_j \times BEF_j \times (1 + R_j) \quad (16)$$

Where:

$B_{TREE,l,p,j,i}$	=	Biomass of tree l of species j in sample plot p of stratum i; t d.m.
$V_{TREE,l,p,j,i}$	=	Stem volume of tree l of species j in sample plot p of stratum i, estimated from the tree dimension(s) as entry data into a volume table or volume equation; m3
D_j	=	Density of tree species j; t d.m./m3
BEF_j	=	Biomass expansion factor for conversion of tree stem biomass to above-ground tree biomass, for tree species j; dimensionless
R_j	=	Root-shoot ratio for tree species j; dimensionless

For the Stem volume of tree l of species j in sample plot p of stratum i $V_{TREE,l,p,j,i}$, the tree dimensions used as entry data into a volume equations are Height of trees ($H_{l,p,j,i}$) and Diameter at breast height of trees ($DBH_{l,p,j,i}$).

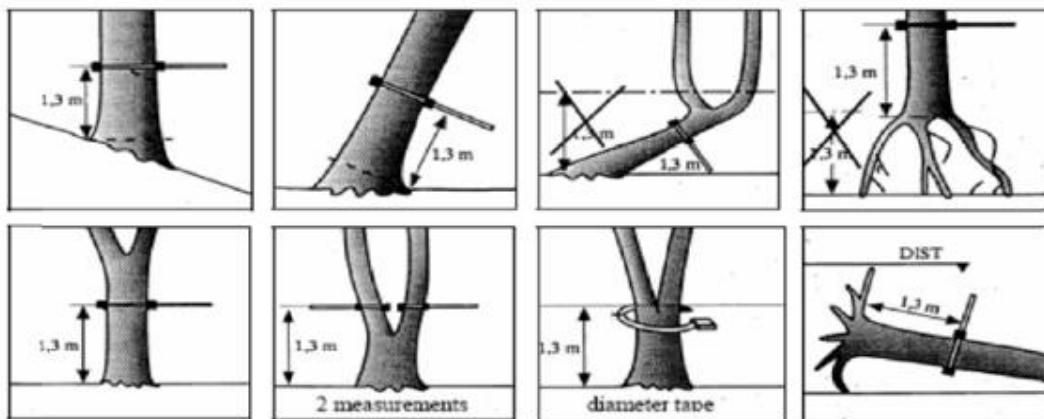


Figure 4 Tree measurements

The minimum diameter at breast height (DBH) measured is 2.7 cm. The DBH of many young trees especially those planted with delay have not reached the threshold. If over 2/3 of trees in a sampling plot have DBH less than 2.0 cm, then the plot was not measured and its carbon stock in living biomass was assumed to be zero.

DBH and height of each tree with DBH equal or over 2.0 cm in all sample plots were measured. DBH was measured at 1.3 m above the ground in the manner as shown in the figure below. After measuring the DBH of trees, their respective height measurements were conducted. The measured DBH and height were recorded on the field form (Figure-6).

Some preventive measures were taken into account:

- Measurement tape was kept in a position that perpendicularly cut the tree axe at 1.3 m;
- On inclined terrain, DBH measurement at 1.3 m is taken from an uphill position
- For fork trees, according to the point where the fork divides the stem, was used the following methodology. If the fork began (the point where the core is divided) below 1.3 m height, each stem having the diameter required (≥ 10 cm) was considered as a tree and was measured. Diameter measurement of each stem was taken at 1.3 m height. If the fork began at 1.3 m or a little higher, the tree was counted as a single tree. The diameter measurement was thus carried out below the fork intersection point, just below the bugle that could influence the DBH.

Data management

All data collected as part of monitoring is archived electronically. All information should be stored by the technology department of the project owner and all the material has a physical copy for backup. And all data collected shall be archived for a period of at least two years after the end of the last crediting period of the project activity.

Statistical table of tree monitoring records of sample land								
Category of tree:								
No	High (m)	The perimeter (cm)	No	High (m)	The perimeter (cm)	No	High (m)	The perimeter (cm)
1			44			87		
2			45			88		
3			46			89		
4			47			90		
5			48			91		
6			49			92		
7			50			93		
8			51			94		
9			52			95		
10			53			96		
11			54			97		
12			55			98		
13			56			99		
14			57			100		
15			58			101		
16			59			102		
17			60			103		
18			61			104		
19			62			105		
20			63			106		
21			64			107		
22			65			108		
23			66			109		
24			67			110		
25			68			111		
26			69			112		
27			70			113		
28			71			114		
29			72			115		
30			73			116		
31			74			117		
32			75			118		
33			76			119		
34			77			120		
35			78			121		
36			79			122		
37			80			123		
38			81			124		
39			82			125		
40			83			126		
41			84			127		
42			85			128		
43			86			129		
Monitoring supervisor (signature):			Reviewer (signature):			Monitoring period:		

Figure 5 Plot of tree monitoring table

QA/QC

There is a systematic internal review and correction process. The technicians provide the original record forms. The checks on the data and the detection of negative growth which might be caused by data entry errors are done by Guizhou Xinzhanxin. Then, Guizhou Xinzhanxin provides feedback to the technicians and correct the data before sharing with Libra. Libra drafts the monitoring report based on the raw data and cross check with the forestry bureau experts. If there is no further comment from the experts, Libra finalizes the report. All parties are required to reply to any questions raised within 30 days. The monitoring equipment should be updated annually if there are new versions or more efficient monitoring tools available. The forestry bureaus are responsible for the monitoring equipment renewal or update.

3.1.4 Dissemination of Monitoring Plan and Results (CL4.2)

Monitoring plans and all documents and information about the results of the fourth monitoring and fourth verification of this project had been published on VERRA's platforms for public comment from. Additionally, the project owner maintains the communication between the different stakeholders and villagers were informed of the latest project progression.

In the upcoming verification period, the PP will relay the information on monitoring plan and results once the documents are available.

3.2 Quantification of GHG Emission Reductions and Removals

3.2.1 Baseline Emissions

Baseline net GHG removals by sinks

As described above, the baseline scenario is the continuation of existing land use i.e. lands remain land suitable for afforestation. Based on the applied methodology AR-ACM0003 (Version 2.0.0), the baseline net GHG removals by sinks is estimated as follows:

$$\Delta C_{BSL,t} = \Delta C_{TREE_BSL,t} + \Delta C_{SHRUB_BSL,t} + \Delta C_{DW_BSL,t} + \Delta C_{LI_BSL,t} \quad (17)$$

Where:

- $\Delta C_{BSL,t}$ = Baseline net GHG removals by sinks in year t; t CO₂-e
- $\Delta C_{TREE_BSL,t}$ = Change in carbon stock in baseline tree biomass within the project boundary in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO₂-e
- $\Delta C_{SHRUB_BSL,t}$ = Change in carbon stock in baseline shrub biomass within the project boundary, in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO₂-e
- $\Delta C_{DW_BSL,t}$ = Change in carbon stock in baseline dead wood biomass within the project boundary, in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities"; t CO₂-e
- $\Delta C_{LI_BSL,t}$ = Change in carbon stock in baseline litter biomass within the project boundary, in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities"; t CO₂-e

According to the tool Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities v04.1, Carbon stock in trees in the baseline can be accounted as zero if all of the following conditions are met: (a) The pre-project trees are neither harvested, nor cleared, nor removed

throughout the crediting period of the project activity; (b) The pre-project trees do not suffer mortality because of competition from trees planted in the project, or damage because of implementation of the project activity, at any time during the crediting period of the project activity; (c) The pre-project trees are not inventoried along with the project trees in monitoring of carbon stocks but their continued existence, consistent with the baseline scenario, is monitored throughout the crediting period of the project activity.

For this project, the carbon stock and change in carbon stock is estimated as zero under the following 3 conditions: a) this project does not involve harvesting, clearing and removing of pre-project trees throughout the crediting period of the project activity; b) under the approval of Forestry Bureau, the tree-planting activity in this project is conducted under the condition of no disturbing the pre-existing tree, therefore, the pre-project trees do not suffer mortality or damage because of implementation of the project activity, at any time during the crediting period of the project activity; c) The trees planted in the project have been marked by hanging tree number signs, and original trees before the project do not hanging signs, which means that these original trees are not counted during the monitoring of the project, that is to say, pre-project trees are not inventoried along with the project trees in monitoring of carbon stocks . Above all, the baseline scenario $\Delta C_{TREE\ BSL,t}$, $\Delta C_{SHRUB\ BSL,t}$ is zero. Therefore, set the project baseline carbon variation of zero, $\Delta C_{BSL,t}=0$.

3.2.2 Project Emissions

Actual net GHG removals by sinks

According to the applied methodology AR-ACM0003 (Version 2.0.0), GHG emissions resulting from removal of herbaceous vegetation, combustion of fossil fuel, fertilizer application, use of wood, decomposition of litter and fine roots of N-fixing trees, construction of access roads within the project boundary, and transportation attributable to the project activity shall be considered insignificant and therefore accounted as zero.

The actual net GHG removals by sinks shall be calculated as the sum of the changes in carbon stocks in the project minus the increase in non-CO₂ GHG emissions within the project boundary, which is shown as follows:

$$\Delta C_{ACTUAL,t} = \Delta C_{P,t} - GHG_{E,t} \quad (18)$$

Where:

$\Delta C_{ACTUAL,t}$ = Actual net GHG removals by sinks, in year t; t CO₂-e

$\Delta C_{P,t}$ = Change in the carbon stocks in project, occurring in the selected carbon pools, in year t; tCO₂-e

$GHG_{E,t}$ = Increase in non-CO₂ GHG emissions within the project boundary as a result of the implementation of the A/R CDM project activity, in year t, as estimated in the tool “Estimation of non-CO₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity”; t CO₂-e

According to the tool, the use of fire for site preparation and/or to clear the land of harvest residue prior to replanting is specifically excluded from the project management and therefore non-CO₂ GHG emissions are estimated as zero.

$$GHG_{E,t} = 0$$

Change in the carbon stocks in project, occurring in the selected carbon pools in year t shall be calculated as follows:

$$\Delta C_{P,t} = \Delta C_{TREE_PROJ,t} + \Delta C_{SHRUB_PROJ,t} + \Delta C_{DW_PROJ,t} + \Delta C_{LI_PROJ,t} + \Delta SOC_{AL,t} \quad (19)$$

Where:

$\Delta C_{P,t}$ = Change in the carbon stocks in project, occurring in the selected carbon pools, in year t; t CO₂-e

$\Delta C_{TREE_PROJ,t}$ = Change in carbon stock in tree biomass in project in year t, as estimated in the tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities”; t CO₂-e

$\Delta C_{SHRUB_PROJ,t}$ = Change in carbon stock in shrub biomass in project in year t, as estimated in the tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities”; t CO₂-e

$\Delta C_{DW_PROJ,t}$ = Change in carbon stock in dead wood in project in year t, as estimated in the tool “Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities”; t CO₂-e

$\Delta C_{LI_PROJ,t}$ = Change in carbon stock in litter in project in year t, as estimated in the tool “Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities”; t CO₂-e

$\Delta SOC_{AL,t}$ = Change in carbon stock in SOC in project, in year t, in areas of land meeting the applicability conditions of the tool “Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities”, as estimated in the same tool; t CO₂-e

For conservativeness, only change in carbon stock in tree biomass of project will be considered. Therefore, the above equation can be simplified as:

$$\Delta C_{p,t} = \Delta C_{TREE_PROJ,t} \quad (20)$$

And the tool ‘Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activity’ (Version 04.2) is used to estimate the change in carbon stock above the ground. According to the tool, change in carbon stock in trees between two points of time is estimated by using one of the following methods or a combination thereof:

- (a) The difference of two independent stock estimations;
- (b) Direct estimation of change by re-measurement of sample plots;
- (c) Estimation by proportionate crown cover;
- (d) Demonstration of “no-decrease”.

Method (b) is efficient when there is a significant correlation between the plot biomass values on the two occasions (e.g. when there has been no harvest or disturbance in a stratum and therefore no significant spatial re-distribution of biomass has occurred in the stratum after the first estimation) For the project, there will be no harvest or disturbance during the project period, thus Method (b) should be selected to be selected, but this method is applicable only in ex-post estimation of change in carbon stock in trees for monitoring of project activities. Therefore, Method (a) is used for the ex-ante estimation during validation, and method (b) has been used in this monitoring period.

Under Method (a), the change in carbon stock in trees and the associated uncertainty are estimated as follows:

$$\Delta C_{TREE} = C_{TREE,t1} - C_{TREE,t2} \quad (21)$$

$$u_{\Delta C} = \frac{\sqrt{(u_1 \times C_{TREE,t1})^2 + (u_2 \times C_{TREE,t2})^2}}{|\Delta C_{TREE}|} \quad (22)$$

Where:

ΔC_{TREE} = Change in the carbon stocks in trees during the period between two points of time t1 and t2; t CO₂-e

$C_{TREE,t1}$ = Carbon stock in trees as estimated at time t1; t CO₂-e

$C_{TREE,t2}$ = Carbon stock in trees as estimated at time t2; t CO₂-e

$u_{\Delta C}$ = Uncertainty in ΔC_{TREE}

u_1, u_2 = Uncertainties in $C_{TREE,t1}$ and $C_{TREE,t2}$ respectively

For this monitoring, $C_{TREE,t1}$ means carbon stock in trees as estimated from 01-January-2016 to 31-December-2022. $C_{TREE,t2}$ means carbon stock in trees as estimated from 01-January-2016 to 31-December-2021.

Because it is the fourth verification over this monitoring period, $C_{TREE,t1}=2,753,915$, $C_{TREE,t2}=2,054,882$

Hence, $\Delta C_{TREE} = C_{TREE,t1} - C_{TREE,t2}$

Carbon stock in trees at a point of time is estimated by using one of the following methods or a combination thereof:

- (a) Estimation by measurement of sample plots;
- (b) Estimation by modelling of tree growth and stand development;
- (c) Estimation by proportionate crown cover;
- (d) Updating the previous stock by independent measurement of change.

For this monitoring period, Method (a) is used for the ex-post estimation during the monitoring period.

According to the Tool, under this method, random sample plots are installed in the strata (e.g. systematic sampling with a random start) and measured.

This method is more efficient when the sample plots are optimally allocated to the strata keeping in view the expected mean tree biomass per hectare and its variability in the strata. The number of sample plots and their allocation to strata may be estimated by using the A/R methodological tool 'Calculation of the number of sample plots for measurements within A/R CDM project activities'.

The carbon stock in trees in the tree biomass estimation strata is estimated as follows:

$$C_{TREE,i,j} = \sum_{i,j} A_i \times N_{i,j} \times \frac{44}{12} \times CF_{TREE,j} \times B_{TREE,j} \quad (23)$$

$$B_{TREE,j} = V_{TREE,j} \times D_j \times BEF_j \times (1 + R_j) \quad (24)$$

Where:

$C_{TREE,i,j}$	=	Carbon stock in trees of tree species j of strata i; t CO ₂ -e
A_i	=	Area of strata i; Mu
$N_{i,j}$	=	Number of the tree species j of strata i; trees/ha
$CF_{TREE,j}$	=	Carbon fraction of tree biomass for tree species j; t C/t d.m.
$B_{TREE,j}$	=	Biomass of one tree of tree species j; t d.m.
$V_{TREE,j}$	=	Stem volume of one tree of tree species j; t d.m.
D_j	=	Density of tree species j; t d.m/m ³
BEF_j	=	Biomass expansion factor for conversion of tree stem biomass to above-ground tree biomass, for tree species j; dimensionless
R_j	=	Root-shoot ratio for tree species j; dimensionless

Selection of allometric equations is based on the tool “Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities”, In this tool, a species-specific or group-of-species-specific allometric equation derived from trees growing in edapho-climatic conditions similar to those in the project area is considered appropriate, and hence can be used for ex post estimation of tree biomass, if at least one of the following conditions is satisfied:

- (a) The equation is used in the national forest inventory, or the national GHG inventory, of the host Party;
- (b) The equation has been used in commercial forestry sector of the host Party for ten years or more;
- (c) The equation was derived from a data set of at least 30 sample trees, and the value of coefficient of determination (R²) obtained was not less than 0.85.

The calculation formulas of this monitoring period are the allometric equations from DB52/T 702_2011 <The binary standing tree volume table of China Fir>, DB52/T 703_2011 <The binary standing tree volume table of Pinus Massoniana plantation>, DB52/T 773_2012 <The binary standing tree volume table of Cypress>, DB52/T 763_2012 <The binary standing tree volume table of Pinus yunnanensis>. These four formulas are the local Standards of Guizhou Province where the project is located. Since the criteria are used for national forest inventory in the host country, meeting the option (a) in the above criteria, which is in line with the requirement of the tool.

Referring to the equation in the Tool, the mean carbon stock in trees within the tree biomass estimation strata is estimated as follows:

$$C_{TREE,i,j} = \sum_{i,j} A_i \times N_{i,j} \times \frac{44}{12} \times CF_{TREE,j} \times B_{TREE,j} \quad (25)$$

And the biomass of tree is estimated as follows by referring to equation (5) in Appendix 1 of the Tool:

$$B_{TREE,j} = V_{TREE,j} \times D_j \times BEF_j \times (1 + R_j) \quad (26)$$

Where:

$C_{TREE,i,j}$	=	Carbon stock in trees of tree species j of strata i; t CO ₂ -e
A_i	=	Area of strata i; Mu
$N_{i,j}$	=	Number of the tree species j of strata i; trees/ha
$CF_{TREE,j}$	=	Carbon fraction of tree biomass for tree species j; t C/t d.m.
$B_{TREE,j}$	=	Biomass of one tree of tree species j; t d.m.
$V_{TREE,j}$	=	Stem volume of one tree of tree species j; m ³ .
D_j	=	Density of tree species j; t d.m/m ³
BEF_j	=	Biomass expansion factor for conversion of tree stem biomass to above-ground tree biomass, for tree species j; dimensionless
R_j	=	Root-shoot ratio for tree species j; dimensionless

The tree species adopted in the project are China fir, Cyprresses, Pinus yunnanensis and Masson pine. Allometric equation are used to estimate the average merchantable volume of one tree ($V_{TREE,j}$)

China fir ³⁰	$V_{TREE,j} = 0.000088296 \times D^{(1.94097 - 0.0044583 \times (D+H))} \times H^{(0.76012 + 0.0056841 \times (D+H))}$
Masson pine ³¹	$V_{TREE,j} = 0.000094602 \times D^{(1.88156 - 0.0030651 \times (D+H))} \times H^{(0.76840 + 0.0046574 \times (D+H))}$
Cyprresses ³²	$V_{TREE,j} = 0.000085626 \times D^{(1.9148 - 0.0045828 \times (D+H))} \times H^{(0.74041 + 0.00668 \times (D+H))}$
Pinus yunnanensis ³³	$V_{TREE,j} = 0.00010729 \times D^{(1.95029 - 0.0047643 \times (D+H))} \times H^{(0.63241 + 0.0075891 \times (D+H))}$

³⁰ DB52/T 702_2011 <The binary standing tree volume table of China Fir>.

³¹ DB52/T 703_2011 < The binary standing tree volume table of Pinus Massoniana plantation >.

³² DB52/T 773_2012 < The binary standing tree volume table of Cypress >.

³³ DB52/T 763_2012 < The binary standing tree volume table of Pinus yunnanensis >.

Where, $V_{TREE,j}$ = Stem volume of one tree of tree species j ; m^3

Wood density (D), biomass expansion factor ($BEF_{2,j}$), root-shoot ratio (R_i) and carbon fraction (CF_{TREE}) for China fir, Cypresses, Pinus yunnanensis and Masson pine are listed in the below.

Table 4-1 Wood density, BEF, Root-shoot ratio and carbon fraction used in the proposed project activity

	China fir		Masson pine		Cypress		Pinus yunnanensis	
Parameter	factor	Source	factor	Source	factor	Source	factor	Source
Wood density (D_i) (tonnes d.m.m-3)	0.307	The tree species involved in the proposed project can be obtained from the table using the values	0.380	The tree species involved in the proposed project can be obtained from the table using the values	0.478	The tree species involved in the proposed project can be obtained from the table using the values	0.483	The tree species involved in the proposed project can be obtained from the table using the values
$BEF_{2,j}$	1.634	in the second national bulletin	1.472	in the second national bulletin	1.732	in the second national bulletin	1.619	in the second national bulletin
Root-shoot ratio (R_i)	0.246	on climate change of the People's Republic of China	0.187	on climate change of the People's Republic of China	0.220	on climate change of the People's Republic of China	0.146	on climate change of the People's Republic of China
CF_{TREE}	0.520	"list of land-use change and forest greenhouse gases"	0.460	"list of land-use change and forest greenhouse gases"	0.510	"list of land-use change and forest greenhouse gases"	0.511	"list of land-use change and forest greenhouse gases"

According to the growing years of the description of the project activity, the aboveground biomass can be categorized into four Project Stratifications.

Table 4-2 Tree biomass per hectare in sample plots

Sample ID	$b_{tree,p,i}$	Sample ID	$b_{tree,p,i}$	Sample ID	$b_{tree,p,i}$	Sample ID	$b_{tree,p,i}$	Sample ID	$b_{tree,p,i}$	Sample ID	$b_{tree,p,i}$
Proj-1-	33.10	Proj-1-	32.06	Proj-3-01	16.71	Proj-5-01	38.95	Proj-7-	44.11	Proj-09-	27.77
Proj-1-	33.54	Proj-1-	32.30	Proj-3-02	16.45	Proj-5-02	39.02	Proj-7-	44.33	Proj-09-	29.04
Proj-1-	32.85	Proj-1-	33.18	Proj-3-03	16.72	Proj-5-03	39.32	Proj-7-	44.74	Proj-09-	27.30

Proj-1-	33.40	Proj-2-	24.48	Proj-4-01	56.99	Proj-6-01	31.99	Proj-8-	28.62	Proj-10-	35.62
Proj-1-	32.21	Proj-2-	24.64	Proj-4-02	56.26	Proj-6-02	33.13	Proj-8-	29.32	Proj-10-	36.65
Proj-1-	32.64	Proj-2-	24.35	Proj-4-03	57.32	Proj-6-03	32.35	Proj-8-	29.19	Proj-10-	35.87
Proj-1-	32.28	Proj-2-	23.15								
Proj-1-	32.99	Proj-2-	25.68								

According to the 'Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities', all trees in a sample plot above a minimum dimension are measured and the biomass of each tree is estimated. According to the HJ 710.1-2014 'Technical guidelines for biodiversity monitoring—terrestrial vascular plants', the minimum DBH dimension is 2cm. So if the DBH dimension of tree in the sample plot is not above 2cm, V_{TREE} , t of the tree is equal to 0. The DBH dimension of the sample trees in this project is all over 2cm.

Table 4-3 Tree biomass per hectare in stratum

Sample ID	Tree species	Area (ha)	$b_{tree,i}(t$ d.m. ha-1)	W_i	S_i^2	$W_i * b_{tree,i,t}$	Number of Plots n_i	S^2_{bTREE}
Proj-1	China fir	19245.27	32.78	0.38444	0.2617	12.60194	11	0.00352
Proj-2	China fir	8477.07	24.46	0.16933	0.8123	4.14181	5	0.00466
Proj-3	China fir	3121	16.63	0.06234	0.0234	1.03671	3	0.00003
Proj-4	Cypresses	500	56.86	0.00999	0.2942	0.56803	3	0.00001
Proj-5	Cypresses	2345	39.10	0.04684	0.0386	1.83144	3	0.00003
Proj-6	Cypresses	2226.4	32.49	0.04447	0.3396	1.44483	3	0.00022
Proj-7	Pinus yunnanensis	500	44.39	0.00999	0.1022	0.44346	3	0.00000
Proj-8	Pinus yunnanensis	8204.4	29.04	0.16389	0.1386	4.75937	3	0.00124

Proj-9	Pinus yunnanensis	2441.93	28.04	0.04878	0.8102	1.36779	3	0.00064
Proj-10	Masson pine	3000	36.05	0.05993	0.2886	2.16048	3	0.00035

Uncertainty of the mean tree biomass per hectare within the project boundary was estimated as (Equation (15) in methodological tool 'Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities' (Version 04.2):

$$b_{TREE} = \sum_{i=1}^M w_i \times b_{TREE,i}$$

=30.35586

$$S_{b_{TREE}} = 0.1034408$$

$$u_C = \frac{t_{VAL} \times \sqrt{\sum_{i=1}^M w_i^2 \times \frac{s_i^2}{n_i}}}{b_{TREE}}$$

=0.00578

Table 4-4 Statistical parameters from monitoring

Item	Unit	Value
		Total
B_{TREE} (Tree biomass of the project)	t d.m.	1,519,644.707
C_{TREE,t1} (Carbon stock in trees of the project)	t CO ₂ e	2,753,915
C_{TREE,t2} (Carbon stock in trees of the project)	t CO ₂ e	2,054,882
ΔC_{p,t} (Change in the carbon stocks in project)	t CO ₂ e	699,033

U_c (Uncertainty in C_{TREE})	%	0.578%
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According to the Appendix 2 of the tool, the uncertainty in the estimated mean value of a parameter is more than 10 per cent, the estimated mean value is either increased or decreased by a percentage of the uncertainty. The table provides the uncertainty discount factors to be applied for different ranges of uncertainty.

Uncertainty discount factors

Uncertainty	Discount (% of U)
$U \leq 10\%$	0%
$10 < U \leq 15$	25%
$15 < U \leq 20$	52%
$20 < U \leq 30$	75%
$U > 30$	100%

Due to the calculation result of U_c is less than 10%, thus discount for this monitoring period is zero.

3.2.3 Leakage

According to the applied methodology AR-ACM0003 (Version 2.0.0), leakage emission is estimated as follows:

$$LK_t = LK_{AGRIC,t} \quad (27)$$

Where:

LK_t = GHG emissions due to leakage, in year t; tCO₂-e

$LK_{AGRIC,t}$ = Leakage due to the displacement of agricultural activities in year t, as estimated in the tool "Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity"; tCO₂-e

According to the A/R Methodological tool “Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity”, leakage emission resulting from displacement of the activities is composed of decrease in carbon stock in the carbon pools of the land and change in soil organic carbon stock due to land-use change in the land.

$$LK_{AGRIC,t} = \frac{44}{12} \times (DC_{BIOMASS,t} + DSOC_{LUC,t})^{34} \quad (28)$$

Where:

- $LK_{AGRIC,t}$ = Leakage due to the displacement of agricultural activities in year t; tCO₂-e
- $DC_{BIOMASS,t}$ = Decrease in carbon stock in the carbon pools of the land receiving the activity displaced in year t; t d.m
- $DSOC_{LUC,t}$ = Change in soil organic carbon (SOC) stock due to land-use change in the land receiving the displaced activity in year t; tC ha

According to the tool Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity, v2.0, paragraph 10 of the tool refers to the leakage emissions caused by the displacement of grazing activities are considered insignificant in some conditions, and hence accounted as zero. However, for the project, the baseline situation is land suitable for afforestation, which means there is no vegetation. In addition, the karst area is unsuitable for grazing, so the project does not involve grazing³⁵. Since there is no grazing, the condition of relocation of livestock from within the project area to outside the project area does not exist. Therefore, the leakage due to grazing mentioned in Tool 15 (a) Animals are displaced to existing grazing land and the total number of animals in the receiving grazing land (displaced and existing) does not exceed the carrying capacity of the grazing land; (b) Animals are displaced to existing non-grazing grassland and the total number of animals displaced does not exceed the carrying capacity of the receiving grassland; (c) Animals are displaced to cropland that has been abandoned within the last five years; (d) Animals are displaced to forested lands, and no clearance of trees, or decrease in crown cover of trees and shrubs, occurs due to the displaced animals; (e) Animals are displaced to zero-grazing system is not applicable.

Besides, the project was implemented by manual operation instead of mechanical operation. No weeding, chopping, pruning, intermediate cutting activities are going to be conducted during the crediting period because of the natural condition, the economic condition and the slow growth pattern. Fertilization and watering are not going to take place, neither. Therefore, there is no expected leakage due to a decrease in carbon stock in the carbon pools of the land and a change in soil organic carbon stock. In other words, there is no expected leakage due to the displacement of agricultural activity from the project activity.

³⁴Equation (1) in page 5 in the A/R Methodological tool “Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity” (Version 02.0)

³⁵ According to the baseline survey and biodiversity baseline survey of the project.

Therefore, the leakage emission is zero in this monitoring period.

3.2.4 Net GHG Emission Reductions and Removals

The net anthropogenic GHG removals by sinks shall be calculated as follows:

$$\Delta C_{AR,t} = \Delta C_{ACTUAL,t} - \Delta C_{BSL,t} - LK_t \quad (29)$$

Where:

- $\Delta C_{AR,t}$ = Net anthropogenic GHG removals by sinks, in year; t CO₂-e
- $\Delta C_{ACTUAL,t}$ = Actual net GHG removals by sinks, in year; t CO₂-e
- $\Delta C_{BSL,t}$ = Baseline net GHG removals by sinks, in year; t CO₂-e
- LK_t = GHG emissions due to leakage, in year; t CO₂-e

The net anthropogenic GHG removals by sinks are summarized below.

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
01-January-2022 to 31-December-2022	0	699,033	0	699,033
Total	0	699,033	0	699,033

Year	Change in GHG benefit (tCO ₂ e)	Buffer 10% (tCO ₂ e)	VCUs	VCUs available
01-Janurary-2022 to 31-December-2022	699,033	69,903	629,130	629,130
Total	699,033	69,903	629,130	629,130

Buffer calculating: buffer credits are determined by the non-permanence risk rating (as determined in the AFOLU Non-Permanence Risk Report).

The non-permanence risk rating of the Project is derived from the risk report calculation and corresponds to 10%. This value was specifically calculated during this Monitoring Period and coincides with the calculated value presented in the PDD.

The number of GHG credits issued to the Project during this Monitoring period, considering the buffer credits, is 629,130 VCUs.

The total VCUs that must be deposited in the AFOLU pooled buffer account are 69,903 VCUs.

3.3 Optional Criterion: Climate Change Adaptation Benefits

N/A

3.3.1 Activities and/or processes implemented for Adaptation (GL1.3)

N/A.

4 COMMUNITY

4.1 Net Positive Community Impacts

4.1.1 Community Impacts (CM2.1)

The evaluation of the positive impacts resulting from the community's project activities is based on the stakeholder consultation methods. The tables below describe the impacts on each community group:

Community Group	Local villagers in 169 villages of 1 district and 7 counties in Zunyi City: (110 long-term technicians in 169 villages of 1 district and 7 counties and villagers who own forest land tenure of this project are directly affected in this monitoring period)
Impact(s)	1.Improved the living environment 2.Increased household income and living level
Type of Benefit/Cost/Risk	Predicted direct and indirect benefits.
Change in Well-being	1. Due to the implementation of the afforestation project, the forest has formed. In villagers' perceptions, the improved living environment is embodied through enhanced biodiversity, improved soil quality, and air quality. 2. During this monitoring period, it is known through the stakeholders meeting and questionnaires that 110 long-term

	technicians including 60 female long-term technicians have obtained more job opportunities, and they got additional payment CNY 2,400 per year for this project. At the same time, the increase in income is also the embodiment of improvement of well-being. According to the <i>Carbon Sink Project Cooperation Agreement</i>, 60% of profit from the previous VCUs issuance have been distributed to the villagers who own forest land tenure of this project. The profit from this monitoring period will be distributed when the VCUs are issued.
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Community Group	Village committees in project area
Impact(s)	1. It has increased the opportunities for communication of the village. 2. At the same time, women's job opportunities, income and social status have been increased.
Type of Benefit/Cost/Risk	Predicted indirect and direct benefits.
Change in Well-being	1. Increased communication can help to improve coordination among other parties and other stakeholders in the community. This can help to ensure that everyone is working towards the same goals. 2. The benefits delivered to women help to strengthen the capacity and effectiveness of the village committee, which can help to build trust and support.

Community Group	Forestry Bureaus of Bozhou district, Tongzi county, Suiyang county, Zheng'an county, Daozhen county, Wuchuan county, Meitan county, Xishui county.
Impact(s)	1. Achieve goals in afforestation 2. Promote forest management and protection.
Type of Benefit/Cost/Risk	Achieved and long-term benefits
Change in Well-being	1. Although the afforestation goal has been achieved during the first monitoring period, the indicator involves long-term monitoring due to the following reasons: a) Afforestation project often have long-term goals as part of the benefit permanence. Monitoring helps to ensure that these goals are being achieved over time, and that the project is sustainable in the long run. b) Monitoring allows for adaptive management, which means that changes can be made to the project as needed based on the

	results of the monitoring. Overall, monitoring is an essential part even after the goals have been achieved. This is to ensure the ongoing health, sustainability, and success of the project over time. 2. With better management and protection capacity, forestry bureaus can more efficiently and effectively carry out their duties.
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Community Group	Governments of Bozhou district, Tongzi county, Suiyang county, Zheng'an county, Daozhen county, Wuchuan county, Meitan county, Xishui county.
Impact(s)	Improve the local ecological environment and improve people's living level.
Type of Benefit/Cost/Risk	Direct and indirect benefits.
Change in Well-being	Improved ecological environment can help protect natural resources, prevent environmental degradation, and reduce the risk of natural disasters. This can help reduce the cost of environmental governance and improve the resilience of the environment to natural and human-made disasters.

4.1.2 Negative Community Impact Mitigation (CM2.2)

In order to mitigate the negative well-being impact on community groups, the project proponent has established a problem-solving mechanism. Problem-solving mechanism in this context is understood as an open and transparent way to raise issues, a clear way to receive issues and a standardized process to deal with problems. In order to effectively manage and run a successful project, project leaders have to develop problem-solving techniques that are viable and suitable. The problem-solving techniques can include the definition of problem, generation of alternative solutions, evaluation of alternatives and follow-up on solutions. To be more specific, since this is an afforestation project, human-induced risks may affect community, climate and biodiversity. In this light, problem-solving mechanism should be kicked into the gear to make sure that once issues related to community, climate and biodiversity surface, the relevant personnel shall report the issues to the PP, and the PP shall bring solutions, say, patrol inspection that can help mitigate the risk in place. At the same time, the effectiveness of mitigation measures will be measured and well-recorded to help to improve the mechanism in a constant manner. Besides, the PP has provided a variety of ways for communities to report problems, including setting up an exclusive liaison in each village, make sure the opinion books are in place in the village committee and telephone numbers of project leaders readily available. In this light, In these ways, the problems and negative well-being impacts of community groups can be smoothly and timely reported to the project

proponent. Once the project proponent is informed of these problems, the project leader will be designated to conduct thorough investigation at the place where the problems occur and solve these negative effects.

Mitigation refers to the design and action of activities or measures aimed at minimizing or eliminating the negative impacts the afforestation project may generate on the community. With the principle of prevention is way better than mitigation, the PP has taken the following actions to decrease the likelihood that negative results will occur:

1. Landslide may pose a recurrent risk to the community life and livelihood. The risk is mitigated mainly through precautionary means—for instance, by restricting the access to landslide-prone areas and set up safety signs. Besides, the PP has conducted sessions concerning working safety for technicians and these training sessions has helped to develop and maintain safety standards. Besides, when encountering natural disaster, rescue team will be on the scene immediately.

2. Safety is the number one priority when it comes to on-site tree survey and monitoring. Every year, technicians are trained on the working safety. During each patrol, technicians are required to keep record on the safety conditions. During the routine forest patrol, technicians are required to wear personal protective equipment when handling hazardous work. For example, a hard hat is required anytime technicians are on forest lands where there is potential for head injury from falling. As part of the procedure, pre-work onsite safety inspection and record-keeping are needed to ensure the safety of the technicians. All personnel employed in forest activities must be trained in first aid to ensure there is no occurrence of life-threatening conditions.

3. Individuals and communities can work together to improve preparedness and respond to natural disasters and emergencies. To consolidate the importance of preparedness, forestry bureaus and the PP has provided different opportunities to get villagers trained on emergency preparedness and response topics, including how to prepare for disasters and how to save lives by taking fast and simple actions.

By now, all the activities related to the Project only enhanced the positive impact on the community. No negative impacts have been identified regarding the Community. The aforementioned actions are designed to respond to the potential risks and make sure these potential risks won't escalate to irreversible negative impact.

4.1.3 Net Positive Community Well-Being (CM2.3, GL1.4)

The net well-being impacts of the project are positive for all identified community groups compared with their well-being conditions under the without-project land use scenario.

Improved environment: Due to the implementation of the afforestation project, the forest has formed. In villagers' perceptions, the improved living environment is embodied through enhanced biodiversity, improved soil quality, and air quality. Besides, the improved ecological environment can help protect

natural resources, prevent environmental degradation, and reduce the risk of natural disasters. This can help reduce the cost of environmental governance and improve the resilience of the environment to natural and human-made disasters.

Increased household income and living level: The project has generated job opportunities and directly improved the villagers' income. The improved living level has been achieved as the result of increase in income. Women also play a significant part in the afforestation project, the economic benefits delivered to women also help to build trust and support of the village committee.

Enhanced communication: Increased communication can help to improve coordination among other parties and other stakeholders in the community. This can help to ensure that everyone is working towards the same goals.

Long-term benefit: Although the afforestation goal has been achieved during the first monitoring period, the indicator involves long-term monitoring due to the following reasons: a) Afforestation project often have long-term goals as part of the benefit permanence. Monitoring helps to ensure that these goals are being achieved over time, and that the project is sustainable in the long run. b) Monitoring allows for adaptive management, which means that changes can be made to the project as needed based on the results of the monitoring. Overall, monitoring is an essential part even after the goals have been achieved. This is to ensure the ongoing health, sustainability, and success of the project over time.

Forest management and protection capacity: With better management and protection capacity, forestry bureaus can more efficiently and effectively carry out their duties.

4.1.4 Protection of High Conservation Values (CM2.4)

No HCVs was identified related to community well-being in the project zone thus none of the HCVs related to community well-being will be negatively affected by the project.

4.2 Other Stakeholder Impacts

4.2.1 Mitigation of Negative Impacts on Other Stakeholders (CM3.2)

There is no negative well-being impact on other stakeholders during this monitoring period.

4.2.2 Net Impacts on Other Stakeholders (CM3.3)

Project was not to negative impacts within and beyond the project zone. Besides, it was increased the income of the local communities and bring positive environmental benefits. Therefore, this project was not created negative impacts on the other stakeholder groups.

4.3 Community Impact Monitoring

4.3.1 Community Monitoring Plan (CM4.1, CM4.2, GL1.4, GL2.2, GL2.3, GL2.5)

During this monitoring period, the project community was evaluated through stakeholder meetings, questionnaire-based survey and opinion logbook collected from villages. Results achieved in terms of the community are presented as below:

The following key variables are monitored for this monitoring period:

The improvement as a perceived benefit:

Variable	The change of living environment
monitoring methods to be applied	Interview during the stakeholder meeting, questionnaire and logbook
Frequency of monitoring/recording	Before every verification event
Affected community groups	1. Local villagers 2. Governments of 1 district and 7 counties
Result of monitoring	The changes in living environment are mainly reflected in the improvement of daily life and surrounding ecological environment. The intangible benefit is the perceived change in the living environment based on responses from these methods. During this monitoring period, the results from the aforementioned methods show that 100% of local villagers and 100% of officer representatives from governments believed that after the implementation of the project, the living environment has improved.

Variable	The change of living level.
monitoring methods to be applied	Interview during the stakeholder meeting, questionnaire and logbook
Frequency of monitoring/recording	Before every verification event
Affected community groups	Governments of 1 district and 7 counties.
Result of monitoring	The result showed that 100% officer representatives believed that the change of villagers' living level is achieved and can benefit them accordingly.

Variable	Increased collective communication of the village
monitoring methods to be applied	Interview during the stakeholder meeting, questionnaire and logbook; Training record
Frequency of monitoring/recording	Before every verification event
Affected community groups	Village committees in project area
Result of monitoring	100% of the village committees and villager representatives think the opportunities for communication of the villagers has been increased.

Variable	Promote forest management and protection.
monitoring methods to be applied	Interview during the stakeholder meeting, questionnaire and logbook
Frequency of monitoring/recording	Before every verification event
Affected community groups	Officials from Forestry Bureaus of 1 district and 7 counties, local villagers and officials from government
Result of monitoring	100% of officers representatives from governments believed that the implementation of the project has protected the local environment, and has improved local environment.

The quantifiable improvement:

Variable	Households' incomes
monitoring methods to be applied	Payroll of technicians related to the project. And 60% of profit gained from VCUs issuance has been distributed to all village committees and villagers and the profit from this monitoring period will be closely monitored.
Frequency of monitoring/recording	Before each verification event.
Affected community groups	Local villagers
Result of monitoring	Villagers were hired as the technicians earned an extra CNY 200 per month total CNY 2,400 per year. During the investigation, technicians participated in the project reported that the implementation of the project increased their income. The

	project provides an annual income of CNY 2,400 for each technician and provide a payroll signed by the mechanic. This income provided is a very effective and direct way to improve living standards. And according to the receipts from villages, 60% of profit gained from the previous monitoring periods has been distributed to all village committees and villagers who own forest land tenure of this project. And the distribution of the VCU's profit from this monitoring period will be monitored once issued.
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Variable	Achieve goals in afforestation
monitoring methods to be applied	Biodiversity survey report
Frequency of monitoring/recording	Before every verification event
Affected community groups	Forestry Bureaus of 1 district and 7 counties
Result of monitoring	Already achieved during first monitoring period. According to the survey result of Biodiversity survey report, the afforestation project plays a positive role in the governance of environment. During this monitoring period, the technicians completed the weeding and pest prevention work in accordance with the requirements of the forest management manual. And there were no disasters such as fires or mudslides. Due to the public awareness of environmental protection, there was no illegal logging during this monitoring period. Therefore, the forest area has not decreased and the trees are growing well.

Variable	The changes brought to female technicians
monitoring methods to be applied	Payroll of female technicians related to the project, annual training records, stakeholder meeting and interview.
Frequency of monitoring/recording	Before every verification event
Affected community groups	60 Female technicians directly affected during this monitoring

	period
Result of monitoring	During this monitoring period, changes have been made to female technicians and the changes are embodied in the following aspects: 1. Increased income: women hired as the technicians earned an extra CNY 200 per month total CNY 2,400 per year. This income provided is a very effective and direct way to increase their income. 2. The annual training has equipped them with skills related to forest management and protection. In addition, their awareness of forest protection and management has been further improved. 3. Increased social status: during the stakeholder meeting and interview, female technicians reckoned that their status has been greatly improved due to the job opportunities and skills brought by the project.

4.3.2 Monitoring Plan Dissemination(CM4.3)

Community monitoring plans and manuals for project monitoring periods will be posted on bulletin boards in villages. The draft monitoring report and summary for this period will be made publicly available on the VERRA website, and the relevant villagers can the progress of the project through updates on the bulletin board. The project manager will also communicated effectively with the local villagers, and the technician also explain how the project was monitored, how to collect data, and how to record the patrol inspection to villagers.

For each verification, the monitoring team will summarize all the comments received from stakeholders and corresponding responses regarding the monitoring plan and results, which has been published on VCS and CCB website along with the monitoring report for each monitoring period. During the monitoring period, no feedback from villagers was provided, which indicates that the public is satisfied with the process and community monitoring plan of the project implementation.

During this monitoring period, no comments on the community monitoring plan and results received.

4.4 Optional Criterion: Exceptional Community Benefits

N/A.

4.4.1 Short-term and Long-term Community Benefits (GL2.2)

N/A.

4.4.2 Marginalized and/or Vulnerable Community Groups (GL2.4)

N/A.

4.4.3 Net Impacts on Women (GL2.5)

N/A.

4.4.4 Benefit Sharing Mechanisms (GL2.6)

N/A.

4.4.5 Governance and Implementation Structures (GL2.8)

N/A.

4.4.6 Smallholders/Community Members Capacity Development (GL2.9)

N/A.

5 BIODIVERSITY

5.1 Net Positive Biodiversity Impacts

5.1.1 Biodiversity Changes (B2.1)

Change in Biodiversity	Species of plants
Monitored Change	Increased
Justification of Change	The increased plants were achieved by the implementation of afforestation program. According to the requirements of the survey method, sample plots of three types of vegetation were collected. After collecting data, the survey report was compiled by Guizhou Academy of Social Sciences. During this monitoring period, 5 species of plants were discovered.

Change in Biodiversity	Endangered species
Monitored Change	Predicted indirect positive impact

Justification of Change	The afforestation project contributed to provide natural habitat for endangered plants and animals. Therefore, the threats to endangered species were expected to reduce as the result of project activities. Besides, protective measures were taken to protect endangered species.
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Change in Biodiversity	Species of animals
Monitored Change	Predicted increase
Justification of Change	The increased species of animals were achieved by the implementation of the afforestation program. According to the biodiversity survey report completed by the Guizhou Academy of Social Sciences, 40 sample plots were monitored and the collection was carried out according to the direction of the transect map, which covered 700 hectares of land, each sample plot or transect line covered at least 18 hectares. During this monitoring period, 7 species of animals were discovered.

5.1.2 Mitigation Actions (B2.3)

Local species and scientifically-sound methods are adopted during the implementation of afforestation activity. In order to protect existing vegetation as much as possible, burning and logging are not allowed. Therefore, fruitful results have been achieved in terms of biodiversity.

5.1.3 Net Positive Biodiversity Impacts (B2.2, GL1.4)

Firstly, due to long-term farming, the ecological structure of most project area is relatively homogenous, with lower biodiversity. The other small part is wasteland, mainly covered with grass and scattered shrubs. Afforestation of this project used local species, implementing afforestation activity with scientific and reasonable configuration method without burning and slash. The employment of cave-like site preparation has helped protected the existing vegetation as much as possible. Thus, fruitful results have been yielded in terms of biodiversity.

Secondly, scientific and rational afforestation projects can adjust the hydrological cycle, reduce drought and flood risk, promote soil nutrient cycle, and improve local micro-climate and other ecological environments. In addition, as the project area is located within 1 district and 7 counties in Guizhou Province, the surrounding area is concentrated of wildlife. Therefore, the revegetation of project sites will facilitate biodiversity protection of the whole project zone. The 10 National protected species in the project zone are shown in the following table:

Animals	Plants
Francois's Leaf Monkey	cathaya argyrophylla
Moschus berezovskii	Mangnolia officinalis
otus bakkamoena	Douglas fir
Viverra zibetha	Camellia sinensis var assamica
Macaca mulatta	
Syrmaticus reevesii	

Francois's Leaf Monkey is globally endangered species according to IUCN. "HCVs are biological, ecological, social or cultural values of outstanding significance at the national, regional or global level or of critical importance at the local level. All natural habitats possess inherent conservation values, including the presence of rare or endemic species, provision of ecosystem services, sacred sites, or resources harvested by local residents." Therefore, it is identified as HCV

5.1.4 High Conservation Values Protected (B2.4)

In the context of this project, carrying out resource monitoring and scientific research is a necessary step to protect endangered animals. Through resource monitoring, we can understand the growth and decline of endangered wild populations and the changes of distribution areas. It paves way for the state to formulate policies on protection, management, and utilization. On the other hand, during the implementation of the project, the annual technician training meeting will also provide guidance and educational sessions on the protection of wild animals and plants. In addition, the project proponent will conduct educational sessions on wildlife protection to local community. Due to the implementation of the project, the forest has formed and continued to sustain the ecological environment in a constant manner. Thanks to the improvement of the living environment of animals and plants, ideal habitat has been formed for flora and fauna to inhabit and reproduce. In addition, through the frequent inspection and patrolling conducted by technicians, any human-induced environment-related crime that involves the illegal trade, smuggling, poaching, capture or collection of endangered species, protected wildlife can be deterred. Therefore, the one HCVs identified has not been negatively affected by the project.

5.1.5 Invasive Species (B2.5)

All the planted trees are native species and no invasive species have been introduced into any area affected by the project during this monitoring period.

5.1.6 Impacts of Non-native Species (B2.6)

No non-native species have been used in the project zone.

5.1.7 GMO Exclusion (B2.7)

No GMOs have been used to generate GHG emissions reductions or removals.

5.1.8 Inputs Justification (B2.8)

Name	Chemical pesticides
Justification of Use	The chemical pesticides are allowed to be used only if there is a serious disease problem erupted in the project area, and the pesticides will be used in accordance with the National Pesticides Policy.
Adverse Effect	Improper pesticide application would be harmful to natural environment, including polluting soil, water and air conditions, as well as the habitat of the wildlife. But for this project, pesticide will be strictly managed by well trained technicians to minimize the potential effect. Especially the biological measures to control pests and diseases will be adopted. Therefore, the pesticide application will be limited. During monitoring period, no chemical pesticides, no chemical pesticides have been used since there is no occurrence of pests and disease..

Name	Biological control agents
Justification of Use	Upon routine overseeing, the pest will be treated by biological control once occurred according to local Pest Control and Prevention Policy.
Adverse Effect	The biological control agents are natural enemy of pest which are native species and have no adverse effect on local environment and communities. During monitoring period, no biological control agents have been

employed since there is no occurrence of pests and disease.

5.2 Offsite Biodiversity Impacts

5.2.1 Negative Offsite Biodiversity Impacts (B3.1) and Mitigation Actions (B3.2)

As the project activities was increased the area of the habitat, as well as improve the habitats' quality, only positive biodiversity impacts can be identified. Therefore, there are no potential negative offsite impacts on biodiversity.

5.2.2 Net Offsite Biodiversity Benefits (B3.3)

Since there are no potential negative offsite impacts on biodiversity, the net offsite biodiversity benefits are positive.

5.3 Biodiversity Impact Monitoring

5.3.1 Biodiversity Monitoring Plan (B4.1, B4.2, GL1.4, GL3.4)

Sample Plots

The sample plots for monitoring biodiversity are same as the sample plots for carbon monitoring. The scope of the biodiversity survey by Guizhou Academy of Social Sciences (GASS) was set as 1 district and 7 counties County.

Table 5 Information table of the sample spots

the Number of Sample Plot	Sample plots ID	Address	Carbon Layer	Latitude and longitude
1	ID-M12	Panjiashai village, Xima town, Bozhou District	Carbon Layer1	27°55'57"N107°30'48"E
2	ID-M13	Zhulin village, Xima town, Bozhou District	Carbon Layer1	27°55'56"N107°28'23"E
3	ID-S31	Shuimo village, Wenquan town, Suiyang County	Carbon Layer1	28°09'45"N107°20'51"E
4	ID-W5	Baiyanggang village, Fuyang town, Wuchuan County	Carbon Layer1	28°30'08"N107°39'47"E
5	ID-D7	Xintian village, Zhongba town, Daozhen County	Carbon Layer1	28°45'11"N107°44'49"E
6	ID-D19	Huaiping village, Jiucheng	Carbon Layer1	28°43'22"N107°43'38"E

		town, Daozhen County		
7	ID-S2	Lianzhuang village, Kuangkuo town, Suiyang County	Carbon Layer1	28°16'22"N106°58'57"E
8	ID-T17	Shanpo village, Xinzhan town, Tongzi County	Carbon Layer1	28°21'13"N106°51'27"E
9	ID-X2	Taiping village, Donghuang town, Xishui County	Carbon Layer1	28°22'35"N106°11'41"E
10	ID-X12	Longtan village, Huailong town, Xishui County	Carbon Layer1	28°13'36"N106°14'09"E
11	ID-B3	Lianxin village, Fenxiang town, Bozhou District	Carbon Layer1	27°36'21"N106°29'24"E
12	ID-S33	Yangwo village, Wenquan town, Suiyang County	Carbon Layer2	27°12'03"N107°21'10"E
13	ID-S11	Fengshoule village, Kuankuo town, Suiyang County	Carbon Layer2	28°14'19"N107°01'44"E
14	ID-T9	Dushi village, Maoshi town, Tongzi County	Carbon Layer2	28°08'36"N106°53'39"E
15	ID-T1	Damianpo village, Bajiao town, Tongzi County	Carbon Layer2	28°45'04"N107°10'41"E
16	ID-T32	Haozhitai village, Shuibatang town, Tongzi County	Carbon Layer2	28°46'24"N107°04'30"E
17	ID-B16	Hexin village, Xinmin town, Bozhou District	Carbon Layer3	27°20'50"N106°54'28"E
18	ID-S37	Shijiaba village, Zhengchang town, Suiyang County	Carbon Layer3	27°53'11"N107°12'32"E
19	ID-M19	Xinzhan village, Yuquan town, Meitan County	Carbon Layer3	27°50'07"N107°28'36"E
20	ID-S36	Lianhua village, Zhengchang town, Suiyang County	Carbon Layer4	27°53'27"N107°16'58"E
21	ID-S25	Xinzhai village, Taibai town, Suiyang County	Carbon Layer4	28°26'55"N107°05'02"E
22	ID-S13	Taiping village, Maoya town, Suiyang County	Carbon Layer4	28°05'13"N107°12'42"E
23	ID-S16	Lipo village, Pingle town, Suiyang County	Carbon Layer5	28°13'27"N107°26'18"E
24	ID-Z5	Nongfeng village, Bifeng	Carbon Layer5	28°40'32"N107°18'45"E

		town,Zhengan County		
25	ID-W8	Nigao village, Nigao town,Wuchuan County	Carbon Layer5	28°41'16"N107°47'35"E
26	ID-B13	Qingkeng village, Shangji town, Bozhou District	Carbon Layer6	27°21'06"N106°58'46"E
27	ID-W13	Shixing village, Zhuoshui town,Wuchuan County	Carbon Layer6	28°57'52"N107°54'42"E
28	ID-M3	Hejiang village, Gaotai town,Meitan County	Carbon Layer6	27°38'17"N107°22'18"E
29	ID-S3	Pingshang village, Huangyang town, Suiyang County	Carbon Layer7	28°19'45"N107°01'09"E
30	ID-S4	Baiyuan village, Qinggangba town, Suiyagn County	Carbon Layer7	28°18'50"N107°06'27"E
31	ID-S14	Lvhua village, Maoya town, Suiyang County	Carbon Layer7	28°04'16"N107°09'08"E
32	ID-B15	Xinhau village, Shangji town, Bozhou District	Carbon Layer8	27°22'29"N106°56'31"E
33	ID-M11	Xiaotangba village, Xima town,Meitan County	Carbon Layer8	27°57'44"N107°28'50"E
34	ID-T24	Erping village, Shuibatang town,Tongzi County	Carbon Layer8	28°43'21"N107°02'07"E
35	ID-T7	Tianchi village, Loushanguan town, Tongzi County	Carbon Layer9	28°10'24"N106°47'30"E
36	ID-Z11	Xinan village, Yangxing town,Zhengan County	Carbon Layer9	28°44'09"N107°23'06"E
37	ID-T25	Jizhong village, Shuibatang town,Tongzi County	Carbon Layer9	28°44'48"N107°07'19"E
38	ID-W4	Quanxin village, Fuyang town, Wuchuan County	Carbon Layer10	28°30'39"N107°41'56"E
39	ID-X10	Bazi village, Liangcun town,Xishui County	Carbon Layer10	28°23'26"N106°24'33"E
40	ID-T10	Shuijing village, Loushanguan town,Tongzi County	Carbon Layer10	28°08'44"N106°48'25"E

Survey Method

Animal Diversity Survey

(1) Survey Tool

Digital camera, the sample plot searching line map, GPS locator, telescope, pedometer, board clip, oil-based paint marker, etc

(2) Survey Method

In the survey of routine sample zone, the belt transect method was adopted. The survey was carried out by first finding and recording the starting point of the sample zone and then travelling in a northeast-to-southwest direction at a speed of 2-3 km/hour, while recording data and information on the number of animal entities or traces of activity found, the vertical distance from the center line of the sample zone, and the habitat and altitude of the sample strip. The survey area was Zunyi City, and it was delineated on a 1:100,000-scale topographic map prior to the survey to include each route, and the actual route was chosen based on the on-site situations within the survey area. All the fresh animal feces should be sampled for molecular biological analysis. Also, the information of other animals (including entity, feces, footprints, food tracks, etc.) detected in the route should also be recorded. Meanwhile, the vegetation distribution and relevant environmental information in the area should be investigated. The animal information confirmation can be conducted through household investigation

The 40 plots in this survey area were sampled using the random sampling methodology referred to in the project design documents.

Plant survey

(1) Survey tool

The survey tools are digital camera, tape measure, tape, scissors, specimen bag, specimen holder, the ropes with the length of 1 meter, 2 meters, 5 meters and 10 meters, oil-based paint markers, etc..

(2) Vegetation survey method:

According to the characteristics of natural succession of vegetation in the karst rocky desertification area in 1 district and 7 counties, the method of typical sampling was used to investigate plant communities at each succession stage. The area of survey sample plots was divided into:

a. The arbor layer is selected to have a quadrat area of 30 meters in length and 30 meters in width, so as to determine the types and the number of arbors in the sample plot, number the identification tag, measure the height, diameter at breast height, canopy density of these arbors and judge their viability. All the measurement results were recorded.

b. The shrub layer is selected to have a quadrat area of 5 meters in length and 5 meters in width, so as to determine the types and the number of shrub in the sample plot, number the identification tag, measure the height, crown diameter, coverage degree of these shrubs and judge their viability. All the measurement results were recorded.

c. The herb layer is selected to have a quadrat area of 1 meter in length and 1 meter in width, so as to determine the types and the number of the herb in the sample plot, number the identification tag, measure the height, crown diameter, coverage degree of the herb and judge their viability. All the

measurement results were recorded.

Survey results:

From the beginning of the project, the biodiversity monitoring was mainly completed by the 110 technicians who were hired by Guizhou Xinzhanxin. All technicians have performed biodiversity monitoring during the monthly forestland inspection. They recorded the results according to the concrete scheme of monitoring plan and requirements and then summarized yearly to feedback to Guizhou Xinzhanxin project manager. The conclusion on biodiversity was obtained from a field survey conducted by the Academy of Social Sciences of Guizhou.

Animal diversity

As required by the survey methodology, the technicians report the monitoring results to the project manager of Guizhou Xinzhanxin. Afterwards, Guizhou Academy of Social Sciences completed the biodiversity survey report based on the survey data. The 40 sample plots were monitored and collected relevant data according to the direction of the sample diagram. The sample line covered 700 hectares of land with a minimum of 18 hectares for each sample plot and each sample line. In the routine sample line survey, the areas involved in the project adopted the sample line method of Guizhou Province, and the survey was conducted all year round. The survey showed that during this monitoring period, During this monitoring period, 7 species of animals were discovered.

Plant diversity

As required by the survey methodology, the sample plots of three types of vegetation were collected. The survey report was compiled by the Academy of Social Sciences of Guizhou. According to the report, it was shown that during the monitoring period, 5 species of plants were discovered.

In summary, the data of biodiversity survey stated that due to the afforestation project implementation in 1 district and 7 counties, the geographic characteristics of the rocky desertification barren hills have been improved to some extent. Plants and animals that had been supposed to grow in the region were found during the monitoring period, which never happened previously. It can be proven that the project management of rocky desertification has played a certain positive effect, the biodiversity in this area has started to be increased by the project. The statistical results are shown as the following table:

Table 6 Monitoring variables for biodiversity

Indicator type	Description	Monitoring indicator	Indicator	Survey results	Monitoring method	Monitoring frequency
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			unit			
State variables	The quantity and quality of forest in the project area	Forest cover	ha	50,061	By Measuring the sample plots.	Before every verification
		Species of plants	/	5 species of plant were discovered.	According to the 40 sampling points and sample line set up during the monitoring process, the monitoring points are designated for monitoring. Selecting quadrats and then taking photos for recording.	Before every verification
		Species of animals	/	7 species of animals were discovered.	According to the 40 sample spots and sample line set during monitoring, monitoring the animal entity or trace by designating sample line and then taking photos or recording the sound.	Before every verification
		Population status of the identified HCV Francois's Leaf Monkey	/	One species in this project is categorized as HCV. Due to the implementation of the project, the living environment	The monitoring mainly adopts the Variable Distance Line Transect Method. The set-up of transect lines is in accordance with the "Technical Regulations on Bird Biodiversity Survey and Assessment" and "Technical Regulations on Mammals Biodiversity Survey and Assessment" issued by	Before every verification

				ent for animals and plants was improved, creating an ideal place for animals and plants to inhabit and reproduce . Therefore , the species have not been negatively affected and were indeed protected in this monitorin g period	the Ministry of Ecology and Environment of the People's Republic of China. Choose 3 to 5 representative areas, set up multiple transects lines for each plot, and try to cover different habitats and different altitudes. A total of 26 plots will be set up. The monitoring term is from March to July, and each transect line will monitor at least twice a year, and the time interval between the two of monitoring times is not less than 20 days. The monitoring period is the most active time for animals, from 05:30-09:30 in the morning and 16:00-20:00 in the evening. During the observation, travel along the transect line at a speed of 1.5~3km/h, and record the species and population numbers within three distances (0~25m, 25~100m, and more than 100m) on the transect line.	
Pressure variables	The frequency or	Number of fire occurred	/	None	Recorded by forest rangers and confirmed by local Forest Bureau	Once every year

	intensity of anthropogenic impacts that are directly harmful to biodiversity in the project zone	Affected forest area suffered insects and disease	ha	0	Recorded by forest rangers and confirmed by local Forest Bureau	Once every year
Response variables	The frequency or intensity of project interventions relevant to biodiversity	Forest area under prevention control from fires	ha	50,061	Recorded by forest rangers and confirmed by local Forest Bureau	Once every year
		Forest area under prevention control from insects and diseases	ha	50,061	Recorded by forest rangers and confirmed by local Forest Bureau	Once every year
		Forest area recovered from fire, insects or diseases	/	0	Recorded by forest rangers and confirmed by local Forest Bureau	Once every year
		Number of trees re-planted	/	0	Recorded by forest rangers and confirmed by local Forest Bureau	Once every year

5.3.2 Biodiversity Monitoring Plan Dissemination (B4.3)

Once the draft for the fourth monitoring period is made publicly available on the Verra website, biodiversity monitoring plans and manuals for project monitoring periods will be posted on bulletin boards in villages. The project leader will communicate effectively with the local villagers during the public comment period, and the technician will also explain how the project was monitoring, how to collect data, and how to record the patrol inspection.

For each verification, the monitoring team will summarize all the comments received from stakeholders and corresponding responses regarding the biodiversity monitoring plan and results, which has been published on VCS and CCB website along with the monitoring report for each monitoring period. During the monitoring period, no feedback was collected, which indicates that the public is satisfied with the process and monitoring plan of the project implementation.

During this monitoring period, no comments on the biodiversity monitoring plan and results were received.

5.4 Optional Criterion: Exceptional Biodiversity Benefits

N/A.

5.4.1 Trigger Species Population Trends (GL3.3)

N/A.

6 ADDITIONAL PROJECT IMPLEMENTATION INFORMATION

N/A.

7 ADDITIONAL PROJECT IMPACT INFORMATION

N/A