



**Verified Carbon
Standard**

GUANGXI JINXIU IFM (CONVERSION OF LOGGED TO PROTECTED FOREST) PROJECT



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1 PROJECT DETAILS

1.1 Summary Description of the Project

The Guangxi Jinxiu IFM (conversion of logged to protected forest) Project (hereafter “the project activity”) is implemented in Jinxiu Yao Autonomous County, Laibin City, Guangxi Zhuang Autonomous Region of China by Jinxiu Yao Autonomous County Zhengtong Asset Management Co., Ltd, the geo-coordinate of the project proponent is 109.840797E—110.440241E and 23.724686N-24.443053N, the total area is 18,333.3 ha, which includes the Improved Forest Management (IFM) of the forests in the conversion of logged to protected forest.

The area of the project activity is 6,572.13 ha, including 249 subcompartments spreading over Jinxiu Forest Farm, Jinxiu Town, Toupai Town, Dazhang Township, Liuxiang Township, Luoxiang Township, Sanjiang Township, Sanjiao Township, Changdong Township, Zhongliang Township of Jinxiu Yao Autonomous County. All these forests are state-owned forests or privately-owned forests or collective-owned forests, and have the legal right to forest ownership. The species involved in the project are Broad-leaved tree, Chinese fir and *Pinus massoniana*.

Before the implementation of the project activity, the trees are logged based on a valid and verifiable government-approved timber management plan for harvesting the project area. The implementation of the project activity converses the trees to protected forest to reduce the GHG emissions for about 1,500,045 tCO₂e in 20 years, the average annual emission reduction is 75,002 tCO₂e and Verified Carbon Units with buffer deduction is about 1,170,024 tCO₂e in 20 years, and average annual VCUs with buffer deduction is 58,501 tCO₂e.

The project activity will contribute to the environment (biodiversity conservation, rocky desertification prevention and soil erosion control), thus contribute to sustainable development.

1.2 Sectoral Scope and Project Type

Sectoral scope 14 (AFOLU)

Improved Forest Management: Logged to Protected Forest (LtPF)

1.3 Project Eligibility

The scope of the VCS Program includes:

1. The six Kyoto Protocol greenhouse gases.
2. Ozone-depleting substances.
3. Project activities supported by a methodology approved under the VCS Program through the methodology approval process.

4. Project activities supported by a methodology approved under a VCS approved GHG program, unless explicitly excluded under the terms of Verra approval.
5. Jurisdictional REDD+ programs and nested REDD+ projects as set out in the VCS Program document Jurisdictional and Nested REDD+ (JNR) Requirements.

The scope of the VCS Program excludes projects that can reasonably be assumed to have generated GHG emissions primarily for the purpose of their subsequent reduction, removal or destruction. The VCS Program also excludes the following project activities under the circumstances indicated in Table 1, below.

Table 1: Excluded Project Activities

Activity	Non-LDC ¹		LDC	
	Large scale ²	Small scale ²	Large scale	Small scale
Activities that reduce hydrofluorocarbon-23 (HFC-23) emissions	Excluded	Excluded	Excluded	Excluded
Grid-connected electricity generation ³ using hydro power plants/units	Excluded	Excluded	Excluded	
Grid-connected electricity generation using wind, geothermal, or solar power plants/units	Excluded	Excluded		
Utilization of recovered waste heat for, <i>inter alia</i> , combined cycle electricity generation and the provision of heat for residential, commercial or industrial use	Excluded	Excluded		
Generation of electricity and/or thermal energy using biomass. This does not include efficiency	Excluded	Excluded		

¹Least Developed Country, as designated by the United Nations

²Small-scale and large-scale designations are as per CDM definitions for same.

³“Grid-connected electricity generation” means the generation of electricity primarily for delivery to a national or regional grid. Generation of electricity primarily for delivery to a micro-grid (i.e., a localized grid that facilitates the delivery of electricity to discrete and often remote sets of infrastructure that do not otherwise have reliable access to electricity) is not included in this definition, and such project activities are eligible under the scope of the VCS Program.

improvements in thermal applications (e.g., cook stoves).				
Generation of electricity and/or thermal energy using fossil fuels, including activities that involve switching from a higher carbon content fuel to a lower carbon content fuel	Excluded	Excluded		
Replacement of electric lighting with more energy efficient electric lighting, such as the replacement of incandescent electrical bulbs with CFLs or LEDs	Excluded			
Installation and/or replacement of electricity transmission lines and/or energy efficient transformers	Excluded			

The project activities supported by a methodology of VM0010 version 1.3 is approved under the VCS Program through the methodology approval process and approved under a VCS approved GHG program⁴. The Sectoral scope of proposed project is 14 (AFOLU), which was not the VCS excluded project activities.

The project is eligible under the scope of the VCS Program.

1.4 Project Design

This project is not relevant to the grouped project.

Eligibility Criteria

N/A.

1.5 Project Proponent

Organization name	Jinxiu Yao Autonomous County Zhengtong Asset Management Co., Ltd
Contact person	Wang Yujie
Title	Chairman

⁴<https://verra.org/methodologies/>

Address	No. 11 Min'an Road, Jinxiu Town, Jinxiu Yao Autonomous County, Laibin City, Guangxi Zhuang Autonomous Region of China
Telephone	+86 18978239955
Email	xjxnl@163.com

1.6 Other Entities Involved in the Project

Organization name	Guangzhou Guotan Assets Management Co., Ltd
Contact person	Chen Kezhi
Title	General Manager
Address	Room 913, Tian'an Developing Building, Tian'an-TEP, No.555 Panyu Dadao North, Panyu District, Guangzhou, Guangdong Province, P.R.China
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Email	gdm@guotanzichan.com

1.7 Ownership

The forests of this project are owned by many different owners, including stated-owned owners, privately-owned and collective-owned. Jinxiu Yao Autonomous County Zhengtong Asset Management Co., Ltd, which is authorized by the forest owners will execute the corresponding power of distributing CERs revenue. Jinxiu Yao Autonomous County Zhengtong Asset Management Co., Ltd, commissioned Guangzhou Guotan Assets Management Co., Ltd. to apply the emission reductions from their IFM project activity using VCS standard.

1.8 Project Start Date

The project start date is 01/03/2016. This is according to the Notice of Guangxi Jinxiu IFM (Conversion of Logged to Protected Forest) Project issued by Jinxiu Yao Autonomous County Forestry Bureau on January 20, 2016. The Notice stipulated that commercial logging would be banned and forest protection would be carried out in the project area from March 1, 2016.

1.9 Project Crediting Period

The project crediting period is from 01/03/2016 to 29/02/2036 with the total length of 20 years.

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	✗
Large project	

Years	Estimated GHG emission reductions or removals (tCO ₂ e)	Estimated GHG emission reductions or removals with buffer deduction (tCO ₂ e)
01/03/2016-28/02/2017	141,447	110,328
01/03/2017-28/02/2018	128,499	100,229
01/03/2018-28/02/2019	134,568	104,963
01/03/2019-29/02/2020	126,986	99,048
01/03/2020-28/02/2021	127,699	99,604
01/03/2021-28/02/2022	81,123	63,275
01/03/2022-28/02/2023	81,123	63,275
01/03/2023-29/02/2024	81,123	63,275
01/03/2024-28/02/2025	81,123	63,275
01/03/2025-28/02/2026	81,123	63,275
01/03/2026-28/02/2027	68,483	53,417
01/03/2027-29/02/2028	58,774	45,843
01/03/2028-28/02/2029	49,531	38,633
01/03/2029-28/02/2030	42,450	33,110
01/03/2030-28/02/2031	35,999	28,079
01/03/2031-29/02/2032	35,999	28,079
01/03/2032-28/02/2033	35,999	28,079
01/03/2033-28/02/2034	35,999	28,079
01/03/2034-28/02/2035	35,999	28,079
01/03/2035-29/02/2036	35,999	28,079
Total estimated ERs	1,500,045	1,170,024
Total number of crediting years	20	
Average annual ERs	75,002	58,501

1.11 Description of the Project Activity

The Improved Forest Management (IFM) project activity is located in Jinxiu Yao Autonomous County, Laibin City, Guangxi Zhuang Autonomous Region of China. The annual mean temperature is 17.1°C. The annual mean precipitation is 1,823.9 mm.

The project activity includes the Improved Forest Management (IFM) of the forests in 249 subcompartments spreading over Jinxiu Forest Farm, Jinxiu Town, Toupai Town, Dazhang Township, Liuxiang Township, Luoxiang Township, Sanjiang Township, Sanjiao Township, Changdong Township, Zhongliang Township of Jinxiu Yao Autonomous County by the conversion of logged to protected forest. All the subcompartments had the legal right to harvest issued by local forest bureau before the implementation of the project activity. Before 2016, they were all forests which the trees could be logged and sold once reached the cutting rotation age based on a timber harvest plan. After 2016, they are all converted to protected forests.

Parcel number	Department	Serial number	Area (ha)	Quantities of subcompartments
1	Jinxiu Forest Farm	JFF	195.54	9
2	Jinxiu Town	JXT	1019.32	42
3	Toupai Town	TPT	270.93	16
4	Dazhang Township	DZT	395.62	19
5	Liuxiang Township	LIUXT	101.97	5
6	Luoxiang Township	LUOXT	2019.47	59
7	Sanjiang Township	SJIANGT	1299.89	50
8	Sanjiao Township	SJIAOT	759.69	22
9	Changdong Township	CDT	170.72	10
10	Zhongliang Township	ZLT	338.98	17
Total			6572.13	249

Jinxiu Yao Autonomous County Zhengtong Asset Management Co., Ltd and Guangzhou Guotan Asset Management Co., Ltd together have overall control responsibility for the project. The latter is also in charge of applying VCS project.

The purpose of strata is to improve accuracy and reduce the sampling cost. The strata is usually based on the tree species, age and canopy density, but it does not mean all these factors should be considered for all projects, more strata means more workload and cost. For this project, the factor of species for strata could reduce the variation within the same stratum and reach the accuracy level of 90% under certain degree of freedom. So the strata are reasonable and feasible.

All the subcompartments are divided into 3 strata based on the tree species.

Serial number of strata	Area (ha)	Tree species	Source
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1	4,143.40	Broad-Leaved tree	Timber harvest plan issued by Guangzhou Peisen Landscape Architecture Design Co., Ltd
2	1,843.43	Chinese Fir	
3	585.30	Pinus massoniana	
Total			
		6,572.13ha	

The implementation of the project activity includes the conversion from logged to protected forests in the parcels mentioned above. After the activity, trees could be avoided to be logged and then the carbon stocks could be increased. Therefore, net GHG emission reductions/removals resulting from the implementation of IFM projects aimed at the protection of forests that would be logged in the absence of carbon finance could be earned by the project activity.

The project will promote local sustainable development by the conversion of logged to protected forest.

Major contributions of the project are as follows:

- (1) The implementation of the project will control soil and water erosion and land degradation in the project area.
- (2) The implementation of the project will enhance biodiversity conservation by increasing forest cover and nature habitat connectivity.
- (3) The implementation of the project will absorb and fix carbon dioxide every year by conversion of logged to protected forest, and reduce GHG emission.
- (4) The implementation of the project will generate income for the local farmers by regular forest management. Local people's standard of living has been developed.

When the project was implemented, the local forestry bureau would not issue cutting quotas to all forest-owners within the project area. The PP, Jinxiu Yao Autonomous County Zhengtong Asset Management Co., Ltd would organize forest-owners to turn the personnel for logging into those for forest protection. In this case, the PP was responsible for the organization and coordination, the forest-owners or the employees were responsible for the implementation of management, protection and planting, and the local forestry bureau is responsible for the supervision

When the project was implemented, the project was not located within a jurisdiction covered by a jurisdictional REDD+ program.

1.12 Project Location

The project is located in Jinxiu Yao Autonomous County, Laibin City, Guangxi Zhuang Autonomous Region of P.R.China. The geo-coordinate range of the project proponent is 109.840797E—110.440241E and 23.724686N-24.443053N. There are 249 subcompartments spreading over Jinxiu Forest Farm, Jinxiu Town, Toupai Town, Dazhang Township, Liuxiang Township, Luoxiang Township, Sanjiang Township, Sanjiao Township, Changdong Township, Zhongliang Township of Jinxiu Yao Autonomous County.



Figure 1: The project location

1.13 Conditions Prior to Project Initiation

Prior to the implementation of the project, the forest within the project area was logged annually according to the timber harvest plan.

The project is located in Jinxiu Yao Autonomous County.

The project area belongs to the south Asian tropical monsoon climate region, and the seasonal climate change is obvious. It's wet and rainy in summer, cold and dry and less rain in winter. Because the county is mountainous, high altitude and complex terrain, Dayaoshan Mountain has significant subtropical mountain climate characteristics, that is, warm in winter and cool in summer, more cloudy and rainy days, less sunshine, and high humidity. The vertical and horizontal changes of the climate are quite obvious, and there is a saying 'different days across the mountains'. The average sunshine hours in Jinxiu Yao Autonomous County are 1269 hours, accounting for 29% of the available sunshine hours. The annual average temperature is 17°C. Due to the different geographical environment, the annual average temperature varies significantly across the county. The higher the altitude is, the lower the temperature is, and the variation range is about 0.5°C per 100 meters. The average annual average temperature of the hottest month (July) is 28.5°C, the average annual average temperature of the coldest month (January) is 8°C, and the cumulative temperature of $\geq 10^{\circ}\text{C}$ between 180~772 meters

above sea level in the county is 5234~6843°C. The annual frost-free period is 283 days, with an average annual rainfall of 1648 mm and an average annual rainfall of 190 days. The rainy season is distributed from May to August. The annual average relative humidity is 83%, the annual dryness of the county is 0.66, evaporation is less than rainfall, and the air is moist. The wind direction changes significantly. Generally, the north wind is more frequent in winter, with an average frequency of 27%, while the south wind is more frequent in summer, with an average frequency of 33%. Spring and autumn for the north and south wind alternate period.

The soil parent rocks in the project area are mainly sandstone, sand shale and granite, and the soil is mainly composed of red soil, mountain yellow soil, red soil and mountain meadow soil. The forestry soil is mainly zonal red soil and yellow soil, distributed between 300-1000m above sea level. The soil layer is deep, loose, with good natural fertility, high organic matter content, generally 5-10%, up to 30%, and pH value is between 4.5-5.0. The vegetation flora of the project area belongs to the subtropical evergreen broad-leaved forest area, with a variety of plant species. The native vegetation is well protected, and the vertical distribution of vegetation is zonal. Flake or zonal azalea dwarf forest is more common in the mountainous areas above 1500m in altitude. The mountains with an altitude of 1000-1500 m are evergreen broad-leaved forests. The low hills and hills below 1000m are dominated by artificial coniferous forests, bamboo forests and economic forests. Common herbaceous plants are the five hornwort, iron awn and fern, etc. The project area used to be covered by dense primordial forest, the quantity and species of wild animals and plants were plentiful. Prior to project implementation, the quantity and species of wild animals and plants are less and less due to years of timber harvest.

The project area is located in Jinxiu Yao Autonomous County water system, which belongs to the Xijiang River water system of the Pearl River Basin, is China's most important gene bank of wild biology is very important to the ecological environment of China, and it is very important to the ecological environment of China. Within the scope of forest, it had a whole south Asia tropical mountain forest ecosystem. Prior to project implementation, the present ecosystem is emerging more and more fragile due to years of logging.

The implementation of project (conversion of logged to protected forest) will increase the stability of the ecosystem, enhance biodiversity conservation by increasing forest cover and nature habitat connectivity.

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

The project activity is in line with the Forest Law of People's Republic of China and Regulations on the implementation of the Forest Law of the People's Republic of China.

Forestry Law of the People's Republic of China

Chapter	Section	Article	Justification (Y/N) / Explanation
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1	1	This Law is enacted to protect, cultivate and make rational use of forest resources, speed up the greening of the country, ensure forest ecological security, promote ecological progress, and achieve harmonious coexistence between man and nature.	Y. When the project was implemented, commercial logging will be banned in the project area and the forest would be protected in a scientific and efficient wayThe project activity will contribute to the environment (biodiversity conservation, rocky desertification prevention and soil erosion control), thus contribute to sustainable development.
1	2	This Law shall apply to the protection, cultivation and utilization of forests and trees and the operation and management of forests, trees and woodlands within the territory of the People's Republic of China.	Y. The project activity would carry out forest management and forest protection in accordance with this law.
1	3	The protection, cultivation and utilization of forest resources shall respect and conform to nature, and adhere to the principles of giving priority to ecology, protection, combination of conservation and sustainable development.	Y. When the project was implemented, commercial logging will be banned in the project area and the forest would be protected in a scientific and efficient wayThe project activity will contribute to the environment (biodiversity conservation, rocky desertification prevention and soil erosion control), thus contribute to sustainable development.
1	4	The state implements the responsibility system and the assessment and evaluation system for the development goals of forest resources protection.The people's government at a higher level shall examine the people's government at a lower level in fulfilling the objectives of forest resources protection and development and in the work of forest fire prevention and the prevention and control of major forest pests, and shall make public the results of the examination.	Y. The project activity would strictly abide by the forest fire prevention and forest pest control system, and inform the higher authorities of the relevant situation once a month. In case of forest fire or pests, PP will immediately report the situation, and take effective measures.

2	15	The ownership and use right of woodlands, forests and trees on woodlands shall be registered and recorded uniformly by realty registration organs and issued certificates after verification. The department in charge of natural resources under The State Council shall be responsible for the registration of forests, trees and woodlands in the state key forest districts designated by The State Council (hereinafter referred to as "key forest districts"). The legitimate rights and interests of the owners and users of forests, trees and woodlands shall be protected by law and shall not be infringed upon by any organization or individual. Owners and users of forests, trees and woodlands shall protect and make rational use of the forests, trees and woodlands according to law, and may not illegally change the use of woodlands or destroy the forests, trees and woodlands.	Y. All forests of the project are state-owned forests or privately-owned or collective-owned, and have the legal right to forest ownership. All the owners authorized the project proponent to access the project to their behalf. Local forestry bureaus strictly controlled logging quotas and cracked down on illegal logging.
3	26	In light of local conditions, the competent forestry authorities of the people's governments at or above the county level may work out special plans for the protection and utilization of forestland, afforestation, forest operation, and the protection of natural forests.	Y. The project start date is according to the Notice of Guangxi Jinxiu IFM (Conversion of Logged to Protected Forest) Project issued by Jinxiu Yao Autonomous County Forestry Bureau on January 20, 2016. The Notice stipulated that commercial logging would be banned and forest protection would be carried out in the project area from March 1, 2016.
6	55	Commercial forests shall be adopted different logging methods according to different situations, strictly control the area of clear-logging and synchronously plan and implement logging.	Y. In the project area, the timber harvest plan must be approved by the local forestry bureau before it's implemented.
6	56	To log trees on woodlands, an application shall be made for the logging license, and the logging shall be carried out in accordance with the provisions of the logging license. It is not necessary to apply for a logging license to log bamboo forests outside the nature reserves, but the technical regulations for tree logging shall be complied with.	Y. In the project area, It is necessary to apply for a logging license if the owner of the forest want to log trees. Bamboo trees are not included in the project.

6	57	The logging license shall be verified and issued by the competent forestry authorities of the people's governments at or above the county level.	Y. In the project area, the logging license is verified and issued by the local forestry bureau.
6	59	If the technical regulations for tree logging are met, the departments verifying and approving the logging license shall issue the logging license in time. However, the departments verifying and approving the issuance of logging licenses shall not issue logging licenses exceeding the annual logging quota.	Y. In baseline scenario, the extracted volume in the timber harvest plan approved by the local forestry bureau didn't exceeding the annual logging quota.

Regulations on the implementation of the Forest Law of the People's Republic of China

Chapter	Section	Article	Justification (Y/N) / Explanation
2	15	The state protects the legitimate rights and interests of forests, trees and woodland operators according to law. No unit or individual may encroach on the trees legally owned by business operators and the woodlands for use.	Y. The legitimate rights and interests of the stakeholders in the project were protected by law.

3	19	The competent forestry authorities of the people's governments at or above the county level shall regularly issue long-term, medium-term and short-term forecasts of forest diseases and insect pests based on the investigation and monitoring of the forest diseases and insect pests' detection and reporting centers and stations, and put forward prevention and control plans in time.	Y. The project activity would strictly abide by the forest pest control system, and inform the higher authorities of the relevant situation once a month. In case of occurrence of forest diseases and insect pests, The local forest bureau and PP should take comprehensive prevention and control measures and conduct timely elimination and treatment. When serious forest diseases and insect pests occur, the local people's government should take emergency measures to prevent their spread and eliminate hidden dangers.
3	23	When a forest fire breaks out, the local people's government must immediately organize the military and civilian to fight it; Relevant departments shall actively do a good job in the supply, transportation, communication and medical treatment of fire fighting and rescue materials.	The project activity would strictly abide by the forest fire prevention and control system, and inform the higher authorities of the relevant situation once a month. In case of forest fire, PP will immediately report the situation, and take effective measures.
5	28	National forests and trees all by state-owned forestry enterprises, institutions, farms, factories and mines for the unit, the collective forests and trees, individually-owned trees by county as the unit, formulate annual forest logging quota, by the competent forestry authorities of the people's governments of provinces, autonomous regions and municipalities directly under the central government summary, balance, after verified by the people's government at the corresponding level, the State Council for approval. The annual quota for forest logging in key forest districts shall be submitted to the competent forestry authorities under The State Council for approval.	Y. In baseline scenario, the extracted volume in the timber harvest plan approved by the local forestry bureau didn't exceeding the annual logging quota.

1.15 Participation under Other GHG Programs

1.15.1 Projects Registered (or seeking registration) under Other GHG Program(s)

The project has not been registered, or is seeking registration under any other GHG programs.

1.15.2 Projects Rejected by Other GHG Programs

The project has not been rejected by any other GHG programs.

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

N/A

1.16.2 Other Forms of Environmental Credit

The project has neither intends to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program, nor any such credit has been or will be cancelled from the relevant program.

1.17 Additional Information Relevant to the Project

Leakage Management

N/A

Commercially Sensitive Information

There are no commercially sensitive information been excluded from the public version of the project description.

Sustainable Development

As one of the most precious ecological resources, forest is the key to biodiversity and all life forms. The protection of local forest will enrich the biodiversity and provide more opportunity for adaptive response to natural challenges and economic development (e.g. climate change). The project activity will result in significant carbon sequestration and contribute to the environment (e.g. biodiversity conservation rocky desertification control and soil erosion control), thus contribute to sustainable development.

Further Information

There is no additional relevant legislative, technical, economic, sectoral, social, environmental, geographic, site-specific and/or temporal information that may have a bearing on the eligibility of the project, the net GHG

emission reductions or removals, or the quantification of the project's net GHG emission reductions or removals.

2 SAFEGUARDS

2.1 No Net Harm

An Environmental Impact Assessment (EIA) is not required for logged to protected forest projects according to Construction project classification management of environmental impact assessment list. The key mitigation action of the project activity is avoiding the illegal harvest of the forest, which can protect and improve the surviving environment, keep the ecological balance, save the species resources and enhance homeland security.

According to the guideline of the General Office of the State Council on improving the compensation mechanism for ecological protection⁵, the commercial logging subsidy and reward funds will be stopped, and the dynamic adjustment mechanism of forest compensation standards will be improved to improve the management and protection mechanism of forest, which mainly relies on government purchase of services. In this way, this will make up for the loss of timber harvest income for the foresters, as well as an additional income when the VCU's are sold.

When the project was implemented, it could reduce tree logging by more than 260,000m³ and manage forest effectively, so that it can control soil and water erosion and land degradation, prevent rocky desertification, enhance biodiversity conservation by increasing forest cover and nature habitat connectivity, absorb and fix carbon dioxide every year by conversion of logged to protected forest, and reduce GHG emission.

At the same time, the project will provide thousands of employment opportunities for managing forest. According to Chapter II of the Labour Law of the People's Republic of China⁶, workers are not discriminated against in employment on the basis of their ethnic group, race, sex or religious belief. Women enjoy equal rights with men in employment, and employers are prohibited from recruiting minors under the age of 16. As the supervisor of the project, the local forestry Bureau supervised that all parties of the project did not violate laws during the implementation of the project, including labour and criminal laws, so as to avoid discrimination (gender/age/religion) and sexual harassment.

Therefore, there is no potential negative environmental or socio-economic impact due to the project.

2.2 Local Stakeholder Consultation

Questionnaires were distributed by the project proponent to the residents who lives in the community and closely related to the project. The questions aimed to find out their concerns and opinions about the project.

⁵http://www.gov.cn/zhengce/content/2016-05/13/content_5073049.htm

⁶http://www.mohrss.gov.cn/SYrlzyhshbzb/zcfg/flfg/fl/201601/t20160119_232110.html

The questionnaires covered areas of economic, social benefit and environmental effect etc. The content of the questionnaire includes the following information :

1. The purpose of the questionnaire
2. Basic information of the participants
3. Questions
 - 1) Do you know the proposed project?
 - 2) What do you think the proposed project will bring you?
 - 3) Do you support the implementation of the proposed project?
 - 4) What is your concern about the proposed project?
 - 5) What is your opinion and suggestion regarding the proposed project?

The Survey was conducted through distributing and collecting responses to a questionnaire in Dec 2015. Totally 50 questionnaires returned out of 50 with 100% response. The following is a summary of the key findings based on returned questionnaires.

1. Attitude towards the proposed project

All of them support the implementation of the project, they think the protection of forest instead of cutting is good the environment, and will benefit the sustainable development.

2. The concern about the proposed project

The project could reduce tree logging by more than 260,000m³ and manage forest effectively, so that it can control soil and water erosion and land degradation, prevent rocky desertification, enhance biodiversity conservation by increasing forest cover and nature habitat connectivity, absorb and fix carbon dioxide every year by conversion of logged to protected forest, and reduce GHG emission.

At the same time, the project will provide thousands of employment opportunities for managing forest.

3. Conclusion

The survey shows that the proposed project is 100% supported by local people. It is because they believe the implementation of the project will bring multiple benefits.

During the implementation of the project, the local forestry bureau would continue to conduct a questionnaire survey among stakeholders to understand their opinions. Since the project is running normally, local stakeholders have no opinion. The local forestry bureau also conducts regular training on ecological forest conservation for stakeholders to ensure better implementation of the project.

- The project design and implementation, including the results of monitoring.

It will be announced by the local forestry bureau.

- The risks, costs and benefits the project may bring to local stakeholders.

PP has entered into agreements with various local stakeholders of the project, which are supervised by the local forestry bureau.

- All relevant laws and regulations covering workers' rights in the host country.

The local forestry bureau has publicized to the local stakeholders of the project.

- The process of VCS Program validation and verification and the validation/verification body's site visit.

Based on the above issues, the project proponent implements the coordination mechanism of project-related stakeholders:

(1) To establish a democratic and unimpeded mechanism for the expression of interests

(1a) To establish information sharing channels.

In the process of project implementation, both national policies and local regulations need to be understood by local stakeholders. Only by understanding them can they participate in the project and express their interests and appeal for their interests according to their actual needs. Local government plays a leading role in project implementation and actively establishes information sharing channels. Through publicity and information sharing, local stakeholders could know the core spirit of the policy and all kinds of effective information related to the project and change passivity into initiative. From 18-Oct-2015 to 23-Oct-2015, the project proponent and local forestry Bureau held a mobilization meeting about the project activities. The local forestry bureau informed the representatives of each stakeholder to participate the meeting through the forestry stations of each township. The project proponent presented: the project design and implementation, including the results of monitoring, the benefit of the local stakeholders, the risks, costs and benefits the project might bring to local stakeholders, the relevant laws and regulations, the rights of workers, the process of VCS Program validation and verification and the validation/verification body's site visit, etc in the meeting. At the same time, it can also make full use of the publicity channels of new media and realize the transparency of information sharing through Wechat group information exchange platform.

(1b) To establish channels of interest expression.

Interest expression is the basis for all stakeholders to safeguard their own rights and interests and coordinate development. Through effective expression of interests, conflicts and contradictions can be resolved in time, and at the same time, vulnerable rural community residents have a sense of acquisition and enhance the sense of ownership. PRA (Participatory Rural Appraisal) will be done every two years, and the local government resolves any conflicts which may arise between the project proponent and local stakeholder according to the relevant law. At the same time, according to the Note of VCS AFLOU Project Interview Session, the local government had set up a petition mechanism for the project. If the local stakeholders had any concerns about potential negative impacts during the implementation of the project, they could appeal to the local government. Residents' meetings in rural communities, regular coordination and communication meetings, village message boards, Posting boards, secretaries' mailboxes, and cadres' talks at home were also effective forms of expression for local stakeholders. These methods were conducive to stakeholders to express their demands in reasonable and legal forms, especially for vulnerable rural community residents to

fully express their interests to build an effective platform. At the same time, attention should also be paid to the feedback of information to form a closed loop of information communication. Problem-oriented, timely reply, timely treatment, emphasis on timeliness. Through legalization, rationalization and institutionalization to reflect problems and get timely feedback, the group events caused by unfair distribution of benefits could be reduced from the source. At the same time, villagers' interest demands are satisfied or their opinions were adopted, which could greatly enhance their enthusiasm for participation.

(2) To establish a fair and effective interest participation mechanism.

(2a) To enhance the participation awareness of rural community residents.

The key to project implementation lies in the active participation of local stakeholders, who should show their dominant status in the process of project implementation. Through knowledge and skill training, local stakeholders could enhance their cognitive ability and participation in forest protection and management, and improved their awareness and ability to cope with climate change, conserve water, conserve soil and water, improve the environment and protect biodiversity. When a project involves planning related to the interests of local stakeholders, the local government should fully solicit the opinions of local stakeholders, respect their interests, and speak for the people. Local stakeholders themselves should be proactive in learning about relevant policies and building a sense of ownership. On the other hand, local stakeholders themselves were part of the project, and only when local stakeholders participate in management and gain benefits could the potential obstacles to project implementation be eliminated. When the project implemented, the local stakeholders could not get timber harvest. But according the agreements signed by the PP and the local stakeholders, the PP would apply the project to VCS project. Then the local stakeholders could live for selling VCUs instead of selling timber harvest.

(2b) To increase employment opportunities for local stakeholders

Local forestry bureau would provide more jobs opportunities for the local stakeholders to manage and protect the forest, so as to ensure that the income of stakeholders was increased. The increase of employment opportunities and the provision of jobs make the project implementation closely related to the interests of local stakeholders, so as to promote the active participation of local stakeholders in the project.

(3) To establish a reasonable and perfect interest protection mechanism

(3a) To improve laws and regulations

The Project proponent had entered into legal agreements with various local stakeholders of the project, which were supervised by the local forestry bureau. Through the formulation of relevant laws and regulations and the signing of agreements, the responsibilities, rights and benefits of each stakeholder in the project were clarified. At the same time, the government also did a good job of publicity and education, so that each participant in the implementation of the project could know the law, understand the law, abide by the law, and then regulate their own behavior, to create an orderly project implementation environment.

(3b) Strengthening interest supervision

According to the agreement signed between PP and the local stakeholders, the local forestry Bureau is the project supervisor and closely supervises the implementation process of the project. According to the Note

of VCS AFLOU Project Interview Session, the petition mechanism of the government was also an important and powerful means of supervision. On the other hand, the validation/verification body would validate and verify the project.

2.3 Environmental Impact

An Environmental Impact Assessment (EIA) is not required for logged to protected forest projects according to Construction project classification management of environmental impact assessment list⁷. The key mitigation action of the project activity is avoiding the illegal harvest of the forest, which can protect and improve the surviving environment, keep the ecological balance, save the species resources and enhance homeland security.

Therefore, the project has no negative impact on the environment.

2.4 Public Comments

This project was open for public comment from 8 September - 8 October 2020. No comments were received.⁸

2.5 AFOLU-Specific Safeguards

- *Local stakeholder identification process and a description of results.*

The local stakeholders mainly include the local households live near by the project and the local government. Before start construction, project owner had distributed questionnaires for local stakeholder to investigate the suggestion of them on the construction of the project, including the impact on society, economy and life. 50 investigation questionnaires have been returned, of which, 42% are women, 63% are graduated from high school or inferior school, 100% are elder than twenty years old.

According to Chapter II of the Labour Law of the People's Republic of China⁹, workers are not discriminated against in employment on the basis of their ethnic group, race, sex or religious belief. Women enjoy equal rights with men in employment, and employers are prohibited from recruiting minors under the age of 16. As the supervisor of the project, the local forestry Bureau supervised that all parties of the project did not violate laws during the implementation of the project, including labour and criminal laws, so as to avoid discrimination (gender/age/religion) and sexual harassment.

- *Risks to local stakeholders due to project implementation and how the project will mitigate such risks.*

There is no risk to local stakeholders due to the project implementation.

- *Risks to local stakeholder resources due to project implementation and how the project will mitigate such risks, including the plans to ensure the project will not impact local stakeholder's property rights without the free, prior and informed consent.*

⁷http://www.gov.cn/gongbao/content/2009/content_1265996.htm

⁸<https://registry.verra.org/app/projectDetail/VCS/2326>

⁹http://www.mohrss.gov.cn/SYrlzyhshbzb/zcfg/flfg/fl/201601/t20160119_232110.html

Prior to the implementation of the project, the project proponent and local forestry Bureau held a mobilization meeting about the project activities. The local forestry bureau informed the representatives of each stakeholder to participate the meeting through the forestry stations of each township. The project proponent presented: what the project activity was, the benefit of the local stakeholders, the risks, costs and benefits the project might bring to local stakeholders, the relevant laws and regulations, the rights of workers, the process of VCS Program validation and verification and the validation/verification body's site visit, etc in the meeting. When the project implement, the local stakeholders could not get timber harvest. But according the agreements signed by the PP and the local stakeholders, the PP would apply the project to VCS project. Then the local stakeholders could live for selling VCU instead of selling timber harvest. Meanwhile, local forestry bureau would provide more jobs opportunities for the local stakeholders to manage and protect the forest, so as to ensure that the income of stakeholders was increased. So the project will not impact local stakeholder's property rights without the free, prior and informed consent. All the local stakeholders were excited and indicated that they would support the project activity. According to the agreements between PP and the stakeholders, as the supervising party, the local Forestry Bureau must ensure the authenticity of the relevant information submitted by PP and the stakeholders, ensure the effective implementation of the project, and ensure that the proceeds from the project are distributed to PP and the stakeholders.

Town / Township	Date of Meeting
Jinxu Forest Farm	18-Oct-2015
Jinxu Town	18-Oct-2015
Toupai Town	23-Oct-2015
Dazhang Township	19-Oct-2015
Liuxiang Township	20-Oct-2015
Luoxiang Township	19-Oct-2015
Sanjiang Township	21-Oct-2015
Sanjiao Township	21-Oct-2015
Changdong Township	22-Oct-2015
ZhongliangTownship	22-Oct-2015

- *Processes to ensure ongoing communication and consultation with local stakeholders, including a grievance redress procedure to resolve any conflicts which may arise between the project proponent and local stakeholders.*

Based on participatory rural appraisal tools such as field trips, questionnaires, community meetings and interviews with representative of the local stakeholders, the project activity was evaluated. The results showed that: The project activity could well reflect the livelihood development needs of local stakeholders, and would contribute not only to climate change mitigation, but also to community economic development and environmental protection. Relevant stakeholders such as farmers, communities and governments have put forward useful suggestions for the implementation of the project.

PRA (Participatory Rural Appraisal) will be done every two years, and the local government resolves any conflicts which may arise between the project proponent and local stakeholder according to the relevant law.

If PP and stakeholders fail to negotiate due to disputes, they can appeal to the local forestry bureau and relevant government departments, or put forward arbitration in the local arbitration organization. If the arbitration fails, they can bring a lawsuit to the local court.

At the same time, according to the Note of VCS AFOLU Project Interview Session, the local government has set up a petition mechanism for the project. If the local stakeholders have any concerns about potential negative impacts during the implementation of the project, they can appeal to the local government.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

VM0010 version 1.3: Methodology for Improved Forest Management: Conversion of Logged to Protected Forest

This methodology uses the latest versions of the following methodologies, modules and tools:

- *CDM Tool for Calculation of the Number of Sample Plots for Measurements within A/R CDM Project Activities*
- *CDM Tool for testing significance of GHG emissions in A/R CDM project activities*
- *VCS methodology VM0003 Methodology for Improved Forest Management through Extension of Rotation Age*
- *VCS methodology VM0005 Methodology for Conversion of Low-Productive Forests to High-Productive Forests*
- *VCS methodology VM0007 REDD+ Methodology Framework (REDD-MF)*
- *VCS methodology VM0011 Methodology for Improved Forest Management: Calculating GHG Benefits from Logged to Protected Forest*
- *VCS tool VT0001 Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities*

3.2 Applicability of Methodology

According to VM0010 version 1.3, Projects must fall within the AFOLU project category “IFM Logged to Protected Forest” as defined in the most recent version of the VCS AFOLU Guidance document. Therefore, specific conditions which can be applicable to the methodology are shown below:

- ◆ *Forest management in the baseline scenario must be planned timber harvest; There is a planned timber harvest before the conversion of Logged to Protected Forest as the baseline scenario.*
- ◆ *Under the project scenario, forest use is limited to activities that do not result in commercial timber harvest or forest degradation; Under the project scenario, there is no forest use for commercial timber harvest or forest degradation. Only forest tending and managing are allowed in the timber harvest plan, which has been strictly carried out by the project proponent.*
- ◆ *Planned timber harvest must be estimated using forest inventory methods that determine allowable offtake as volume of timber (m^3ha^{-1});*
The timber harvest plan was taken by Guangzhou Peisen Landscape Architecture Design Co., Ltd (Certificate No. : Bing 19-068) who is experienced for the forestry investigation, based on the forest inventory data issued by Laibin City Forestry Survey and Design Institute (Certificate No. : YI 003). Then Guangzhou Peisen Landscape Architecture Design Co., Ltd uses forest inventory data, mainly on the stock volume to estimate the planned timber harvest and then to determine allowable offtake as volume

of timber (m^3ha^{-1}),

- ◆ *The boundaries of the forest land must be clearly defined and documented;*
The boundaries of the forest land could be clearly defined and documented through the maps and the forest inventory data. The location of the forest is measured by GPS and draw map. Both the forest map and forest second class investigation will be monitored periodically by the government according to the local laws and regulations.
- ◆ *Baseline scenario cannot include conversion to managed plantations;*
According to the previously issued timber harvest plan, the project baseline scenario is planned timber harvest *within the project area*, which doesn't include conversion to managed plantations.
- ◆ *Baseline scenario, project scenario and project case cannot include wetland or peatland*
The baseline scenario, project scenario and project case don't include wetland or peatland.
- ◆ *All applicability conditions of VCS and CDM tools used in conjunction with this methodology must be met.*

The project meets all applicability conditions of VCS and CDM tools used in conjunction with this methodology.

The applicability conditions of Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU)

Project Activities are:

- a) AFOLU activities the same or similar to the proposed project activity on the land within the proposed project boundary performed with or without being registered as the VCS AFOLU project shall not lead to violation of any applicable law even if the law is not enforced;
Yes, all projects are in conformity with law.
- b) The use of this tool to determine additionality requires the baseline methodology to provide for a stepwise approach justifying the determination of the most plausible baseline scenario. Project proponent(s) proposing new baseline methodologies shall ensure consistency between the determination of a baseline scenario and the determination of additionality of a project activity.
Yes, the baseline methodology uses a stepwise approach justifying the determination of the most plausible baseline scenario. And project proponent proposing new baseline methodologies ensure consistency between the determination of a baseline scenario and the determination of additionality of a project activity.

3.3 Project Boundary

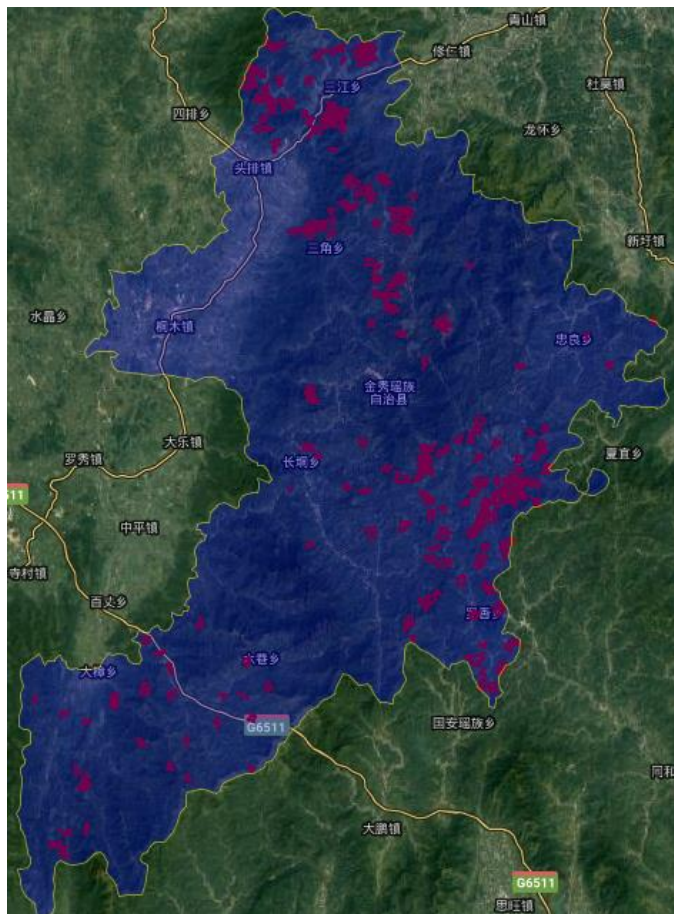
According to VM0010 version 1.3, the spatial boundaries of the project activity so as to facilitate accurate measuring, monitoring, accounting, and verifying of the project's emissions reductions and removals is defined below:

3.3.1 Geographical Boundaries

When describing physical project boundaries, the information is shown in Figure 1 above. The details of the subcompartments (e.g. area, age, species, stock volume and location) are shown in timber harvest plan as appendix submitted to DOE.

The geographic boundaries of the project activity are fixed and thus do not change over the project lifetime.

Following the VCS definition of market leakage the geographic boundaries for leakage from market effects are those of the country in which the project area occurs.



3.3.2 Temporal Boundaries

The following temporal boundaries shall be defined:

The temporal boundaries are defined by the project start date and length of the project crediting period

According to VCS standard version 4.0, the start date of the project activity is 01/03/2016. The length of the project crediting period is 20 years.

The minimum duration of a monitoring period is one year and the maximum duration is 10 years.

The project proponent decides the periodicity of verifications every 5 years.

3.3.3 Carbon Pools

The carbon pools included or excluded from the project boundary are shown in the table below:

Carbon pools		Included/Optional/ Excluded	Justification/Explanation
Baseline	Aboveground trees	Included	The stock change in the aboveground tree biomass is estimated
	Aboveground non- tree	Excluded	Exclusion is always conservative when forests remains as forest
	Belowground	Excluded	Unlikely to change significantly in forests remaining as forests and is difficult to measure - omission is conservative
	Dead wood (logging slash)	Included	The dead wood (logging slash) carbon pool is expected to be larger in the baseline than in the project scenario, and therefore this pool must be included
	Dead wood (naturally accumulated)	Excluded	Following IPCC guidelines, it is assumed that carbon stocks in the naturally occurring dead wood pool (both standing and lying) are equivalent in both the project and baseline scenario, and therefore this pool is conservatively excluded
	Harvested wood products	Included	Will be greater in baseline than project scenario and significant
	Litter	Excluded	Insignificant and exclusion is conservative
	Soil organic carbon	Excluded	Exclusion is always conservative when forests remains as forest
Project	Aboveground trees	Included	The stock change in the aboveground tree biomass is estimated
	Aboveground non- tree	Excluded	Exclusion is always conservative when forests remains as forest
	Belowground	Excluded	Unlikely to change significantly in forests remaining as forests and is difficult to measure - omission is conservative
	Dead wood (logging slash)	Excluded	There is no dead wood (logging slash) in the project scenario
	Dead wood (naturally accumulated)	Excluded	Following IPCC guidelines, it is assumed that carbon stocks in the naturally occurring dead wood pool (both standing and lying) are equivalent in both the project and baseline scenario, and therefore this pool is conservatively excluded
	Harvested wood products	Included	Will be greater in baseline than project scenario and significant
	Litter	Excluded	Insignificant and exclusion is conservative
	Soil organic carbon	Excluded	Exclusion is always conservative when forests remains as forest

3.3.4 Greenhouse Gases

The emissions sources included in or excluded from the project boundary are shown in the table below.

The project proponent has chosen to exclude to account for GHG emissions related to the combustion of fossil fuels, which is conservative.

If the application of the most recent version of the CDM Tool for testing significance of GHG emissions in A/R CDM project activities leads to the conclusion that the emission source is insignificant. In addition, the sum of decreases in carbon pools and increases in emissions that may be neglected must be less than 5% of the total project GHG benefits.

Source		Gas	Included?	Justification/Explanation
Baseline	Combustion of fossil fuels (in vehicles, machinery and equipment)	CO ₂	Excluded	Conservative as emissions will be greater in the baseline scenario than in the project scenario.
		CH ₄	Excluded	Conservative as emissions will be greater in the baseline scenario than in the project scenario.
		N ₂ O	Excluded	Conservative as emissions will be greater in the baseline scenario than in the project scenario.
	Removal of herbaceous vegetation	CO ₂	Excluded	Based on CDM EB decision reflected in paragraph11ofthe report of the 23rd session of the board: https://cdm.unfccc.int/Panels/ar/023/ ar_023_rep.pdf
	Burning of biomass	CH ₄	Included	Included as CO ₂ equivalent emission
		N ₂ O	Excluded	Potential emissions are negligible
	Nitrogen based fertilizer	N ₂ O	Excluded	Potential emissions are negligible. Following the VCS update to the Tool for AFOLU Methodological Issues and Guidance for AFOLU Projects, emissions through the use of fertilizer are considered insignificant and are not considered here.
Project	Combustion of fossil fuels (in vehicles, machinery and equipment)	CO ₂	Excluded	Conservative as emissions will be greater in the baseline scenario than in the project scenario.
		CH ₄	Excluded	Conservative as emissions will be greater in the baseline scenario than in the project scenario.
		N ₂ O	Excluded	Conservative as emissions will be greater in the baseline scenario than in the project scenario.
	Removal of herbaceous vegetation	CO ₂	Excluded	Based on CDM EB decision reflected in paragraph11ofthe report of the 23rd session of the board: https://cdm.unfccc.int/Panels/ar/023/ ar_023_rep.pdf
		CH ₄	Included	Included as CO ₂ equivalent emission

Source		Gas	Included?	Justification/Explanation
	Burning of biomass	N ₂ O	Excluded	Potential emissions are negligible
	Nitrogen based fertilizer	N ₂ O	Excluded	Potential emissions are negligible. Following the VCS update to the Tool for AFOLU Methodological Issues and Guidance for AFOLU Projects, emissions through the use of fertilizer are considered insignificant and are not considered here.

3.4 Baseline Scenario

3.4.1 Selection of baseline

According to VM0010, the “Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities” (version 3.0), the following steps are applied for the demonstration of the additionality for the project by project proponent:

- STEP 1. Identification of alternative land use scenarios to the AFOLU project activity;
- STEP 2. Investment analysis to determine that the proposed project activity is not the most economically or financially attractive of the identified land use scenarios; or
- STEP 3. Barriers analysis; and
- STEP 4. Common practice analysis.

Step 1. Identification of alternative land use scenarios to the proposed VCS AFOLU project activity

Sub-step 1a. Identify credible alternative land use scenarios to the proposed VCS AFOLU project activity

a) Identify realistic and credible land-use scenarios that would have occurred on the land within the proposed project boundary in the absence of the AFOLU project activity under the VCS. The scenarios should be feasible for the project area taking into account relevant national and/or sectoral policies and circumstances, such as historical land uses, practices and economic trends. The identified land use scenarios at least include:

- Continuation of the pre-project land use as the timber harvest plan;
- Project activity on the land within the project boundary performed without being registered as the VCS AFOLU project;
- If applicable, activities similar to the proposed project activity on at least part of the land within the project boundary of the proposed VCS AFOLU project that are resulting from:
 - Legal requirements; or
 - Extrapolate similar activities in the geographical area under similar socioeconomic and ecological conditions to the proposed VCS AFOLU project activity which cover a period began a decade earlier than the project start date.

For (ii), the NPV under this scenario is obviously not financially attractive compared to the scenario of logging.

For (iii), the lands within the project boundary of the proposed VCS AFOLU project are all with the same legal requirements and are existed as forests more than ten years prior to the project start date. So (iii) is not applicable.

Therefore, the baseline scenario is continuation of the pre-project land use as the timber harvest plan.

The baseline is further confirmed by the timber harvest plan issued by Guangzhou Peisen Landscape Architecture Design Co., Ltd and is determined both in PD and MR.

3.4.2 Modelling the baseline scenario

According to VM0010 version 1.3, a historical baseline scenario is used for determining how to model the baseline management scenario as:

1. Historical records of forest management exist for 5 years preceding the project start date;
2. Historical records indicate that the management practices have surpassed the legal requirements provided by conforming to all local and regional forest legislation;
3. Historical records that indicate that the historical management surpasses financial barriers by providing above average financial returns.

Box 1. Timber Harvest Plan

The description of harvesting in the form of a timber harvest plan forms the basis of the baseline scenario for greenhouse gas accounting.

The timber harvest plan describes the harvest of timber products:

- a) reference the forest volume inventory (see Section 8.1.1 – parameter $V_{j,i|BSL}$) to identify the relative number of trees per hectare potentially available for harvest by species in each stratum;
- b) demarcate all non-harvest areas within the forest based on legally required exclusions for environmental features such as slope, swamp areas or conservation buffers;
- c) divide the harvestable forest into annual operating areas (referred to throughout this methodology as land parcels) using common practice;
- d) include a design and presentation of the forestry infrastructure to harvest, skid/haul, store and move harvested timber products from the land parcels to downstream processing or market entry points. Where the project proponent accounts for emissions from forestry infrastructure, the design and presentation must include all forest roads, skidtrails and log landings that would be established under the baseline scenario as a georeferenced layer (shapefile or equivalent), and must list necessary harvest and transport machinery.
- e) The timber harvest plan must follow local best practice for timber harvest practices, including planning of roads, skidtrails and log landings-and the timber resource volume and extraction quotas defined in any legal requirements.

For the purpose of estimating the net annual changes in carbon stocks resulting from planned timber harvest in the baseline scenario a detailed planned timber harvesting schedule will be developed from the timber harvest plan, setting out details of harvest

and forestry infrastructure establishment for each land parcel in the project area in terms of the following:

- a) the species to be harvested;
- b) the year (1,2,3...) in which timber harvest and/or forestry infrastructure establishment of each land parcel is scheduled to occur;
- c) the number of years each land parcel is in a post-harvest and/or forestry infrastructure establishment state during the project crediting period;
- d) the maximum and minimum diameters at breast height (DBH), at stump and at top for tree harvesting;
- e) the planned harvesting regime (clear felling, specie/stratum-selective logging, area-selective logging);
- f) the fraction of merchantable timber volume from clearing of forest roads, skidtrails and log landings that is to be processed into wood products (FV,INF,HWP). Based on this fraction, as well as forest inventory and forestry infrastructure data, $V_{EX,INF,j,i|BSL}$ and $V_{notEX,INF,j,i|BSL}$ (see points 2 and 3 below) will be calculated.
- g) technical specifications for the categories of wood products to be harvested; and
- h) the total volumes or fractions to be harvested, broken down by categories of wood products defined as sawnwood, wood-based panels, other industrial roundwood, paper and paper board, and other.

The planned timber harvest schedule is determined ex ante to reflect the timber harvesting plan as stipulated in the legal right to harvest. The planned timber harvesting schedule will be developed for the Project Area to include all land parcels within the project boundary for the proposed IFM activity.

The output of the timber harvest plan and timber harvesting schedule must be:

The mean extracted volume of extracted merchantable timber per unit area by species in each stratum in each year ($V_{EX,j,i|BSL}$).

Where the project proponent accounts for forestry infrastructure, the mean volume of merchantable timber extracted for wood processing that is harvested during the process of forestry infrastructure establishment per unit area by species in each stratum in each year ($V_{EX,INF,j,i|BSL}$).

Where the project proponent accounts for forestry infrastructure, the mean volume of merchantable timber that is cleared during the process of forestry infrastructure establishment and NOT extracted for wood processing per unit area by species in each stratum in each year ($V_{notEX,INF,j,i|BSL}$).

The planned timber harvesting schedule will be submitted by the project proponent as part of the project documents.

The timber harvest and management plan describes the harvest of timber products and includes:

Demands

The project activity

a) reference the forest volume inventory (see Section 8.1.1 – parameter $V_{j,i BSL}$) to identify the relative number of trees per hectare potentially available for harvest by species in each stratum;	According to the forest volume inventory, the $V_{j,i BSL}$ is listed as follows: <table><tr><th>Dominant Species</th><th>Area(ha)</th><th>Volume (m³)</th><th>$V_{j,i BSL}$(m³/ha)</th></tr><tr><td>Broad-leaved tree</td><td>4,143.40</td><td>940,484.48</td><td>226.98</td></tr><tr><td>Chinese fir</td><td>1,843.43</td><td>292,102.48</td><td>158.46</td></tr><tr><td>Pinus massoniana</td><td>585.30</td><td>99,237.48</td><td>169.55</td></tr></table>	Dominant Species	Area(ha)	Volume (m ³)	$V_{j,i BSL}$ (m ³ /ha)	Broad-leaved tree	4,143.40	940,484.48	226.98	Chinese fir	1,843.43	292,102.48	158.46	Pinus massoniana	585.30	99,237.48	169.55
Dominant Species	Area(ha)	Volume (m ³)	$V_{j,i BSL}$ (m ³ /ha)														
Broad-leaved tree	4,143.40	940,484.48	226.98														
Chinese fir	1,843.43	292,102.48	158.46														
Pinus massoniana	585.30	99,237.48	169.55														
b) demarcate all non-harvest areas within the forest based on legally required exclusions for environmental features such as slope, swamp areas or conservation buffers;	The project area only includes commercial forests, the ecological forests are excluded from the project boundary. Therefore, the legally required exclusions for environmental features such as slope, swamp areas or conservation buffer are obviously non-harvest areas, which are also excluded from the project boundary.																
c) divide the harvestable forest into annual operating areas (referred to throughout this methodology as land parcels) using common practice;	Yes, the harvestable forests are listed into annual operating areas using clear felling. The timber harvest plan was prepared by Guangzhou Peisen Landscape Architecture Design Co., Ltd and was approved by Jinxiu Yao Autonomous County Forestry Bureau in 2015 is a long-term plan of 5 years.																
d) include a design and presentation of the forestry infrastructure to harvest, skid/haul, store and move harvested timber products from the land parcels to downstream processing or market entry points. Where the project proponent accounts for emissions from forestry infrastructure, the design and presentation must include all forest roads, skidtrails and log landings that would be established under the baseline scenario as a georeferenced layer (shapefile or equivalent), and must list necessary harvest and transport machinery.	Because the emission from forestry infrastructure is hard to calculate, and if it is accounted in the baseline scenario, the total emission reduction will be greater. Considering the cost effectiveness and conservative, the project proponent didn't account for emission from forestry infrastructure.																
e) the timber harvest plan must follow local best practice for timber harvest practices, including planning of roads, skidtrails and log landings-and the timber resource volume and extraction quotas defined in any legal requirements.	The timber harvest plan has followed local best practice for timber harvest practices. The planning of roads, skidtrails and log landings meet the related national regulations and standard. The timber resource volume and extraction quota is defined according to timber harvest plan, which comply with the legal requirements.																

The timber harvest schedule :

Demands	The project activity
a) the species to be harvested;	The species within the project area are Broad-leaved tree, Chinese fir and Pinus massoniana
b) the year (1,2,3...) in which timber harvest and/or forestry infrastructure establishment of each land parcel is scheduled to occur;	The timber harvest plan has demonstrated the year in which timber harvest is scheduled to occur. The forestry infrastructures of departments were established when the company was founded, so the timber harvest schedule doesn't include this part.
c) the number of years each land parcel is in a post-harvest and/or forestry infrastructure establishment state during the project crediting period;	According to the timber harvest plan, the land parcel will be regenerated after timber harvest occurred, the post-harvest state during the project crediting period will be not more than a year.
d) the maximum and minimum diameters at breast height (DBH), at stump and at top for tree harvesting;	There is no specific requirement for the maximum and minimum diameters at breast height (DBH), at stump and at top for tree harvesting, which is not applicable in China.
e) the planned harvesting regime (clearfelling, specie/stratum-selective logging, area-selective logging);	The planned harvesting regime is clear felling for the project.
f) the fraction of merchantable timber volume from clearing of forest roads, skidtrails and log landings that is to be processed into wood products ($F_{V,INF,HWP}$). Based on this fraction, as well as forest inventory and forestry infrastructure data, $V_{EX,INF,j,i BSL}$ and $V_{notEX,INF,j,i BSL}$ (see points 2 and 3 below) will be calculated.	The fraction of merchantable timber volume from clearing of forest roads, skidtrails and log landings that is to be processed into wood products is very small and hard to calculate precisely, so we didn't take the $V_{EX,INF,j,i BSL}$ and $V_{notEX,INF,j,i BSL}$ into account for calculate the baseline scenario emission. As this is conservative for emission reduction of the project, so it is reasonable.
g) technical specifications for the categories of wood products to be harvested; and	There is no technical specifications for the categories of the wood products, they will be determined by the requirements of the customers
h) the total volumes or fractions to be harvested, broken down by categories of wood products defined as sawnwood, wood-based panels, other industrial roundwood, paper and paper board, and other.	The wood products of the project is only sawnwood, there is no others such as wood-based panels, other industrial roundwood, paper and paper board, etc.

3.4.3 Stratification

As the project activity area contains different forest types or forests with different carbon density, stratification is carried out in order to improve the accuracy and precision of carbon stock estimates. The details of the subcompartments (e.g. area, age, species, stock volume and location) are shown in timber harvest plan as appendix submitted to DOE.

Based on the availability of data regarding the nature and composition of forest stocks in the project area, stratification is developed on the basis of existing vegetation stratification, where these are documented in the legal right to harvest. The purpose of strata is to improve accuracy and reduce the sampling cost. The strata is usually based on the tree species, age and canopy density, but it does not mean all these factors should be considered for all projects, more strata means more workload and cost. For this project, the factor of species for strata could reduce the variation within the same stratum and reach the accuracy level of 90% under certain degree of freedom. So the strata are reasonable and feasible.

Table 2 shows the 3 strata specified based on the tree species.

Table 2: Tree strata

Serial number of strata	Area (ha)	Tree species	Source
1	4,143.40	Broad-Leaved tree	Timber Harvest Plan issued by Guangzhou Peisen Landscape Architecture Design Co., Ltd based on forest second class investigation issued by Laibin City Forestry Survey and Design Institute
2	1,843.43	Chinese Fir	
3	585.30	Pinus massoniana	
Total	6,572.13 ha		

3.5 Additionality

According to VM0010 version 1.3, the additionality of the project is demonstrated using the VCS “Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities” version 3.0.

The following four steps are applied for the project:

3.5.1 Step 1: Identification of alternative land use scenarios to the AFOLU project activity;

Sub-step 1a: Identify credible alternative land use scenarios to the proposed VCS AFOLU project activity

- a) Identify realistic and credible land-use scenarios that would have occurred on the land within the proposed project boundary in the absence of the AFOLU project activity under the VCS.

The scenarios should be feasible for the project area taking into account relevant national and/or sectoral policies and circumstances, such as historical land uses, practices and economic trends. The identified land use scenarios shall at least include:

- i) Continuation of the pre-project land use as the timber harvest plan as analysed in section 3.4.3;
- ii) Project activity on the land within the project boundary performed without being registered as the VCS AFOLU project.
- iii) If applicable, activities similar to the proposed project activity on at least part of the land within the project boundary of the proposed VCS AFOLU project at a later date resulting from:
 - Legal requirements; or
 - Extrapolate similar activities in the geographical area under similar socioeconomic and ecological conditions to the proposed VCS AFOLU project activity which cover a period began a decade earlier than the project start date.

For (iii), the lands within the project boundary of the proposed VCS AFOLU project are all with the same legal requirements and are existed as forests more than ten years prior to the project start date. So (iii) is not applicable.

Therefore, pre-project land use scenario is the timber forest within the authorized limit and timber plan was approved by government, which is the common practice in China. And there is no land within the Project boundary performed being registered as the VCS AFOLU project.

- b) All identified land use scenarios must be credible. All land-uses within the boundary of the proposed VCS AFOLU project that are currently existing or that existed at some time in the period beginning ten years prior to the project start date but no longer exist, may be deemed realistic and credible. For all other land use scenarios, credibility shall be justified. The justification shall include elements of spatial planning information (if applicable) or legal requirements and may include assessment of economic feasibility of the proposed land use scenario.

The (i) and (ii) identified land-use scenarios that would have occurred on the land within the proposed project boundary in the absence of the AFOLU project activity under the VCS are realistic and credible, as all land-uses within the boundary of the project activity that existed in the period beginning ten years prior to the project start date but no longer exist. Therefore, it is deemed realistic and credible. Outcome of Section 3.5.1:

The identified land use scenarios include the two below:

- i) Continuation of the pre-project land use as the timber harvest plan as analysed in section 3.4;
- ii) Project activity on the land within the project boundary performed without being registered as the VCS AFOLU project.

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

According to Forest law of the People's Republic of China¹⁰ and Regulations on the implementation of the Forest Law of the People's Republic of China¹¹, forest cutting management quota system is implemented in China. The central government issued the maximum timber harvest to state-owned, collective-owned, private-owned forests of every province, and nation level state-owned forest enterprises every five years. The State draws up a unified annual timber harvest plan, which shall not exceed the approved annual quota for tree felling. The forest owner cannot increase timber harvest freely according to timber market without government approval.

Scenario I: Pre-project land use scenario is the timber forest within the authorized limit and timber plan was approved by government, which is the common practice in China, and is compliance with enforced mandatory applicable laws and regulations.

Scenario II: According to the 13th Five-year Forest Harvest Limit issued by State Council (Guohan [2016] No.32)¹², the maximum timber harvest volume in China during the period from 2016 to 2020 is $25,403.6 \times 10^4 \text{ m}^3$ per year; the maximum timber harvest volume in Guangxi Zhuang Autonomous Region during the period from 2016 to 2020 is $4,460.9 \times 10^4 \text{ m}^3$ per year. Therefore, the maximum timber harvest is strictly controlled by the national forest authority, which not means forbidding timber harvest. Therefore, the project owner has the right to decide the quantity of logging within the authorized limit. Scenario II (the project activity conversion of logged to protected forest on the land within the project boundary without being registered as the VCS AFOLU project) is not mandated by any systematically enforced law, statute or other regulatory framework, and is compliance with enforced mandatory applicable laws and regulations.

The identified land use scenarios include the two below:

- i) Continuation of the pre-project land use as the timber harvest plan as analysed in section 3.4;
- ii) Project activity on the land within the project boundary performed without being registered as the VCS AFOLU project.

3.5.2 Step 2: Investment analysis to determine that the proposed project activity is not the most economically or financially attractive of the identified land use scenarios; or

This section will determine whether the proposed project activity, without the revenue from the sale of GHG credits is economically or financially less attractive than at least one of the other land use scenarios. To conduct the investment analysis, use the following sections.

Sub-step 2a: Determine appropriate analysis method

Determine whether to apply simple cost analysis, investment comparison analysis or benchmark analysis. If the VCS AFOLU project generates no financial or economic benefits other than VCS related income, then apply the simple cost analysis (Option I). Otherwise,

¹⁰http://www.gov.cn/xinwen/2019-12/28/content_5464831.htm

¹¹http://www.gov.cn/zhengce/2020-12/26/content_5574381.htm

¹²http://www.gov.cn/zhengce/zhengceku/2016-02/16/content_5041486.htm

use the investment comparison analysis (Option II) or the benchmark analysis (Option III). Note, that Options I, II and III are mutually exclusive hence, only one of them can be applied.

According to the tool, Option I is not applicable for the proposed project since the project will generate other financial and economic benefits (e.g. income from tending and managing instead of commercial harvest) other than VCS related income.

The benchmark analysis is not applicable for the proposed project since there is neither practical nor public available standard benchmark for forest industry within the project area.

Therefore, the project will use the investment comparison analysis (Option II) since the 2 alternatives identified in step 1 both have cost and benefit separately.

Sub-step 2b: Option II. Apply investment comparison analysis

As the project proponent should compare to determine which one is more economic attractive in the 2 scenarios identified in step 1, NPV will be used as the financial indicator to calculate the discounting in 20 years for decision-making context.

Sub-step 2c: Calculation and comparison of financial indicators (only applicable to options II and III):

- a) Calculate the suitable financial indicator for the proposed VCS AFOLU project without the financial benefits from the VCS for the 2 alternatives identified in step 1. Include all relevant costs and revenues, and, as appropriate, non-market cost and benefits in the case of public investors.

Basic Parameters					
Series	Item	Unit	Baseline value	Project value	Data source
Revenue					
1	Broad-leaved tree Price	RMB/m ³	900	0	Record of Historical Agreements or Sales Receipts
2	Chinese fir Price	RMB/m ³		0	
3	Pinus massoniana Price	RMB/m ³		0	
4	Other timber product from tending and managing instead of commercial harvest	RMB/m ³	300	300	
Extracted Volume					

1	Broad-leaved tree	m ³	940,484.84	0	Timber Harvest Plan
2	Chinese fir	m ³	292,102.48	0	
3	Pinus massoniana	m ³	99,237.48	0	
4	Other timber product from tending and managing instead of commercial harvest	m ³ /ha/year	2	2	
5	Total Area	Mu	98,582	98,582	
Cost					
1	A/R cost	RMB/Mu	300	0	Record of Historical Agreements or Sales Receipts
2	Harvest cost	RMB/m ³	180	0	
3	Management Fee	RMB/Mu	120	120	
4	Additional maintenance cost for protected forest	RMB/Mu/working day	0	0.1	

b) Present the investment analysis in a transparent manner and provide all the relevant assumptions in the VCS AFOLU project description.

The NPV before and after the conversion of logged to protected forest is shown in the table below. The NPV under the scenario of logging is ¥40,839*10⁴ Yuan with the discount rate of 8%.

However, the NPV under the scenario of protected forest is ¥-10,173*10⁴ Yuan with the discount rate of 8%, which is lower than the scenario of logging. Therefore, the NPV under the scenario of protected forest is obviously not financially attractive compared to the scenario of logging. By taking into account the VCUs revenue, the NPV under the scenario of protected forest is increased to be ¥-9,147*10⁴ Yuan.

With revenue from VCS at the assumed price level, the project would be more financially attractive. Table 3 shows the comparison of the NPV between project and baseline scenario.

Table 3: Comparison of NPV at different scenarios

	NPV (10 ⁴ Yuan)
Scenario of Logging	¥40,839
Scenario of protected	¥-10,173
Scenario of protected(with VCUs)	¥-9,147

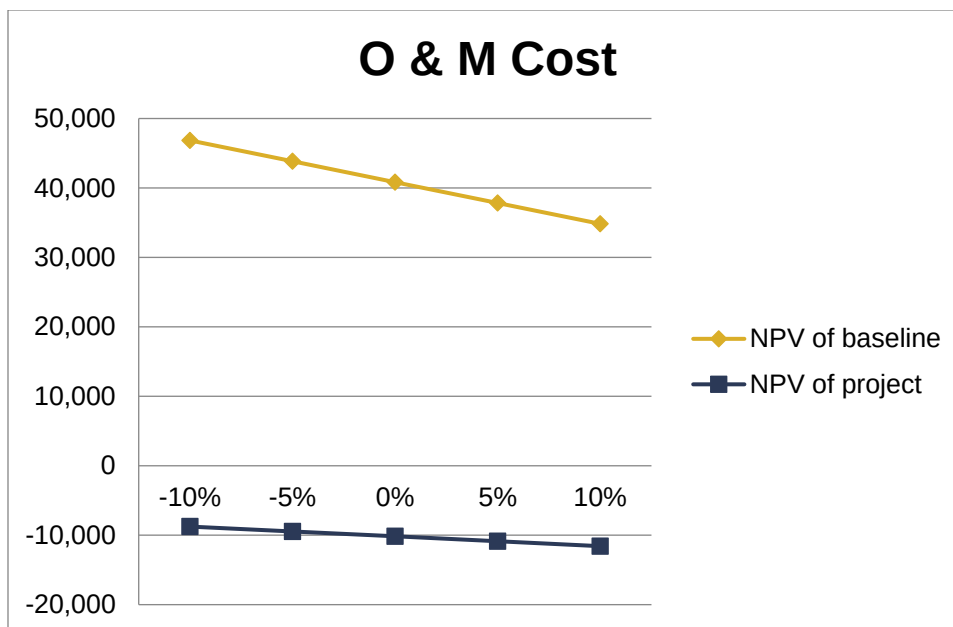
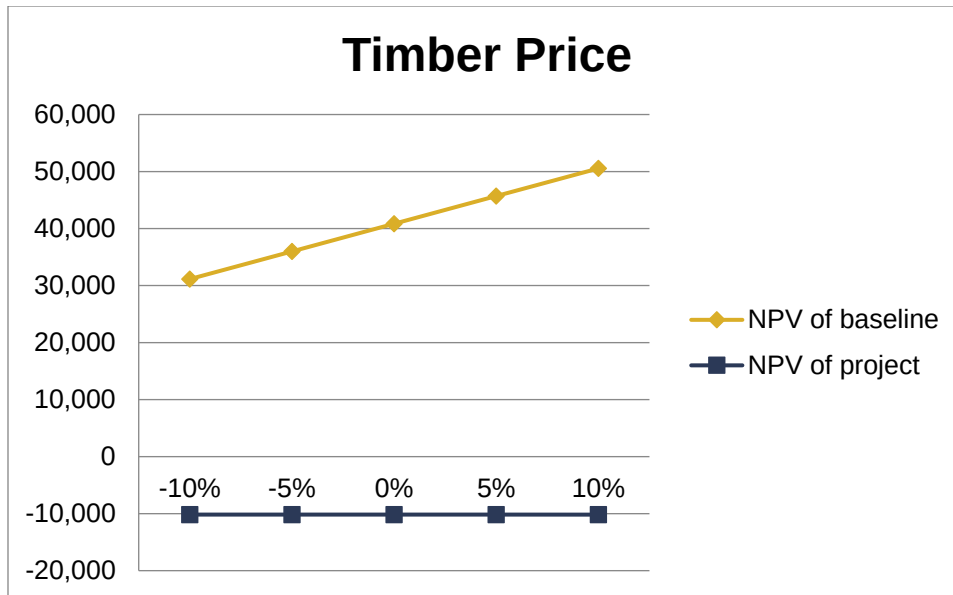
Sub-step 2d: Sensitivity analysis

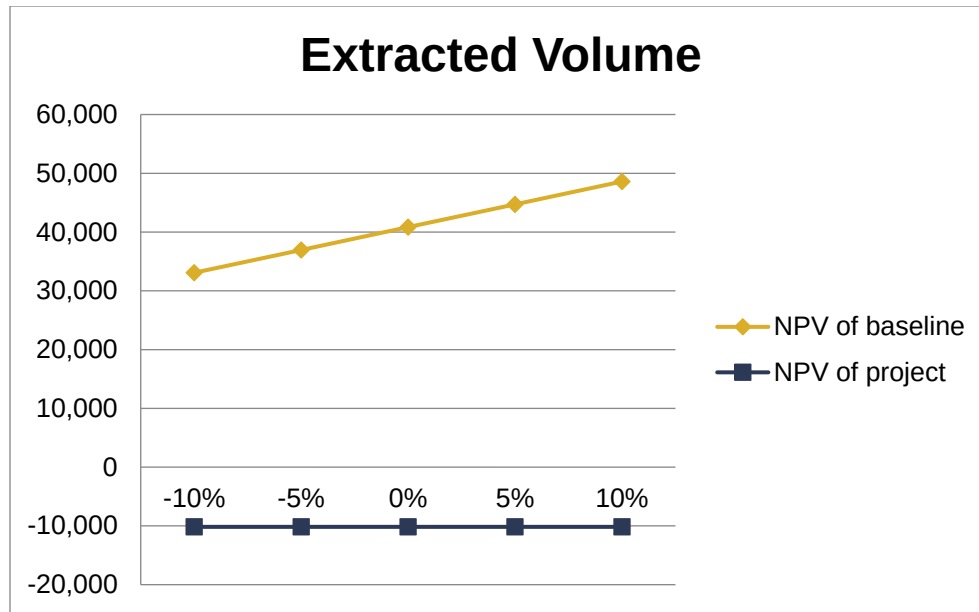
The objective of the sensitivity analysis is to show whether the conclusion regarding the financial attractiveness is robust to reasonable variations in the critical assumptions. The investment analysis provides a valid argument in favour of additionality only if it consistently supports (for a realistic range of assumptions) the conclusion that the proposed VCS AFOLU project without the financial benefits from the VCS is unlikely to be financially attractive.

For the project, the key parameters of Price of the trees, the O&M cost, and the extracted volume will be taken into account of the sensitivity analysis. Results of the 3 parameters are shown in the table 4 and figure 2 below:

Table 4: NPV comparison sensitivity analysis of the project

Key parameters	NPV of baseline scenario (10 ⁴ Yuan)					NPV of project scenario (10 ⁴ Yuan)				
	-10%	-5%	0%	5%	10%	-10%	-5%	0%	5%	10%
Price of the trees	31,136	35,988	40,839	45,690	50,541	-10,173	-10,173	-10,173	-10,173	-10,173
O&M cost	46,844	43,842	40,839	37,836	34,833	-8,768	-9,470	-10,173	-10,875	-11,577
Volume of the extracted trees	33,077	36,958	40,839	44,720	48,601	-10,173	-10,173	-10,173	-10,173	-10,173





By referring to the Figures above, the NPV under protected scenario will not exceed the baseline scenario if the price, the O&M cost and the extracted volume varies within $\pm 10\%$.

In the baseline scenario, the project receives revenue from both the commercial harvest and timber products derived from tending and managing. The latter covers a very small fraction. Under the project scenario, all the commercial harvest has been cancelled and only tending and managing is allowed, the only revenue of the project scenario is the very little income from the selling of the timber products from tending and managing, which remains the same amounts as the baseline scenario. It is obvious that the revenue of the project is only a small part of the baseline scenario, which would not be influenced by the variation of the timber price and extracted volume. On the other hand, the cost in the project scenario will increase due to the more cost on tending and maintenance. Therefore, it is impossible for the NPV of the project scenario to reach to the baseline scenario no matter how the two parameters vary.

In order to show the opportunity of the NPV under protected scenario exceeding the baseline scenario is very little, the analysis of critical assumption is conducted as below. That is, for the three parameters, to what extent, the NPV of the project scenario can reach to that of the baseline scenario.

Parameters	Range Extent (When the NPV of the project scenario reached to the baseline scenario)
Timber price	1317.59%
O&M cost	-363.22%
Extracted Volume	1317.59%

1) Timber price

It is assumed that only when the timber product price for tending and managing increased 1317.59%, the nominal NPV of the project scenario could reach to $40,839 \times 10^4$ Yuan. Since the timber price for the

project scenario and the baseline scenario remains the same. Therefore, the project scenario will not become equal to the baseline scenario.

2) O&M cost

The NPV of the Project will reach to $40,839 \times 10^4$ Yuan if the O&M cost reduced by 363.22%, and it is obvious that when the O&M cost reduced by 100%, it would become zero, that is impossible to occur for the normal project operating, not even to mention the decrease of 363.22%. In fact, the cost of labor index has increased recently according to the data of National Bureau of Statistics of China¹³.

3) Extracted Volume

It is assumed that only when the extracted volume for tending and managing increased 1317.59%, the nominal NPV of the project scenario could reach to $40,839 \times 10^4$ Yuan. As the extracted volume of the project is determined in the timber production plan issued by the forestry authority based on the forest survey, it is also impossible to increase 1317.59%. Therefore, it is impossible for the NPV of the project scenario to reach to the baseline scenario within the crediting period.

Therefore, the result of the sensitivity analysis confirms that the project is financially unattractive.

According to the tool, if after the sensitivity analysis it is concluded that the proposed VCS AFOLU project without the financial benefits from the VCS is unlikely to be financially most attractive (Option II and Option III), then proceed directly to Step 4 (Common practice analysis).

3.5.3 Step 3. Barrier analysis

Not applicable.

3.5.4 Step 4. Common practice analysis

According to the “Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities” (version 3.0). “Similar activities are defined as that which are of similar scale, take place in a comparable environment, inter alia, with respect to the regulatory framework and are undertaken in the relevant geographical area, subject to further guidance by the underlying methodology”. China has a vast territory, the development policies and economic environment for projects in each province of China are not same. The investment climate varies considerably from province to province depending on the local conditions. The Project is located in Guangxi Zhuang Autonomous Region. However, the geographic and geomorphic conditions are totally different in the whole province. Therefore, only activities in Guangxi Zhuang Autonomous Region are included in the analysis.

¹³<http://www.stats.gov.cn/tjsj/>

By searching the VCS, CDM websites and so on, we found that Guangxi Huanjiang IFM (Conversion of logged to Protected Forest Project in Guangxi Zhuang Autonomous Region has been under validation¹⁴. And there is no similar project without applying the VCS, CDM¹⁵ or other voluntary emission reduction project.¹⁶

Therefore, according to the analysis above, the similar activities which haven't applied for the VCS are not common practice in Laibin City. So the proposed project has additionality.

3.6 Methodology Deviations

N/A

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

Calculation of baseline emissions for all land parcels under both the historical and common practice baseline scenarios requires the application of the equations presented in Sections 8.1.1 to Section 8.1.6 of the methodology.

Baseline projections are calculated ex-ante and are not adjusted through-out the project lifetime.

According to the methodology, Section 8.1.1 serves to calculate carbon stocks in commercial timber volumes. Next, baseline emissions are estimated based on the calculation of deadwood (logging slash) generated in the process of timber harvest and establishment of forestry infrastructure (Section 8.1.2), the emissions resulting from production and subsequent retirement of wood products derived from timber harvesting (including timber harvesting from the establishment of forestry infrastructure (Section 8.1.3)), the combustion of fossil fuels in forestry machinery including mechanized felling, skidding / forwarding /hauling, loading and transporting inside the project area, and processing (Section 8.1.5), minus the rates of forest regrowth post-timber harvest (Section 8.1.6).

The following table lists the baseline emissions modelled by the methodology:

Included in modelling

¹⁴ <https://registry.terra.org/app/search/VCS>

¹⁵ <http://cdm.unfccc.int/>

¹⁶ <http://cdm.ccchina.org.cn/ccer.aspx>

1. Emission from wood product conversion
2. Decomposition of deadwood from harvested trees
3. Emissions from wood product retirement
4. Stock change due to regrowth following timber harvest
5. Decomposition of trees incidentally killed during tree felling Where project proponent accounts for forest infrastructure :
6. Decomposition of trees killed through skid trail creation
7. Decomposition of trees killed through road construction Optional (as omission is conservative)
8. Emissions from fossil fuels burned in baseline harvesting practices Conservatively excluded from modeling
9. Emissions through subsequent forest re-entry

The options of 5 to 9 are hard to calculate and tiny in baseline scenario, so we exclude those from baseline emissions modelling considered of cost. As emission is conservative so it is reasonable to exclude those from baseline emissions modelling.

Baseline commercial timber volumes must be derived for development of the timber harvest plan and for ex-post accounting of emissions resulting from natural forest disturbance.

The equations below calculate the total emissions across the project crediting period for each emission source. Total emissions are averaged across the crediting period to give annual emissions and are multiplied by t^* , time elapsed since the start of project activity. EX-post, t^* is updated so baseline projections are available for each proposed future verification date.

Data for input into these carbon stock change calculations for the baseline scenario shall be established from the same data used to create the timber harvest plan.

According to VM0010 version 1.3, the baseline emissions are calculated in the sections below:

4.1.1 Calculation of carbon stocks in commercial timber volumes

This section calculates $C_{HB,j,i|BSL}$, the mean carbon stock in total harvested biomass in $tC \cdot ha^{-1}$ and $C_{EX,j,i|BSL}$, the mean carbon stock in extracted timber (merchantable timber that leaves the forest) in $tC \cdot ha^{-1}$.

The pre-existing forest inventory data are used for this purpose provided that the pre-existing data:

- a) represents the project strata;
- b) is not more than 10 years old.

These inventory data used the method of sample plot inventory. These data were sourced from timber harvest plan taken by Guangzhou Peisen Landscape Architecture Design Co., Ltd based on forest inventory data issued by Laibin City Forestry Survey and Design Institute. The project involves 3 strata and 249 subcompartments. For each stratum, mean volume is estimated from sample plot size of 0.04 ha and at least 1 sample plot will be selected in 1 subcompartment within the project area using standard forest inventory assessment methods, which satisfies the number of sample plots required by

the Tool for Calculation of the Number of Sample Plots for Measurements within A/R CDM Project Activities (version 02.1.0) as stated in section 5.3.5.

The estimate of merchantable volume for each species j at the sample plot level will be calculated as:

$$V_{j,i,sp} = \sum_{l=1}^L V_{l,j,i,sp} \quad (1)$$

Where:

$V_{j,i,sp}$	merchantable volume for species j in stratum i in sample plot sp , m^3 ;
$V_{l,j,i,sp}$	merchantable volume for tree l of species j in stratum i in sample plot sp , m^3 ;
l	1, 2, 3 ...L sequence of individual trees in sample plot;
i	1, 2, 3 ...M strata;
sp	1, 2, 3 ...SP sample plots; and
j	1, 2, 3 ...J tree species.

Therefore, the merchantable volume per unit area of species j in stratum i will be calculated as the mean merchantable volume in all sample plots in stratum i :

$$V_{j,i|BSL} = \frac{1}{SP} * \sum_{sp=1}^{SP} \frac{V_{j,i,sp}}{A_{sp}} \quad (2)$$

Where:

$V_{j,i BSL}$	mean merchantable volume per unit area of species j in stratum i in the baseline scenario, $m^3 \cdot ha^{-1}$;
$V_{j,i,sp}$	merchantable volume for species j in stratum i in sample plot sp ; m^3 ;
A_{sp}	area of sample plot sp , ha ;
i	1, 2, 3 ...M strata;
sp	1, 2, 3 ...SP sample plots; and
j	1, 2, 3 ...J tree species.

Therefore, the carbon stock of timber harvested per unit area for species j in stratum i will be calculated from this mean volume of extracted timber:

$$C_{HB,j,i|BSL} = V_{EX,j,i|BSL} * BCEF_R * C_j \quad (3)$$

Where:

$C_{HB,j,i BSL}$	mean carbon stock of harvested biomass per unit area for species j in stratum i , $tC \cdot ha^{-1}$;
$V_{EX,j,i BSL}$	mean volume of extracted timber per unit area for species j in stratum i , $m^3 \cdot ha^{-1}$;
$BCEF_R$	biomass conversion and expansion factor applicable to wood removals in the project area, $t.d.m \ m^{-3}$;
CF_j	carbon fraction of biomass for species j , $tC \ t \ d.m^{-1}$;
i	1, 2, 3 ...M strata; and
j	1, 2, 3 ...J tree species.

Not all of the harvested biomass leaves the forest because the timber harvested has two components: 1) wood removed to market (extracted timber) and, 2) wood remaining in the forest as a result of harvest.

Therefore, the mean carbon stock of extracted timber per unit area for species j in stratum i will be calculated from the mean volume of extracted timber multiplied by density and carbon fractions:

$$C_{EX,j,i|BSL} = V_{EX,j,i|BSL} * D_j * CF_j \quad (4)$$

Where:

$C_{EX,j,i BSL}$	mean carbon stock of extracted timber per unit area for species j in stratum i ; $tC \cdot ha^{-1}$;
$V_{EX,j,i BSL}$	mean volume of extracted timber per unit area for species j in stratum i , $m^3 \cdot ha^{-1}$;
D_j	basic wood density of species j ; $t \ d.m. \ m^{-3}$;
CF_j	carbon fraction of biomass for species j , $tC \ t \ d.m^{-1}$;
i	1, 2, 3 ...M strata; and
j	1, 2, 3 ...J tree species.

4.1.2 Calculation of dead wood (logging slash) generated in the process of timber harvest

This section calculates $\Delta C_{DWSLASH,i,p|BSL}$, the change in carbon stock in dead wood resulting from timber harvest in stratum i in land parcel p , using $C_{EX,j,i|BSL}$ and $C_{HB,j,i|BSL}$ as calculated in section 4.1.1.

The simplifying assumption is made that dead wood created during timber harvest is emitted in the year of harvest.

Therefore, the change in carbon stock in the dead wood pool in stratum i in land parcel p will be calculated as the difference between the total carbon stock of the harvested biomass and the carbon stock of the extracted timber:

$$\Delta C_{DWSLASH,i,p|BSL} = \left[\sum_{j=1}^J (C_{HB,j,i|BSL} - C_{EX,j,i|BSL}) \right] \quad (5)$$

Where:

$\Delta C_{DWSLASH,i,p BSL}$	change in carbon stock of dead wood as logging slash resulting from timber harvest per unit area in stratum i in land parcel p , in $tC \cdot ha^{-1}$;
$C_{HB,j,i BSL}$	mean carbon stock of harvested biomass per unit area for species j in stratum i , $tC \cdot ha^{-1}$;
$C_{EX,j,i BSL}$	mean carbon stock of extracted timber per unit area for species j in stratum i , $tC \cdot ha^{-1}$;
i	1, 2, 3 ...M strata; and
j	1, 2, 3 ...J tree species.
p	1, 2, 3 ...P land parcels.

4.1.3 Calculation of baseline carbon sequestered in wood products

The carbon stock of extracted timber across species is calculated as:

$$C_{EX,i|BSL} = \sum_{j=1}^J C_{EX,j,i|BSL} \quad (6)$$

Where:

$C_{EX,i BSL}$	change in carbon stock of extracted wood products resulting from timber harvest per unit area in stratum i in land parcel p , $tC \cdot ha^{-1}$;
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$C_{EX,j,i BSL}$	mean carbon stock of extracted timber per unit area for species j in stratum i , $tC \cdot ha^{-1}$;
i	1, 2, 3 ...M strata; and
j	1, 2, 3 ...J tree species.

In accordance with the VCS AFOLU Requirements, the amount of carbon stored in wood products that would decay within 3 years after harvest (ie, the Wood Waste (WW) and the Short Lived Fraction (SLF)), are assumed to be emitted at the time of harvest.

Wood products that are retired between 3 and 100 years after harvest (ie, the Additional Oxidised Fraction, OF), must be accounted according to a 20 year linear decay function. This decay function is applied when the net greenhouse gas emissions/removals are calculated on an annual basis in equations 11 and 12.

All other wood product pools are considered to permanently store carbon.

Therefore, the carbon stock of extracted timber that is immediately emitted to the atmosphere at the time of harvest is calculated as

$$C_{WPO,i|BSL} = \sum_k C_{EX,i,k|BSL} * (WW_k + SLF_k) \quad (7)$$

Where:

$C_{WPO,i BSL}$	carbon stock of extracted timber from stratum i that is assumed to be emitted immediately at the time of harvest, in $tC \cdot ha^{-1}$;
$C_{EX,i,k BSL}$	mean carbon stock of extracted timber per unit area in stratum i , for wood product type k , $tC \cdot ha^{-1}$;
WW_k	fraction of biomass carbon from wood waste that is assumed to be emitted to the atmosphere immediately at the time of harvest for wood product k , dimensionless;
SLF_k	fraction of biomass carbon from the short lived wood product pool that is assumed to that be emitted to the atmosphere immediately at the time of harvest for wood product k , dimensionless;
i	1, 2, 3 ...M strata; and
k	Wood products (sawnwood, wood base products, etc).

The amount of extracted carbon stock that is assumed to enter the wood products pool that is not immediately emitted at harvest is calculated as per equation 8 below:

$$C_{WPI|BSL} = \sum_k C_{EX,i,k|BSL} - C_{WPO,i|BSL} \quad (8)$$

Where:

$C_{WP,i BSL}$	carbon stock of extracted timber from stratum i that is assumed to enter the wood products pool that is not immediately emitted at the time of harvest ,in $tC \cdot ha^{-1}$;
$C_{EX,i BSL}$	mean carbon stock of extracted timber per unit area in stratum i, for wood product type k, $tC \cdot ha^{-1}$;
$C_{WP0,i BSL}$	carbon stock of extracted timber from stratum i that is assumed to be emitted immediately at the time of harvest, in $tC \cdot ha^{-1}$;
i	1, 2, 3 ...M strata; and
k	Wood products (sawnwood, wood base products, etc).

Therefore, the carbon stock of wood products assumed to be retired between 3 -100 years following harvest is calculated as:

$$C_{WP100,i|BSL} = C_{WP,i|BSL} * OF_k \quad (9)$$

Where :

$C_{WP100,i,p BSL}$	Amount of carbon stored in wood products that are assumed to be retired between 3-100 years after harvest from stratum i in land parcel p, $tC \cdot ha^{-1}$;
$C_{WP,i BSL}$	carbon stock of extracted timber from stratum i that is assumed to enter the wood products pool that is not immediately emitted at the time of harvest ,in $tC \cdot ha^{-1}$;
OF_k	fraction of biomass carbon for wood product type k that is assumed to be emitted to the atmosphere between 3 and 100 years of timber harvest, dimensionless; and
i	1, 2, 3 ...M strata

4.1.4 Change in carbon stocks due to forest regrowth after harvest

The carbon sequestration in the baseline resulting from forest regrowth after timber harvest up to year t is equal to the forest regrowth rate of each stratum.

Therefore, carbon sequestration resulting from forest regrowth after timber harvest is calculated as:

$$C_{RG,i,p|BSL} = \sum_i RGR_i \quad (10)$$

Where:

$C_{RG,i,p BSL}$	carbon sequestration resulting from forest regrowth after timber harvest in stratum i in land parcel p, $tC \cdot ha^{-1} \cdot yr^{-1}$;
RGR_i	regrowth rate of forest post timber harvest for stratum i, $tC \cdot ha^{-1} \cdot yr^{-1}$;
i	1, 2, 3 ...M strata

4.1.5 Calculation of baseline scenario greenhouse gas emissions from change in carbon stocks

The net carbon stock change to be converted to emissions is equal to the carbon stock change as a result of timber harvest plus the carbon stock change resulting from conversion and retirement of wood products minus carbon sequestration from forest regrowth after harvest.

In order to generate the annual carbon stock change in the baseline scenario, the total net change in carbon stocks for parcels within is multiplied by the area of forest in the particular age class (ie, years since harvest in the baseline).

The annualized calculations vary between years 1, 2-10; 10-20; and all years since the start of the project activity, depending on which decay functions apply.

Therefore, the net change in carbon stock from wood products and logging slash across all parcels within the first year of harvest in the baseline is calculated as:

$$\Delta C_{NET|BSL(1)} = \sum_{i,p} A_{1,i,p} * \sum_{i=1}^M (C_{DWSLASH,i,p|BSL}/10) + C_{WP0,i,p|BSL} + (C_{WP100,i,p|BSL}/20) \quad (11)$$

Where:

$\Delta C_{NET BSL(1)}$	net change in carbon stock across all parcels in the baseline scenario in the first year since harvest in the baseline scenario, in tC;
$\Delta C_{DWSLASH,i,p BSL}$	change in carbon stock of dead wood as logging slash resulting from timber harvest per unit area in stratum i in land parcel p, in tC ha ⁻¹ ;
$\Delta C_{WP0,i,p BSL}$	change in carbon stock resulting from wood product conversion and retirement from stratum i in land parcel p, that is assumed to be emitted in the first year of harvest in the baseline tC ha ⁻¹ ;
$\Delta C_{WP100,i,p BSL}$	Amount of carbon stored in wood products that is assumed to be retired between 3-100 years after harvest from stratum i in land parcel p, tC ha ⁻¹ ;
$A_{1,i,p}$	the area of stratum i in land parcel p that was harvested 1 year ago, ha;
i	1, 2, 3 ...M strata; and
p	1, 2, 3 ...P land parcels harvested within the project crediting period.

The net change in carbon stock from wood products and logging slash across all parcels the years 2-10 since harvest in the baseline are calculated as:

$$\Delta C_{NET|BSL(2-10)} = \sum_{i,p} A_{2-10,i,p} * \sum_{i=1}^M (C_{DWSLASH,i,p|BSL}/10) + (C_{WP100,i,p|BSL}/20) \quad (12)$$

Where:

$\Delta C_{NET BSL(2-10)}$	net change in carbon stock across all parcels in the baseline scenario in
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years 2-10 since harvest in the baseline scenario, in tC;

$\Delta C_{DWSLASH,i,p BSL}$	change in carbon stock of dead wood as logging slash resulting from timber harvest per unit area in stratum i in land parcel p, in tC ha ⁻¹ ;
$\Delta C_{WP100,i,p BSL}$	Amount of carbon stored in wood products that is assumed to be retired between 3-100 years after harvest from stratum i in land parcel p, tCha ⁻¹ ,
$A_{2-10,i,p}$	the area of stratum i in land parcel p that was harvested 2 and 10 years ago, ha;
i	1, 2, 3 ...M strata; and
p	1, 2, 3 ...P land parcels harvested within the project crediting period.

The net change in carbon stock from wood products across all parcels the years 11 -20 since harvest in the baseline are calculated as:

$$\Delta C_{NET|BSL(11-20)} = \sum_{i,p} A_{11-20,i,p} * \sum_{i=1}^M (C_{WP100,i,p|BSL}/20) \quad (13)$$

Where:

$\Delta C_{NET BSL(11-20)}$	net change in carbon stock across all parcels in the baseline scenario in years 11-20 since the start of the project activity, in tC;
$\Delta C_{WP100,i,p BSL}$	Amount of carbon stored in wood products that is assumed to be retired between 3-100 years after harvest from stratum i in land parcel p, tCha ⁻¹ ;
$A_{11-20,i,p}$	the area of stratum i in land parcel p that was harvested 11 and 20 years ago, ha;
i	1, 2, 3 ...M strata; and
p	1, 2, 3 ...P land parcels harvested within the project crediting period.

The net change (sequestration) in carbon stock due to forest regrowth across all parcels in all years since harvest in the baseline scenario is calculated according to equation 14 below. Note that there will be no more emissions quantified from decay of logging slash or wood products.

$$\Delta C_{NET|BSL(1+)} = \sum_i A_{t*} * \sum_{i=1}^M (-\Delta C_{RG,i,p|BSL}) \quad (14)$$

Where:

$\Delta C_{NET BSL(1+)}$	net change in carbon stock due to forest regrowth in all parcels that have been harvested in the baseline scenario, in tC;
$\Delta C_{RG,i,p BSL}$	carbon sequestration resulting from forest regrowth after timber harvest in stratum i in land parcel p, tC ha ⁻¹
A_{t^*}	Cumulative area harvested until time t*, ha;
i	1, 2, 3 ...M strata; and
p	1, 2, 3 ...P land parcels harvested within the project crediting period.

Therefore, net change in carbon stock across all parcels harvested over each year of the project crediting period in the baseline scenario since the start of the project activity is calculated as:

$$\Delta C_{NET|BSL,t^*} = \sum_{p=1}^P \Delta C_{NET|BSL(1)} + \Delta C_{NET|BSL(2-10)} + \Delta C_{NET|BSL(11-20)} + \Delta C_{NET|BSL(1+)} \quad (15)$$

Where:

$\Delta C_{NET BSL,t^*}$	net change in carbon stock across all parcels in the baseline scenario in the year t* since the start of the project activity, in tC;
$\Delta C_{NET BSL(1)}$	net change in carbon stock in the baseline scenario for all parcels p that are within 1 year of harvest in the baseline scenario, in tC;
$\Delta C_{NET BSL(2-10)}$	net change in carbon stock in the baseline scenario for all parcels p, that were harvested between 2-10 years ago in the baseline scenario, in tC;
$\Delta C_{NET BSL(11-20)}$	net change in carbon stock in the baseline scenario in parcel p, that were harvested between 11-20 years ago in the baseline scenario, in tC;
$\Delta C_{NET BSL(1+)}$	net change in carbon stock due to forest regrowth in the baseline scenario for all parcels p that have been harvested in the baseline scenario, in tC;
t*	time elapsed since the start of the project, in years; and
p	1, 2, 3 ...P land parcels harvested within the project crediting period.

The net carbon stock change in the baseline scenario must be converted to net greenhouse gas emissions and is calculated as:

$$GHG_{NET|BSL,t^*} = \Delta C_{NET|BSL,t^*} * \frac{44}{12} \quad (16)$$

Where:

$GHG_{NET BSL,t^*}$	net greenhouse gas emissions in the baseline scenario in the year t* since the start of the project activity, tCO ₂ e;
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$\Delta C_{NET BSL}$	net change in carbon stock across all parcels in the baseline scenario in the year t^* since the start of the project activity, tC; and
44/12	ratio of molecular weights of carbon dioxide and carbon, $tCO_2\text{-}tC^{-1}$.

4.2 Project Emissions

4.2.1 Ongoing forest growth in the project scenario

This section calculates $\Delta C_{AB,t|PRJ}$ annual carbon stock change in aboveground biomass of trees in the project scenario, in tCO_2e .

Allometry

Select the appropriate allometric equation for forest type/group of species j (e.g. tropical humid forest or tropical dry forest) or for each species or family j (group of species) found in the inventory (hereafter referred to as species group) that converts tree dimensions from field timber inventories on sample plots to aboveground biomass of trees.

Measurements

Only the individual trees, species and strata which were to be harvested in the baseline scenario are to be measured. Any minimum values employed in inventories are held constant for the duration of the project.

Determining Sample Plot Carbon Stocks

The carbon stock in aboveground biomass for each individual tree of species group j in the sample plot located in stratum i will be estimated using the selected allometric equation applied to the tree dimensions resulting from section 4.2.1.2.

Therefore, the sum of the carbon stock in each sample plot will be calculated as:

$$C_{AB,j,i,t,sp|PRJ} = \sum_{l=1}^{L_{j,i,sp,t}} f_j(X, Y \dots) * CF_j \quad (17)$$

Where:

$C_{AB,j,i,t,sp PRJ}$	carbon stock in aboveground biomass of trees of species j in plot sp in stratum i at time t in the project scenario, tC
CF_j	carbon fraction of biomass for tree group j , $tC\ t\ d.m.^{-1}$;

$f_i(X, Y \dots)$	aboveground biomass of trees based on allometric equation for species group j based on measured tree variable(s), t.d.m. tree-1;
i	1, 2, 3, ...M strata;
j	1, 2, 3 ... J tree species;
l	1, 2, 3, ... $L_{j,i,t,sp}$ sequence number of individual trees of species group j in stratum i at time t in sample plot sp ;
t	0, 1, 2, 3, ... t^* years elapsed since start of the project activity; and
sp	1, 2, 3 ...SP sample plots.

Determining Stratum Carbon Stocks

The total carbon stock in the aboveground biomass of all trees present in sample plot sp in stratum i at time t , must be calculated as:

$$C_{AB,i,t,sp|PRJ} = \sum_{j=1}^J C_{AB,j,i,t,sp|PRJ} \quad (18)$$

Where:

$C_{AB,i,t,sp PRJ}$	aboveground biomass carbon stock of all trees of stratum i at time t in sample plot sp in the project scenario, tC ;
$C_{AB,j,i,t,sp PRJ}$	carbon stock in aboveground biomass of trees of species j in stratum i at time t in plot sp in the project scenario, tC ;
i	1, 2, 3, ...M strata;
j	1, 2, 3 ... J tree species; and
t	0, 1, 2, 3 ... t^* years elapsed since the start of the project activity.

Determining Mean Carbon Stocks

Therefore, the mean carbon stock in aboveground biomass for each stratum per unit area is calculated as:

$$C_{AB,i,t|PRJ} = \frac{1}{SP} * \sum_{sp=1}^{SP} \left(\frac{C_{AB,i,t,sp|PRJ}}{A_{sp}} \right) \quad (19)$$

Where:

$C_{AB,i,t PRJ}$	mean aboveground biomass carbon stock of trees in stratum i at time t, tC^{-1} ;
$C_{AB,i,t,sp PRJ}$	aboveground biomass carbon stock of trees in stratum i at time t in sample plot sp, tC;
A_{sp}	area of sample plot sp, ha;
sp	1, 2, 3 ... SP sample plots;
i	1, 2, 3 ... M strata; and
t	0, 1, 2, 3 ... t* years elapsed since the start of the project activity.

Determining Carbon Stock Changes

The annual carbon stock change in aboveground biomass of trees in year t is the difference in mean carbon stock in aboveground biomass between sampling events and, when expressed in tCO₂e, is calculated as:

$$\Delta C_{AB,t|PRJ} = \left(\sum_{i=1}^M (A_i * \frac{C_{AB,i,t2|PRJ} - C_{AB,i,t1|PRJ}}{T}) \right) * \frac{44}{12} \quad (20)$$

Where:

$\Delta C_{AB,t PRJ}$	annual carbon stock change in aboveground biomass of trees in year t, tCO ₂ e yr ⁻¹ ;
$C_{AB,i,t PRJ}$	mean aboveground biomass carbon stock of trees in stratum i at time tC^{-1} ;
A_i	area covered by stratum i, ha;
sp	1, 2, 3 ... SP sample plots;
T	number of years between monitoring time t1 and t2 (T=t ₂ – t ₁); years;
i	1, 2, 3 ... M strata; and
t	0, 1, 2, 3 ... t* years elapsed since the start of the project activity; and
44/12	ratio of molecular weights of carbon dioxide divided carbon, tCO ₂ e tC ⁻¹ .

The carbon stock change in aboveground biomass of trees ($\Delta C_{AB,t|PRJ}$) is the output of this section and is necessary to calculate net greenhouse gas emissions in the project scenario.

4.2.2 Forest disturbance in the project scenario

This section calculates $\Delta C_{DIST_FR,t|PRJ}$, carbon stock change due to fire disturbance in the project scenario; tCO₂-e, $\Delta C_{DIST,t|PRJ}$, carbon stock change due to non-fire natural disturbance in the project scenario; tCO₂-e

Natural disturbance

4.2.2.1a Natural Disturbance – Fire

Where fires occur ex post in the project area, the area burned shall be delineated. Therefore, based on the IPCC 2006 Inventory Guidelines, estimation of greenhouse gas emissions from biomass burning shall be calculated as:

$$\Delta C_{DIST_{FR,t|PRJ}} = \sum_{i=1}^M A_{burn,i,t} * B_{i,t|PRJ} * COMF_i * G_{g,i} * 10^{-3} * GWP_{CH4} \quad (21)$$

Where:

$\Delta C_{DIST_{FR,t PRJ}}$	net greenhouse gas emissions resulting from fire disturbance in year t , tCO ₂ ^e ;
$A_{burn,i,t}$	area burnt for stratum i at time t , ha;
$B_{i,t PRJ}$	average aboveground biomass stock present in the project scenario but absent in the baseline scenario before burning stratum i , time t ; t d. m. ha ⁻¹ ;
$COMF_i$	combustion factor for stratum i , dimensionless;
$G_{g,i}$	emission factor for stratum i for methane, g kg ⁻¹ dry matter burnt;
GWP_{CH4}	global warming potential for CH ₄ (IPCC default: 21), tCO ₂ ^e tCH ₄ ⁻¹ ;
i	1, 2, 3 ... M strata; and
t	1, 2, 3, ... t^* years elapsed since the start of the IFM project activity.

The average aboveground biomass stock present in the project scenario but absent in the baseline scenario before burning for a particular stratum shall be calculated as:

$$B_{i,t|PRJ} = \sum_{j=1}^J \{V_{EX,i,j|BSL} * BCEF_R\} \quad (22)$$

Where:

$B_{i,t PRJ}$	average aboveground biomass stock present in the project scenario but absent in the baseline before burning for stratum i , time t , t d. m. ha ⁻¹ ;
$V_{EX,j,i BSL}$	mean volume of extracted timber per unit area for species j in stratum i , m ³ ·ha ⁻¹ ;
$BCEF_R$	biomass conversion and expansion factor applicable to wood removals in the project area, t.d.m m ⁻³ ;
i	1, 2, 3 ... M strata;
j	1, 2, 3 ... J tree species; and

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

4.2.2.1b Natural Disturbance – Non-Fire

There are no fire disturbance occurred in the project area, therefore, $\Delta C_{DIST_FR,t|PRJ}=0$

Where non-fire natural disturbances occur ex post in the project area, the area disturbed must be delineated.

$$\Delta C_{DIST,t|PRJ} = \sum_{i=1}^M \left(A_{dist,i,t} * \sum_{j=1}^J \{C_{AB,j,i|BSL}\} \right) * \frac{44}{12} \quad (23)$$

Where:

$\Delta C_{DIST,t PRJ}$	net greenhouse gas emissions resulting from non-fire natural disturbance in year t , tCO_2^e ;
$A_{dist,i,t}$	area disturbed for stratum i at time t , ha;
$C_{AB,j BSL}$	carbon stock in aboveground biomass per unit area in stratum i , $tC \cdot ha^{-1}$;
$44/12$	ratio of molecular weights of carbon dioxide and carbon, $tCO_2^e \ tC^{-1}$;
i	1, 2, 3 ... M strata;
j	1, 2, 3 ... J tree species; and
t	1, 2, 3, ... t^* years elapsed since the start of the IFM project activity.

There are non-fire natural disturbances occur ex post in the project area, therefore, $\Delta C_{DIST,t|PRJ}=0$

Illegal logging

Where the PRA and the limited sampling indicate degradation is occurring, net carbon stock changes as a result of illegal logging shall be calculated as:

$$\Delta C_{DIST-IL,t|PRJ} = \sum_{i=1}^M \left(A_{DIST-IL,i} * \frac{C_{DIST-IL,i,t|PRJ}}{AP_i} \right) \quad (24)$$

Where:

$\Delta C_{DIST-IL,t PRJ}$	net carbon stock changes as a result of illegal logging at time t , tCO_2^e ;
$A_{DIST-IL,i}$	area potentially impacted by illegal logging in stratum i , ha;
$C_{DIST-IL,i,t PRJ}$	biomass carbon of trees cut and removed through illegal logging in stratum i at time t , tCO_2^e ;
AP_i	total area of illegal logging sample plots in stratum i , ha;

i 1, 2, 3 ... M strata in the in the project case; and
 t 1, 2, 3, ... t years elapsed since the projected start of the project activity.

There are no degradation occurred indicated in PRA and limited sampling, therefore, $\Delta C_{DIST_IL,t|PRJ} = 0$

4.2.3 Net greenhouse gas emissions in the project scenario

This section calculates $\Delta C_{NET,t|PRJ}$, the net greenhouse gas emissions in the project scenario in year t , in tCO_2e .

The net greenhouse gas emissions in the project scenario are the sum of net greenhouse gas emissions resulting from fire and non-fire forest disturbance, plus any carbon stock changes that occur as a result of illegal logging, minus the annual carbon stock change in the aboveground biomass of trees due to forest growth.

Therefore, net greenhouse gas emissions in the project scenario in year t , is calculated as:

$$\Delta C_{NET,t|PRJ} = (\Delta C_{DIST-FR,t|PRJ} + \Delta C_{DIST,t|PRJ} + \Delta C_{DIST-IL,t|PRJ}) - \Delta C_{AB,t|PRJ} \quad (25)$$

Where:

$\Delta C_{NET,t PRJ}$	net greenhouse gas emissions in the project scenario in year t , tCO_2e
$\Delta C_{DIST-FR,t PRJ}$	net greenhouse gas emissions resulting from fire disturbance in year t , tCO_2e
$\Delta C_{DIST,t PRJ}$	net greenhouse gas emissions resulting from non-fire natural disturbance in year t , tCO_2e
$\Delta C_{DIST-IL,t PRJ}$	Net carbon stock changes as a result of illegal logging at time t , tCO_2e
$\Delta C_{AB,t PRJ}$	annual carbon stock change in aboveground biomass of trees in year t , $tCO_2e \text{ yr}^{-1}$; and
t	1, 2, 3, t^* years elapsed since start of the project activity.

The net greenhouse gas emissions across in the project scenario since the start of the project activity is calculated as:

$$GHG_{NET|PRJ} = \sum_{t=1}^{t^*} \Delta C_{NET,t|PRJ} \quad (26)$$

Where:

$GHG_{NET PRJ}$	net greenhouse gas emissions in the project scenario since the start of the project activity, tCO_2^e
$\Delta C_{NET,t PRJ}$	net greenhouse gas emissions in the project scenario in year t, tCO_2^e ; and
t	1, 2, 3, t* years elapsed since start of the project activity.

4.3 Leakage

4.3.1 Activity shifting leakage

The project does not involve in the activity shifting leakage.

In China, the forest timber harvest is strictly controlled by the authority. According to Forest law of the People's Republic of China¹⁷Chapter 6 and Regulations on the implementation of the Forest Law of the People's Republic of China¹⁸Chapter 5, forest cutting management quota system is implemented in China. The central government issued the maximum timber harvest to state-owned, collective-owned, private-owned forests of every province and nation level state-owned forest enterprises every five years. And the provincial forestry authority issued the timber harvest approval and restrictions to its subordinate based on its limit.

Also, the China Forest Law also clearly stipulates the punishment for the illegal logging, which not only requires 5-10 times compensation of replanting, but also 2-10 times economic penalty. In China, the timber harvest is tightly controlled by the forestry authority, the illegal logging is severely punished.

Therefore, for the project activity, even if the project proponent has more than one forest parcels, the timber harvest limit is planned in advance by the forestry authority; they have no right to harvest more in other parcels outside the project activity.

Therefore, there is no leakage due to activity shifting.

4.3.2 Market leakage

Leakage due to market effects is equal to the net emissions from planned timber harvest activities in the baseline scenario multiplied by an appropriate leakage factor:

$$GHG_{LK|LtPF} = LF_{me} * GHG_{NET|BSL,t*} \quad (27)$$

Where:

$GHG_{LK|LtPF}$ is total market leakage as a result of IFM LtPF activities, tCO_2^e ;

¹⁷http://www.gov.cn/xinwen/2019-12/28/content_5464831.htm

¹⁸http://www.gov.cn/zhengce/2020-12/26/content_5574381.htm

LF_{ME}	is the dimensionless leakage factor for market-effects calculations;
$GHG_{NET BSL,t^*}$	net greenhouse gas emissions in the baseline scenario in the year t^* since the start of the project activity, tCO_2^e .

The leakage factor is determined by considering where in the country logging will be increased as a result of the decreased timber supply caused by the project.

Leakage factor calculation

The leakage factor is determined by considering where in the country logging will be increased as a result of the decreased supply of the timber caused by the project. If the areas liable to be logged have a higher ratio of merchantable biomass to total biomass higher than the project area it is likely that the proportional leakage is higher and vice versa.

Therefore,

$$LF_{ME} = 0$$

If it can be demonstrated that no market-effects leakage will occur within national boundaries, that is if no new concessions are being assigned AND annual extracted volumes cannot be increased within existing national concessions AND illegal logging is absent (or de minimis) in the host country.

For the project,

- According to the 13th Five-year Forest Harvest Limit issued by State Council (Guohan [2016] No.32)¹⁹, the total harvest volume limit from 2016 to 2020 is $25,403.6 \times 10^4 \text{ m}^3$ each year, and the total harvest volume limit of Guangxi Zhuang Autonomous Region from 2016 to 2020 is $4,460.9 \times 10^4 \text{ m}^3$ each year. The harvest volume when the proposed project absent is $26.6 \times 10^4 \text{ m}^3$ from 2016 to 2020, extremely low compared to provincial level and far below the country level in the same time period. The harvest volume in the baseline is only 0.60% of the total harvest volume in Guangxi Zhuang Autonomous Region and 0.010% of the host country level, far less than the 25% indicated by VCS standard. The reduction in timber supply caused by the project activities is insignificant compared with the market of the whole Guangxi Zhuang Autonomous Region. Therefore, the project activities will not lead to changes in the balance of supply and market demand. The stability of timber prices can also prove this view. According to GUANGXI STATISTICAL YEARBOOK 2020²⁰, the timber price index from 2016 to 2018 was 101.6%, 101.5% and 102.3% (of preceding year) respectively, indicating the price is stable with slightly decreasing.
- China's annual extracted volumes are allocated by the country to provinces and then to counties and cities. It is a top-down governmental regulation. Whether the county, city or company harvests or not will not affect the decision-making of the upper level. That is, no new concessions

¹⁹http://www.gov.cn/zhengce/content/2016-02/16/content_5041486.htm

²⁰ <http://tjj.gxzf.gov.cn/tjsj/tjnj/material/tjnj20200415/2020/zk/indexch.htm>

will be assigned. If a concession owner decides to give up the rights of logging, he can't trade or transfer the logging right to any other. So even if the market demand for timber increases, under the existing legal framework, annual extracted volumes cannot be increased. And China's penalty on illegal logging is very strong. Regulations of the People's Republic of China on forestry law Article 38 and Article 39 clearly stipulates the punishment for the illegal logging. According to the volume and quantity of illegal logging, punishment includes not only 5-10 times compensation of replanting, but also 2-10 times economic penalty.

- In general, without new logging concessions, the harvest can't be done. And due to the strictly enforced law, illegal logging is absent with frequent patrol and high economic penalty. So the leakage emission will not be shifted to anywhere in the host country. Although the risk of market leakage caused by project activities is very low, we still discuss it again according to the VCS Standard V4.2 for the sake of conservatism. According VCS Standard V4.2 (3.14.9) states that "IFM projects may apply the appropriate market leakage discount factor identified in Table 3 to the net change in carbon stock associated with the activity that reduces timber harvest to determine market leakage".
- Guangxi Jinxiu IFM project is a logged to protected forest IFM activity. The project activities permanently protect the forests in the project area, and harvesting activity is permanently stopped. As mentioned earlier, even if the market demand for timber increases, under the existing legal framework, annual extracted volumes cannot be increased. So project activities are more in line with option 3 (IFM activity that substantially reduces harvest levels permanently). And market leakage discount factor conditional upon where timber harvest is likely to be shifted follow the VCS Standard table 3 and VCS Methodology. Therefore, each project must calculate within each stratum the ratio of merchantable biomass to total biomass (PMP_i). This shall then be compared to the ratio of merchantable biomass to total biomass for each forest type (PML_{FT}). we select Guangxi Zhuang Autonomous Region which located in the subtropical area with subtropical monsoon climate and dominated by forest type of Subtropical humid forest as the reference area (harvest most likely to be displaced) since China has a vast and varied territory across tropical, subtropical, temperate, cold temperate, cold and its climate, elevation and wood supply and demand are huge different. We have set 3 stratum based on the tree species which are Broad-leaved Tree, Chinese Fir and Pinus Massoniana for the project.

Hence, the calculation is below, in the base year:

$$PMP_{\text{Broad-leaved trees}} = 267172\text{m}^3 / 2313537\text{ m}^3 = 11.55\%^{21}$$

$$PMP_{\text{Chinese Fir}} = 28183\text{m}^3 / 2603826\text{ m}^3 = 1.08\%^{22}$$

²¹ From ER calculation sheet

²² From ER calculation sheet

$$PMP_{\text{Pinus Massoniana}} = 3017 \text{ m}^3 / 576160 \text{ m}^3 = 0.52\% \quad ^{23}$$

$$PML_{\text{Subtropical humid forest}} = 4460.9 \times 10^4 \text{ m}^3 / 22272.16 \times 10^4 \text{ m}^3 = 20.03\% \quad ^{24}$$

$PML_{\text{Subtropical humid forest}}$ is 73.4% greater than $PMP_{\text{Broad-leaved trees}}$

$PML_{\text{Subtropical humid forest}}$ is 1750.5% greater than $PMP_{\text{Chinese Fir}}$

$PML_{\text{Subtropical humid forest}}$ is 3724.7% greater than $PMP_{\text{Pinus Massoniana}}$

PMP data comes from ER calculation table. And PML data comes from 2016 China forestry statistical yearbook²⁵. From above calculation, it is indicated that the PML_{FT} is > 15% greater than PMP_i , the ratio of merchantable biomass to total biomass is higher within the area to which harvesting is displaced compared to the project area. Therefore, whether according to VCS Standard table 3 or VCS Methodology, the market leakage discount factor is 20%.

- In summary, $LF_{\text{ME}} = 0.2$

All the regulations and laws with regard to no new concessions and the penalty on illegal logging and data sources has been submitted to and verified by DOE.

4.4 Estimated Net GHG Emission Reductions and Removals

4.4.1 Net Project Greenhouse Gas Emission Reductions

According to VM0010 version 1.3, the Net Project Greenhouse Gas Emission Reductions are calculated as:

$$GHG_{\text{CREDITS}|LIPF,t^*} = GHG_{\text{NET}|BSL,t^*} - GHG_{\text{NET}|PRJ,t^*} - GHG_{\text{LK}|LIPF,t^*} \quad (28)$$

Where:

$GHG_{\text{CREDITS} LIPF,t^*}$	project greenhouse gas credits associated with the implementation of improved forest management (IFM) activities in the year t^* since the start of the project activity, in the project scenario, tCO_2^e
$GHG_{\text{NET} BSL,t^*}$	net greenhouse gas emissions in the baseline scenario in the year t^* since the start of the project activity, tCO_2^e

²³ From ER calculation sheet

²⁴ <https://navi.cnki.net/knavi/yearbooks/YCSRT/detail>

²⁵ <https://navi.cnki.net/knavi/yearbooks/YCSRT/detail>

$GHG_{NET PRJ,t^*}$	net greenhouse gas emissions in the project scenario in the year t^* since the start of the project activity, tCO_2^e ; and
$GHG_{LK LTPF,t^*}$	total greenhouse gas emissions due to leakage arising outside the project boundary as a result of the implementation of improved forest management (IFM) activities in the year t^* since the start of the project activity, in the project scenario, tCO_2^e

4.4.2 Project Verified Carbon Units

The number of Verified Carbon Units (VCUs) for each year t in the project crediting period is the greenhouse gas emission reductions and removals adjusted for uncertainty and risk.

4.4.2.1 Adjustment for uncertainty

Estimated greenhouse gas emissions and emission reductions from IFM activities have uncertainties associated with parameters and coefficients including estimates of area, carbon stocks, regrowth and expansion factors. It is assumed that the uncertainties associated with input data are available, either as default uncertainty values given in most recent IPCC guidelines, or as statistical estimates based on sampling.

Uncertainty at all times is defined at the 95% confidence interval where the estimated variance exceeds ± 15 percent from the mean. Procedures including stratification and the allocation of sufficient measurement plots will help ensure that low uncertainty results and ultimately full crediting can result.

Uncertainties arising from the measurement and monitoring of carbon pools and greenhouse gases shall always be quantified. Errors in each pool shall be weighted by the size of the pool so that projects may reasonably target a lower precision level in pools that only form a small proportion of the total stock.

For both the baseline and the with-project case the total uncertainty is equal to the square root of the sum of the squares of each component uncertainty and is calculated at the time of reporting through propagating the error in the baseline stock and the error in the project stocks.

Therefore, total uncertainty for LTPF project is calculated as:

$$U_{TOTAL|LTPF} = \sqrt{U_{PRJ}^2 + U_{BSL}^2} \quad (29)$$

Where:

$U_{total LTPF}$	total uncertainty for LTPF Project, dimensionless;
U_{PRJ}	total uncertainty for the improved forest management activities in the project scenario, dimensionless; and
U_{BSL}	total uncertainty for the baseline scenario, dimensionless.

Project proponents must justify the selection of uncertainty propagation in the VCS-PD. If $U_{total|LtPF} \leq 0.15$ then no deduction will result for uncertainty.

If $U_{total|LtPF} > 0.15$ then the amount of greenhouse gas emission credits associated with IFM activities will be deducted as follows:

$$Credits_{total|LtPF} = GHG_{credits|LtPF} \cdot (1 - U_{total|LtPF}) \quad (30)$$

Where:

$Credits_{total LtPF}$	total greenhouse gas credits adjusted for uncertainty for each year t in the project crediting period;
$GHG_{credits LtPF}$	project greenhouse gas credits associated with the implementation of improved forest management (IFM) activities in the project scenario, $tCO_2^e \cdot year^{-1}$; and
$U_{total LtPF}$	total uncertainty for LtPF Project, dimensionless.

4.4.2.2 Calculation of verified carbon units

The amount of greenhouse gas credits estimated at section 4.4.2.1 above shall be adjusted to account for risk.

They shall be subject to deductions based on application of the most recent version of the VCS Tool for AFOLU Non-Permanence Risk Analysis and Buffer Determination.

Therefore, the amount of VCU's that can be issued at time $t=t_2$ (the date of verification) for monitoring period $T=t_2-t_1$, is calculated as:

$$VCU_{net|LtPF} = (Credits_{total,t2|LtPF} - Credits_{total,t1|LtPF}) - Bu_{|IFM-VCS} \quad (31)$$

Where:

$VCU_{net LtPF}$	number of verified carbon units; dimensionless;
$Credits_{total,t1 LtPF}$	net anthropogenic greenhouse gas removals by sinks, as estimated for $t^*=t_1$ in tCO_2^e ;
$Credits_{total,t2 LtPF}$	net anthropogenic greenhouse gas removals by sinks, as estimated for $t^*=t_2$ in tCO_2^e ; and
$Bu_{ IFM-VCS}$	total number of credits withheld in VCS buffer account

4.4.3 The calculation process

4.4.3.1 The calculation process of baseline emission

Therefore, for the calculation of GHGNET|BSL, according to section 4.1, the process is shown below:

Table 5: Basic Parameter of Baseline Scenario

Basic Parameter		Value	Data Unit	Data Source
Total Area of Stratum	Broad-leaved tree	4,143.40	ha	Timber harvest plan issued by Guangzhou Peisen Landscape Architecture Design Co., Ltd, approved by Jinxiu Yao Autonomous County Forestry Bureau in 2015
	Chinese fir	1,843.43	ha	
	Pinus massoniana	585.30	ha	
$V_{j,l,BSL}$	Broad-leaved tree	226.98	m ³ /ha	
	Chinese fir	158.46	m ³ /ha	
	Pinus massoniana	169.55	m ³ /ha	
$V_{EX,j,l,BSL,y}$	Refer to ER sheet		m ³ /ha	
$A_{i,p,y}$	Refer to ER sheet		ha	
D_j	Broad-leaved tree	0.482	t d.m. m ⁻³	"Land Use Change and Forestry GHG Inventory(2013)" of "Second National Information Notification on China Climate Change"
	Chinese fir	0.307	t d.m. m ⁻³	
	Pinus massoniana	0.380	t d.m. m ⁻³	
BEF	Broad-leaved tree	1.514	dimensionless	
	Chinese fir	1.634	dimensionless	
	Pinus massoniana	1.472	dimensionless	
$BCEFR$	Broad-leaved tree	0.730	t d.m. m ⁻³	calculated by BEF and D
	Chinese fir	0.502	t d.m. m ⁻³	
	Pinus massoniana	0.559	t d.m. m ⁻³	
CF_j	Broad-leaved tree/ Chinese fir/ Pinus massoniana	0.5	tC t d.m. ⁻¹	VM0010 version 1.3
WW	Broad-leaved tree/ Chinese fir/ Pinus massoniana	24%	kg kg ⁻¹	

SLF	Broad-leaved tree/ Chinese fir/Pinus massoniana	0.12	kg kg ⁻¹	IPCC Guidelines for National Greenhouse Gas Inventories (2006), Table4.9
OF	Broad-leaved tree/ Chinese fir/Pinus massoniana	0.86	kg kg ⁻¹	
Regrowth rate in baseline scenario	Broad-leaved tree	1.50	t.ha ⁻¹ .yr ⁻¹	
	Chinese fir	1.50	t.ha ⁻¹ .yr ⁻¹	
	Pinus massoniana	1.50	t.ha ⁻¹ .yr ⁻¹	

Table 6: The baseline emission during the crediting period

Year	$\Delta C_{NET BSL}$	GHG _{NET BSL}
01/03/2016-28/02/2017	36,328	133,202
01/03/2017-28/02/2018	31,914	117,018
01/03/2018-28/02/2019	33,983	124,604
01/03/2019-29/02/2020	31,398	115,126
01/03/2020-28/02/2021	31,641	116,017
01/03/2021-28/02/2022	15,763	57,797
01/03/2022-28/02/2023	15,763	57,797
01/03/2023-29/02/2024	15,763	57,797
01/03/2024-28/02/2025	15,763	57,797
01/03/2025-28/02/2026	15,763	57,797
01/03/2026-28/02/2027	11,454	41,998
01/03/2027-29/02/2028	8,144	29,861
01/03/2028-28/02/2029	4,993	18,307
01/03/2029-28/02/2030	2,579	9,456
01/03/2030-28/02/2031	380	1,393
01/03/2031-29/02/2032	380	1,393
01/03/2032-28/02/2033	380	1,393
01/03/2033-28/02/2034	380	1,393
01/03/2034-28/02/2035	380	1,393
01/03/2035-29/02/2036	380	1,393
Total	273,529	1,002,932
Average	13,676	50,146

4.4.3.2 The calculation of project emission

The ex-ante estimation of project emission of the proposed project is as follows:

Table 7: Basic Parameter of Project Scenario

Basic Parameter		Value	Data Unit	Data Source
Total Area of Stratum	Broad-leaved tree	4,143.40	ha	Timber harvest plan issued by Guangzhou Peisen Landscape Architecture Design Co., Ltd
	Chinese fir	1,843.43	ha	
	Pinus massoniana	585.30	ha	
D_j	Broad-leaved tree	0.482	t d.m. m ⁻³	"Land Use Change and Forestry GHG Inventory(2013)" of "Second National Information Notification on China Climate Change"
	Chinese fir	0.307	t d.m. m ⁻³	
	Pinus massoniana	0.380	t d.m. m ⁻³	
BEF	Broad-leaved tree	1.514	dimensionless	
	Chinese fir	1.634	dimensionless	
	Pinus massoniana	1.472	dimensionless	
BCEFR	Broad-leaved tree	0.730	t d.m. m ⁻³	calculated by BEF and D
	Chinese fir	0.502	t d.m. m ⁻³	
	Pinus massoniana	0.559	t d.m. m ⁻³	
CF _j	Broad-leaved tree/ Chinese fir/ Pinus massoniana	0.5	tC t d.m. ⁻¹	VM0010 version 1.3
Ongoing growth rate in project scenario	Broad-leaved tree	3.58	m ³ .ha ⁻¹ .yr ⁻¹	The statement on the growth volume in Jinxiu issued by Jinxiu Yao Autonomous County Forestry Bureau
	Chinese fir	7.59	m ³ .ha ⁻¹ .yr ⁻¹	
	Pinus massoniana	3.62	m ³ .ha ⁻¹ .yr ⁻¹	

Because the forest inventory conducted by Laibin City Forestry Survey and Design Institute didn't include the detail of each tree in the subcompartment, so we didn't use allometric equation to estimate the project emission here. And according to the methodology, it is acceptable to use pre-existing forest inventory data for this purpose, so we use the ongoing growth rate to predict the project emission.

On-going growth rate is predicted by the project owner based on the historical data, so the emissions of each year during the whole crediting period are same. In the monitoring report, the actual stock volume will be measured, then re-calculate the emission within the crediting period.

Table 8: The project emission during the crediting period

Year	$\Delta C_{AB,t PRJ}$	$\Delta C_{DIST_FR,t PRJ}$	$\Delta C_{DIST,t PRJ}$	$\Delta C_{DIST_IL,t PRJ}$	$\Delta C_{NET,t PRJ}$
01/03/2016- 28/02/2017	34,885	0	0	0	-34,885
01/03/2017- 28/02/2018	34,885	0	0	0	-34,885
01/03/2018- 28/02/2019	34,885	0	0	0	-34,885
01/03/2019- 29/02/2020	34,885	0	0	0	-34,885
01/03/2020- 28/02/2021	34,885	0	0	0	-34,885
01/03/2021- 28/02/2022	34,885	0	0	0	-34,885
01/03/2022- 28/02/2023	34,885	0	0	0	-34,885
01/03/2023- 29/02/2024	34,885	0	0	0	-34,885
01/03/2024- 28/02/2025	34,885	0	0	0	-34,885
01/03/2025- 28/02/2026	34,885	0	0	0	-34,885
01/03/2026- 28/02/2027	34,885	0	0	0	-34,885
01/03/2027- 29/02/2028	34,885	0	0	0	-34,885
01/03/2028- 28/02/2029	34,885	0	0	0	-34,885
01/03/2029- 28/02/2030	34,885	0	0	0	-34,885
01/03/2030- 28/02/2031	34,885	0	0	0	-34,885
01/03/2031- 29/02/2032	34,885	0	0	0	-34,885
01/03/2032- 28/02/2033	34,885	0	0	0	-34,885
01/03/2033- 28/02/2034	34,885	0	0	0	32,366
01/03/2034- 28/02/2035	34,885	0	0	0	32,366
01/03/2035- 29/02/2036	34,885	0	0	0	32,366
Total	697,700	0	0	0	-697,700

Average	34,885	0	0	0	-34,885
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Forest disturbance in the project scenario:

According to the analysis in section 4.2, $\Delta C_{DIST_FR,i|PRJ}$, $\Delta C_{DIST,i|PRJ}$ and $\Delta C_{DIST_IL,i,i|PRJ}$ are all = 0.

Therefore,

$$GHG_{LK|LTPF} = 0$$

4.4.4 Uncertainty for the baseline scenario:

According to IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories²⁶, the uncertainty in the baseline scenario is associated with parameters and coefficients including estimates of area, carbon stocks, regrowth and expansion factors, the calculation process follows the two rules below:

Rule A: Where uncertainties are to be combined by addition, the standard deviation of the sum will be the square root of the sum of the squares of the standard deviations of the quantities that are added with the standard deviations all expressed in absolute terms (this rule is exact for uncorrelated variables).

Using this interpretation, a simple equation can be derived for the uncertainty of the sum, that when expressed in percentage terms become:

$$U_{total} = \frac{\sqrt{(U_1 \times E_1)^2 + (U_2 \times E_2)^2 + \dots + (U_n \times E_n)^2}}{E_1 + E_2 + \dots + E_n} \quad (32)$$

Where:

U_{total} is the percentage uncertainty in the sum of the quantities (half the 95% confidence interval divided by the total (i.e. mean) and expressed as a percentage);

E_i and U_i are the uncertain quantities and the percentage uncertainties associated with them, respectively

Rule B : Where uncertain quantities are to be combined by multiplication, the same rule applies except that the standard deviations must all be expressed as fractions of the appropriate mean values (this rule is approximate for all random variables)

²⁶IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories, Chapter 6, Quantifying Uncertainties in Practice

A simple equation can also be derived for the uncertainty of the product, expressed in percentage terms:

$$U_{total} = \sqrt{U_1^2 + U_2^2 + \dots + U_n^2} \quad (33)$$

Where:

U_{total} is the percentage uncertainty in the product of the quantities (half the 95% confidence interval divided by the total and expressed as a percentage);

U_i are the percentage uncertainties associated with each of the quantities.

The uncertainty is calculated per stratum by dividing the 95% confidence interval by the mean value of the uncertainty quantities. The corresponding standard deviation is calculated over the measured plot values of the uncertainty quantities. The 95% confidence interval is calculated based on the standard deviation and the t-value for n-1 degree of freedom of plots per stratum.

As the uncertainty in the baseline scenario is associated with parameters and coefficients including estimates of area, carbon stocks, regrowth and expansion factors, the calculation of the 4 parameters and coefficients are shown below:

1) Uncertainty of Area:

In the baseline scenario, the area of every stratum are quoted from the field survey inventory data and legal right of harvest, so no data are from measurement and monitoring. Therefore, it is deemed as 0 in the period of validation. It will be monitored in the period of verification.

2) Uncertainty of expansion factors:

The Sample size, Sample mean and Standard error of expansion factors are quoted from Forestry Part of China's greenhouse gas emissions list divided as tree species, and the uncertainty of expansion factors are calculated as below:

For Broad-leaved tree:

Uncertainty of BCEF-Broad-leaved tree		3.02%	
Uncertainty of BEF Broad-leaved tree	2.99%	Uncertainty of D- Broad-leaved tree	0.42%
BEF		D	
Sample size	153	Sample size	189
Sample mean (BEF)	1.514	Sample mean (D)	0.443
Standard deviation	0.283	Standard deviation	0.013
Average error	0.023	Average error	0.001
Confidence level	0.95	Confidence level	0.95
Degree of freedom	152	Degree of freedom	188

Two-sided Student's t-value	1.976	Two-sided Student's t-value	1.973
Allowable error	0.045	Allowable error	0.002
Lower confidence limit	1.469	Lower confidence limit	0.441
Upper confidence limit	1.559	Upper confidence limit	0.445
Confidence interval	0.045	Confidence interval	0.002

For Chinese fir:

Uncertainty of BCEF-Chinese fir		2.21%	
Uncertainty of BEF- Chinese fir	2.06%	Uncertainty of D- Chinese fir	0.80%
BEF		D	
Sample size	71	Sample size	54
Sample mean (BEF)	1.323	Sample mean (D)	0.307
Standard deviation	0.115	Standard deviation	0.009
Average error	0.014	Average error	0.001
Confidence level	0.95	Confidence level	0.95
Degree of freedom	70	Degree of freedom	53
Two-sided Student's t-value	1.994	Two-sided Student's t-value	2.006
Allowable error	0.027	Allowable error	0.002
Lower confidence limit	1.296	Lower confidence limit	0.305
Upper confidence limit	1.350	Upper confidence limit	0.309
Confidence interval	0.027	Confidence interval	0.002

For Pinus massoniana:

Uncertainty of BCEF-Pinus massoniana		2.38%	
Uncertainty of BEF-Pinus massoniana	1.82%	Uncertainty of D-Pinus massoniana	1.54%
BEF		D	
Sample size	68	Sample size	43
Sample mean (BEF)	1.305	Sample mean (D)	0.380
Standard deviation	0.098	Standard deviation	0.019
Average error	0.012	Average error	0.003
Confidence level	0.95	Confidence level	0.95
Degree of freedom	67	Degree of freedom	42
Two-sided Student's t-value	1.996	Two-sided Student's t-value	2.018
Allowable error	0.024	Allowable error	0.006
Lower confidence limit	1.281	Lower confidence limit	0.374
Upper confidence limit	1.329	Upper confidence limit	0.386
Confidence interval	0.024	Confidence interval	0.006

3) Uncertainty of carbon stock:

The calculation of uncertainty of carbon stock is based on the uncertainty of volume in every stratum multiply by the uncertainty of expansion factors using formula (33):

Uncertainty of carbon stock- Broad-leaved tree	4.48%	Uncertainty of carbon stock- Chinese fir	5.46%	Uncertainty of carbon stock- Pinus massoniana	8.07%
Uncertainty of volume- Broad-leaved tree	3.32%	Uncertainty of volume – Chinese fir	4.99%	Uncertainty of volume – Pinus massoniana	7.71%
carbon stock- Broad-leaved tree	343158.33	carbon stock- Chinese fir	106580.60	carbon stock- Pinus massoniana	36209.18
Area(ha)	4143.40	Area(ha)	1843.43	Area(ha)	585.30
Sample size	165	Sample size	61	Sample size	23
Sample mean (m ³ /ha)	226.98	Sample mean (m ³ /ha)	158.46	Sample mean (m ³ /ha)	169.55
Standard deviation	49.39	Standard deviation	31.52	Standard deviation	32.00
Average error	3.84	Average error	4.04	Average error	6.67
Confidence level	0.95	Confidence level	0.95	Confidence level	0.95
Degree of freedom	164	Degree of freedom	60	Degree of freedom	22
Two-sided Student's t- value	1.96	Two-sided Student's t- value	1.96	Two-sided Student's t- value	1.96
Allowable error	7.54	Allowable error	7.91	Allowable error	13.08
Lower confidence limit	219.45	Lower confidence limit	150.55	Lower confidence limit	156.47
Upper confidence limit	234.52	Upper confidence limit	166.37	Upper confidence limit	182.63
Confidence interval	7.54	Confidence interval	7.91	Confidence interval	13.08

4) Uncertainty of regrowth

The uncertainty of regrowth is only associated with the parameter RGR_i, as for the value quoted from the expertise of the local forest authority, the uncertainty of 10% is adopted from the National Forest Resource Continuous Investigation Technical Regulation issued by the State Forestry Bureau. And this uncertainty is adopted for the project for conservative.

Based on the calculation of the 4 parameters and coefficients above, the calculation of $U_{\text{Broad-leaved tree|BSL}}$, $U_{\text{Chinese fir|BSL}}$ and $U_{\text{Pinus massoniana|BSL}}$ are shown below:

Stratum	Parameter	A _{rea} (Ha)	V _{EX,j,l} BSL (m ³ /ha)	BEF	D(tdm/m ³)	BCE _{F_R} (tdm/m ³)	CF _j (tc/tdm)	C _{HB,j,l} BSL(tc/ha)	C _{EX,j,l} BSL (tc ha ⁻¹)	ΔC _{DW,i,p} BSL
		a	b	c	d	e=c*d	f	g=b*e*f	h=b*d*f	i=g-h
								$U_g = \sqrt{U_b^2 + U_e^2}$	$U_h = \sqrt{U_b^2 + U_d^2}$	$U_i = \frac{\sqrt{(E_g * U_g)^2 + (E_h * U_h)^2}}{(E_g + E_h)}$
Broad-leaved tree	E	4143.40	226.98	1.514	0.482	0.730	0.5	82.82	54.70	28.12
	U	0.00%	3.32%	2.99%	0.42%	3.02%		4.48%	3.35%	3.01%
Chinese fir	E	1843.43	158.46	1.634	0.307	0.502	0.5	39.74	24.32	15.42
	U	0.00%	4.99%	2.06%	0.80%	2.21%		5.46%	5.06%	3.89%
Pinus massoniana	E	585.30	169.55	1.472	0.380	0.559	0.5	47.42	32.21	15.21
	U	0.00%	7.71%	1.82%	1.54%	2.38%		8.07%	7.86%	5.76%

Stratum	Parameter	WW _k	SLF _k	C _{wp,0} BSL(tc/ha)	C _{WP,j} BSL(tc/ha)	OF _k	ΔC _{WP,100} BSL (tc/ha)	A _{i,p} (ha)	ΔC _{NET} BSL(1)(tc)
		j	k	l=h*(j+k)	m=h-l	n	o=m*n	p	q=(i/10+l+o/20)*p
				U _l =U _h	$U_m = \frac{\sqrt{(E_g * U_h)^2 + (E_l * U_l)^2}}{(E_h + E_l)}$		U _o =U _m	U _p =0	$U_m = \frac{\sqrt{(E_l * U_l)^2 + (E_i * U_i)^2 + (E_o * U_o)^2}}{(E_l + E_i + E_o)}$
Broad-leaved tree	E	24%	0.12	19.69	35.01	0.86	30.11	4143.40	99484.18
	U			3.35%	2.62%		2.62%	0.00%	1.71%
Chinese fir	E	24%	0.12	8.76	15.57	0.86	13.39	1843.43	20218.23
	U			5.06%	3.95%		3.95%	0.00%	2.43%
Pinus massoniana	E	24%	0.12	11.60	20.62	0.86	17.73	585.30	8196.70
	U			7.86%	6.15%		6.15%	0.00%	3.75%

Stratum	Parameter	$\Delta C_{NET BSL(2-10)}(tC)$	$\Delta C_{NET BSL(11-20)}(tC)$	regrowth rate (m ³ /ha/yr)	$\Delta C_{NET BSL(1+)}(tC)$	$\Delta C_{NET BSL,t^*}(tC)$
		$r=(i/10+o/20)*p$	$s=o/20*p$	t	$w=q+r+s-v$	$v=e*f*p*t$
		$U_r = \frac{\sqrt{(E_i * U_i)^2 + (E_o * U_o)^2}}{(E_i + E_o)}$	$U_s = U_o$	$U_t = 10\%$	$U_m = \frac{\sqrt{(E_q * U_q)^2 + (E_r * U_r)^2 + (E_s * U_s)^2 + (E_v * U_v)^2}}{(E_q + E_r + E_s + E_v)}$	$U_v = \sqrt{U_e^2 + U_f^2}$
Broad-leaved tree	E	160989.76	52752.46	3.11	82133.08	231093.33
	U	1.99%	2.62%	10.00%	4.49%	10.44%
Chinese fir	E	36689.82	9880.27	4.89	38421.20	28367.12
	U	2.78%	3.95%	10.00%	3.30%	10.24%
Pinus massoniana	E	12679.69	4016.33	3.95	10817.03	14075.69
	U	4.25%	6.15%	10.00%	4.09%	10.28%
					U_{BSL}	8.90%

Therefore, as there are 3 strata in the project activity, the uncertainty across combined strata is calculated with the revised equation below:

$$U_{|BSL} = \frac{\sqrt{(U_{Broad-leaved Tree|BSL} \times E_{Broad-leaved Tree|BSL})^2 + (U_{Chinese fir|BSL} \times E_{Chinese fir|BSL})^2 + (U_{Pinus massoniana|BSL} \times E_{Pinus massoniana|BSL})^2}}{E_{Broad-leaved Tree|BSL} + E_{Chinese fir|BSL} + E_{Pinus massoniana|BSL}} \quad (34)$$

Uncertainty for the project scenario:

Stratum	Parameter	$A_{\text{rea}}(\text{Ha})$	BEF	$D(\text{tdm}/\text{m}^3)$	$\text{BCEFR}(\text{tdm}/\text{m}^3)$	$\text{CFj}(\text{tc}/\text{tdm})$	ongoing growth rate (m3/ha/yr)	$\Delta C_{\text{AB},i \text{PRJ}}(\text{tCO}_2)$
		a	b	c	d=b*c	e	f	g=f*a*d*e*44/12
							$U_i=10\%$	$U_g = \sqrt{U_d^2 + U_f^2}$
Broad-leaved tree	E	4143.40	1.514	0.482	0.730	0.5	3.58	19845.14
	U	0	2.99%	0.42%	3.02%		10.00%	10.44%
Chinese fir	E	1843.43	1.634	0.307	0.502	0.5	7.59	12867.68
	U	0	2.06%	0.80%	2.21%		10.00%	10.24%
Pinus massoniana	E	585.3	1.472	38.00%	0.559	0.5	3.62	2172.80
	U	0	1.82%	1.54%	2.38%		10.00%	10.28%
							U_{PRJ}	7.07%

Total uncertainty:

Total uncertainty for LtPF project is calculated according to the follow equation:

$$U_{\text{TotalLtPF}} = \sqrt{U_{\text{PRJ}}^2 + U_{\text{BSL}}^2} = \sqrt{8.90\%^2 + 7.07\%^2} = 11.37\% = 0.1137 \quad (35)$$

According to the methodology, if $U_{\text{total,LtPF}} \leq 0.15$ then no deduction will result for uncertainty, as $U_{\text{total}} < 0.15$, then no deduction will result from uncertainty.

4.4.5 Calculation of verified carbon units

Based on the analysis in NON-PERMANENCE RISK REPORT, the overall risk rating is 22, then 22% of the total emission reductions should be deducted.

Therefore, the emission reduction detail is listed:

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)	Estimated net GHG emission reductions or removals with buffer deduction (tCO ₂ e)

01/03/2016-28/02/2017	133,202	-34,885	26640.4	141,447	110,328
01/03/2017-28/02/2018	117,018	-34,885	23403.6	128,499	100,229
01/03/2018-28/02/2019	124,604	-34,885	24920.8	134,568	104,963
01/03/2019-29/02/2020	115,126	-34,885	23025.2	126,986	99,048
01/03/2020-28/02/2021	116,017	-34,885	23203.4	127,699	99,604
01/03/2021-28/02/2022	57,797	-34,885	11559.4	81,123	63,275
01/03/2022-28/02/2023	57,797	-34,885	11559.4	81,123	63,275
01/03/2023-29/02/2024	57,797	-34,885	11559.4	81,123	63,275
01/03/2024-28/02/2025	57,797	-34,885	11559.4	81,123	63,275
01/03/2025-28/02/2026	57,797	-34,885	11559.4	81,123	63,275
01/03/2026-28/02/2027	41,998	-34,885	8399.6	68,483	53,417
01/03/2027-29/02/2028	29,861	-34,885	5972.2	58,774	45,843
01/03/2028-28/02/2029	18,307	-34,885	3661.4	49,531	38,633
01/03/2029-28/02/2030	9,456	-34,885	1891.2	42,450	33,110
01/03/2030-28/02/2031	1,393	-34,885	278.6	35,999	28,079
01/03/2031-29/02/2032	1,393	-34,885	278.6	35,999	28,079
01/03/2032-28/02/2033	1,393	-34,885	278.6	35,999	28,079
01/03/2033-28/02/2034	1,393	-34,885	278.6	35,999	28,079
01/03/2034-28/02/2035	1,393	-34,885	278.6	35,999	28,079
01/03/2035-29/02/2036	1,393	-34,885	278.6	35,999	28,079

Total	1,002,932	-697,700	200,586	1,500,045	1,170,024
Average	50,146	-34,885	10,029	75,002	58,501

5 MONITORING

5.1 Data and Parameters Available at Validation

Data / Parameter:	$V_{l,j,i,sp}$
Data unit:	m^3
Description:	Merchantable volume for tree l of species j in sample plot sp in stratum i
Source of data:	Calculated from volume tables or equations linking diameter at breast height (DBH, at typically 1.3 m aboveground level), and merchantable height (MH), to commercial (merchantable) volume of trees in the sample plots above the minimum DBH set in the timber harvest plan. If locally derived equations or yield tables are not available use relevant regional, national or default equations from IPCC literature, national inventory reports or published peer-reviewed studies– such as those provided in Tables 4.A.1 to 4.A.3 of the GPG-LULUCF (IPCC 2003).
Value applied:	See the detailed excel spreadsheet

Justification of choice of data or description of measurement methods and procedures applied:	It is necessary to verify the applicability of equations used. Allometric equations can be verified by both: 1. Verification of equation conditions Justification should be provided for the applicability of the equation to the project locations. Such justification should include identification of climatic, edaphic, geographical and taxonomic similarities between the project location and the location in which the equation was derived. Any equation used should have an r^2 value of greater than 0.5 (50%) and a p value that is significant (<0.05 at the 95% confidence level). 2. Additional field verification The following limited measures method must be used for field verification: select at least 10 trees per species distributed across the age range (but excluding trees less than 15 years old for which there is rarely a great relative inaccuracy in equations); measure DBH, and height to a 10 cm diameter top or to the first branch; calculate stem volume from measurements; and plot the estimated volume of all the measured trees along with the curve of volume against diameter as predicted by the allometric equation. If the estimated volume of the measured trees are distributed both above and below the curve (as predicted by the allometric equation) the equation may be used. The equation may also be used if the measured individuals have a volume consistently higher than predicted by the equation. The equation may not be used if $>75\%$ of the measured trees have a volume lower than the predicted curve. In this instance another equation must be selected.
Purpose of Data	Calculation of baseline emissions
Comments:	N/A

Data / Parameter:	CF_j
Data unit:	$tC \cdot td.m.^{-1}$
Description:	Carbon fraction of dry matter for species j
Source of data:	According to VM0010 version 1.3, the default value $0.5 tC \cdot t d.m.^{-1}$ is used and the same value is used in all instances where this parameter is used.
Value applied:	0.5

Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions
Comments:	N/A

Data / Parameter:	D_j								
Data unit:	t d.m. m^{-3}								
Description:	Basic wood density of species j in t d.m. m^{-3}								
Source of data:	According to VM0010 version 1.3, it must be chosen with priority from higher to lower preference as follows: National species-specific or group of species-specific values (eg, from National GHG inventory); Species-specific or group of species-specific values from neighboring countries with similar conditions. When species-specific data from neighboring countries is of higher quality, being more representative of the species in the project scenario, it may be preferable to use these values than lower quality national data; Global species-specific or group of species-specific (eg, IPCC 2006 AFOLU Chapter 4 Tables 4.13 and 4.14). Species-specific wood densities may not always be available, and may be difficult to apply with certainty in the typically species rich forests of the humid tropics, hence it is acceptable practice to use wood densities developed for forest types or plant families or species groups. "Land Use Change and Forestry GHG Inventory(2013)" of "Second National Information Notification on China Climate Change" matches the first choice.								
Value applied:	<table border="1"> <thead> <tr> <th>Tree species</th><th>D_j</th></tr> </thead> <tbody> <tr> <td>Broad-leaved tree</td><td>0.482</td></tr> <tr> <td>Chinese fir</td><td>0.307</td></tr> <tr> <td>Pinus massoniana</td><td>0.380</td></tr> </tbody> </table>	Tree species	D_j	Broad-leaved tree	0.482	Chinese fir	0.307	Pinus massoniana	0.380
Tree species	D_j								
Broad-leaved tree	0.482								
Chinese fir	0.307								
Pinus massoniana	0.380								
Justification of choice of data or description of measurement methods and procedures applied:	N/A								
Purpose of Data	Calculation of baseline emissions								
Comments:	N/A								

Data / Parameter:	$f_j(X, Y...)$
Data unit:	t d.m. tree ⁻¹
Description:	Allometric equation(s) for species j linking measured tree variable(s) to aboveground biomass of living trees
Source of data:	Equations must have been derived using a wide range of measured variables (eg, DBH, Height, etc.) based on datasets that comprise at least 30 trees. Equations must be based on statistically significant regressions and must have an r^2 that is ≥ 0.8. The source of equation(s) must be chosen with priority from higher to lower preference, as available, as follows: a) National species-, genus-, family-specific; b) Species-, genus-, family-specific from neighbouring countries with similar conditions (ie, broad continent alregions); c) National forest-type specific; d) Forest-type specific from neighbouring countries with similar conditions (ie, broad continental regions); e) Forest type-specific such as those provided Tables 4.A.1 to 4.A.3 of the GPG-LULUCF (IPCC 2003); or in Pearson, T., Walker, S. and Brown, S. 2005. Sourcebook for Land Use, Land-Use Change and Forestry Projects. Winrock International and the World Bank Biocarbon Fund. 57pp.; or in Chave, J., C. Andalo, S. Brown, M. A. Cairns, J. Q. Chambers, D. Eamus, H. Folster, F. Fromard, N. Higuchi, T. Kira, J.-P. Lescure, B. W. Nelson, H. Ogawa, H. Puig, B. Riera, T. Yamakura. 2005. Tree allometry and improved estimation of carbon stocks and balance in tropical forests. Oecologia 145: 87-99. Species-, genus- and family-specific allometric equations may not always be available, and may be difficult to apply with certainty in the typically species rich forests of the humid tropics. Hence it is acceptable practice to use equations developed for regional forest types, provided that their accuracy has been validated with direct site-specific data following guidance given below. If a forest-type specific equation is used, it should not be used in combination with species-specific equation(s) (ie, it must be used for all tree species).
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions

Comments:	It is necessary to validate the applicability of equations used. Source data from which equation(s) was derived should be reviewed and confirmed to be representative of the forest type/species and conditions in the project and covering the range of potential independent variable values. Allometric equations can be validated either by: 1. Limited Measurements select at least 30 trees (if validating forest type-specific equation, selection should be representative of the species composition in the project area, ie, species representation in roughly in proportion to relative basal area). Minimum diameter of measured trees must be 20cm and maximum diameter must reflect the largest trees present or potentially present in the future in the project area (and/or leakage belt); measure DBH, and height to a 10 cm diameter top or to the first branch; calculate stem volume from measurements and multiplying by species-specific density to gain biomass of bole; apply a biomass expansion factor to estimate total aboveground biomass from stem biomass³⁷; and plot the estimated biomass of all the measured trees along with the curve of biomass against diameter as predicted by the allometric equation. If the estimated volume of the measured trees are distributed both above and below the curve (as predicted by the allometric equation) the equation may be used. The equation may also be used if the measured individuals have a biomass consistently higher than predicted by the equation. If >75% of the measured trees have a biomass lower than the predicted curve, destructive sampling must be undertaken or another equation must be selected. 2. Destructive Sampling select at least 5 trees (if validating forest type-specific equation, selection should be representative of the species composition in the project area, ie, species representation in roughly in proportion to relative basal area) at the upper end of the range of independent variable values existing in the project area; measure DBH and commercial height and calculate volume using the same procedures/equations used to generate commercial volumes to which BCEFs will be applied; fell and weigh the aboveground biomass to determine the total (wet) mass of the stem, branch, twig, leaves, etc. Extract and immediately weigh subsamples from each of the wet stem and branch components, followed by oven drying at 70 degrees C to determine dry biomass; determine the total dry weight of each tree from the wet weights and
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	the averaged ratios of wet and dry weights of the stem and branch components; and plot the estimated biomass of all the measured trees along with the curve of biomass against diameter as predicted by the allometric equation. If the estimated volume of the measured trees are distributed both above and below the curve (as predicted by the allometric equation) the equation may be used. The equation may also be used if the measured individuals have a biomass consistently higher than predicted by the equation. If >75% of the measured trees have a biomass lower than the predicted curve another equation must be selected. Details of destructive sampling measurements are given in: Brown, S. 1997. Estimating biomass and biomass change of tropical forests: a primer. FAO Forestry Paper 134, Rome, Italy. Available at http://www.fao.org/docrep/W4095E/W4095E00.htm If using species-specific equations, and new species are encountered in the course of monitoring, new allometric equations must be sourced from the literature and validated, if necessary, as per requirements and procedures above. Default values must be updated whenever new guidelines are produced by the IPCC
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Data / Parameter:	BCEFR
Data unit:	t d.m. m ⁻³
Description:	Biomass conversion and expansion factor applicable to wood removals in the project area
Source of data:	The source of data must be chosen with priority from higher to lower preference as follows: Existing local forest type-specific; National forest type-specific or eco-region-specific (eg, from national GHG inventory); Forest type-specific or eco-region-specific from neighboring

	countries with similar conditions. Sometimes (c) might be preferable to (b); Global forest type or eco-region-specific (eg, IPCC 2006 INV GLs AFOLU Chapter 4 Table 4.5). Alternatively: $BCEFR = BEFR * D$ Where BCEF values are not directly available, they can be calculated as Biomass Expansion Factor (BEF)* basic wood density (D). Application of this equation requires caution because basic wood density and biomass expansion factors tend to be correlated. If the same sample of trees was used to determine D, BEF or BCEF, conversion will not introduce error, therefore, it is acceptable to use this equation. If, however, basic wood density is not known with certainty, transforming one into the other might introduce error, as BCEF implies a specific but unknown basic wood density, therefore, all conversion and expansion factors must be derived or their applicability checked locally. "Land Use Change and Forestry GHG Inventory(2013)" of "Second National Information Notification on China Climate Change" matches the second choice.								
Value applied:	<table border="1"> <thead> <tr> <th>Tree species</th><th>BCEFR</th></tr> </thead> <tbody> <tr> <td>Broad-leaved tree</td><td>0.730</td></tr> <tr> <td>Chinese fir</td><td>0.502</td></tr> <tr> <td>Pinus massoniana</td><td>0.559</td></tr> </tbody> </table>	Tree species	BCEFR	Broad-leaved tree	0.730	Chinese fir	0.502	Pinus massoniana	0.559
Tree species	BCEFR								
Broad-leaved tree	0.730								
Chinese fir	0.502								
Pinus massoniana	0.559								
Justification of choice of data or description of measurement methods and procedures applied:	N/A								
Purpose of Data	Calculation of baseline emissions								
Comments:	The combustion factor is a measure of the proportion of the fuel that is actually combusted, which varies as a function of the size and architecture of the fuel load (ie, a smaller proportion of large, coarse fuel such as tree stems will be burnt compared to fine fuels, such as grass leaves), the moisture content of the fuel and the type of fire (ie, intensity and rate of spread). Default values must be updated whenever new guidelines are produced by the IPCC								
Data / Parameter:	G _{gi}								

Data unit:	g kg ⁻¹ dry matter burnt
Description:	Emission factor for stratum i for gas g
Source of data:	Defaults can be found in Volume 4, Chapter 2, of the IPCC 2006 Inventory Guidelines in table 2.5
Value applied:	Please refer to the spreadsheet
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions
Comments:	Default values shall be updated whenever new guidelines are produced by the IPCC

Data / Parameter:	OF, SLF, WW
Data unit:	Kg kg ⁻¹
Description:	OF = Fraction of wood products that will be emitted to the atmosphere between 3 and 100 years after production; SLF = Fraction of wood products that will be emitted to the atmosphere within 3 years of production; and WW = Fraction of extracted biomass effectively emitted to the atmosphere during production Wood waste fraction(WW): Winjum et al. 1998 indicate that the proportion of extracted biomass that is oxidized (burning or decaying) from the production of commodities to be equal to 19% for developed countries, 24% for developing countries. Short-lived fraction (SLF) Winjum et al 1998 give decay rates for proportions of wood products, which were converted to with short-term (<3yr) uses (applicable internationally) as below: Sawnwood 0.12 Woodbase panels 0.06 Other industrial roundwood 0.18 Paper and Paperboard 0.24 Additional oxidized fraction (OF) Winjum et al 1998 gives annual oxidation fractions for each class of wood products split by forest region (boreal, temperate and tropical). This methodology projects these fractions over 95 years to give the additional proportion that is oxidized between the 3rd and the 100th year after initial harvest:

	<table><tr><th rowspan="2">Wood Product Class</th><th colspan="3">OF</th></tr><tr><th>Boreal</th><th>Temperate</th><th>Tropical</th></tr><tr><td>Sawnwood</td><td>0.39</td><td>0.62</td><td>0.86</td></tr><tr><td>Woodbase panels</td><td>0.62</td><td>0.86</td><td>0.98</td></tr><tr><td>Other industrial roundwood</td><td>0.86</td><td>0.98</td><td>0.99</td></tr><tr><td>Paper and paperboard</td><td>0.39</td><td>0.62</td><td>0.99</td></tr></table>	Wood Product Class	OF			Boreal	Temperate	Tropical	Sawnwood	0.39	0.62	0.86	Woodbase panels	0.62	0.86	0.98	Other industrial roundwood	0.86	0.98	0.99	Paper and paperboard	0.39	0.62	0.99
	Wood Product Class		OF																					
		Boreal	Temperate	Tropical																				
	Sawnwood	0.39	0.62	0.86																				
	Woodbase panels	0.62	0.86	0.98																				
	Other industrial roundwood	0.86	0.98	0.99																				
Paper and paperboard	0.39	0.62	0.99																					
Source of data:	According to VM0010 version 1.3, the default values are chosen.																							
Value applied:	<table><tr><th>Parameters</th><th>Species</th><th>Value</th></tr><tr><td>OF</td><td rowspan="3">Broad-leaved tree/ Chinese fir/ Pinus massoniana</td><td>0.86</td></tr><tr><td>SLF</td><td>0.12</td></tr><tr><td>WW</td><td>24%</td></tr></table>			Parameters	Species	Value	OF	Broad-leaved tree/ Chinese fir/ Pinus massoniana	0.86	SLF	0.12	WW	24%											
Parameters	Species	Value																						
OF	Broad-leaved tree/ Chinese fir/ Pinus massoniana	0.86																						
SLF		0.12																						
WW		24%																						
Justification of choice of data or description of measurement methods and procedures applied:	N/A																							
Purpose of Data	Calculation of baseline emissions																							
Comments:	N/A																							

Data / Parameter:	RGR _i						
Data unit:	tC.ha ⁻¹ .yr ⁻¹						
Description:	Forest regrowth rate post timber harvest for stratum i						
Source of data:	According to VM0010 version 1.3, regrowth rate must be calculated from either a) data generated in a reference area using measurements of timber volume in a chronosequence of replicated sample plots; or b) published data on forest growth after timber harvest of the same forest type within the same region as the project; or c) the IPCC default values for aboveground net biomass growth in natural forests.						
Value applied:	<table> <tr> <td>Broad-leaved tree</td><td>1.50</td></tr> <tr> <td>Chinese fir</td><td>1.50</td></tr> <tr> <td>Pinus massoniana</td><td>1.50</td></tr> </table>	Broad-leaved tree	1.50	Chinese fir	1.50	Pinus massoniana	1.50
Broad-leaved tree	1.50						
Chinese fir	1.50						
Pinus massoniana	1.50						

Justification of choice of data or description of measurement methods and procedures applied:	Method a is applied. The average annual regrowth is confirmed by The statement on the growth volume in Jinxiu issued by Guangxi Jinxiu Yao Autonomous County Forestry Bureau. And the RGRi can therefore be calculated by the biomass expansion factor, density and carbon fraction of the separate species.
Purpose of Data	Calculation of baseline emissions
Comments:	Default values must be updated whenever new guidelines are produced by the IPCC

Data / Parameter:	$V_{EX,j,i BSL}$
Data unit:	$m^3.ha^{-1}$
Description:	Mean volume of extracted timber per unit area for species j in stratum i
Source of data:	The timber harvest plan sets the allowable mean extracted volume is equal to the merchantable volume of timber in the forest inventory ($V_{j,i BSL}$), based on legal limits.
Value applied:	please refer to ER sheet
Justification of choice of data or description of measurement methods and procedures applied:	The measurement method is from academic paper and equations developed for regional forest types. Please refer to ER sheet
Purpose of Data	Calculation of baseline emissions
Comments:	N/A

Data / Parameter:	$A_{i,p}$
Data unit:	Ha
Description:	Area covered by stratum i over land parcel p
Source of data:	Geodetic coordinates and/or Remote Sensing data and/or legal parcel records
Value applied:	See the detailed Project Land Form
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions-
Comments:	It must be assumed ex-ante that land parcel boundaries and strata areas must not change through time

Data / Parameter:	$A_{1,i,p}$
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Data unit:	Ha
Description:	The area of stratum i in land parcel p that was harvested 1 year ago
Source of data:	Geodetic coordinates, GIS Files or legal parcel records
Value applied:	See the detailed Project Land Form
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions
Comments:	N/A

Data / Parameter:	$A_{2-10,i,p}$
Data unit:	Ha
Description:	The area of stratum i in land parcel p that was harvested between 2 and 10 year ago
Source of data:	Geodetic coordinates, GIS Files or legal parcel records
Value applied:	See the detailed Project Land Form
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions
Comments:	N/A

Data / Parameter:	$A_{11-20,i,p}$
Data unit:	Ha
Description:	The area of stratum i in land parcel p that was harvested between 11 and 20 year ago
Source of data:	Geodetic coordinates, GIS Files or legal parcel records
Value applied:	See the detailed Project Land Form
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions
Comments:	N/A

Data / Parameter:	A_{t*}
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Data unit:	Ha
Description:	Cumulative area harvested until time t*
Source of data:	Geodetic coordinates, GIS Files or legal parcel records
Value applied:	See the detailed Project Land Form
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data	Calculation of baseline emissions
Comments:	N/A

Data / Parameter:	$A_{s,p}$
Data unit:	Ha
Description:	Area of sample plot sp
Source of data:	Recording and archiving of size of sample plots
Justification of choice of data or description of measurement methods and procedures applied:	Standard procedures for plot delineation in forest timber inventory surveys shall be used
Purpose of Data	Calculation of baseline emissions
Comments:	Ex-ante the size of the plots shall be defined and recorded in the monitoring plan.

5.2 Data and Parameters Monitored

Data / Parameter:	Illegal Logging PRA Results
Data unit:	Dimensionless
Description:	N/A
Source of data:	PRA

Description of measurement methods and procedures to be applied:	The PRA must evaluate whether timber harvest may be occurring in the project area and shall consist of semi-structured interviews / questionnaires. If $\geq 10\%$ of those interviewed/surveyed believe that illegal logging may be occurring within the project boundary then the limited on-the-ground illegal logging survey shall be triggered. An additional output of the PRA shall be a depth of penetration of illegal logging pressure. A maximum distance shall be recorded for penetration into the forest from access points (such as roads, rivers, already cleared areas) for the purpose of harvesting timber.
Frequency of monitoring/recording:	Every two years
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of Data	Calculation of project emissions
Calculation method:	N/A
Comments:	Ex ante estimation shall be made of illegal logging in the with-project case. If the belief is that zero illegal logging will occur within the project boundaries then this parameter may be set to zero if clear infrastructure, hiring and policies are in place to prevent illegal logging.

Data / Parameter:	Result of Limited Illegal Logging Survey
Data unit:	Dimensionless
Description:	N/A
Source of data:	Limited on-the-ground illegal logging survey
Description of measurement methods and procedures to be applied:	Sampled by surveying multiple transects of known length and width across the access-buffer area to check whether new tree stumps are evident or not. The access-buffer area shall be equal in area to at least 1% of $A_{DIST_IL,i}$
Frequency of monitoring/recording:	Must to be repeated each time the PRA indicates a potential for illegal logging.
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of Data	Calculation of project emissions
Calculation method:	N/A

Comments:	Ex ante an estimation shall be made of illegal logging in the with-project case. If the belief is that zero illegal logging will occur within the project boundaries then this parameter may be set to zero if clear infrastructure, hiring and policies are in place to prevent illegal logging.
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Data / Parameter:	$A_{burn,i,t}$
Data unit:	Ha
Description:	Area burnt in stratum i at time t
Source of data:	Geodetic coordinates and / or Remote Sensing data
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	Areas burnt must be monitored at least every five years
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Standard quality control/quality assurance (QA/QC) procedures for forest inventory including field data collection and data management shall be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or from the IPCC GPG LULUCF 2003, is recommended.
Purpose of Data	Calculation of project emissions
Calculation method:	N/A
Comments:	Ex ante estimations of areas burned shall be based on historic incidence of fire in the Project region

Data / Parameter:	$A_{dist,i,t}$
Data unit:	Ha
Description:	Area disturbed in stratum i at time t
Source of data:	Geodetic coordinates and / or Remote Sensing data
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	Areas disturbed shall be monitored at least every five years
Value applied:	N/A
Monitoring equipment:	N/A

QA/QC procedures to be applied:	Standard quality control/quality assurance (QA/QC) procedures for forest inventory including field data collection and data management shall be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or from the IPCC GPG LULUCF 2003, is recommended.
Purpose of Data	Calculation of project emissions
Calculation method:	N/A
Comments:	Ex ante estimations of areas burned must be based on historic incidence of fire in the Project region

Data / Parameter:	$A_{DIST_IL,i}$
Data unit:	Ha
Description:	Area potentially impacted by illegal logging in stratum i
Source of data:	GIS delineation and ground truthing
Description of measurement methods and procedures to be applied:	Must be composed of a buffer from all access points (access buffer), such as roads and rivers or previously cleared areas. The width of the buffer shall be determined by the depth of degradation penetration as defined as a PRA output
Frequency of monitoring/recording:	Repeated each time the PRA indicates a potential for degradation
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of Data	Calculation of project emissions
Calculation method:	N/A
Comments:	Ex ante a limited survey can be used to determine a likely depth of degradation penetration

Data / Parameter:	$C_{DIST_IL,i,t PRJ}$
Data unit:	tCO ₂ e
Description:	biomass carbon of trees cut and removed through illegal logging in stratum i at time t
Source of data:	Field measurements in sample plots

Description of measurement methods and procedures to be applied:	The sampling plan must be designed using plots systematically placed over the buffer zone so that they sample at least 3% of the area of the buffer zone ($A_{DIST_IL,i}$). The diameter of all tree stumps will be measured and conservatively assumed to be the same as the DBH. Where the stump is a large buttress, several individuals of the same species nearby shall be located and a ratio of the diameter at DBH to the diameter of buttress at the same height above ground as the measured stumps shall be determined. This ratio will be applied to the measured stumps to estimate the likely DBH of the cut tree. The aboveground carbon stock of each harvested tree will be estimated using the allometric regression equations chosen for forest growth in the project scenario. The mean aboveground carbon stock of the harvested trees is conservatively estimated to be the total emissions and to all enter the atmosphere
Frequency of monitoring/recording:	Repeated each time limited sampling of A_{DIST_IL} , indicates illegal logging
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Standard quality control/quality assurance (QA/QC) procedures for forest inventory including field data collection and data management shall be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or from the IPCC GPG LULUCF 2003, is recommended.
Purpose of Data	Calculation of project emissions
Calculation method:	N/A
Comments:	If species-specific equations are used and species cannot be identified from stumps then it shall be assumed that the harvested species is the species most commonly harvested. A PRA shall be used to determine the most commonly harvested species.

Data / Parameter:	AP_i
Data unit:	Ha
Description:	Total area of illegal logging sample plots in stratum i
Source of data:	Ground measurement
Description of measurement methods and procedures to be applied:	A sampling plan must be designed using multiple sample plots systematically placed across the buffer zone so that they sample at least 3% of the area of the buffer zone.
Frequency of monitoring/recording:	Not more than five years
Value applied:	N/A
Monitoring equipment:	N/A

QA/QC procedures to be applied:	Standard quality control/quality assurance (QA/QC) procedures for forest inventory including field data collection and data management shall be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or from the IPCC GPG LULUCF 2003, is recommended.
Purpose of Data	Calculation of project emissions
Calculation method:	N/A
Comments:	Ex ante estimation should be made of area of plots. This should be set to exactly 3% of the buffer zone $A_{DIST_IL,i}$

Data / Parameter:	PMP_i
Data unit:	%
Description:	Merchantable biomass as a proportion of total aboveground tree biomass for stratum i within the project boundaries
Source of data:	Within each stratum divide the summed merchantable biomass (defined as total gross biomass of a tree 15cm DBH or larger) by the summed total of aboveground tree biomass.
Description of measurement methods and procedures to be applied:	A sampling plan must be designed using multiple sample plots systematically placed across the buffer zone so that they sample at least 3% of the area of the buffer zone.
Frequency of monitoring/recording:	Not more than five years
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Standard quality control/quality assurance (QA/QC) procedures for forest inventory including field data collection and data management shall be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or from the IPCC GPG LULUCF 2003, is recommended.
Purpose of Data	Calculation of project emissions
Calculation method:	N/A
Comments:	Ex-ante a time zero measurement shall be made of this factor. The timber harvest plan sets the allowable mean extracted volume from the merchantable volume of timber in the forest inventory ($V_{i,ILBSL}$), based on legal limits.

Data / Parameter:	A_i
Data unit:	Ha

Description	Area covered by stratum i																	
Source of data	Geodetic coordinates and/or Remote Sensing data and/or legal parcel records																	
Description of measurement methods and procedures to be applied	The stratum is from the second class forestry inventory																	
Frequency of monitoring/recording:	Every ten years.																	
Value applied:	<table><tr><th>Serial number of strata</th><th>Area (ha)</th><th>Tree species</th></tr><tr><td>1</td><td>4,143.40</td><td>Broad-leaved tree</td></tr><tr><td>2</td><td>1,843.43</td><td>Chinese fir</td></tr><tr><td>3</td><td>585.30</td><td>Pinus massoniana</td></tr><tr><td>Total</td><td>6,572.13</td><td></td></tr></table>			Serial number of strata	Area (ha)	Tree species	1	4,143.40	Broad-leaved tree	2	1,843.43	Chinese fir	3	585.30	Pinus massoniana	Total	6,572.13	
Serial number of strata	Area (ha)	Tree species																
1	4,143.40	Broad-leaved tree																
2	1,843.43	Chinese fir																
3	585.30	Pinus massoniana																
Total	6,572.13																	
Monitoring Equipment:	Tape Measure																	
QA/QC procedures to be applied:	Standard quality control / quality assurance (QA/QC) procedures for forest inventory including field data collection and data management shall be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or from the IPCC GPG LULUCF 2003, is recommended.																	
Purpose of Data	For the calculation of the baseline and project emissions.																	
Calculation method:	N/A																	
Comments	In the baseline scenario strata areas must not change through time. In the project scenario it must be assumed ex-ante that stand boundaries and strata areas must not change through time. Ex post adjustments of the project scenario strata may be needed if unexpected disturbances occur during the project crediting period, severely affecting different parts of an originally homogenous stratum. This disturbance will be delineate as a separate stratum for the purpose of monitoring the carbon stock changes.																	

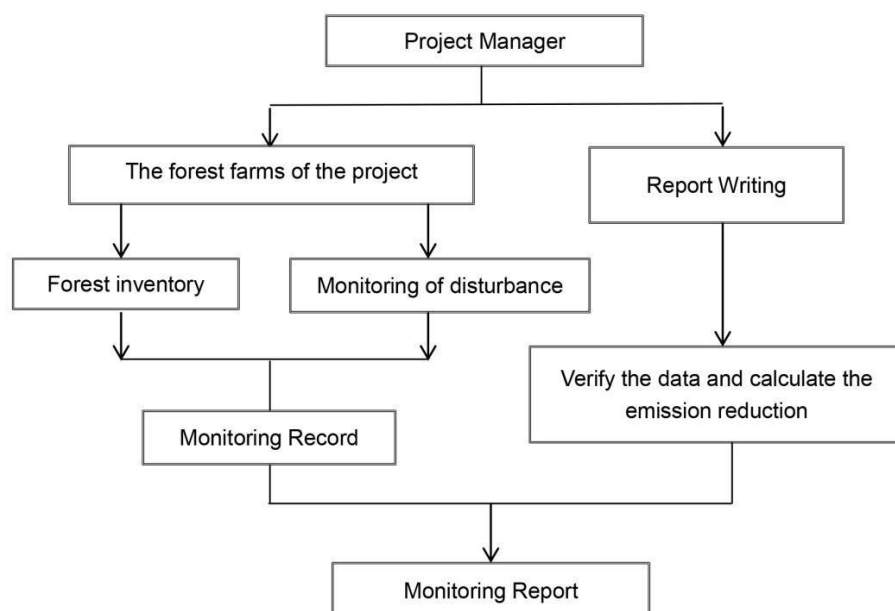
Data / Parameter:	DBH
Data unit:	cm
Description	Diameter at breast height of tree
Source of data	On site measuring on the sample spot.
Description of measurement methods and procedures to be applied	The National Forest Resource Continuous Investigation Technical Regulation issued by the State Forestry Bureau has detailed requirement of the measurement method.

Frequency of monitoring/recording:	Not more than five years
Value applied:	N/A
Monitoring Equipment:	Tape Measure
QA/QC procedures to be applied:	Standard quality control / quality assurance (QA/QC) procedures for forest inventory including field data collection and data management shall be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or from the IPCC GPG LULUC F2003, is recommended.
Purpose of Data	Calculation of tree volume, then to carbon stock change further to the project emissions.
Calculation method:	N/A
Comments	As for the project tree species, there are no allometric equation applied in the project area, the average annual growth and biomass expansion method is adopted for the estimated calculation of carbon stock change. Based on the DBH and local volume table, the volume can be calculated, combined by the BCEF and CF, the carbon stock can be obtained.

5.3 Monitoring Plan

5.3.1 Scope of monitoring and the monitoring plan

The project proponent and consultant will set up a team together to conduct the monitoring. The team is in charge of collecting, monitoring and verifying the data, while the project manager will be assisted by the consultant company. The findings should be reported to the project manager and work out a solution. The operational and management structure is as follows:



Monitoring is required to

- a) determine changes in forest carbon stocks and greenhouse gas emissions from project activity;
- b) confirm project activity; and
- c) determine changes in forest carbon stocks and greenhouse gas emissions from disturbance and illegal logging.

In some cases monitoring may also be implemented to update stratification.

The monitoring plan addresses the monitoring of project implementation, the monitoring of actual carbon stock changes from project activity, and estimation of ex-post net carbon stock changes from the conversion of logged to protected forest.

5.3.2 General requirements for monitoring

All data collected as part of monitoring will be archived electronically and be kept at least for 2 years after the end of the project crediting period. All measurements will be conducted according to relevant standards.

Data archiving shall take both electronic and paper forms, and copies of all data shall be provided to each project participant.

All electronic data and reports shall also be copied on durable media such as CDs and copies of the CDs are to be stored in multiple locations.

The archives shall include:

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

5.3.3 Monitoring of project implementation

Information must be provided, and recorded in the VCS-PD, to establish that:

- The geographic position of the project boundary is recorded for all areas of land;
- The geographic coordinates of the project boundary (and any stratification inside the boundary) are established, recorded and archived. This will be achieved by field survey (e.g. using GPS) or by using geo-referenced spatial data (e.g. maps, GIS datasets, aerial photography, or geo-referenced remote sensing images);

- Commonly accepted principles of forest inventory and management are implemented;
- Standard operating procedures (SOPs) and quality control/quality assurance (QA/QC) procedures for forest inventory including field data collection and data management will be applied. SOPs already applied in national forest monitoring or available from published handbooks or from the IPCC GPG LULUCF 2003 will be used.
- The project plan, together with a record of the plan as actually implemented during the project, shall be available for validation or verification as appropriate.

5.3.4 Stratification

An ex ante stratification of the project area in the project scenario is developed by project proponents through sampling in the project area according to the species.

Sampling to adjust the number and boundaries of the strata defined ex ante where an update is required because of

- a) unexpected disturbances occurring during the project crediting period affecting differently various parts of an originally homogeneous stratum and/or
- b) forest management activities that are implemented in a way that affects the existing stratification in the project scenario.

Established strata may also be merged if the reasons for their establishment have disappeared.

5.3.5 Monitoring of actual carbon stock changes

Carbon stocks will be measured according to the stock assessment equations with field sampling based on forest inventory methods. Various sources exist to assist with the design of a verifiable forest field inventory based on best practice for sampling, data management and analysis (Box 3).

In the project area the inventory plan is specified as below:

- a) adequate forest stratification, sample size estimation methods and consider uncertainty:

The forest stratification is based on the species, which is adequate according to the methodology. The sample size estimation methods, allocation among strata and uncertainty consideration is according to the "Calculation of the number of sample plots for measurements within A/R CDM project activities" (version 02.1.0) approved by the CDM Executive Board.

- b) a sampling framework including sample size, plot size, plot shape and information to determine plot location:

The design of a verifiable forest field inventory based on best practice for sampling, data management and analysis are selected from the Box 3 of the methodology. The sample size estimation methods, allocation among strata and uncertainty consideration is according to the most

recent version of the tool for the “Calculation of the number of sample plots for measurements within A/R CDM project activities” (version 02.1.0) approved by the CDM Executive Board.

For the baseline scenario, the calculation process is shown below:

Parameter	Unit	Description
n	dimensionless	Number of sample plots required for estimation of biomass stocks within the project boundary
n_i	dimensionless	Number of sample plots allocated to stratum i for estimation of biomass stocks within the project boundary

In the baseline scenario:

n_{BSL} for n and $n_{BSL,i}$ for n_i .

In the project scenario:

n_{PROJ} for n and $n_{PROJ,i}$ for n_i

The sample plot will be 0.04 ha and at least 3 sample plots will be selected in 1 stratum. As the sample size should be less than 100, then the total sample plot area should be less than 4 ha, which is small than 5% of the total project area ($6,572.13 \times 5\% = 328.6$ ha).

So we can conclude that the area sampled will be less than 5% of the project area, which means a small sampling fraction.

Therefore, the following simplified equation can be used for estimating the number of sample plots according to the CDM tool:

$$n = \left(\frac{t_{VAL}}{E} \right)^2 * \left(\sum_i \omega_i * S_i \right)^2 \quad (36)$$

where:

- n Number of sample plots required 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
- E Acceptable margin of error (i.e. one-half the confidence interval) in estimation of biomass stock within the project boundary; t d.m. (or t d.m. ha⁻¹), i.e. in the units used for S_i
- ω_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. (or t d.m. ha⁻¹)
- i 1, 2, 3, ... biomass stock estimation strata within the project boundary

After the estimation of total number of sample plots (n), allocation of number of sample plots among strata is calculated as:

$$n_i = n * \frac{\omega_i * S_i}{\sum_i \omega_i * S_i} \quad (37)$$

where:

- n_i Number of sample plots allocated to stratum i ; dimensionless
- n Number of sample plots required for estimation of biomass stocks within the project boundary; 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. (or t d.m.ha⁻¹)
- i 1, 2, 3, ... biomass stock estimation strata within the project boundary

Based on the data of biomass stocks in a carbon pool in the baseline scenario, the estimation of number of sample plots required is shown in table 10 below:

Table 9: The estimation of number of sample plots required

Strata No	Stratum Name	Area (ha)	Mean tonnes C/ha	Standard Deviation (t C/ha)	Plot size (ha)	Wi	Wi* Si
Strata 1	Broad-leaved tree	4,143.40	82.82	18.0	0.04	0.63	11.4
Strata 2	Chinese fir	1,843.43	57.82	11.50	0.04	0.28	3.2
Strata 3	Pinus massoniana	585.30	61.86	11.67	0.04	0.09	1.1

STRATA NO	Stratum Name	Number of Plots	
		Plot Quantity	Rounded Plot Quantity
Total Sample Size			
Strata 1	Broad-leaved tree	15.3	16
Strata 2	Chinese fir	4.3	5
Strata 3	Pinus massoniana	1.4	3
TOTAL NUMBER OF PLOTS			24

* Where the confidence level is 95% as required in the methodology VM0010 version 1.3 and D_f is ∞ . Therefore, t_{VAL} is 1.96.

Carbon stock changes over time shall be estimated by taking measurements in plots at each monitoring event. Monitoring events shall take place at intervals of 5, or preferably 3 years. Including monitoring all the parameters needed. Monitoring reports can use such extrapolated parameter values for the determination of net emissions by sources and removals resulting from the project.

The design of the sampling regime will be determined by the number of strata and timber harvest the baseline case.

5.3.6 Conservative approach and uncertainty

Project proponent will also apply all relevant equations for the ex-ante calculation of net anthropogenic GHG removals by sinks with care and provide transparent estimations for the parameters that are monitored during the project crediting period. These estimates shall be based on measured or existing published data where possible and project proponents should retain a conservative approach; that is, if different values for a parameter are equally plausible, a value that does not lead to over-estimation of net anthropogenic GHG removals by sinks must be selected.

An uncertainty analysis is required for all estimates from monitoring related to change in area, change in carbon stocks and emissions for both the baseline and project case.

APPENDIX < GEOGRAPHICAL COORDINATES OF PROJECT >

GEOGRAPHICAL COORDINATES OF PROJECT

Serial No.	Township	Village	Compartment	Subcompartment	East to	South to	West to	North to
1	SANJIANG	GUFAN	1	38	110°7'59.761"E24°20'49.502"N	110°7'58.912"E24°20'38.437"N	110°7'41.502"E24°20'45.765"N	110°7'55.030"E24°20'51.107"N
2	SANJIANG	HEXING	7	41	110°3'16.209"E24°25'2.054"N	110°3'13.657"E24°24'44.172"N	110°2'55.074"E24°24'55.655"N	110°3'5.199"E24°25'10.271"N
3	SANJIANG	HEXING	8	125	110°3'18.692"E24°24'25.553"N	110°2'41.571"E24°24'1.804"N	110°2'38.238"E24°24'6.490"N	110°3'15.974"E24°24'32.993"N
4	SANJIANG	TONGHUA	2	14	110°8'13.888"E24°22'36.107"N	110°7'51.075"E24°22'17.309"N	110°7'45.714"E24°22'21.849"N	110°8'4.987"E24°22'43.156"N
5	SANJIANG	TONGHUA	2	28	110°8'1.166"E24°22'51.166"N	110°7'45.638"E24°22'40.192"N	110°7'38.398"E24°22'52.846"N	110°7'55.235"E24°23'5.600"N
6	SANJIANG	TONGHUA	2	67	110°8'44.089"E24°22'45.785"N	110°8'12.495"E24°22'22.996"N	110°8'12.249"E24°22'27.376"N	110°8'42.796"E24°22'48.750"N
7	SANJIANG	TONGHUA	6	21	110°6'27.539"E24°22'39.077"N	110°6'14.599"E24°22'29.690"N	110°6'1.302"E24°22'40.600"N	110°6'10.856"E24°22'46.854"N
8	SANJIANG	TONGHUA	7	7	110°7'30.467"E24°22'24.810"N	110°7'13.216"E24°22'10.914"N	110°7'10.006"E24°22'18.185"N	110°7'18.228"E24°22'29.605"N
9	SANJIANG	TONGHUA	7	36	110°8'0.494"E24°22'1.533"N	110°7'46.851"E24°21'56.259"N	110°7'38.674"E24°21'57.786"N	110°7'59.081"E24°22'19.149"N
10	SANJIANG	TONGHUA	7	45	110°8'25.913"E24°22'12.147"N	110°8'5.442"E24°22'0.560"N	110°7'57.861"E24°22'9.843"N	110°8'7.729"E24°22'23.446"N
11	SANJIAO	SANJIAO	1	59	110°7'58.400"E24°16'31.018"N	110°7'35.800"E24°16'10.522"N	110°7'34.048"E24°16'21.036"N	110°7'52.907"E24°16'40.907"N
12	SANJIAO	LIUDING	2	139	110°12'19.431"E24°17'13.602"N	110°12'5.518"E24°16'59.634"N	110°11'39.351"E24°17'12.835"N	110°12'13.148"E24°17'35.424"N
13	SANJIAO	LIUDING	2	174	110°12'25.601"E24°17'35.463"N	110°12'20.147"E24°17'13.354"N	110°12'2.254"E24°17'40.188"N	110°12'6.447"E24°17'47.549"N
14	SANJIAO	LIUDING	4	6	110°12'22.178"E24°16'33.137"N	110°11'50.916"E24°16'27.529"N	110°11'50.505"E24°16'30.501"N	110°12'13.116"E24°16'46.272"N
15	SANJIAO	LIUDING	4	82	110°12'22.462"E24°16'25.574"N	110°12'14.531"E24°16'15.061"N	110°11'59.882"E24°16'31.541"N	110°12'11.169"E24°16'34.817"N
16	SANJIAO	XIAOCHONG	2	11	110°8'44.335"E24°17'45.683"N	110°8'41.545"E24°17'35.660"N	110°8'14.636"E24°17'54.015"N	110°8'17.698"E24°18'2.899"N
17	SANJIAO	XIAOCHONG	7	8	110°10'38.794"E24°13'59.345"N	110°10'25.219"E24°13'40.898"N	110°10'8.352"E24°14'5.927"N	110°10'21.588"E24°14'8.816"N
18	DAZHANG	WACHANG	2	22	110°3'22.137"E23°48'8.292"N	110°3'9.719"E23°47'55.941"N	110°3'0.709"E23°47'59.763"N	110°3'4.486"E23°48'15.818"N
19	TOUPAI	TONGFU	3	64	110°6'50.014"E24°16'26.597"N	110°6'37.826"E24°16'24.274"N	110°6'13.632"E24°16'35.204"N	110°6'14.895"E24°16'37.522"N

20	TOUPAI	TONGFU	3	99	110°7'31.742"E24°16'43.755"N	110°7'16.171"E24°16'32.127"N	110°7'5.217"E24°16'36.764"N	110°7'21.756"E24°16'47.871"N
21	TOUPAI	TONGFU	4	2	110°5'57.708"E24°16'30.122"N	110°5'30.854"E24°16'18.406"N	110°5'20.886"E24°16'27.359"N	110°5'48.221"E24°16'37.707"N
22	TOUPAI	TONGFU	4	40	110°6'20.278"E24°16'24.136"N	110°6'12.831"E24°16'10.879"N	110°6'3.367"E24°16'30.632"N	110°6'4.922"E24°16'34.599"N
23	TOUPAI	TONGFU	4	72	110°6'38.648"E24°16'14.935"N	110°6'36.845"E24°16'9.367"N	110°6'14.282"E24°16'21.330"N	110°6'20.278"E24°16'24.136"N
24	LUOXIANG	DADONG	1	139	110°18'37.070"E24°3'30.908"N	110°18'24.686"E24°3'14.038"N	110°17'48.749"E24°3'30.731"N	110°17'57.176"E24°3'46.055"N
25	LUOXIANG	DADONG	1	140	110°18'48.038"E24°3'45.947"N	110°18'35.657"E24°3'40.561"N	110°18'23.466"E24°3'57.891"N	110°18'32.996"E24°4'4.422"N
26	LUOXIANG	DADONG	2	2	110°19'23.051"E24°3'17.955"N	110°18'57.983"E24°3'1.074"N	110°18'56.237"E24°3'4.303"N	110°19'15.438"E24°3'22.210"N
27	LUOXIANG	DADONG	3	75	110°19'58.327"E24°3'7.669"N	110°19'40.579"E24°3'3.004"N	110°19'21.283"E24°3'7.339"N	110°19'33.438"E24°3'16.492"N
28	LUOXIANG	DADONG	4	4	110°18'35.112"E24°2'4.140"N	110°18'28.328"E24°2'1.959"N	110°18'9.611"E24°2'10.431"N	110°18'19.810"E24°2'24.594"N
29	LUOXIANG	DADONG	4	125	110°19'12.359"E24°2'30.712"N	110°18'46.755"E24°2'16.539"N	110°18'41.947"E24°2'25.532"N	110°18'52.970"E24°2'44.331"N
30	LUOXIANG	DADONG	5	36	110°16'56.687"E24°2'14.194"N	110°16'42.966"E24°1'59.850"N	110°16'28.692"E24°2'17.381"N	110°16'46.729"E24°2'24.908"N
31	LUOXIANG	DADONG	5	38	110°17'30.225"E24°2'31.698"N	110°17'12.719"E24°2'11.441"N	110°17'1.270"E24°2'30.771"N	110°17'5.569"E24°2'38.474"N
32	LUOXIANG	DADONG	5	39	110°18'0.429"E24°2'30.904"N	110°17'58.400"E24°2'29.648"N	110°17'19.612"E24°2'36.295"N	110°17'45.196"E24°2'56.932"N
33	LUOXIANG	DADONG	8	5	110°16'5.336"E24°0'47.745"N	110°15'48.654"E24°0'22.966"N	110°15'35.156"E24°0'34.596"N	110°15'58.761"E24°0'56.429"N
34	LUOXIANG	DADONG	9	28	110°16'54.427"E23°59'52.966" N	110°16'33.080"E23°59'38.608" N	110°16'27.118"E23°59'49.299" N	110°16'43.896"E23°59'55.011" N
35	LUOXIANG	DADONG	10	42	110°18'14.410"E24°0'9.945"N	110°17'38.820"E23°59'51.243" N	110°17'36.029"E23°59'56.287" N	110°18'13.669"E24°0'12.955"N
36	LUOXIANG	PINGLIN	5	2	110°13'48.821"E24°1'29.486"N	110°13'33.043"E24°1'16.499"N	110°13'23.828"E24°1'33.727"N	110°13'36.348"E24°1'47.314"N
37	LUOXIANG	QIONGWU	4	10	110°16'47.578"E23°54'41.311" N	110°16'30.343"E23°54'28.122" N	110°16'23.339"E23°54'34.595" N	110°16'39.937"E23°54'47.565" N
38	LUOXIANG	LUOYUN	9	4	110°12'30.039"E23°55'57.820" N	110°11'56.053"E23°55'16.911" N	110°11'53.680"E23°55'44.071" N	110°12'15.849"E23°56'9.200"N
39	LUOXIANG	LONGPING	3	10	110°16'33.409"E23°54'0.606"N	110°16'16.539"E23°53'34.991" N	110°15'27.033"E23°53'59.733" N	110°16'20.233"E23°54'9.424"N
40	LUOXIANG	LONGPING	6	10	110°16'50.050"E23°52'29.473" N	110°16'21.408"E23°52'19.370" N	110°16'16.629"E23°52'28.539" N	110°16'36.999"E23°52'54.284" N
41	JINXIU FOREST FARM	HEJIANG	6	18	109°53'18.736"E23°47'57.634" N	109°53'8.965"E23°47'47.939"N	109°52'54.116"E23°48'17.808" N	109°52'56.219"E23°48'21.568" N
42	JINXIU	LIUDUAN	2	121	110°11'35.901"E24°13'44.422" N	110°11'1.943"E24°13'21.024"N	110°11'1.536"E24°13'21.928"N	110°11'29.864"E24°13'44.479" N
43	JINXIU	LIUDUAN	7	15	110°11'35.058"E24°12'22.561" N	110°11'12.431"E24°12'7.793"N	110°11'5.648"E24°12'11.636"N	110°11'21.726"E24°12'32.639" N
44	JINXIU	LIUDUAN	7	59	110°10'34.139"E24°13'5.292"N	110°10'17.498"E24°12'57.417" N	110°10'10.103"E24°13'10.240" N	110°10'18.205"E24°13'22.194" N

45	JINXIU	GONGHE	4	6	110°16'29.238"E24°5'51.689"N	110°16'10.235"E24°5'50.223"N	110°15'59.059"E24°5'57.325"N	110°16'16.800"E24°6'16.990"N
46	JINXIU	GONGHE	4	15	110°16'36.726"E24°6'23.441"N	110°16'24.103"E24°6'17.481"N	110°16'7.414"E24°6'29.812"N	110°16'23.207"E24°6'39.774"N
47	JINXIU	GONGHE	7	31	110°18'46.770"E24°4'30.815"N	110°18'44.728"E24°4'18.908"N	110°18'18.612"E24°4'30.210"N	110°18'36.279"E24°4'39.462"N
48	JINXIU	GONGHE	12	81	110°16'22.192"E24°3'20.364"N	110°16'2.305"E24°2'59.518"N	110°15'58.759"E24°3'12.016"N	110°16'13.106"E24°3'26.317"N
49	JINXIU	LUOMENG	2	29	110°13'33.530"E24°4'18.353"N	110°13'2.193"E24°4'13.930"N	110°12'54.555"E24°4'27.390"N	110°12'56.299"E24°4'28.128"N
50	JINXIU	LUOMENG	2	60	110°13'8.031"E24°3'42.115"N	110°13'2.122"E24°3'37.723"N	110°12'47.233"E24°3'52.062"N	110°12'53.003"E24°4'27.798"N
51	JINXIU	LUOMENG	2	62	110°13'33.312"E24°4'4.416"N	110°13'30.195"E24°4'4.118"N	110°13'2.193"E24°4'13.930"N	110°13'20.628"E24°4'15.494"N
52	JINXIU	LUOMENG	2	64	110°13'36.649"E24°3'52.010"N	110°13'29.348"E24°3'36.737"N	110°13'3.823"E24°3'50.701"N	110°13'16.394"E24°4'1.863"N
53	JINXIU	LUOMENG	2	68	110°13'29.890"E24°4'42.540"N	110°13'25.318"E24°4'39.080"N	110°13'6.497"E24°4'49.902"N	110°13'20.151"E24°4'59.501"N
54	JINXIU	LUOMENG	2	86	110°13'20.373"E24°4'59.697"N	110°13'10.002"E24°4'54.990"N	110°12'55.588"E24°5'6.046"N	110°13'5.410"E24°5'11.083"N
55	JINXIU	LUOMENG	3	22	110°14'35.336"E24°4'53.263"N	110°14'33.603"E24°4'50.059"N	110°14'14.351"E24°4'52.119"N	110°14'23.696"E24°5'5.739"N
56	CHANGDON G	GUITIAN	2	101	110°9'48.582"E24°5'23.894"N	110°9'36.071"E24°5'3.676"N	110°9'23.720"E24°5'24.285"N	110°9'35.945"E24°5'27.798"N
57	CHANGDON G	GUITIAN	7	22	110°8'53.684"E24°2'53.194"N	110°8'31.520"E24°2'50.882"N	110°8'31.111"E24°2'51.664"N	110°8'45.077"E24°3'8.693"N
58	CHANGDON G	CHANGDON G	3	53	110°6'43.849"E24°5'4.649"N	110°6'24.171"E24°4'48.385"N	110°6'19.247"E24°4'51.967"N	110°6'32.504"E24°5'13.071"N
59	SANJIANG	SANJIANG	5	82	110°8'31.540"E24°25'29.581"N	110°8'20.217"E24°25'14.726"N	110°8'19.904"E24°25'28.152"N	110°8'25.375"E24°25'31.942"N
60	SANJIANG	SANJIANG	6	17	110°8'9.059"E24°26'2.460"N	110°7'47.077"E24°25'47.970"N	110°7'39.770"E24°25'51.962"N	110°8'3.654"E24°26'6.820"N
61	SANJIANG	SANJIANG	7	10	110°7'25.846"E24°25'52.879"N	110°6'39.137"E24°25'27.517"N	110°6'38.029"E24°25'28.241"N	110°7'11.337"E24°25'59.226"N
62	SANJIANG	SANJIANG	11	31	110°8'34.148"E24°26'15.171"N	110°8'23.521"E24°25'58.891"N	110°8'5.955"E24°26'5.146"N	110°8'26.627"E24°26'17.472"N
63	SANJIANG	HEXING	6	125	110°4'58.099"E24°24'14.948"N	110°4'54.133"E24°24'10.428"N	110°4'32.211"E24°24'28.201"N	110°4'47.945"E24°24'36.375"N
64	SANJIANG	HEXING	7	7	110°3'30.093"E24°24'54.697"N	110°3'16.986"E24°24'32.230"N	110°3'11.825"E24°24'49.100"N	110°3'17.906"E24°25'3.728"N
65	SANJIANG	TONGHUA	2	15	110°7'43.501"E24°22'39.069"N	110°7'20.571"E24°22'24.248"N	110°7'14.053"E24°22'30.000"N	110°7'26.840"E24°22'46.701"N
66	SANJIANG	TONGHUA	2	66	110°8'42.796"E24°22'48.750"N	110°8'12.249"E24°22'27.376"N	110°8'9.648"E24°22'32.178"N	110°8'40.294"E24°22'51.616"N
67	SANJIANG	TONGHUA	2	68	110°8'37.917"E24°22'31.529"N	110°8'25.913"E24°22'12.147"N	110°8'12.495"E24°22'22.996"N	110°8'37.917"E24°22'31.529"N
68	SANJIANG	TONGHUA	4	107	110°4'22.813"E24°23'28.271"N	110°3'53.644"E24°23'15.761"N	110°3'34.769"E24°23'21.161"N	110°4'8.242"E24°23'35.237"N
69	SANJIANG	TONGHUA	4	111	110°4'39.135"E24°23'18.607"N	110°4'24.134"E24°22'54.866"N	110°4'12.214"E24°23'2.995"N	110°4'38.694"E24°23'19.556"N

70	SANJIANG	TONGHUA	5	3	110°5'40.540"E24°23'4.072"N	110°5'23.206"E24°23'0.798"N	110°5'13.238"E24°23'19.065"N	110°5'25.567"E24°23'25.345"N
71	SANJIANG	TONGHUA	6	3	110°6'41.869"E24°22'21.404"N	110°6'39.825"E24°22'1.017"N	110°6'19.320"E24°22'9.631"N	110°6'23.556"E24°22'23.685"N
72	SANJIANG	TONGHUA	7	25	110°7'29.352"E24°22'7.321"N	110°7'2.182"E24°21'48.615"N	110°6'56.885"E24°21'55.566"N	110°7'29.327"E24°22'7.818"N
73	SANJIANG	TONGHUA	7	39	110°7'44.351"E24°22'7.456"N	110°7'38.700"E24°21'58.176"N	110°7'25.310"E24°22'12.279"N	110°7'30.467"E24°22'24.810"N
74	SANJIAO	LIUDING	1	110	110°11'8.462"E24°19'2.029"N	110°10'44.989"E24°18'54.574" N	110°10'32.543"E24°19'10.792" N	110°10'48.044"E24°19'14.849" N
75	SANJIAO	LIUDING	1	116	110°11'4.274"E24°19'16.459"N	110°11'2.617"E24°19'9.406"N	110°10'19.356"E24°19'18.766" N	110°10'39.359"E24°19'24.615" N
76	SANJIAO	LIUDING	1	120	110°10'20.158"E24°18'23.982" N	110°10'7.962"E24°17'59.200"N	110°9'54.259"E24°18'1.430"N	110°10'0.592"E24°18'38.819"N
77	SANJIAO	LIUDING	2	137	110°12'12.706"E24°16'47.498" N	110°11'34.581"E24°16'26.482" N	110°11'26.201"E24°16'52.718" N	110°11'35.104"E24°16'55.790" N
78	SANJIAO	XIAOCHONG	1	95	110°9'22.733"E24°19'5.851"N	110°8'56.312"E24°18'39.654"N	110°8'35.269"E24°19'16.268"N	110°8'47.666"E24°19'22.343"N
79	SANJIAO	JIAJIANG	4	15	110°10'13.610"E24°11'31.294" N	110°9'57.936"E24°11'21.381"N	110°9'56.323"E24°11'29.959"N	110°10'1.772"E24°11'45.006"N
80	LIUXIANG	WANGQIAN	1	7	110°2'56.242"E23°51'51.873"N	110°2'53.284"E23°51'48.397"N	110°2'27.569"E23°51'58.721"N	110°2'29.799"E23°52'3.294"N
81	LIUXIANG	MENTOU	4	62	110°1'45.152"E23°51'57.307"N	110°1'43.161"E23°51'48.579"N	110°1'24.538"E23°51'53.505"N	110°1'33.391"E23°52'5.508"N
82	DAZHANG	LINGMA	10	63	109°53'49.357"E23°50'44.843" N	109°53'39.032"E23°50'29.287" N	109°53'31.074"E23°50'34.039" N	109°53'46.612"E23°50'45.103" N
83	DAZHANG	WACHANG	20	49	109°58'37.427"E23°53'8.051"N	109°58'37.427"E23°53'8.051"N	109°58'13.781"E23°53'35.635" N	109°58'19.002"E23°53'35.923" N
84	DAZHANG	HUALU	7	31	109°58'34.378"E23°48'12.129" N	109°58'23.568"E23°48'0.116"N	109°58'17.414"E23°48'15.663" N	109°58'24.435"E23°48'22.919" N
85	TOUPAI	TONGFU	3	53	110°7'8.092"E24°16'52.319"N	110°7'2.810"E24°16'45.839"N	110°6'34.522"E24°16'59.805"N	110°6'36.166"E24°17'1.274"N
86	TOUPAI	TONGFU	3	62	110°7'37.534"E24°16'48.853"N	110°7'31.742"E24°16'43.754"N	110°7'8.295"E24°16'55.986"N	110°7'17.289"E24°16'59.283"N
87	TOUPAI	TONGFU	3	84	110°6'52.155"E24°16'39.559"N	110°6'38.011"E24°16'38.106"N	110°6'22.744"E24°16'46.411"N	110°6'37.537"E24°16'50.731"N
88	TOUPAI	TONGFU	3	92	110°6'54.762"E24°16'32.607"N	110°6'50.014"E24°16'26.597"N	110°6'21.302"E24°16'45.736"N	110°6'22.799"E24°16'46.630"N
89	TOUPAI	TONGFU	3	97	110°7'7.581"E24°16'41.904"N	110°6'54.762"E24°16'32.607"N	110°6'38.011"E24°16'38.106"N	110°7'0.575"E24°16'47.097"N
90	TOUPAI	XIATANG	5	38	110°7'58.575"E24°17'0.830"N	110°7'50.872"E24°16'53.689"N	110°7'41.313"E24°16'58.653"N	110°7'55.104"E24°17'7.590"N
91	TOUPAI	XIATANG	5	65	110°7'55.758"E24°17'29.813"N	110°7'53.003"E24°17'20.901"N	110°7'32.937"E24°17'29.635"N	110°7'41.029"E24°17'38.512"N
92	ZHONGLIAN G	SHUANGHE	2	107	110°18'52.497"E24°9'22.636"N	110°18'48.830"E24°9'13.030"N	110°18'23.011"E24°9'22.173"N	110°18'25.634"E24°9'27.096"N
93	LUOXIANG	DADONG	1	138	110°18'8.532"E24°3'5.581"N	110°17'56.701"E24°2'51.621"N	110°17'45.230"E24°3'17.267"N	110°17'53.819"E24°3'25.561"N
94	LUOXIANG	DADONG	2	4	110°18'55.192"E24°2'45.419"N	110°18'25.906"E24°2'24.453"N	110°18'13.392"E24°2'27.672"N	110°18'41.952"E24°3'11.357"N

95	LUOXIANG	DADONG	6	7	110°16'24.101"E24°1'2.093"N	110°16'6.059"E24°0'47.681"N	110°16'3.229"E24°0'54.829"N	110°16'9.034"E24°1'17.810"N
96	LUOXIANG	PINGLIN	2	9	110°15'46.537"E24°2'22.050"N	110°15'19.025"E24°1'56.222"N	110°15'18.667"E24°1'57.074"N	110°15'43.913"E24°2'26.018"N
97	LUOXIANG	PINGLIN	4	47	110°14'19.380"E24°1'49.904"N	110°14'13.198"E24°1'43.004"N	110°13'58.369"E24°1'47.640"N	110°14'17.710"E24°2'5.985"N
98	LUOXIANG	PINGLIN	5	25	110°13'45.384"E24°2'7.301"N	110°13'40.668"E24°2'4.942"N	110°13'15.740"E24°2'12.833"N	110°13'25.819"E24°2'21.616"N
99	LUOXIANG	LUODAN	4	12	110°13'28.018"E24°2'32.901"N	110°13'13.841"E24°2'21.054"N	110°12'56.177"E24°2'38.484"N	110°13'9.165"E24°2'42.078"N
100	LUOXIANG	LUODAN	10	19	110°13'56.014"E23°59'52.109" N	110°13'27.580"E23°59'35.288" N	110°13'23.558"E23°59'43.272" N	110°13'49.625"E23°59'54.407" N
101	LUOXIANG	LUOYUN	6	18	110°13'41.588"E23°56'55.648" N	110°13'19.482"E23°56'30.730" N	110°13'9.912"E23°56'37.931"N	110°13'31.839"E23°57'1.790"N
102	LUOXIANG	LUOYUN	6	32	110°13'26.525"E23°57'9.242"N	110°13'0.892"E23°56'49.017"N	110°12'54.646"E23°56'58.036" N	110°13'22.538"E23°57'12.260" N
103	LUOXIANG	LUOYUN	18	49	110°12'35.551"E23°54'57.511" N	110°12'32.930"E23°54'50.738" N	110°12'18.052"E23°55'1.152"N	110°12'34.701"E23°55'6.970"N
104	LUOXIANG	LUOXIANG	3	33	110°17'16.742"E23°57'32.031" N	110°17'7.216"E23°57'18.165"N	110°16'41.954"E23°57'32.792" N	110°16'49.536"E23°57'58.214" N
105	LUOXIANG	LUOXIANG	4	20	110°17'43.498"E23°56'36.787" N	110°17'39.212"E23°56'13.507" N	110°17'5.724"E23°56'37.464"N	110°17'12.281"E23°56'40.971" N
106	LUOXIANG	LONGPING	2	34	110°18'11.479"E23°54'38.333" N	110°18'2.186"E23°54'19.622"N	110°17'48.538"E23°54'34.613" N	110°17'57.581"E23°54'46.471" N
107	LUOXIANG	LONGPING	6	41	110°17'18.076"E23°52'23.273" N	110°17'0.948"E23°52'7.204"N	110°16'46.536"E23°52'24.787" N	110°16'55.874"E23°52'25.236" N
108	LUOXIANG	LONGPING	6	59	110°17'22.402"E23°52'29.569" N	110°17'5.880"E23°52'22.848"N	110°16'46.283"E23°52'25.540" N	110°16'53.143"E23°52'38.957" N
109	JINXIU FOREST FARM	SHIPINGDIN G	7	24	110°0'20.182"E23°55'39.781"N	110°0'2.152"E23°55'33.984"N	110°0'1.578"E23°55'35.879"N	110°0'13.119"E23°56'5.683"N
110	JINXIU	LIUDUAN	2	7	110°12'0.013"E24°14'3.401"N	110°11'50.814"E24°13'44.867" N	110°11'44.108"E24°13'47.665" N	110°11'46.277"E24°14'4.590"N
111	JINXIU	LIUDUAN	8	15	110°15'56.013"E24°14'47.571" N	110°15'49.210"E24°14'32.091" N	110°15'39.738"E24°14'47.492" N	110°15'55.065"E24°14'50.291" N
112	JINXIU	GONGHE	12	84	110°17'28.619"E24°3'9.879"N	110°17'24.339"E24°3'7.123"N	110°17'2.503"E24°3'15.603"N	110°17'18.998"E24°3'30.447"N
113	JINXIU	LUOMENG	2	51	110°13'27.858"E24°4'31.249"N	110°13'22.513"E24°4'19.238"N	110°12'50.535"E24°4'27.339"N	110°13'3.487"E24°4'38.765"N
114	JINXIU	LUOMENG	2	61	110°13'35.588"E24°3'56.757"N	110°13'32.806"E24°3'55.794"N	110°13'4.231"E24°4'4.795"N	110°13'4.496"E24°4'7.697"N
115	JINXIU	JINTIAN	8	3	110°6'42.550"E24°8'12.456"N	110°6'29.557"E24°8'4.939"N	110°6'22.969"E24°8'13.528"N	110°6'32.134"E24°8'19.812"N
116	JINXIU	CHANG'ER	4	64	110°12'10.273"E24°11'3.472"N	110°11'55.006"E24°10'52.844" N	110°11'28.277"E24°11'3.978"N	110°11'52.329"E24°11'11.677" N
117	CHANGDON G	GUITIAN	4	10	110°11'8.528"E24°4'0.514"N	110°10'47.369"E24°3'45.747"N	110°10'44.227"E24°3'45.848"N	110°11'7.239"E24°4'8.919"N
118	CHANGDON G	GUITIAN	6	30	110°8'39.505"E24°4'18.584"N	110°8'29.060"E24°4'13.716"N	110°8'17.586"E24°4'20.372"N	110°8'24.143"E24°4'25.938"N
119	CHANGDON G	ZHENCHONG	4	57	110°5'26.363"E24°2'49.069"N	110°5'24.362"E24°2'42.998"N	110°5'19.061"E24°2'44.052"N	110°5'24.123"E24°3'1.224"N

120	CHANGDON G	CHANGDON G	3	71	110°7'11.129"E24°4'37.780"N	110°6'53.047"E24°4'30.290"N	110°6'50.777"E24°4'31.374"N	110°7'0.199"E24°4'54.299"N
121	SANJIANG	SANJIANG	3	6	110°9'31.858"E24°26'0.097"N	110°9'11.208"E24°25'53.816"N	110°9'6.299"E24°26'9.052"N	110°9'16.943"E24°26'14.084"N
122	SANJIANG	SANJIANG	3	35	110°9'49.449"E24°25'21.182"N	110°9'28.377"E24°25'6.872"N	110°9'18.573"E24°25'13.683"N	110°9'36.946"E24°25'26.133"N
123	SANJIANG	SANJIANG	3	51	110°9'39.986"E24°25'42.641"N	110°9'22.303"E24°25'29.287"N	110°9'16.732"E24°25'32.404"N	110°9'36.054"E24°25'56.045"N
124	SANJIANG	HEXING	3	32	110°4'40.838"E24°26'4.946"N	110°4'26.262"E24°25'59.657"N	110°4'13.211"E24°26'5.256"N	110°4'22.352"E24°26'19.813"N
125	SANJIANG	HEXING	8	50	110°3'27.045"E24°24'12.249"N	110°2'57.111"E24°23'52.103"N	110°2'54.951"E24°23'54.228"N	110°3'16.724"E24°24'17.676"N
126	SANJIANG	TONGHUA	2	22	110°8'27.245"E24°22'51.288"N	110°8'13.888"E24°22'36.107"N	110°7'43.501"E24°22'39.069"N	110°8'17.032"E24°22'55.588"N
127	SANJIANG	TONGHUA	4	112	110°4'28.476"E24°22'59.823"N	110°4'22.147"E24°22'35.899"N	110°4'1.393"E24°23'8.366"N	110°4'20.202"E24°23'16.459"N
128	SANJIANG	TONGHUA	5	2	110°5'17.828"E24°23'12.394"N	110°5'7.072"E24°22'49.849"N	110°4'51.371"E24°23'18.754"N	110°4'53.755"E24°23'20.732"N
129	SANJIANG	TUOSHI	7	14	110°8'38.541"E24°21'53.814"N	110°8'25.433"E24°21'40.499"N	110°8'18.014"E24°21'49.051"N	110°8'24.910"E24°22'2.608"N
130	SANJIAO	LIUDING	2	136	110°11'33.680"E24°16'31.713" N	110°11'20.611"E24°16'27.390" N	110°11'10.104"E24°16'37.003" N	110°11'22.268"E24°16'54.947" N
131	SANJIAO	LIUDING	3	2	110°12'44.518"E24°18'15.761" N	110°12'39.554"E24°18'6.937"N	110°12'24.483"E24°18'23.822" N	110°12'33.722"E24°18'27.335" N
132	SANJIAO	XIAOCHONG	7	1	110°10'21.813"E24°14'56.464" N	110°9'46.990"E24°14'37.159"N	110°9'44.174"E24°14'47.528"N	110°10'4.411"E24°14'57.978"N
133	LIUXIANG	WANGQIAN	5	30	110°3'20.427"E23°50'48.974"N	110°3'13.962"E23°50'38.814"N	110°2'59.585"E23°50'47.894"N	110°3'10.241"E23°50'55.701"N
134	DAZHANG	HUZHU	2	53	109°57'10.504"E23°52'9.003"N	109°57'0.777"E23°52'0.421"N	109°56'40.111"E23°52'22.481" N	109°56'56.224"E23°52'30.936" N
135	DAZHANG	HUZHU	2	56	109°57'21.157"E23°52'12.800" N	109°57'8.840"E23°52'8.526"N	109°56'54.418"E23°52'36.651" N	109°57'9.181"E23°52'39.413"N
136	DAZHANG	HUZHU	5	17	109°55'27.909"E23°51'49.559" N	109°55'10.131"E23°51'47.002" N	109°54'59.558"E23°51'53.730" N	109°55'21.237"E23°52'2.715"N
137	DAZHANG	SHUANGHUA	1	124	109°57'14.506"E23°54'52.515" N	109°57'0.745"E23°54'46.833"N	109°56'54.795"E23°54'55.840" N	109°57'6.969"E23°55'4.726"N
138	DAZHANG	LINGMA	6	118	109°52'32.790"E23°51'3.122"N	109°52'18.199"E23°50'42.763" N	109°52'14.300"E23°50'47.053" N	109°52'20.938"E23°51'13.142" N
139	DAZHANG	WACHANG	14	127	109°59'41.190"E23°49'39.363" N	109°59'25.116"E23°49'23.039" N	109°59'20.176"E23°49'28.148" N	109°59'23.657"E23°49'49.038" N
140	DAZHANG	WACHANG	17	14	109°58'55.423"E23°52'5.778"N	109°58'34.133"E23°51'46.432" N	109°58'22.665"E23°51'52.084" N	109°58'46.199"E23°52'18.576" N
141	DAZHANG	HUALU	13	45	109°57'1.168"E23°49'23.700"N	109°56'50.768"E23°49'17.095" N	109°56'35.766"E23°49'36.981" N	109°56'37.973"E23°49'38.976" N
142	TOUPAI	ERPAI	2	50	110°3'47.866"E24°21'48.976"N	110°3'37.957"E24°21'41.326"N	110°3'21.307"E24°21'52.752"N	110°3'33.311"E24°22'1.744"N
143	ZHONGLIAN G	LIUGAN	1	27	110°20'25.223"E24°6'1.802"N	110°20'2.049"E24°5'54.437"N	110°19'56.369"E24°6'0.008"N	110°20'12.349"E24°6'16.351"N
144	ZHONGLIAN G	LIUGAN	1	56	110°19'32.298"E24°5'47.306"N	110°19'19.971"E24°5'44.982"N	110°18'58.855"E24°5'58.349"N	110°19'5.838"E24°6'1.583"N

145	ZHONGLIAN G	LIUGAN	3	9	110°20'8.682"E24°4'50.425"N	110°20'2.669"E24°4'45.173"N	110°19'29.941"E24°4'55.734"N	110°19'58.409"E24°5'22.271"N
146	ZHONGLIAN G	LIUGAN	3	171	110°20'11.288"E24°4'53.789"N	110°20'4.711"E24°4'49.988"N	110°19'56.540"E24°5'9.652"N	110°20'8.182"E24°5'13.620"N
147	ZHONGLIAN G	YONGHE	4	23	110°14'12.948"E24°11'32.919" N	110°13'59.215"E24°11'15.802" N	110°13'55.710"E24°11'20.829" N	110°14'5.760"E24°11'33.166"N
148	LUOXIANG	DADONG	2	5	110°18'30.129"E24°2'51.907"N	110°18'13.392"E24°2'27.672"N	110°17'59.491"E24°2'43.753"N	110°18'28.744"E24°2'51.972"N
149	LUOXIANG	DADONG	5	37	110°17'20.878"E24°1'49.550"N	110°17'15.639"E24°1'24.082"N	110°16'42.966"E24°1'59.850"N	110°17'4.859"E24°2'25.511"N
150	LUOXIANG	DADONG	6	2	110°16'58.066"E24°1'31.730"N	110°16'41.139"E24°1'20.675"N	110°16'21.383"E24°1'49.240"N	110°16'43.440"E24°1'57.547"N
151	LUOXIANG	DADONG	6	9	110°17'18.202"E24°1'17.995"N	110°16'56.854"E24°1'7.047"N	110°16'45.016"E24°1'18.754"N	110°16'58.066"E24°1'31.730"N
152	LUOXIANG	DADONG	8	4	110°16'27.061"E24°0'50.523"N	110°16'1.487"E24°0'20.298"N	110°15'50.798"E24°0'24.223"N	110°16'26.707"E24°0'51.654"N
153	LUOXIANG	DAXIN	2	120	110°16'43.960"E23°59'18.551" N	110°16'22.291"E23°58'34.195" N	110°16'1.442"E23°58'52.603"N	110°16'23.619"E23°59'27.565" N
154	LUOXIANG	DAXIN	4	29	110°15'31.032"E23°57'52.619" N	110°15'16.558"E23°57'47.024" N	110°15'2.205"E23°58'7.761"N	110°15'10.748"E23°58'24.228" N
155	LUOXIANG	LUODAN	7	12	110°12'18.888"E24°0'59.443"N	110°11'47.392"E24°0'39.887"N	110°11'44.203"E24°1'8.098"N	110°12'13.059"E24°1'12.303"N
156	LUOXIANG	LUODAN	13	73	110°13'45.366"E23°59'16.079" N	110°13'27.906"E23°59'4.749"N	110°13'10.953"E23°59'10.973" N	110°13'40.331"E23°59'19.444" N
157	LUOXIANG	LUOYUN	8	7	110°14'4.646"E23°57'23.652"N	110°13'41.852"E23°57'7.040"N	110°13'32.778"E23°57'12.073" N	110°13'52.243"E23°57'31.833" N
158	LUOXIANG	LONGPING	5	9	110°17'52.324"E23°53'34.799" N	110°17'15.845"E23°53'2.692"N	110°17'15.180"E23°53'4.513"N	110°17'47.253"E23°53'45.997" N
159	JINXIU FOREST FARM	HEJIANG	7	13	109°53'32.978"E23°47'24.199" N	109°53'21.055"E23°46'58.303" N	109°53'11.278"E23°47'6.938"N	109°53'22.967"E23°47'31.455" N
160	JINXIU	LIUDUAN	7	70	110°11'6.332"E24°12'44.338"N	110°11'4.332"E24°12'39.171"N	110°10'32.173"E24°13'11.848" N	110°10'34.522"E24°13'15.340" N
161	JINXIU	GONGHE	5	140	110°17'29.181"E24°5'19.333"N	110°17'8.538"E24°5'2.998"N	110°17'4.937"E24°5'18.902"N	110°17'22.176"E24°5'28.206"N
162	JINXIU	GONGHE	12	82	110°16'47.327"E24°3'20.760"N	110°16'22.765"E24°2'57.163"N	110°16'17.696"E24°2'59.734"N	110°16'40.603"E24°3'29.524"N
163	JINXIU	LUOMENG	3	34	110°14'20.156"E24°4'45.306"N	110°14'2.541"E24°4'39.510"N	110°13'50.990"E24°4'48.981"N	110°14'9.936"E24°4'52.852"N
164	JINXIU	LUOMENG	5	79	110°12'55.278"E24°3'36.581"N	110°12'34.208"E24°3'18.717"N	110°12'28.515"E24°3'32.289"N	110°12'52.363"E24°3'42.116"N
165	JINXIU	LUOMENG	6	25	110°12'26.537"E24°3'24.004"N	110°11'31.731"E24°3'8.082"N	110°11'26.128"E24°3'25.514"N	110°11'32.418"E24°3'44.650"N
166	JINXIU	JINTIAN	8	5	110°6'50.055"E24°7'47.548"N	110°6'40.642"E24°7'46.212"N	110°6'15.039"E24°8'12.998"N	110°6'15.039"E24°8'12.998"N
167	CHANGDON G	GUITIAN	8	68	110°9'59.917"E24°2'51.027"N	110°9'20.849"E24°2'34.793"N	110°9'18.123"E24°2'38.256"N	110°9'51.614"E24°3'1.083"N
168	SANJIANG	SANJIANG	2	64	110°10'22.207"E24°26'2.175"N	110°10'12.994"E24°25'50.394" N	110°9'57.177"E24°26'10.184"N	110°10'1.910"E24°26'17.498"N
169	SANJIANG	SANJIANG	2	73	110°10'8.613"E24°25'50.602"N	110°10'4.805"E24°25'40.256"N	110°9'36.340"E24°25'56.012"N	110°9'55.051"E24°25'59.043"N

170	SANJIANG	SANJIANG	3	56	110°9'36.054"E24°25'56.045"N	110°9'8.684"E24°25'30.080"N	110°9'3.220"E24°25'37.507"N	110°9'32.894"E24°25'57.748"N
171	SANJIANG	HEXING	8	35	110°4'7.268"E24°24'12.545"N	110°3'57.741"E24°23'41.007"N	110°3'47.955"E24°23'44.028"N	110°4'5.741"E24°24'13.371"N
172	SANJIANG	HEXING	8	47	110°3'38.397"E24°23'31.414"N	110°3'27.626"E24°23'12.903"N	110°3'18.820"E24°23'14.640"N	110°3'29.163"E24°23'34.113"N
173	SANJIANG	TONGHUA	1	20	110°6'43.107"E24°24'28.305"N	110°6'17.408"E24°24'15.344"N	110°6'14.494"E24°24'21.243"N	110°6'31.323"E24°24'32.678"N
174	SANJIANG	TONGHUA	2	2	110°7'55.235"E24°23'5.600"N	110°7'38.401"E24°22'52.846"N	110°7'26.967"E24°23'11.745"N	110°7'30.977"E24°23'14.466"N
175	SANJIAO	LIUDING	2	169	110°11'50.020"E24°17'36.505" N	110°11'29.501"E24°17'11.069" N	110°11'10.685"E24°17'36.837" N	110°11'20.199"E24°17'40.344" N
176	SANJIAO	LIUDING	2	171	110°12'3.955"E24°17'31.569"N	110°11'33.874"E24°17'10.120" N	110°11'29.501"E24°17'11.069" N	110°12'2.620"E24°17'45.176"N
177	SANJIAO	XIAOCHONG	1	90	110°10'2.604"E24°18'44.387"N	110°9'55.714"E24°18'14.018"N	110°9'11.293"E24°18'28.718"N	110°9'57.795"E24°18'54.808"N
178	LIUXIANG	LIUXIANG	21	54	110°3'7.210"E23°53'46.691"N	110°3'1.996"E23°53'26.390"N	110°2'43.098"E23°53'42.914"N	110°2'59.390"E23°53'59.712"N
179	DAZHANG	WACHANG	11	35	109°59'37.439"E23°47'25.271" N	109°59'31.225"E23°47'21.764" N	109°59'12.704"E23°47'31.948" N	109°59'26.892"E23°47'44.734" N
180	DAZHANG	HUALU	17	77	109°55'29.765"E23°51'34.599" N	109°55'19.071"E23°51'16.738" N	109°54'53.803"E23°51'27.493" N	109°55'18.723"E23°51'49.339" N
181	TOUPAI	ERPAI	3	17	110°4'19.290"E24°21'51.442"N	110°3'57.143"E24°21'44.560"N	110°3'49.761"E24°21'49.076"N	110°3'55.263"E24°21'59.340"N
182	TOUPAI	TOUPAI	1	93	110°4'43.840"E24°21'1.777"N	110°4'32.024"E24°20'37.249"N	110°4'21.646"E24°20'49.059"N	110°4'36.750"E24°21'19.058"N
183	ZHONGLIAN G	LIUGAN	2	38	110°20'27.398"E24°4'8.926"N	110°20'18.934"E24°3'57.380"N	110°20'3.053"E24°4'9.391"N	110°20'16.703"E24°4'13.011"N
184	ZHONGLIAN G	LIUGAN	2	63	110°19'51.541"E24°4'44.477"N	110°19'19.833"E24°4'22.897"N	110°19'19.405"E24°4'24.625"N	110°19'42.051"E24°4'45.932"N
185	ZHONGLIAN G	LIUGAN	2	82	110°20'18.867"E24°3'56.670"N	110°20'10.445"E24°3'38.657"N	110°19'56.385"E24°3'51.955"N	110°20'18.867"E24°3'56.670"N
186	ZHONGLIAN G	YONGHE	4	16	110°14'35.124"E24°11'26.006" N	110°14'23.491"E24°11'8.616"N	110°14'9.025"E24°11'19.355"N	110°14'27.252"E24°11'30.857" N
187	ZHONGLIAN G	YONGHE	7	10	110°14'26.014"E24°12'0.568"N	110°14'14.560"E24°11'35.890" N	110°14'2.766"E24°11'43.135"N	110°14'23.558"E24°12'1.240"N
188	ZHONGLIAN G	SHIGU	6	8	110°23'57.185"E24°9'13.682"N	110°23'47.586"E24°9'2.563"N	110°23'42.267"E24°9'25.172"N	110°23'55.531"E24°9'33.025"N
189	LUOXIANG	DADONG	4	6	110°18'20.034"E24°2'23.200"N	110°18'4.069"E24°2'6.574"N	110°17'49.487"E24°2'13.664"N	110°18'8.687"E24°2'30.045"N
190	LUOXIANG	DADONG	5	35	110°17'52.867"E24°2'25.022"N	110°17'38.273"E24°2'5.559"N	110°17'24.345"E24°2'13.707"N	110°17'43.146"E24°2'27.492"N
191	LUOXIANG	DADONG	6	8	110°16'49.124"E24°1'17.137"N	110°16'22.422"E24°0'56.141"N	110°16'19.308"E24°1'12.465"N	110°16'25.982"E24°1'22.387"N
192	LUOXIANG	PINGLIN	6	30	110°14'49.671"E24°0'41.442"N	110°14'17.533"E24°0'17.671"N	110°13'49.319"E24°0'18.795"N	110°14'12.566"E24°0'50.893"N
193	LUOXIANG	LONGPING	1	1	110°18'38.666"E23°54'39.583" N	110°18'36.831"E23°54'34.028" N	110°18'13.736"E23°54'47.195" N	110°18'16.177"E23°54'59.655" N
194	JINXIU FOREST FARM	LIUYAOPING	7	3	109°52'6.726"E23°44'3.056"N	109°51'37.046"E23°43'57.349" N	109°51'35.359"E23°44'1.718"N	109°51'52.449"E23°44'6.096"N

195	JINXIU FOREST FARM	LIUYAOPING	7	40	109°52'11.852"E23°44'13.883" N	109°51'35.462"E23°44'2.188"N	109°51'35.151"E23°44'4.789"N	109°52'6.110"E23°44'14.092"N
196	JINXIU FOREST FARM	HEJIANG	8	22	109°53'53.482"E23°47'12.529" N	109°53'39.834"E23°47'8.083"N	109°53'33.584"E23°47'18.411" N	109°53'46.358"E23°47'22.473" N
197	JINXIU FOREST FARM	SHIPINGDIN G	15	1	109°58'7.705"E23°54'17.541"N	109°57'34.825"E23°54'4.103"N	109°57'25.301"E23°54'10.049" N	109°57'56.830"E23°54'20.672" N
198	JINXIU	LIUDUAN	2	5	110°11'47.545"E24°13'53.013" N	110°11'18.335"E24°13'42.040" N	110°11'13.114"E24°13'47.753" N	110°11'17.833"E24°13'56.332" N
199	JINXIU	LIUDUAN	2	73	110°12'0.147"E24°14'3.801"N	110°11'22.142"E24°13'54.854" N	110°11'20.995"E24°13'55.260" N	110°11'49.961"E24°14'14.705" N
200	JINXIU	LIUDUAN	7	65	110°11'4.032"E24°12'26.733"N	110°10'59.163"E24°12'22.788" N	110°10'31.015"E24°13'2.053"N	110°10'34.139"E24°13'5.292"N
201	JINXIU	GONGHE	3	12	110°15'57.841"E24°5'29.872"N	110°15'43.152"E24°5'18.912"N	110°15'32.861"E24°5'25.823"N	110°15'47.376"E24°5'52.367"N
202	JINXIU	LUOMENG	3	18	110°13'48.961"E24°5'12.988"N	110°13'42.299"E24°4'51.886"N	110°13'14.315"E24°5'8.792"N	110°13'42.814"E24°5'20.139"N
203	JINXIU	JINTIAN	8	49	110°6'59.324"E24°7'21.854"N	110°6'59.324"E24°7'21.854"N	110°6'40.642"E24°7'46.212"N	110°6'43.284"E24°7'49.009"N
204	JINXIU	JINTIAN	8	50	110°6'29.206"E24°7'33.056"N	110°6'28.701"E24°7'31.711"N	110°6'11.696"E24°7'42.424"N	110°6'18.654"E24°7'49.929"N
205	JINXIU	JINTIAN	8	51	110°6'43.980"E24°7'28.450"N	110°6'42.070"E24°7'27.354"N	110°6'25.774"E24°7'45.549"N	110°6'26.508"E24°7'50.161"N
206	CHANGDON G	PINGMENG	1	94	110°6'45.400"E23°59'54.376"N	110°6'29.307"E23°59'44.656"N	110°6'23.992"E23°59'56.457"N	110°6'30.813"E24°0'2.547"N
207	CHANGDON G	CHANGDON G	3	45	110°6'26.585"E24°5'14.872"N	110°6'16.060"E24°4'50.417"N	110°6'3.591"E24°5'2.887"N	110°6'19.851"E24°5'16.613"N
208	SANJIANG	SANJIANG	2	58	110°10'1.910"E24°26'17.498"N	110°9'57.592"E24°25'56.266"N	110°9'36.492"E24°26'21.722"N	110°9'37.104"E24°26'23.252"N
209	SANJIANG	SANJIANG	2	62	110°9'55.051"E24°25'59.043"N	110°9'36.340"E24°25'56.012"N	110°9'28.974"E24°26'10.312"N	110°9'36.498"E24°26'21.994"N
210	SANJIANG	SANJIANG	2	72	110°10'21.445"E24°25'36.559" N	110°9'52.811"E24°25'27.181"N	110°9'49.897"E24°25'27.698"N	110°9'57.331"E24°25'41.770"N
211	SANJIANG	HEXING	3	12	110°4'22.352"E24°26'19.813"N	110°4'13.211"E24°26'5.256"N	110°4'0.252"E24°26'14.309"N	110°4'6.777"E24°26'35.044"N
212	SANJIANG	HEXING	3	33	110°5'0.357"E24°26'16.501"N	110°4'46.925"E24°26'2.361"N	110°4'39.418"E24°26'21.901"N	110°4'39.418"E24°26'21.901"N
213	SANJIANG	HEXING	7	4	110°3'57.914"E24°24'37.130"N	110°3'46.778"E24°24'35.291"N	110°3'34.678"E24°24'49.382"N	110°3'47.232"E24°24'53.329"N
214	SANJIANG	TONGHUA	2	10	110°7'57.514"E24°22'38.564"N	110°7'39.526"E24°22'17.232"N	110°7'28.371"E24°22'25.807"N	110°7'49.556"E24°22'39.243"N
215	SANJIANG	TONGHUA	4	108	110°4'15.995"E24°23'34.981"N	110°3'47.898"E24°23'27.141"N	110°3'37.494"E24°23'29.633"N	110°3'48.593"E24°23'42.753"N
216	SANJIANG	TONGHUA	7	10	110°7'7.667"E24°21'37.343"N	110°6'35.767"E24°21'24.890"N	110°6'29.650"E24°21'25.597"N	110°6'49.470"E24°21'54.297"N
217	SANJIAO	XIAOCHONG	3	132	110°10'32.874"E24°16'49.652" N	110°10'27.014"E24°16'43.186" N	110°10'10.565"E24°16'48.408" N	110°10'26.404"E24°17'3.215"N
218	SANJIAO	XIAOCHONG	3	293	110°9'14.984"E24°17'52.307"N	110°8'57.402"E24°17'37.425"N	110°8'46.345"E24°17'51.224"N	110°9'12.054"E24°17'55.665"N

219	SANJIAO	XIAOCHONG	7	2	110°10'36.067"E24°14'37.747" N	110°10'16.912"E24°14'27.086" N	110°10'8.740"E24°14'33.807"N	110°10'33.164"E24°14'46.297" N
220	LIUXIANG	WANGQIAN	2	5	110°4'18.003"E23°52'22.804"N	110°4'6.962"E23°52'14.825"N	110°3'56.954"E23°52'38.339"N	110°4'2.506"E23°52'40.782"N
221	DAZHANG	XINCUN	6	19	109°52'33.177"E23°43'37.787" N	109°52'32.011"E23°43'37.507" N	109°52'8.369"E23°43'41.177"N	109°52'20.944"E23°43'56.276" N
222	DAZHANG	XINCUN	6	26	109°52'38.849"E23°43'28.912" N	109°52'32.369"E23°43'28.760" N	109°52'3.835"E23°43'30.126"N	109°52'8.119"E23°43'39.489"N
223	DAZHANG	XINCUN	9	43	109°52'47.137"E23°44'39.551" N	109°52'45.910"E23°44'28.074" N	109°52'2.319"E23°44'51.654"N	109°52'2.700"E23°44'52.726"N
224	DAZHANG	LINGMA	4	98	109°50'47.389"E23°51'36.916" N	109°50'43.608"E23°51'35.103" N	109°50'30.766"E23°51'36.728" N	109°50'38.497"E23°51'55.641" N
225	DAZHANG	WACHANG	4	141	110°1'17.406"E23°50'22.648"N	110°1'15.441"E23°50'20.754"N	110°1'1.412"E23°50'27.095"N	110°1'16.728"E23°50'57.142"N
226	TOUPAI	ERPAI	3	47	110°4'4.856"E24°22'20.743"N	110°3'45.318"E24°22'18.463"N	110°3'41.209"E24°22'21.841"N	110°4'1.326"E24°22'33.927"N
227	ZHONGLIAN G	LIUBU	10	13	110°19'44.183"E24°1'56.620"N	110°19'36.155"E24°1'54.831"N	110°19'29.411"E24°2'4.330"N	110°19'42.909"E24°2'19.682"N
228	ZHONGLIAN G	ZHONGSHAN	3	70	110°22'33.704"E24°11'1.599"N	110°22'29.332"E24°10'48.098" N	110°22'21.072"E24°10'53.566" N	110°22'26.523"E24°11'5.527"N
229	ZHONGLIAN G	YONGHE	4	6	110°14'37.019"E24°11'28.727" N	110°14'13.627"E24°11'20.327" N	110°14'10.416"E24°11'21.824" N	110°14'25.183"E24°11'34.837" N
230	ZHONGLIAN G	YONGHE	4	21	110°14'14.560"E24°11'35.890" N	110°14'12.948"E24°11'32.919" N	110°13'44.437"E24°11'37.214" N	110°14'3.541"E24°11'43.152"N
231	ZHONGLIAN G	SHIGU	2	22	110°26'28.728"E24°11'39.564" N	110°26'20.057"E24°11'35.024" N	110°26'12.340"E24°11'42.040" N	110°26'17.021"E24°11'51.296" N
232	LUOXIANG	DADONG	2	3	110°18'49.367"E24°3'14.254"N	110°18'27.646"E24°2'51.853"N	110°18'8.758"E24°2'28.554"N	110°18'40.129"E24°3'22.402"N
233	LUOXIANG	DADONG	2	10	110°19'15.438"E24°3'22.210"N	110°18'50.921"E24°3'11.117"N	110°18'48.166"E24°3'18.604"N	110°19'4.462"E24°3'27.301"N
234	LUOXIANG	DADONG	6	4	110°16'43.886"E24°1'40.967"N	110°16'31.376"E24°1'22.163"N	110°16'19.004"E24°1'32.362"N	110°16'31.530"E24°1'46.919"N
235	LUOXIANG	DADONG	10	62	110°17'56.987"E23°59'44.103" N	110°17'48.046"E23°59'8.840"N	110°17'33.456"E24°0'2.733"N	110°17'33.666"E24°0'3.712"N
236	LUOXIANG	LUODAN	8	6	110°10'20.643"E24°0'32.012"N	110°10'6.251"E24°0'16.410"N	110°9'48.891"E24°0'43.938"N	110°9'55.675"E24°0'51.552"N
237	LUOXIANG	LUODAN	13	15	110°14'44.713"E23°58'57.589" N	110°14'12.429"E23°58'44.758" N	110°13'52.001"E23°58'53.740" N	110°14'16.229"E23°59'11.151" N
238	LUOXIANG	LUOXIANG	3	37	110°16'49.959"E23°57'36.803" N	110°16'45.712"E23°57'32.256" N	110°16'28.272"E23°57'51.172" N	110°16'34.305"E23°57'59.697" N
239	LUOXIANG	LUOXIANG	4	41	110°17'47.573"E23°56'41.189" N	110°17'29.938"E23°56'35.629" N	110°17'24.621"E23°56'48.161" N	110°17'38.309"E23°56'54.216" N
240	LUOXIANG	LUOXIANG	5	73	110°16'15.681"E23°56'12.248" N	110°16'10.599"E23°56'1.931"N	110°15'49.165"E23°56'17.644" N	110°16'3.202"E23°56'26.644"N
241	LUOXIANG	LONGPING	4	16	110°16'40.238"E23°52'57.254" N	110°16'38.260"E23°52'56.571" N	110°16'17.878"E23°53'3.185"N	110°16'32.734"E23°53'20.103" N
242	JINXIU FOREST FARM	HEJIANG	8	25	109°53'48.485"E23°47'22.406" N	109°53'33.584"E23°47'18.411" N	109°53'32.566"E23°47'21.804" N	109°53'38.835"E23°47'53.357" N

243	JINXIU FOREST FARM	SHALIPING	13	5	109°53'44.583"E23°45'8.134"N	109°53'40.165"E23°44'42.856" N	109°53'32.400"E23°44'44.929" N	109°53'38.459"E23°45'13.393" N
244	JINXIU	LIUDUAN	6	7	110°11'41.223"E24°13'5.313"N	110°11'16.274"E24°13'2.631"N	110°11'3.955"E24°13'13.720"N	110°11'38.788"E24°13'21.497" N
245	JINXIU	LIUDUAN	7	13	110°11'21.674"E24°12'21.186" N	110°11'16.255"E24°12'16.929" N	110°10'59.264"E24°12'39.458" N	110°11'0.678"E24°12'39.769"N
246	JINXIU	GONGHE	3	57	110°15'23.458"E24°5'29.318"N	110°15'6.765"E24°5'21.556"N	110°15'0.750"E24°5'22.810"N	110°15'8.434"E24°5'38.065"N
247	JINXIU	GONGHE	9	8	110°16'27.477"E24°4'30.872"N	110°16'5.761"E24°4'23.893"N	110°16'0.659"E24°4'26.970"N	110°16'20.939"E24°4'42.935"N
248	JINXIU	GONGHE	11	20	110°16'12.919"E24°2'46.107"N	110°15'57.271"E24°2'31.233"N	110°15'49.045"E24°2'37.511"N	110°16'2.154"E24°2'52.952"N
249	JINXIU	CHANG'ER	6	24	110°13'21.927"E24°9'30.516"N	110°13'7.511"E24°9'14.693"N	110°12'59.982"E24°9'22.295"N	110°13'15.617"E24°9'44.122"N

