



Biodiversity and Conservation in Yunnan , China

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**6740m above
sea level**



76.4m above sea level





The Biodiversity of Yunnan

Biodiversity of Yunnan

A **biodiversity green land** along the Tropic of Cancer.

One of the world's 25 biodiversity Hotspots



I Landscape Diversity

- Modern Glaciers
- Alpine Complex
- Forest Landscapes
- Great Rivers
- Plateau Wetlands
- Karst Landscapes
- Nepheline landscapes
- Agricultural Landscapes

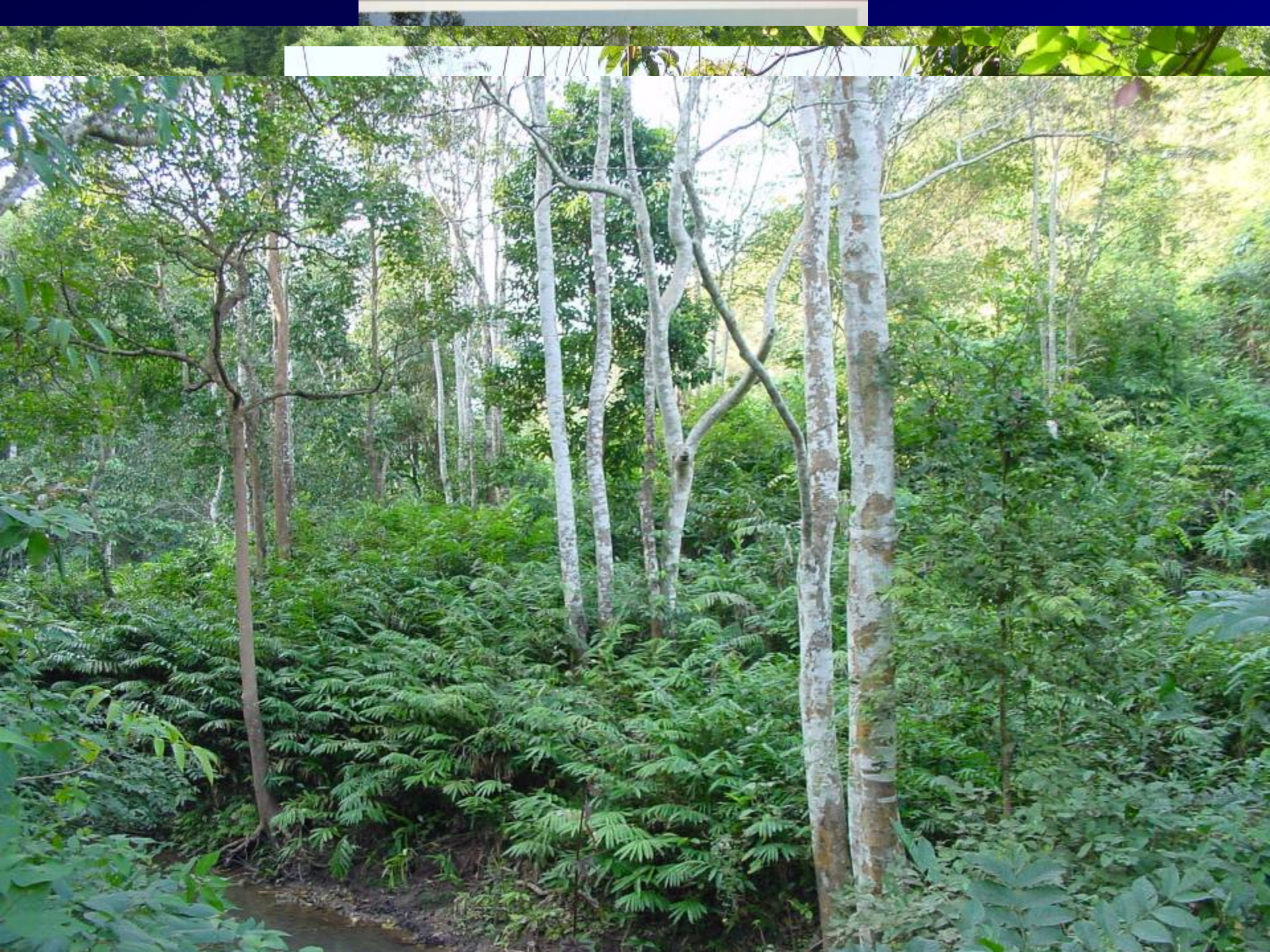


Ⅱ 生态系统多样性 Ecosystem Diversity

- xerothermic valley shrubs
- subtropical evergreen broadleaved forests
- broadleaved deciduous forests
- warm conifer forests
- alpine conifer forests
- sclerophyllous evergreen broadleaved forests
- conifer & broadleaved mixed forests
- alpine shrubs
- alpine meadows
- alpine debris

Over 30 Ecosystem types







monsoon evergreen forest



warm conifer forests

A photograph of an alpine conifer forest. The foreground and midground are filled with tall, dark green coniferous trees, likely spruce or fir, with dense foliage. The trees vary in height and are scattered across the landscape. In the background, a range of mountains is visible under a pale, overcast sky. The mountains have a mix of green vegetation and rocky, snow-dusted peaks. The overall scene is a natural, high-altitude environment.

alpine conifer forests

A photograph of a cold temperate coniferous forest. The scene is dominated by several massive, ancient-looking trees with thick, grey, textured bark. Their branches are heavily laden with vibrant green needles, creating a dense canopy. Sunlight filters through the leaves, casting dappled light on the forest floor. The ground is covered in a lush carpet of green ferns and other low-lying plants. In the lower right foreground, a person with a red backpack is seen from behind, walking away. Further back, near the base of one of the large trees, two other people are visible, one sitting and one standing. The overall atmosphere is serene and majestic. The text "Cold temperate Coniferous Forest" is overlaid in yellow at the bottom center.

Cold temperate Coniferous Forest



Alpine meadow



Alpine talus



Plateau lake



Plateau wetland

独龙江水系
Up Irrawaddy River





Nu river (up Salween river)

怒江\萨尔温江上游)



Up Mekong river



Up Yangtze river



Up Yangtze river

III Species diversity-Plants

类 群 Taxa	No. in Yunnan	No. in China	No. in world	Yunnan/China	Yunnan/world
Angiospermae	15,000	30,000	260,000	50.0	5.8
Gymnospermae	100	270	900	37.0	11.1
Pteridophytes	1,500	2,600	12,000	57.7	12.5
Bryophytes	1,500	2,200	23,000	68.2	6.5
Fresh Algae	800	9,000	25,000	8.9	3.2
Bamboo	250	500	1,000	50.0	25.0





Species Diversity - Animals



- Yunnan = most important habitat for fauna of China
- Many important species first found in the area
- ~50% of China's animal species

<i>Species</i>	<i>China(a)</i>	<i>Yunnan(b)</i>	<i>b/a(%)</i>
Fresh water fish	800	400	50.0
Amphibians	231	102	44.6 (6 in world & 2 Asia-Pacific)
Reptiles	385	143	37.6
Birds	1257	806	64.1
Mammals	600	304	51.1 (5 in world & 2 Asia-Pacific)

***IV** Genetic diversity*



Wild Lichi



Wild Kiwi Fruit



Paris polyphylla

Wild rice (*Oryza meyeniana*)

Vulnerability & Threats



Key threats

- Poverty 贫困
- Incompatible economic development 无序的开发
- Pollution 污染
- Soil erosion 水土流失
- Fuel wood collection 薪柴
- Timber for house construction 建材
- Illegal hunting 非法打猎



贫穷
Poverty



薪柴
fuel wood

Fuel wood collection



Six tons of firewood per family per year

建材 Timber for house



房板 Shingle



Unsustainable Tourism



Over
Loaded



Tramped



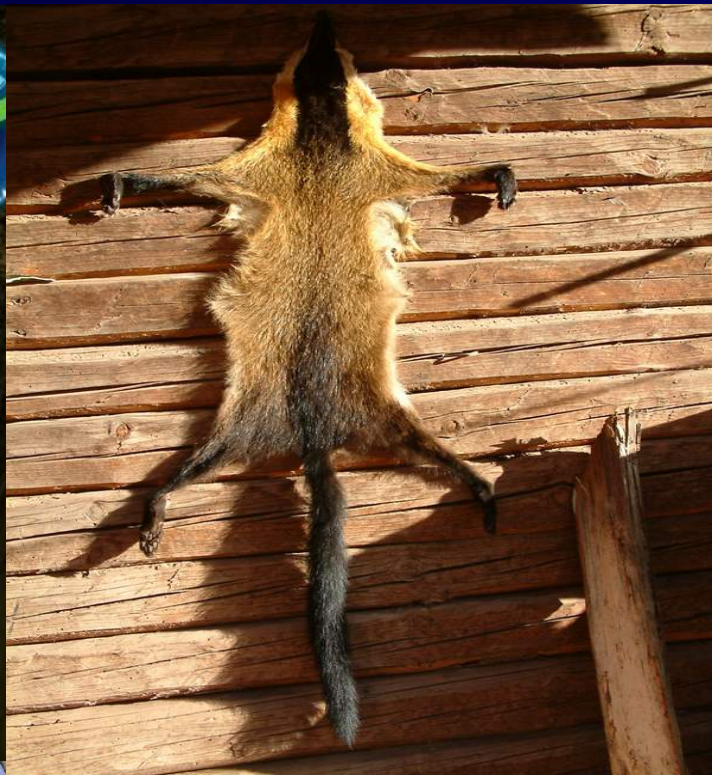
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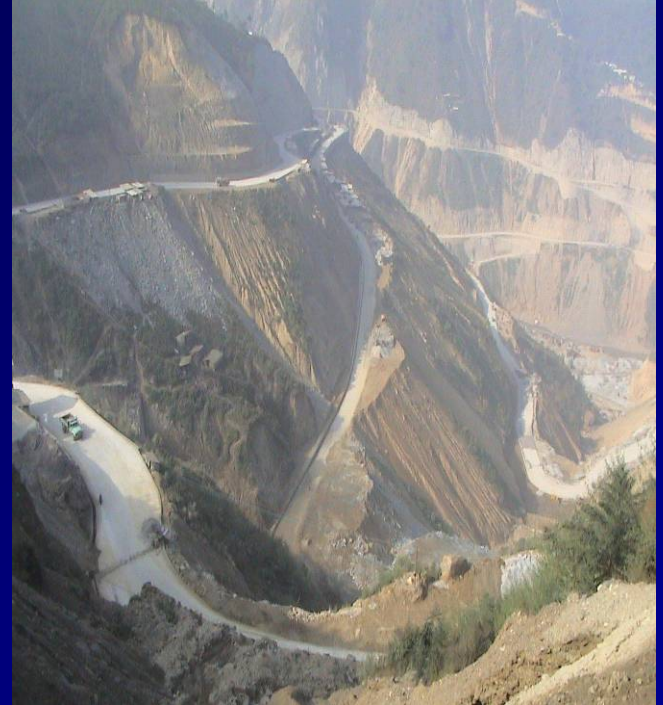
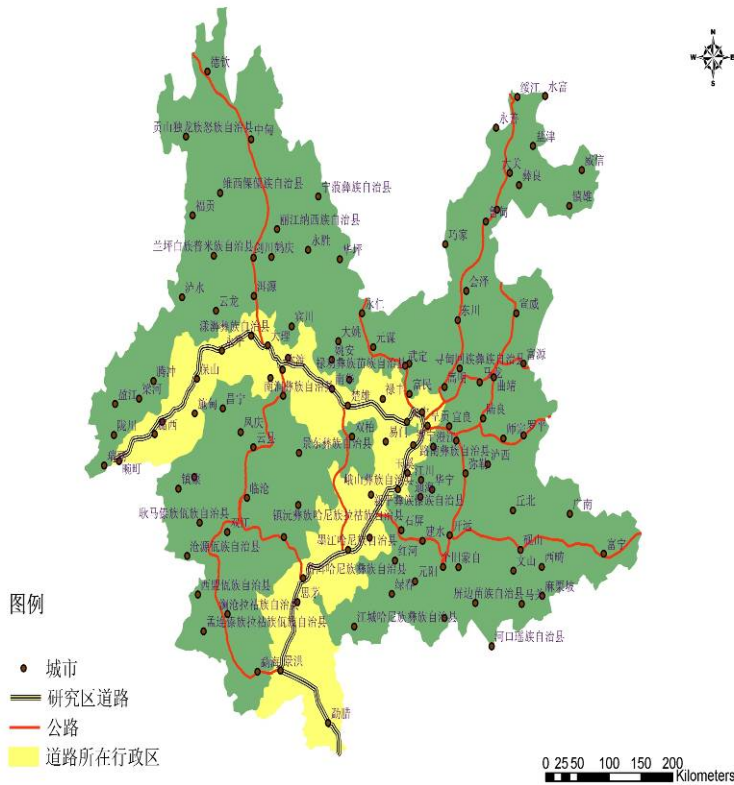
Over Grazing



Illegal hunting



云南研究区公路示意图



**Infrastructure
Highway construction**

Mining



Pollution and shifting cultivation causing Erosion





Water pollution in Dianchi lake

Invasive species



Ageratina adenophorum

To develop rubber plantation by destroying tropical rain forests in South Yunnan



这是西双版纳基牙山麓的山坡，正在开展的橡胶园，留下的一点或残林，可以让人想象森林的模样。森林被砍伐殆尽，是种橡胶的重要工作，土壤要经过重翻，把根得需清理的火地，街道清除。橡胶种上以后，除天两次生长出来的其他植物，只留橡胶树单一物种，它具有耐性，橡胶股份。

橡胶林——绿色沙漠

撰文/李闯 袁方 摄影/肖文 等

冬天的澜沧江依然是弱性的红色。滔滔一条大河带着雨季过后的最后威力，执著地流向东南更炎热的腹地。大江穿过1800公里的高原和峡谷，就到西双版纳的时候已经耗去了它百分之

个植物世界里珍贵的水源。

公路沿着山势沿澜沧江在一片绿色的林中蜿蜒。今天，橡胶林已经成了西双版纳的标志性植物，是通向任何一个方向的公路两旁，从阳



Actions Taken

Conservation & Dev. of Biological Resources

1. Build Institutional capacity

- Biodiversity Institutions established at provincial, prefecture & county levels
- Financial needs addressed

2. Integrated management

- Provincial strategy: build province into economic power based on biological resources
- Community Co-Management of Natural Resources
wareness building & Practical Skills Training
Strengthening conservation studies & exploration of biodiversity resources

Conservation & Dev. of Biological Resources

3. Conservation of Forest & Biodiversity

- **The Six Key Forestry Programs of China**
 - a) **Nature Forests Protection 1999**
 - b) **Key Shelter Forest Construction Program of the Northeast**
 - c) **Reforestation of previous slope agricultural lands**
 - d) **Program of Sand Control Through Forestry around Beijing**
 - e) **Conservation of Wildlife and Construction of Nature Reserves**
 - f) **Construction of the Forestry Industries Based on FGHY Forests**

Conservation & Dev. of Biological Resources

3. Conservation of Forest & Biodiversity

- 125 Nature Reserves (includes 10 national reserves)
- Total Area 26,792 km² = 6.8% of the total provincial area
- 66 counties, 17 forest industry bureaus
- Reduction of timber harvesting: consumption volume from 37.5 mill. m³ to 26.5 mil. m³
- Reduction of commercial timber output from 5.0 mil. m³ to 2.0 mil m³.
- Total Investment 11.83 billion RMB

Set up Nature Reserves

白马雪山国家级自然保护区

高黎贡山国家级自然保护区

苍山洱海国家级自然保护区

南滚河国家级自然保护区

哀牢山国家级自然保护区

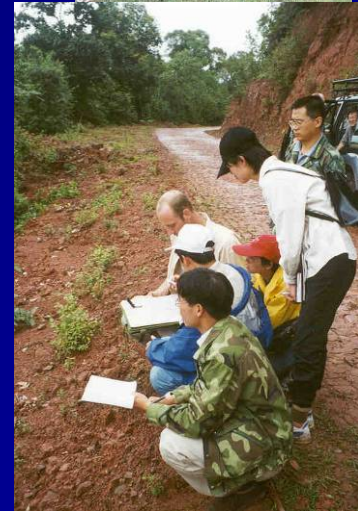
西双版纳国家级自然保护区

- 27 NR were set up in NY Yunnan,
- Accounts for 12.63% of the area
- 2 National level NRs

Conservation & Dev. of Biological Resources

4. Community development

- Developing bio-gas, fuel-efficient stoves & alternative energy sources
- Agro-forestry & reforestation
- Introduction of practical techniques
- Exploration of indigenous knowledge



5. Law Enforcement





Conservation & Dev. of Biological Resources

6. Awareness Building & Public Education

- Demarcation of the NR
- (Re)-Zoning of the NR
- Corridor establishment
- Extension establishment
- Strong integration of Local Government in Land use Planning in and around NR
- Co-management agreements between villagers, NR staff & local government on NR & adjacent area management
- CEAP is formulated with all stakeholders (including FS, MO & MS staff, other bureaus and local authorities)



Conservation and Exploitation of Forest Resources

-- what we have done

- Yunnan Academy of Forestry (YAF)
- Conservation
- Exploitation

Institution Structure of YAF

Eight research institutes

1. **Forestry research institute**
2. **Economic forest research institute**
3. **Forest protection research institute**
4. **Tropic forestry research institute**
5. **Forest products and industry research institute**
6. **Forestry science information institute**
7. **Walnut research institute**
8. **Oil Camellia research institute**

two key laboratories

1. **Yunnan rare and endangered forest plants protection and breeding lab.**
2. **Yunnan forest plants cultivation and exploitation lab.**

Institution Structure of YAF

Two arboretum

1. Kunming sub-tropical Forest Arboretum
2. Xishuangbanna Tropical Forest Arboretum

Two stations

1. Post-doctoral working station
2. Dayao walnut research station

Four branches

1. Pu-er Branch
2. Dehong Branch
3. Honghe Branch
4. Chuxiong Branch

Major Research Areas --YAF

1. **Restoration and rehabilitation of ecosystem:**
tree species selection and structure adjustment
2. **Tree cultivation for industry purpose**
timber, paper, pulp, boards
3. **Conservation of rare and endangered species**
In-situ and ex-situ protection
4. **Economic forest**
genetic improvement, variety/individual selection, propagation, and high-yielding cultivation techniques
5. **Forest protection**
Integrated Pests Management combination of silvicultural practice, bio-control, physical and chemical control measures
6. **processing of forest products**
NTPFs, rosin, turpentine and shellac

Major Research Areas--YAF

7. Extension of forestry technologies

- genetic improvement
- high-yielding cultivation patterns
- restoration and rehabilitation of ecosystem
- variety selection
- forest protection
- forest product processing

Conservation of Forest Resources and Bio-diversity -- YAF

- 1. Threatened tree species collection**
- 2. Researches**
- 3. Domestication and Plantation
establishment**

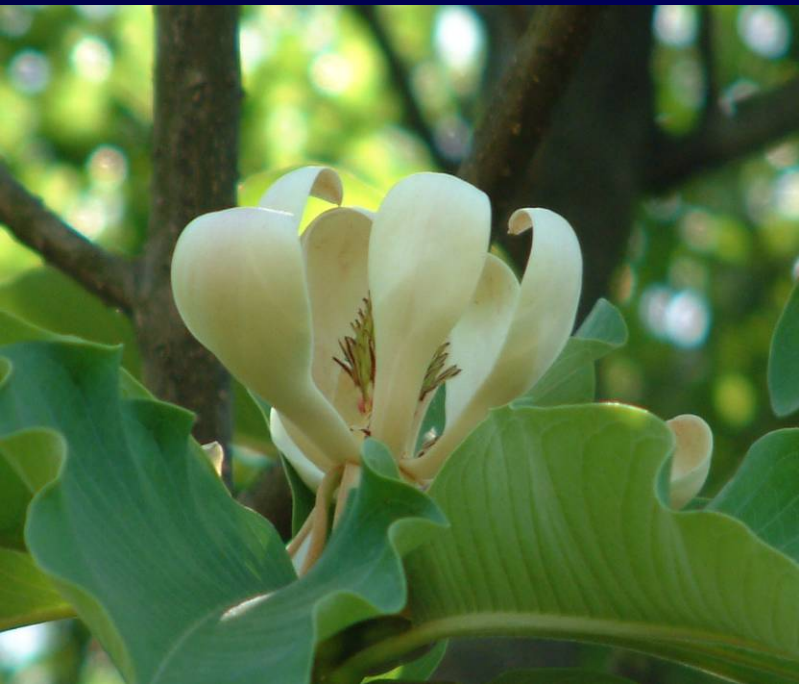
1. Species collection



红花木莲
Manglietia insignis



鹅掌楸
Liriodendron chinense



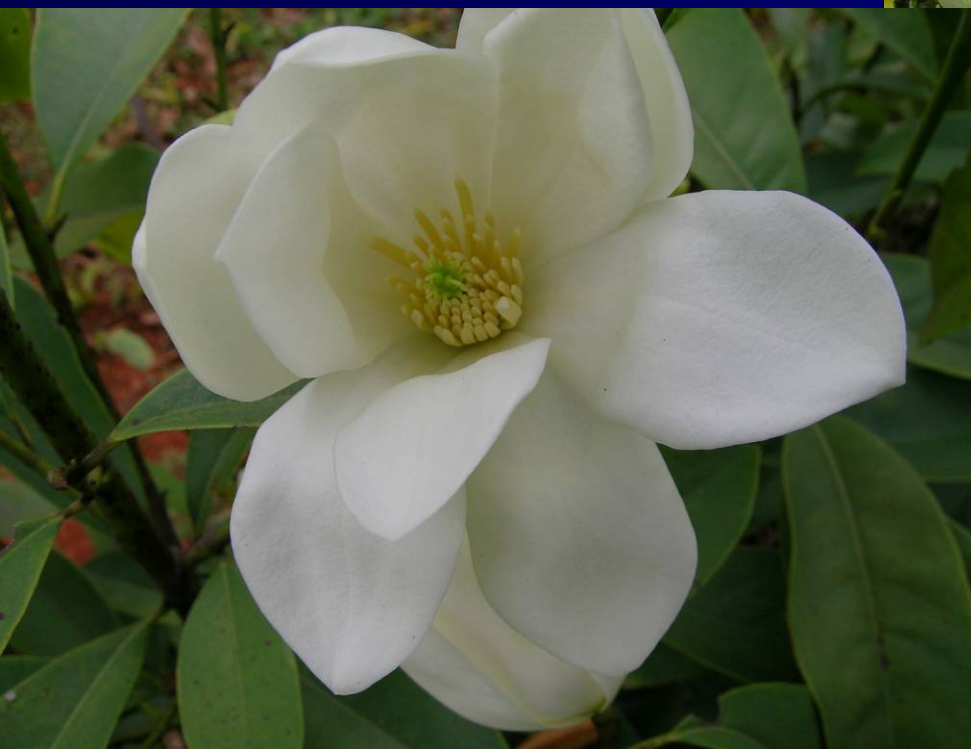
厚朴
Magnolia officinalis



玉兰 *Magnolia denudata*



大叶木莲 *Manglietia megaphylla*



云南含笑 *Michelia yunnanensis*

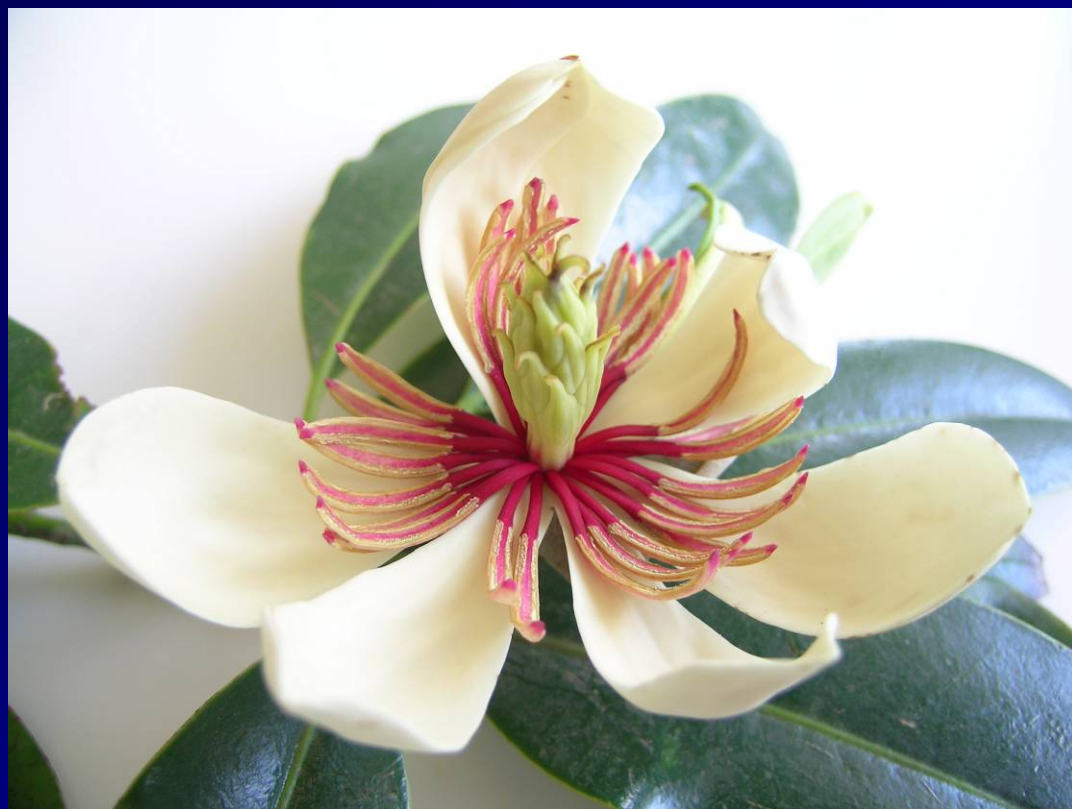


山玉兰 *Magnolia delavayi*



白花杜鹃

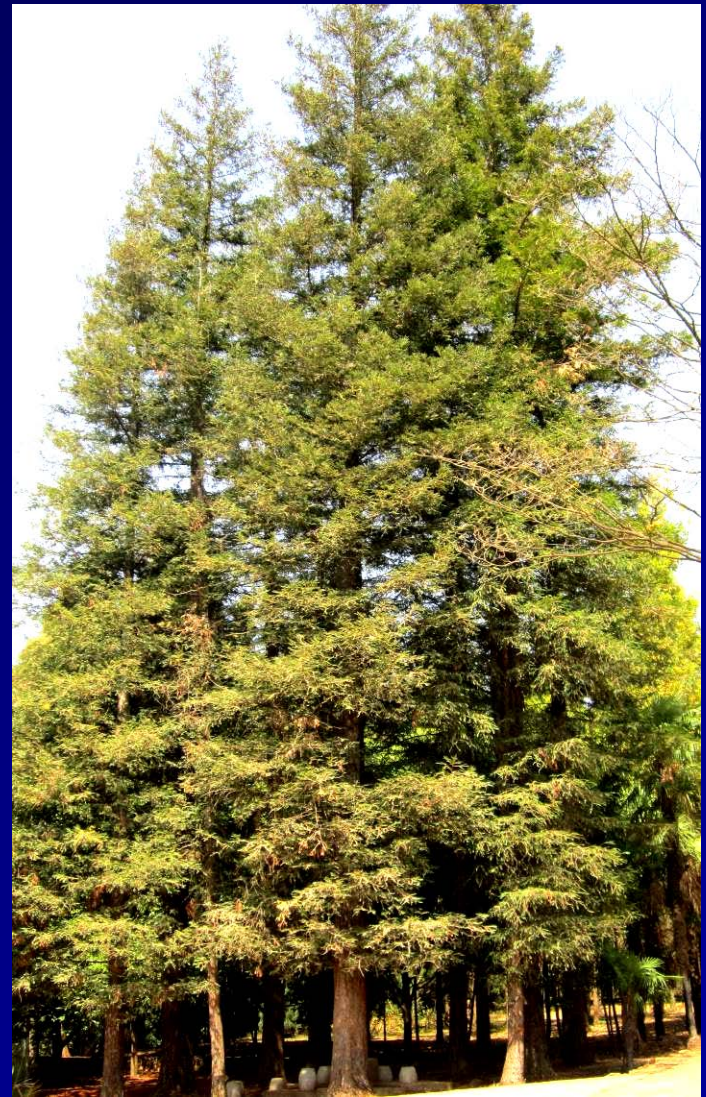
Rhododendron decorum



云南拟单性木兰 *Parakmeria yunnanensis*



秃杉 *Taiwania flousiana*



北美红杉 *Sequoia sempervirens*



云南红豆杉 *Taxus yunnanensis*

云南红豆杉
Taxus yunnanensis



云南山茶 *Camellia reticulata*



银杏 *Ginkgo biloba*



珙桐 *Davidia involucrata*



马缨花杜鹃 *Rhododendron delavayi*



映山红杜鹃 *Rhododendron simsii*



琴丝竹

Bambusa multiplex var.
Alphonse karr

凤尾竹 *Bambusa multiplex*





慈竹
Neosinocalamus affinis

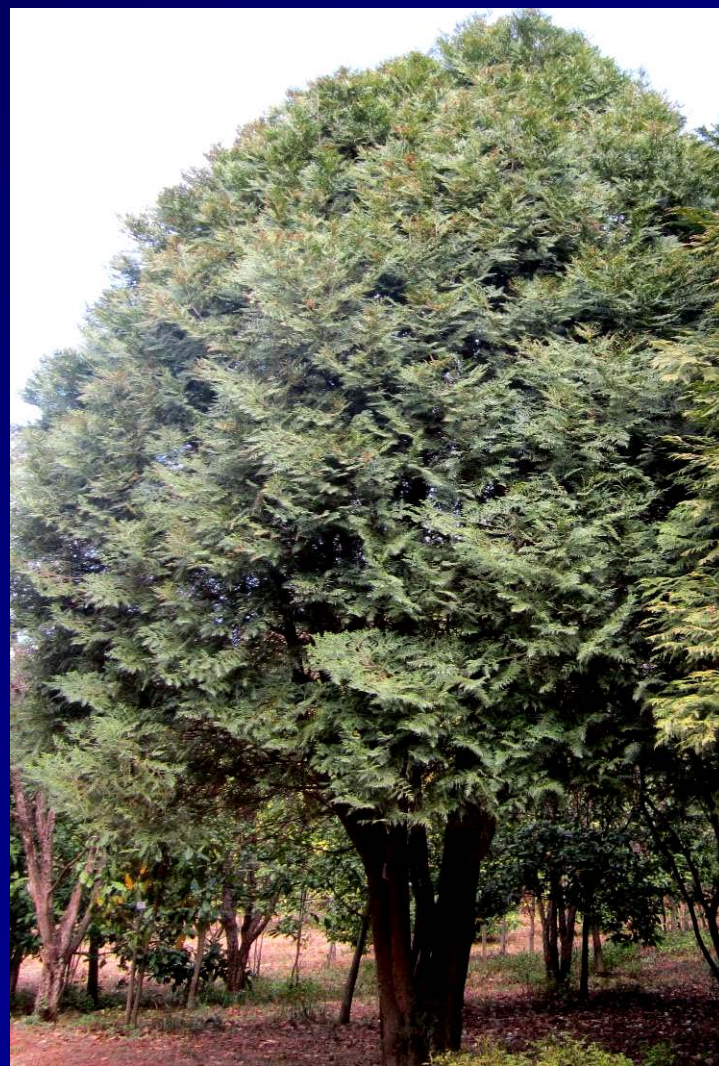


云南松 *Pinus yunnanensis*



山杜英

Elaeocarpus sylvestris



翠柏

Calocedrus macrolepis

2. Researches

1) Investigation of National Protected Wild Plants (1st Batch, 1999) in Yunnan

- 114 species**
- Morphology, Geographic distribution, biological characteristics**
- Current resource condition, threaten factors**
- Protection and utilization value**

2. Researches

2) Wild extreme small population plants

- *Pterospermum kingtungense*
- *Torreya yunnanensis*
- *Aquilaria sinensis*
- *Nyssa yunnanensis*
- *Malania oleifera*

3. Domestication and plantation establishment

Medicinal/ Perfume plant

- *Taxus yunnanensis*
- *Aquilaria sinensis*

Timber use trees

Pterocarpus indicus, *Dalbergia fusca*, *Dalbergia odorifera*,
Malania oleifera, *Parakmeria yunnanensis*, *Paramichelia*
baillonii, *Altingia excelsa*, *Pometia tomentosa*,
Swietenia macrophylla, *Taiwania flousiana*, *Mesua ferrea*,
Terminalia myriocarpa, *Castanopsis echidnocarpa*,

3. Domestication and plantation establishment

Greening and ornamental use

- *Pterocarpus indicus*
- *Parakmeria yunnanensis*
- *Altingia excelsa*
- *Pometia tomentosa*
- *Taiwania flousiana*
- *Mesua ferrea*
- *Terminalia myriocarpa*
- *Parashorea chinensis*
- *Dipterocarpus turbinatus*
- *Podocarpus macrophyllus*
- *Ficus benjamina*
- *Erythrophleum fordii* Oliv
- *Manglietia forrestii*

3. Domestication and plantation establishment

Integrate Seedling raising technology

- Seed collection and treatment
- Propagation technique (seed, cutting, tissue culture)
- Fertilizing, growing medium, container
- grading

Plantation and maintenance

- Land preparation, transplanting
- Weeding, fertilizing
- Pruning, thinning
- Mixed planting, Agroforestry

Genetic improvement

- *Betula anoides* - *Paramichelia baillonii*



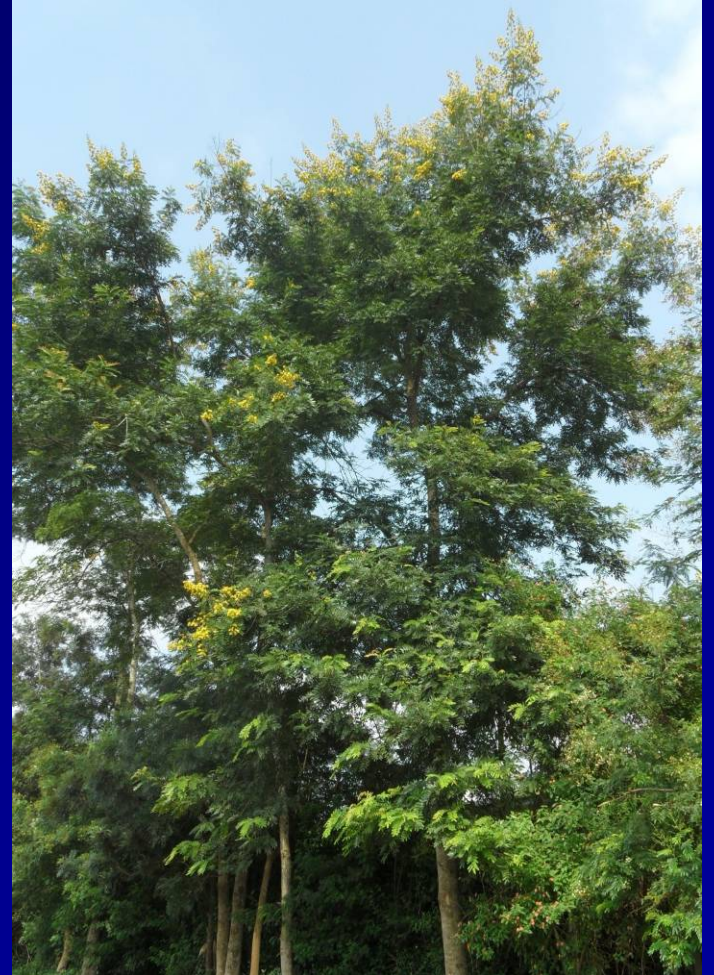
Dalbergia odorifera



Pterocarpus indicus



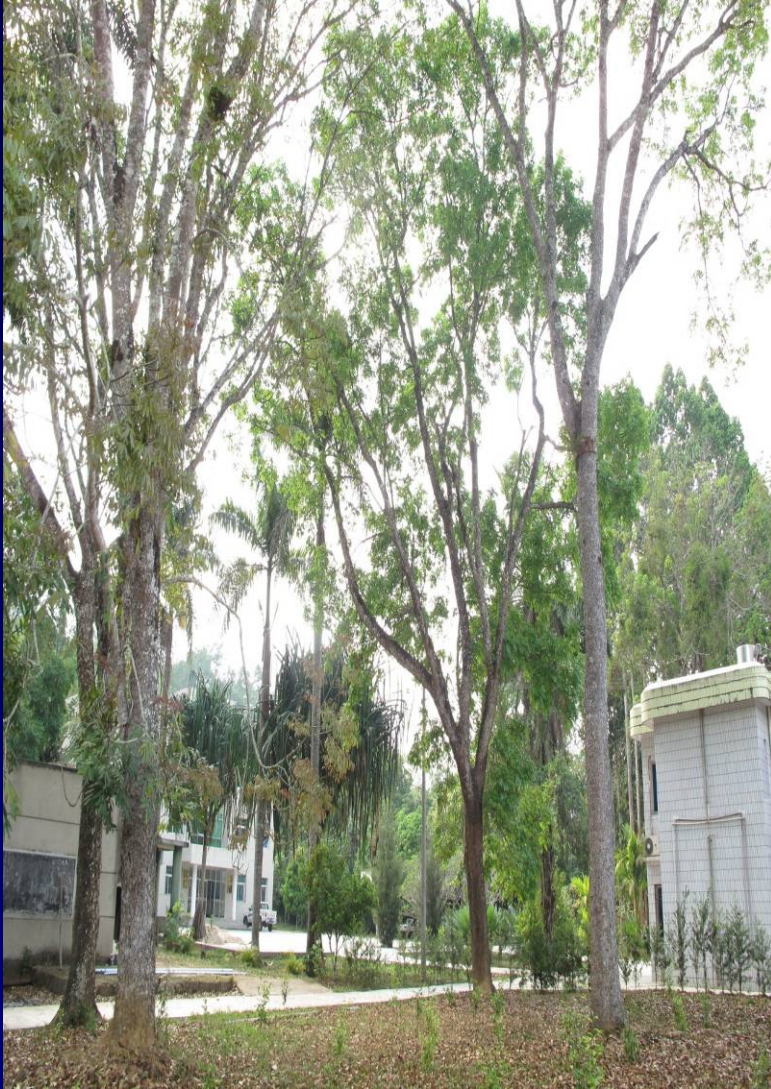
Cassia siamea



Dalbergia fusca Pierre



Swietenia mahagonia



Mesua ferrea Linn



Erythrophleum fordii Oliv



Betula alnoides Buch Ham



Aquilaria sinensis





PD 501/08 Rev.1 (F)

**3 years
implementation**



Future Expectation

- **Regeneration of degraded tropical forest ecosystem**
- **Development of valuable tree species**
- **Development of NTFPs under forest**
- **Rural poverty alleviation**
- **Biodiversity monitoring**
- **Information sharing between countries**



Thank You !