

**Intl Conference on Sustainable  
Development of Non-Timber  
Forest Products and Services**



**Facilitating Reforestation for Guangxi  
Watershed Management in Pearl River Basin  
CDM under Kyoto Protocol**

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# Following WB Biocarbon Procedures and CDM AR Modalities and Procedures

- PIN: March 2004, one of 119 proposals
- Screened and Listed as one of 13 projects in the Bank's Portfolio: June 2004

- ✓ Albania Afforestation and Reforestation
- ✓ **China Pearl River Watershed Management**
- ✓ Costa Rica Cooperative Reforestation
- ✓ Honduras Agroforestry and Reforestation
- ✓ Madagascar Biodiversity Corridor
- ✓ Mexico Seawater Agroforestry
- ✓ Mexico Shade Coffee
- ✓ Philippines Watershed Management
- ✓ Romania Forest Shelterbelts (JI)
- ✓ Tanzania Small Group and Tree Planting
- ✓ Uganda Sawlog Production
- ✓ Ukraine Chernobyl Reforestation (JI)
- ✓ Uruguay Livestock Intensification

- CFD: Jan 2005, examined by FMC
- Letter of Intention
- NMM & NMB: June 14 2005 deadline
- Rating B by AR WG in September 2005
- Approved by AR WG in early Nov 2005
- Approved by EB in 23-25 Nov 2005
- PDD on website for comments since Feb 16
- On-site audit Feb 19-24
- Final validation report: end of April 2005
- DNA approval letter: early June
- Website comments started in early Sept
- Registration on Nov 10 2005.

# Objectives

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- To sequester CO<sub>2</sub> through reforestation, and test and pilot CDM AR project;
- To enhance biodiversity conservation by increasing the connectivity of forests adjacent to nature reserves;
- To improve soil erosion control;
- To generate income for local communities.

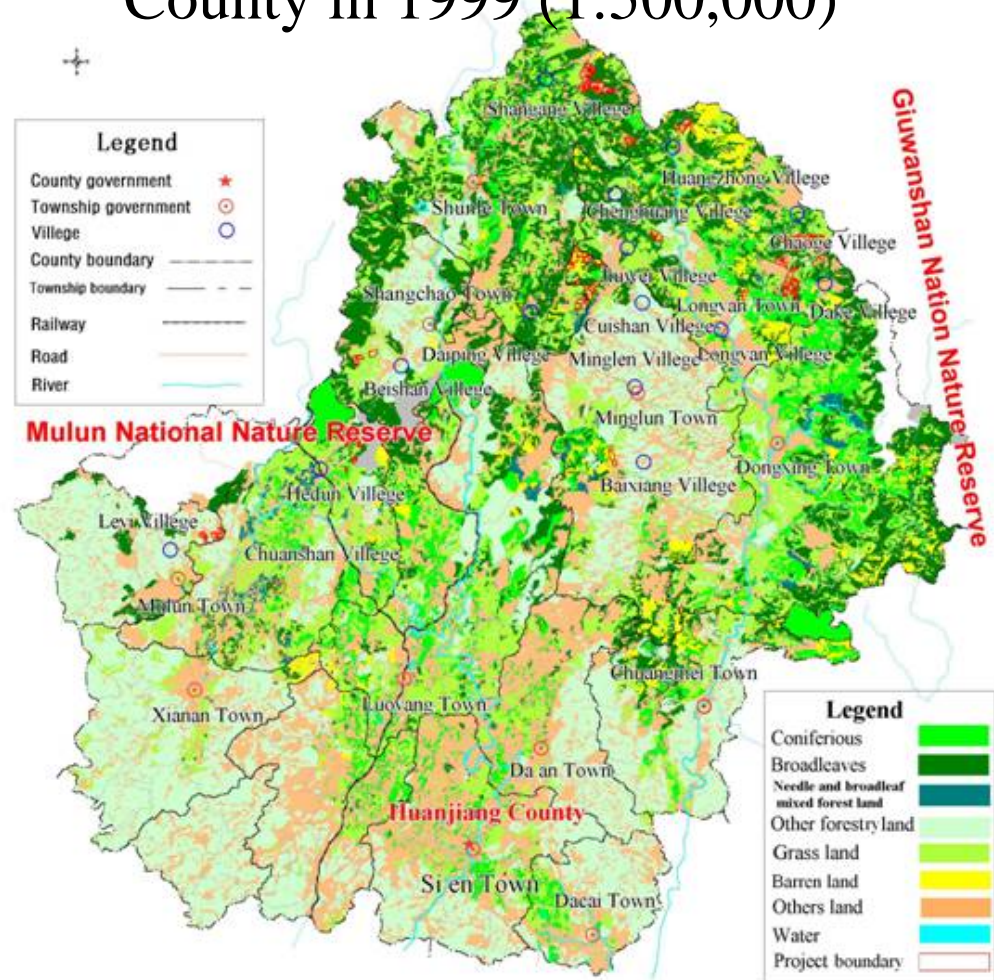
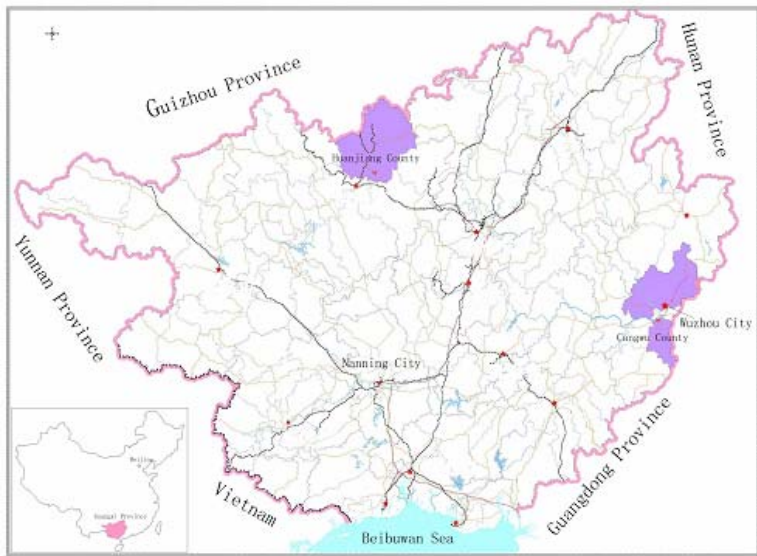
# Activities

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- 2,000 ha of multiple-use forests in Huanjiang County of Guangxi in the buffer zones of Mulun National Nature Reserve (including 830 ha in buffer zone of Mulun and Shiwandashan National Nature Reserve, and 1,170 ha on sites between them).



# Land use/cover map of Huanjiang County in 1999 (1:500,000)



Lands linked to Mulun Nature Reserve (behind)

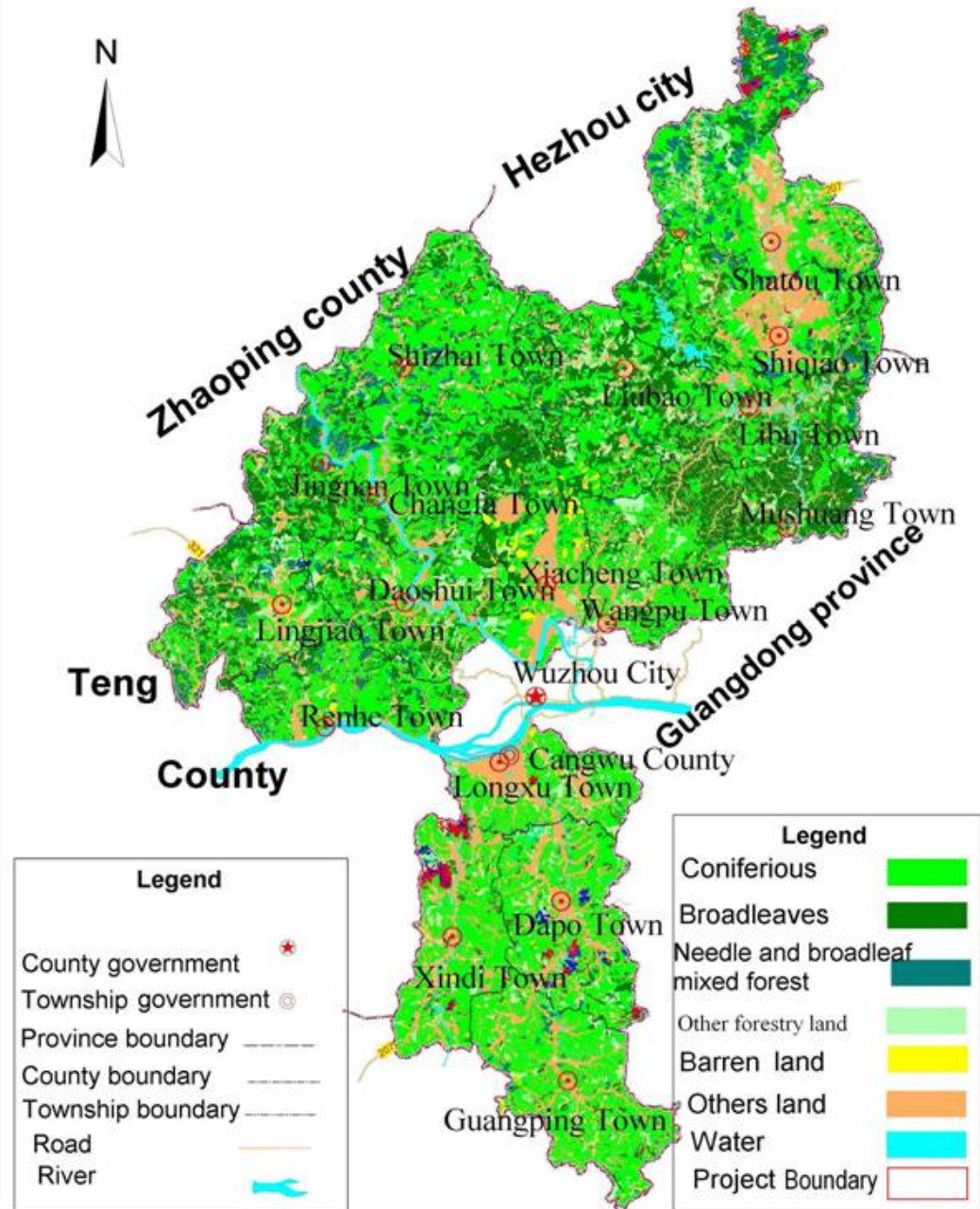


# Activities

- Establishing 2,000 ha of multiple-use forests on sites with severe soil in Cangwu County of Guangxi.



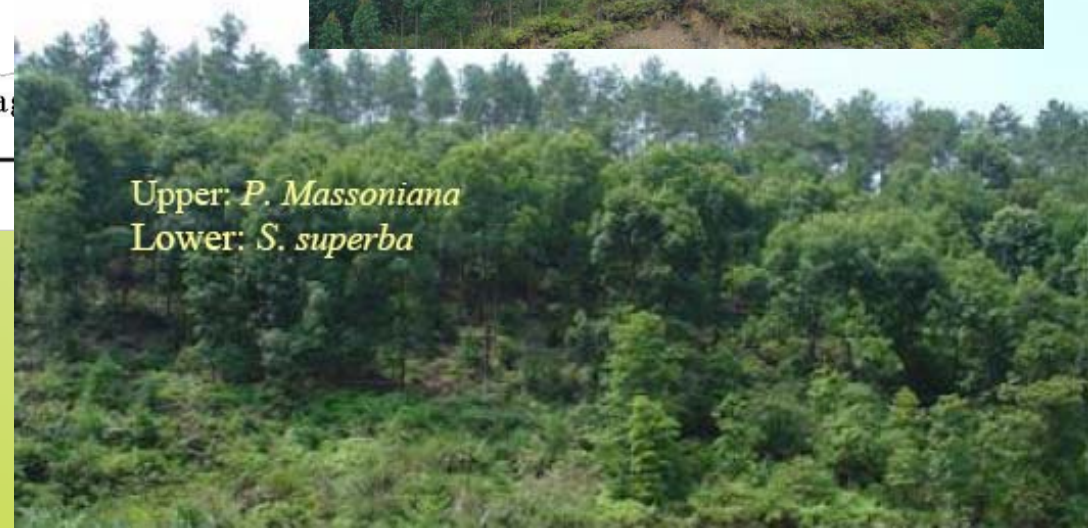
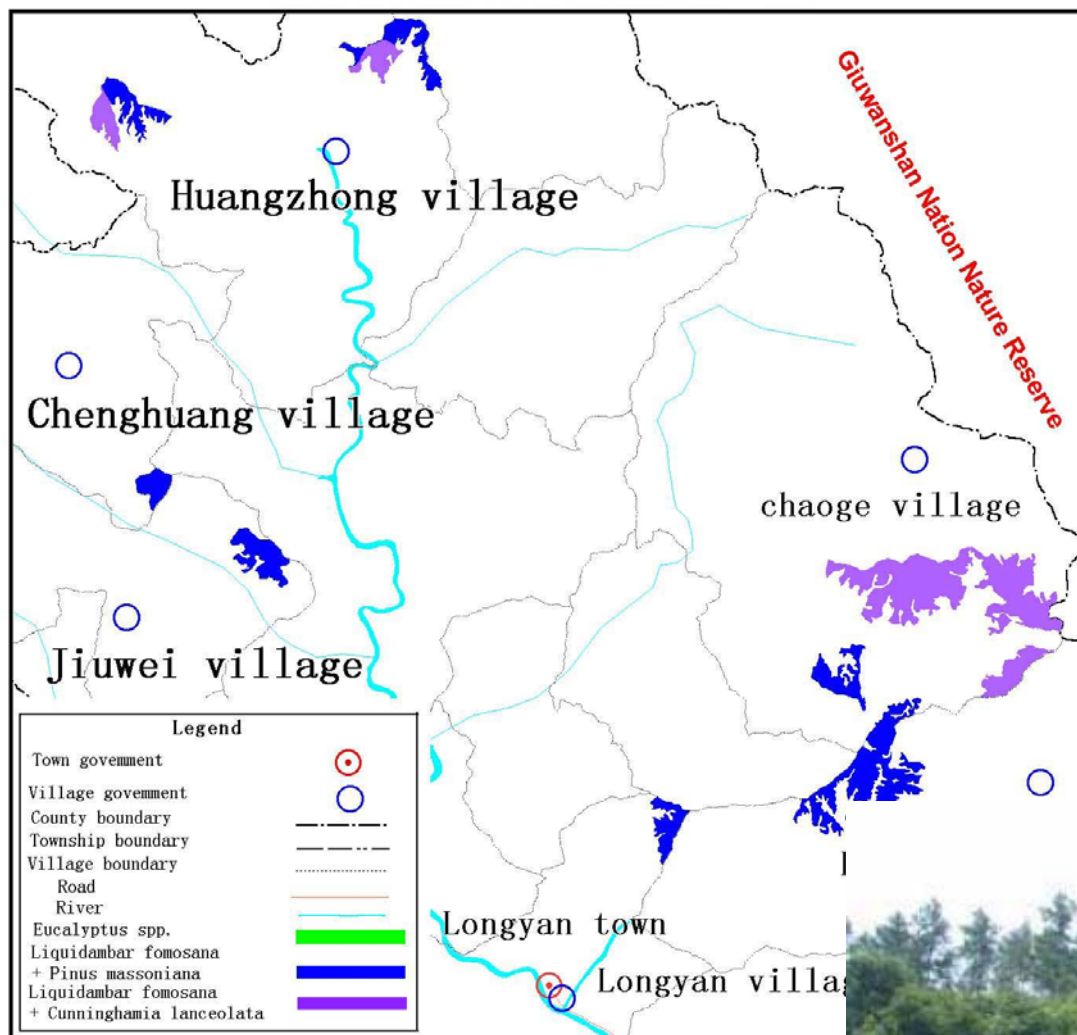
广西苍梧县植被覆盖、造林地布局图





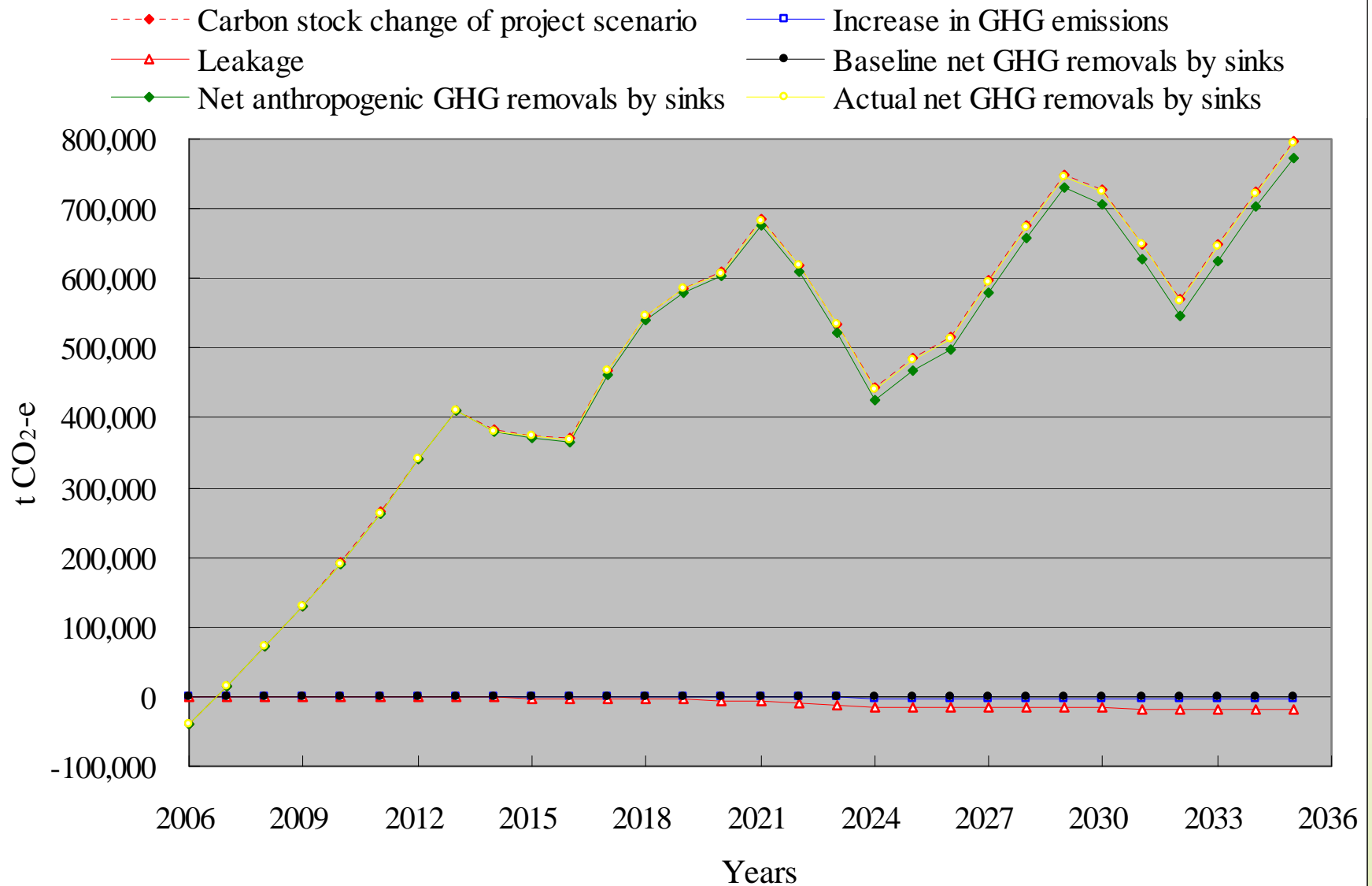
## ■ Species and reforestation models

- ✓ Pinus massoniana x Liquidambar formosana (1,050 ha)
- ✓ Cunninghamia lanceolata X L. formosana (450 ha)
- ✓ Eucalyptus sp. (E.grandis × E.urophylla) (1000 ha)
- ✓ P. massoniana X Quercus griffithii (600 ha)
- ✓ P. massoniana X Schima superba (900 ha)



Upper: *P. Massoniana*  
Lower: *S. superba*

# Expected tCER



# General aspects of new methodologies

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- To Make the meth **as simple as possible** and make it **success** as a start of other meths:
  - ✓ Complicated modalities and procedures
  - ✓ No successful meth
- Based the meth on degraded land that
  - ✓ Is economically unattractive: no activity displacement and easy to justify additionality
  - ✓ Has carbon stock decreased and decreasing in the absence of AR: zero stock change
  - ✓ Allow to make a conservative simple assumption in baseline scenario.

# General aspects of new methodologies

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- Baseline meth: ex-ante estimation of **baseline, project, and leakage**
- Monitoring meth: cookbook guidance for monitoring of GHG emissions and removals during the **project**, basis for CER issuance
- Applicability conditions narrow → easier to approve



# New baseline and monitoring meth ---Reforestation of degraded land

## ■ Scope:

- ✓ Restoration of natural forest and plantation (with harvesting) on (tropical) degraded and degrading land by tree planting or seeding.
- ✓ Aboveground and belowground biomass are the only carbon pools considered.

# Conditions

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- The **project activity does not lead to a shift of pre-project activities outside the project boundary**, i.e. the land under the proposed A/R CDM project activity can continue to provide at least the same amount of goods and services as in the absence of the project activity; Guangxi: **abandoned barren land**
- Lands are **severely degraded** with vegetation indicators (tree crown cover and height) below thresholds for defining forests and the lands are still degrading;
- Environmental conditions and human-caused degradation **do not permit the encroachment of natural forest vegetation**. Guangxi: **large size (50 ha per land) and failure of air seeding in 1990s**
- Lands will be reforested by **direct planting** and/or seeding;
- **Site preparation does not cause significant longer term net emissions** from soil carbon; Guangxi: **2-5% of surface area will be disturbed**

# Conditions

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- **Plantation may be harvested** with short or long rotation and will be regenerated either by direct planting or natural sprouting; Guangxi: 7-30 years, oak and eucalyptus: natural regeneration, others planting
- **Carbon stocks in soil organic matter, litter and deadwood can be expected to decrease** more due to soil erosion and human intervention or increase less in the absence of the project activity, relative to the project scenario; literature provided to DOE to demonstrate it
- **Grazing will not occur** within the project boundary in the project case;
- Baseline approach 22(a) (**existing or historical changes in carbon stocks** in the carbon pools with the project boundary) is the most appropriate choice and the land would remain degraded in the absence of the project activity.

# Other features

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- Carbon pools: above-ground and below-ground biomass
- Uses conservative assumptions in several places (e.g., zero biomass stock change for lands without growing trees, all pre-existing non-tree vegetation will loss, omitting dead wood, litter and soil)
- Allows for individual trees on the site at start of project but with higher BEF. Guangxi: assuming 50% higher BEF
- Stratification
- Preferably land use / cover maps; or satellite images
- Standard additionality tool is used
- Standard eligibility tool is used

# Justification of Baseline approach (a)

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- degraded, abandoned barren land resulting from human degradation and unfavorable environment. Without significant change of social-economic and environmental regimes, their status will not change.
- Agricultural land use, commercial timber plantations and other land uses are **economically unattractive**.
- **Financial barriers** (no funds, commercial loans unavailable), **technical barriers** (e.g., lack of capacity of successful planting and management), inadequate **institutional** arrangement, and/or **market risks** also prevent use of land for economic revenue.



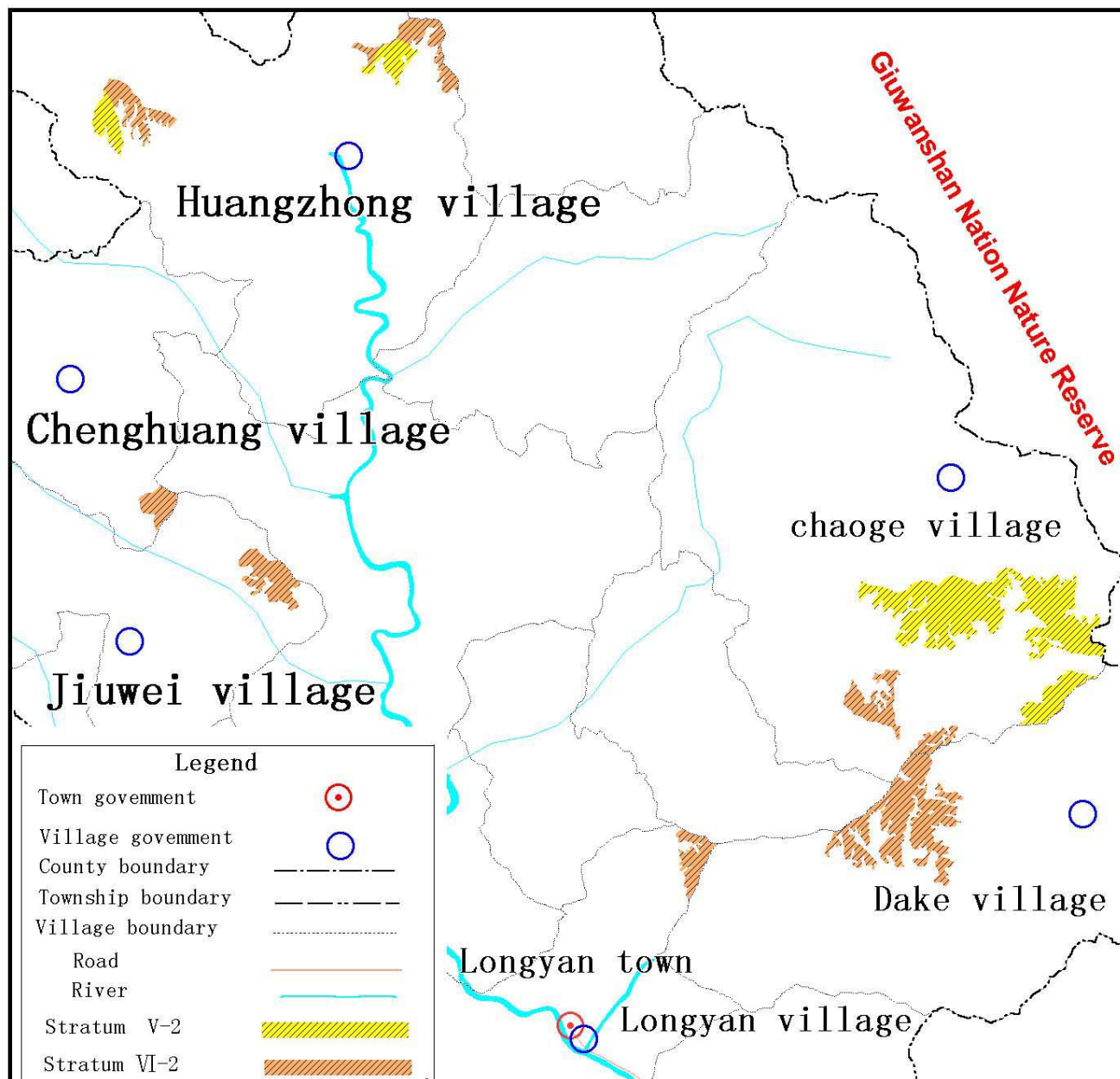
# Steps in applying ARAM0001

# Baseline scenario: steps

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- Ex-ante Stratify the project area using steps:
  - Identify key factors: **Soil, Climate**, previous land use, **existing vegetation, tree species and year to be planted**, anthropogenic influence, etc.
  - Collecting Data (maps) for identified key factors
  - Preliminary stratification
  - On-site investigation: including biomass and soil sampling, preliminary stratification slightly modified
  - Sub-stratifying: year to be planted
  - Final ex-ante stratification: GIS products

## Stratification map in Longyan town of Huanjiang county



# Selection of most plausible baseline scenario

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- Identify plausible alternative land uses
  - ✓ Continuation of current status
  - ✓ Reforestation without CDM benefits
  - ✓ Others: impossible because of legally bound to forestry purposes
- Demonstrate that the most plausible scenario is to remain abandoned and degrading in absence of the project by
  - **Reforestation as alternative land use:** economically unattractive
- demonstrate that the lands to be planted are really “degraded”
  - Vegetation degradation (continuing disturbance)
  - Soil degradation (erosion)
  - Natural encroachment impossible (large size, failure of air seeding)
- With demonstration above, baseline approach 22(a) is the appropriate approach

# Baseline / project GHG estimation

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- Determine baseline carbon stock changes
  - Sites without growing trees: **zero assumption**;
  - Sites with growing trees: the projection of the number (**40 tree/ha**) and growth, based on **growth curve** (yield tables), allometric equations, and local or **national or IPCC default** parameters
    - Standard IPCC GPG methodologies
    - Local data for biomass, GPG or national default data for GHG emissions
    - Carbon in biomass (baseline and project):
      - ✓ Method 1: Gains – losses
      - ✓ **Method 2: Stock-change method**



# Baseline / project GHG estimation

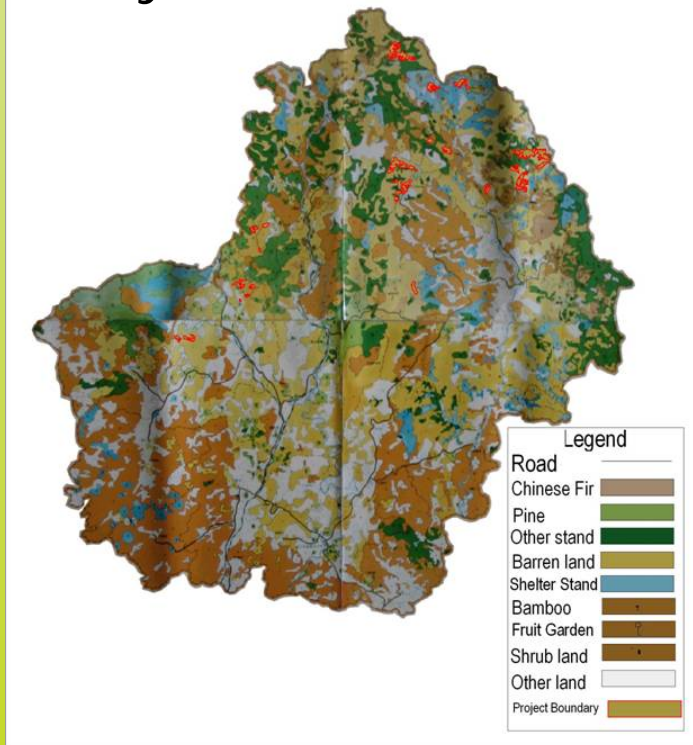
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- GHG emissions (project):
  - Fossil fuel use
  - **Biomass loss** of pre-project non-tree vegetation due to site preparation or competition from planted trees following ARAM0001
  - GHGs from site prep (e.g., burning)
  - **GHGs from fertilizer following ARAM0001**
- Leakage:
  - **Fossil fuels outside project boundary following ARAM0001**
  - No other leakage: degraded lands not used

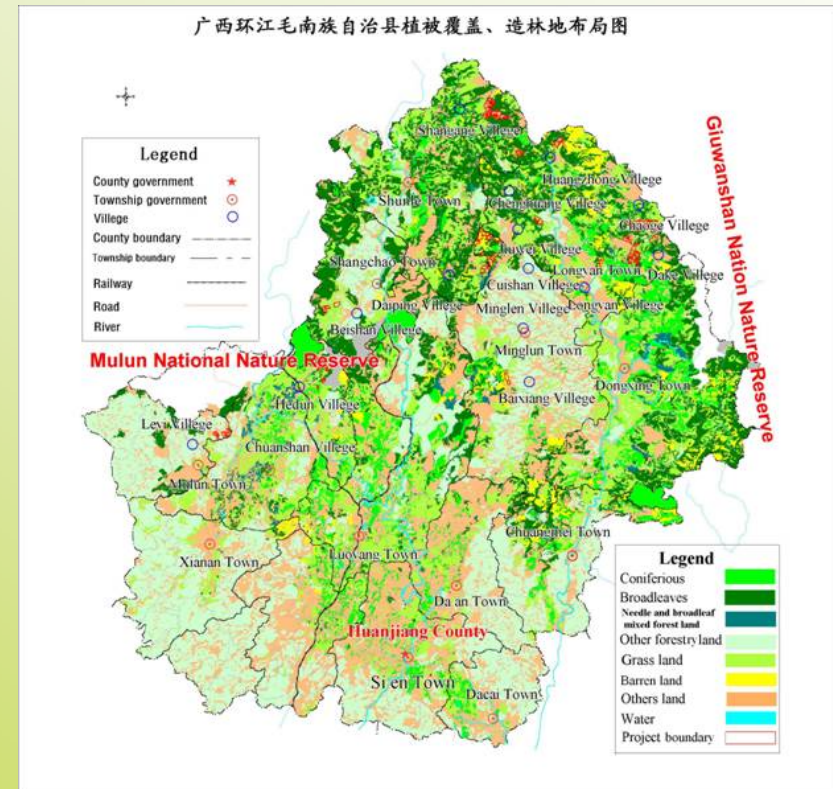
# Land eligibility

- Following published EB land eligibility tool by
  - ✓ Land use/cover maps in 1999 and 1989
  - ✓ Interviewing with local communities on land use/cover history

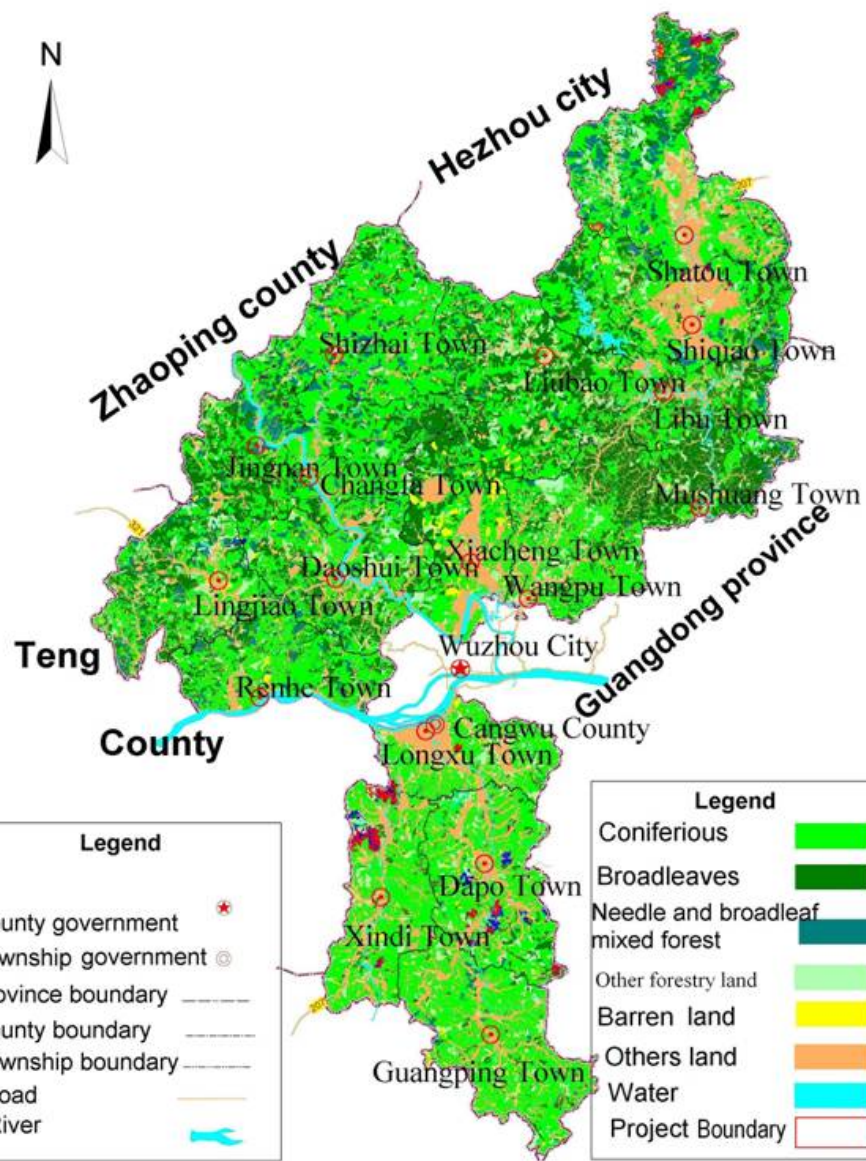
环江毛南族自治县森林分布示意图（1990年）



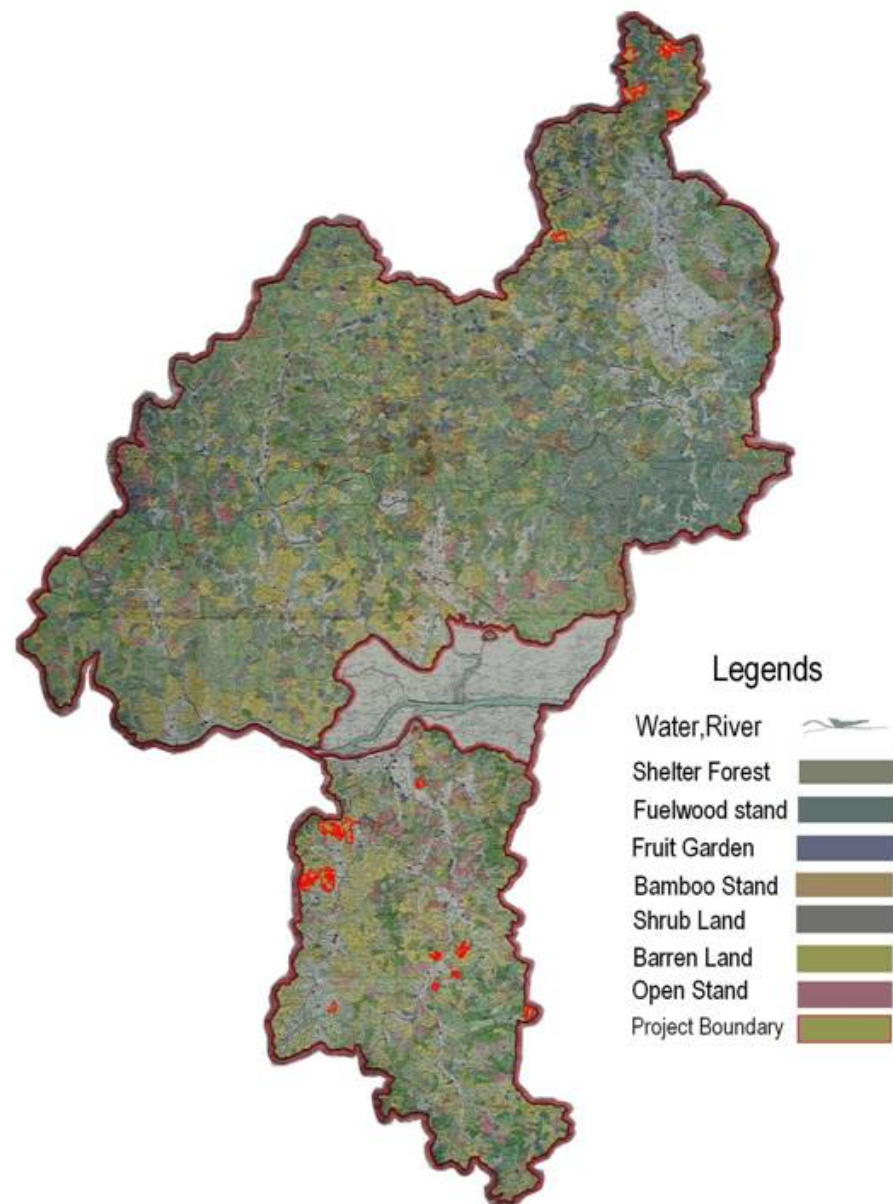
广西环江毛南族自治县植被覆盖、造林地布局图



广西苍梧县植被覆盖、造林地布局图



苍梧县森林分布示意图（1990年）





# Additionality test

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- Step 1: Alternatives to the project scenario
- Step 2: Investment analysis
  - Modification: Investment comparison analysis (option II) not applicable, as baseline has no economic use.
  - China project uses benchmark (III), but simple cost (I) also possible. Guangxi: benchmark 12%
  - WB financial analysis tool is recommended
    - ✓ With CER benefits: 15% (4 US\$ per tCO<sub>2</sub>-e)
    - ✓ Without CER benefits: 8.5%

Parameters	Variation	FIRR (%)	Sensitivity coefficient	Critical points (%)
Without carbon benefit				
Product price	+10%	10.70	2.54	
	-10%	5.98	2.99	
Product Output	+10%	9.83	1.52	
	-10%	7.08	1.70	
Operating cost	+10%	6.15	2.79	
	-10%	10.13	1.88	
With carbon benefit				
Product price	+10%	16.91	1.26	
	-10%	12.81	1.47	46.86
Product Output	+10%	16.13	0.74	
	-10%	13.81	0.81	72.15
Operating cost	+10%	13.34	1.12	60.4
	-10%	16.57	1.03	



# Additionality test

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- Step 3: Barrier analysis
  - China specific: Remote area, timber markets uncertain, ERs create certainty of income
- Step 4: Impact of CDM registration

# Uncertainties

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- Reduce uncertainties through:
  - Stratification
  - Appropriate sampling framework
  - Omitting pools with high spatial variability (e.g., soil carbon)
  - Conservative assumptions

# Social Economic Benefits

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## ■ **Income generation**

- ✓ About 20,000 local farmers of 5,000 households
- ✓ The total income : US\$ 21.1 million within the CP
- ✓ The mean net annual income per capita will be increased by US\$ 34 or by 23.8% compared to the year 2004
- ✓ Especially important for ethnic minorities in Huangjiang County : mean net annual income per capita increased by about 200%

## ■ **Creating employment:**

- ✓ about 5 million person-days of temporary employment
- ✓ 40 long-term job positions during the crediting period.  
ethnic minority groups in Huangjiang County

# Environmental Benefits

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## ■ **Biodiversity conservation**

- ✓ Expand buffer zone of nature reserves
- ✓ Enhance connectivity of nature reserve

## ■ **Soil Erosion Control**

## ■ **Improving watershed management and contributing to the outside of the project boundary and the ecosystem improvement along the Pearl River, through demonstration and extension of the project experience to other areas.**

# Collecting stakeholder comments

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- **Distribution of leaflet:** describing CDM conception and benefits
- **Seminar of farmers' representatives** in each of 27 villages
- **Questionnaire:** 10-15 households randomly selected from each villages.

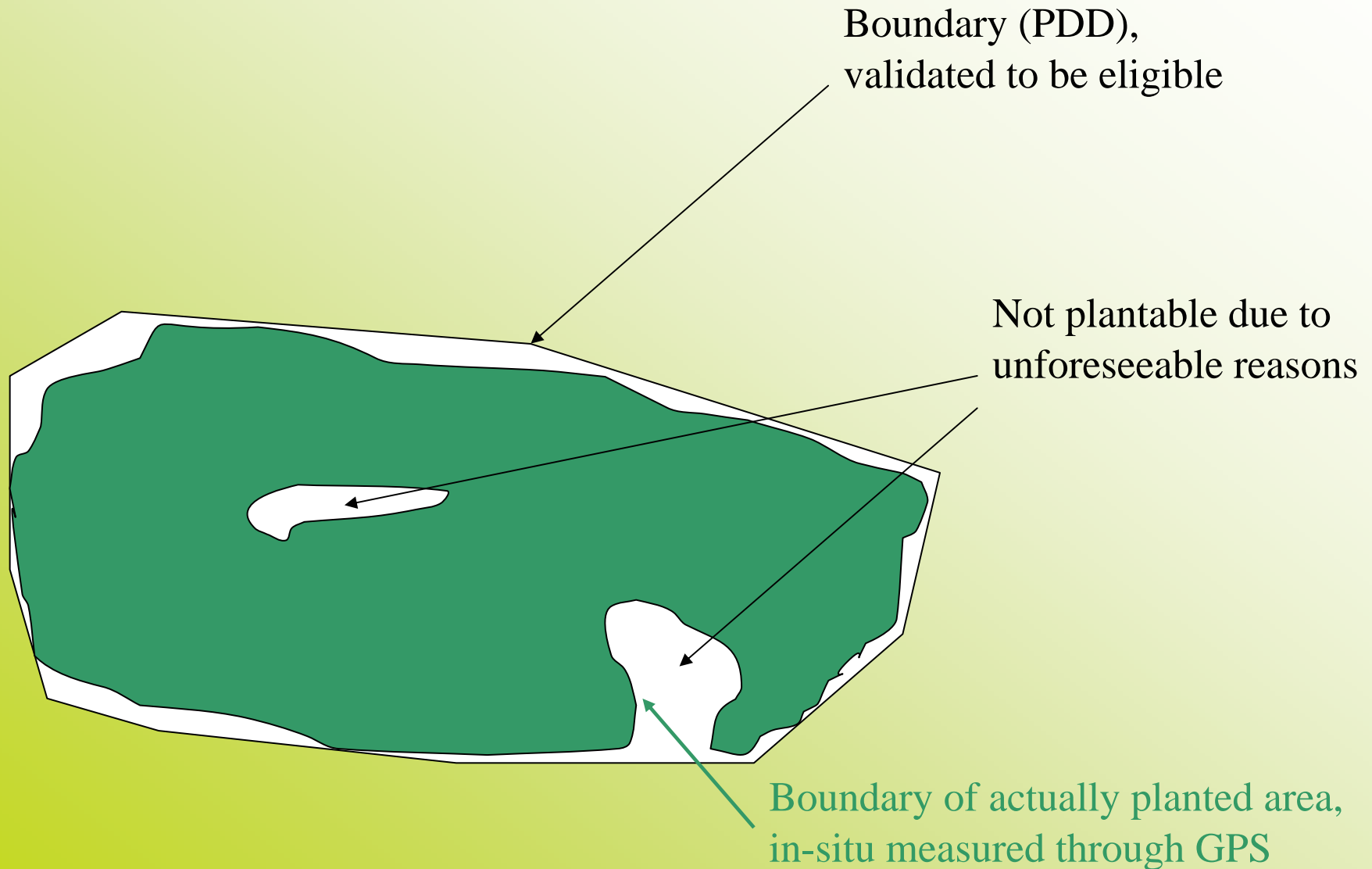
# Feedback from validation visit

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- 4 Corrective action requests, 37 clarification requests
- GPS work in advance of planting?
- BEFs for pre-existing single trees
- Proof that no commercial loans available in baseline
- DNA approval
- Send background info on several items to validation team



# When to GPS?



# Experience from validation

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- To ensure that everything you said in PDD is verifiable or has evidences being provided
  - ✓ Any statement/justification/argument
  - ✓ Data/parameters applied
  - ✓ Original interview/survey data/spreadsheet
  - ✓ Equations (e.g. growth curve for ex-ante estimation)
  - ✓ No significant negative social economic impact (either indicated in DNA letter of approval, or official statement from provincial gov)
  - ✓ No significant negative environmental impact (either indicated in DNA letter of approval, or official statement from provincial gov)

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Thanks for your attention