

Customary Management of Natural Resources by Hani People

XUE Dayuan

Apr. 18-20, 2017
Kota kinabalu, Malaysia

Barriers / challenges that you are having or expected to have in order to mainstream your activity

- How to optimally manage water resources of Hani Terraces ecosystems in a culturally respectful manner, so as to optimize food provisioning of the ecosystems, sustained multiple ESs, and also contributes to better-off of social well-being and stability?

Rationale of the research

- the matter of water resource management in Hani Terraces ecosystems, which is the core issue in the area where Hani people inhabit, is not a main research topic of natural science, but more importantly a social concern, with cultural sphere as well.
- A package of interrelated and mutual facilitated threatening factors faced by self-sufficient and sustainable Hani terraces agro-ecosystem: accelerating tourism, massive construction development of infrastructure for tourism, fast shifting of livelihood, intrusion and impact of alien culture, increasing pressure from climate change, etc.

How did you solve or what do you need to encounter the barrier ?

- For this issue to be best addressed in a multi-ethnic cultural society, a *integrated science-social-cultural approach* was identified and applied in the research.

Research carried out and results yielded

- Research Site:
- 1. Xinjie Township
 - location: $102^{\circ} 40'-102^{\circ} 53'E$, $23^{\circ} 03'-23^{\circ} 14' N$
 - Altitude: 480-2878.3 m Total area: 4089.53 hm^2
- 2. Panzhihua Village
 - location: $102^{\circ} 38'-102^{\circ} 49' E$, $23^{\circ} 01'-23^{\circ} 06' N$
 - Altitude: 650-2149.8 m, Total area: 1150. hm^2
- 3. Niujiao Village
 - location: $102^{\circ} 38'-102^{\circ} 42 E$, $23^{\circ} 03'-23^{\circ} 11' N$
 - Altitude: 680-2662 m; Total area: 4089.53 hm^2
- all of the three are located in core area of Yuanyang County, which is listed as one of the World Heritage Sites.









Outline

- 1. Overview of Agro-ecosystem of Hani terraces;
- 2. Customary management of land resources by Hani People;
- 3. Customary management of water resources by Hani People;
- 4. Customary management of forest resources by Hani People;
- 5. Customary management of biological resources by Hani People;

1. Overview of Agro-ecosystem of Hani terraces;

- Hani terraces are mainly located along Mount Ailao and Honghe basin, southern Yunnan, China. and mainly concentrated in Honghe prefecture, counties of Yuanyang, Lvchun, Jinping, with a total coverage of 55,000 hm².
- The terraces' history spans around 1,300 years according to research, it has been the most known cultural landscape of Hani culture due to its picturesque landscape and magnificent view
- Approved as national wetland park in 2007;
- Listed in Globally Important Agricultural Heritage Systems, in 2010;
-
- Listed as a World Heritage Site in 2013;

1. Overview of Agro-ecosystem of Hani terraces;

- One of typical mountain agro-models, with the four-pillar structure of “Forest-Village-Terraces-River valley” agro-ecosystem;
- Forest eco-subsystem: located at the highest altitude of the system, **serving as the core pillar**, with the ecological functions including: interception of precipitation, water retaining, prevention of soil loss and landslide, providing forest related products, serving also as a water supplying source;
- Village prefecture eco-subsystem: located halfway up the hill, **serving as the control knot** of the whole system, with functions including maintenance of the input/output balance of material and energy among terraces and forest subsystems, as well as to remain system stability and development;
- Terraces eco-subsystem: located halfway down the hill, with the function of **supplying agro-products**;
- River valley eco-subsystem: located along hot-dry valley, with the function of **enabling vapors formation in alpine/mountain forest and precipitation** through high capacity in evaporation and transpiration;

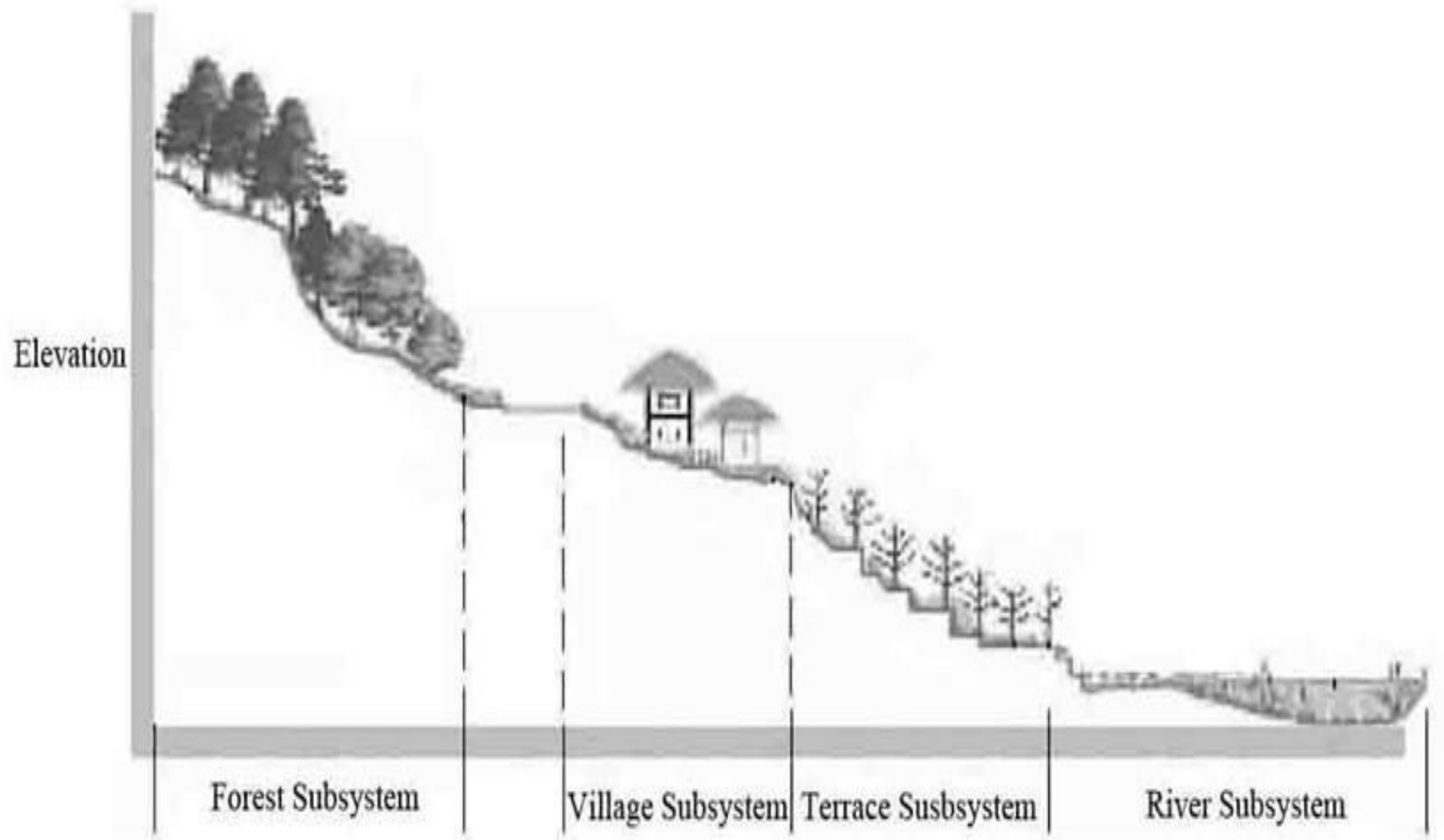
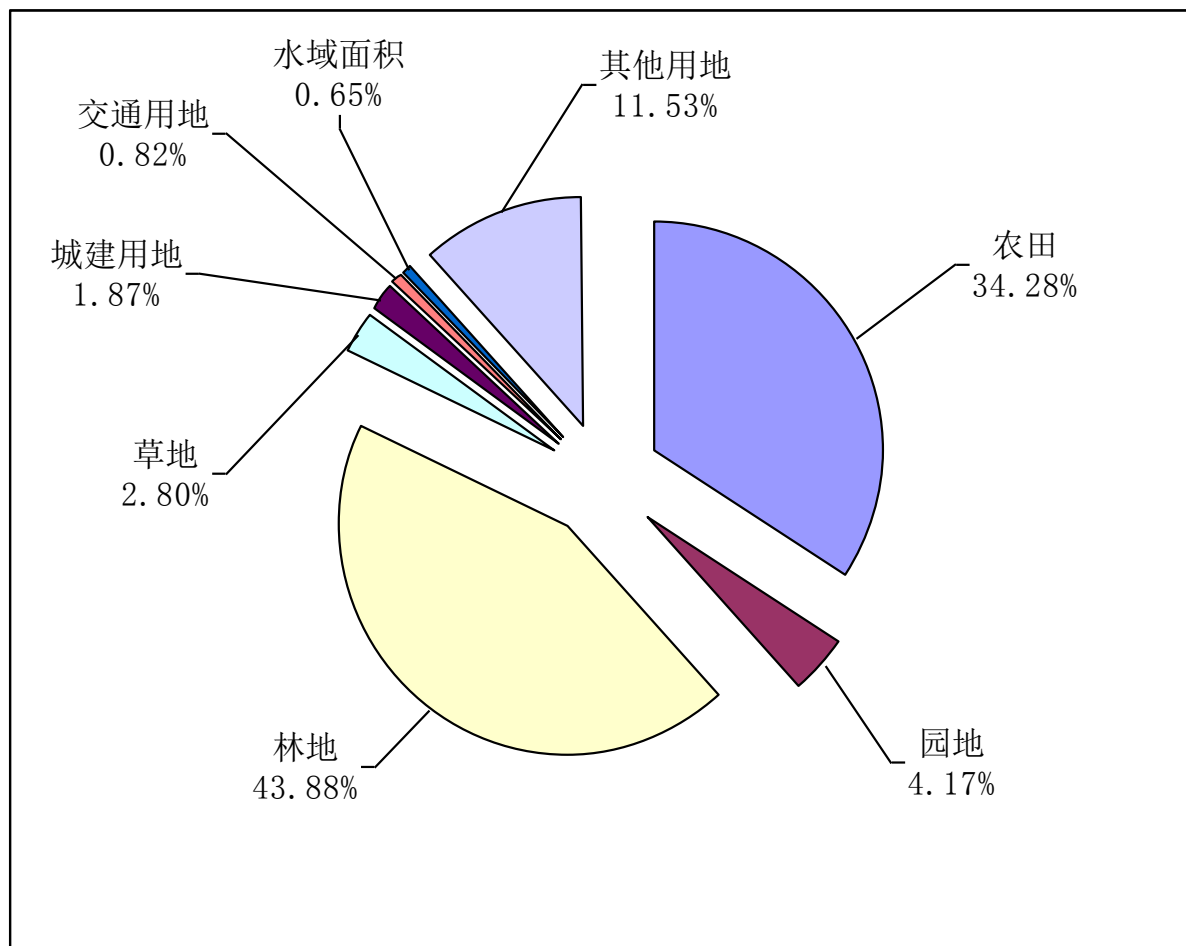


Fig.1. Structure of Hani Terraced Fields Complex Ecosystem

2. Customary management of land resources by Hani People

- **(1) Land use management**

- The percentage of total cultivated area (incl. other land uses) is as high as 45.81%, slightly higher than forested areas;
- Paddy field vs. dry land: 2:1
- Forested area vs. terraces (paddy field):2:1
- Balanced distribution of forested area and cultivated area;

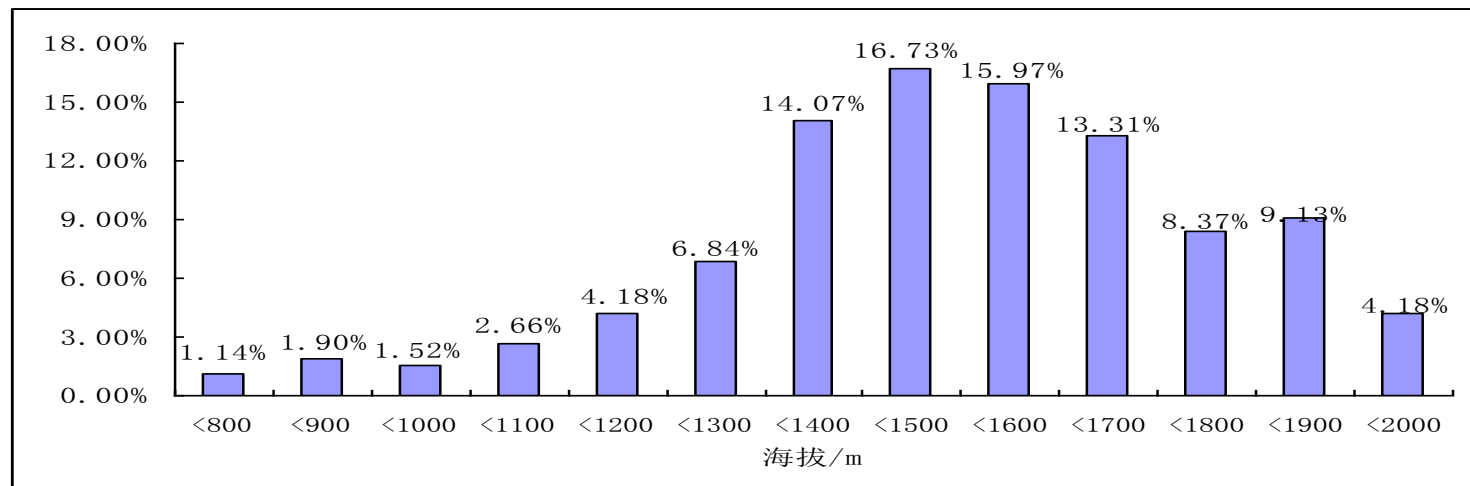




2. Customary management of land resources by Hani People

(2) Management of villages and stockades

- **Village site identification and design**
- --altitude: 1400-1800 m, sunward hillside or halfway up the hill, closer to top of the hill;
- --there has to be a tensely forested area located at higher place of village – to secure sufficient amount of water supply
- --there has to be a stretch of flat, fertile slope – for the purpose of digging up terraces





3. Customary management of water resources by Hani People

- **(1) water retention**

- --water storage capacity of forest: yearly total is 16,058,500 m³ , the water storage capacity can be as high as 56,259,000m³
- --water storage capacity of reservoir: 9 reservoirs in total, with total capacity of 7,044,000 m³
- --water storage capacity of terraces: yearly average is 16,033,500 m³, the maximum capacity is 32,067,000 m³.
- The water storage capacity of forest and terraces is approximately equal;
- Hani terraces in and itself a “invisible water reservoir ”







4. Customary management of forest resources by Hani People

- **Water resources allocation**
- **--Building up channels and ditches**
- The the instance of Yuanyang county, there were totally 2600 channels and ditches back in 1949; the number increased to 6246 in 1985, and was up to 4653 in 2005;
- There are more than 10 principle channels and ditches within the core area of terraces for protection that are longer than 7 km, with an accumulated length of 123.98 km, and practical irrigation area of 3188.26 hm², accounting for 39.77% of the total area of terraces;
- **--Allocation system**
- Use engraved wood (stone) to allocate water resource;
- Generally following the principle of “allocation according to needs”
- Abide by the principle of builders reap the benefits



4. Customary management of forest resources by Hani People

- (1) Strict protection
- Abiding by their **religious culture** and **customary laws**, Hani People have been strictly protecting forest resources. Out of respect and admiration for the forest, each Hani village has at least one stretch of sacred forest, and many stretches of holy mountain forests, graveyard forest, water source forest, and carry out strict protection by following customary laws;
- Take Yuanyuang County for instance, the forest coverage rate was 24% before 1949, and it was decreased to 11.6% due to the influence imposed by events like “great leap forward movement” and policies like “Following the example of Dazhai”, the rate was decreased to 11.6% in 70s. Nonetheless, benefiting from the national grand guideline on polices regarding ethnic minorities and religious beliefs, Hani People’s admiration and respect for forest has been maintained to certain extent, which in turn has contributed a lot to protection of various sacred forests, and thus ecosystem balance has been maintained.





4. Customary management of forest resources by Hani People

- (2) classified utilization
- According to different ownership and obligation, forests are classified into two types: village collective forest and household contract forests. The former is further divided into sacred forest and water source forest; the latter is normally classified into normal forest and “grain for green” forest. Sacred forest demonstrates important cultural functions, while water source forest has major ecological functions, thus these two types of forests are under strict protection; normal forest and “grain for green” forest deliver economic functions as well, i.e. supplying construction materials, firewood, timber related products, and various kinds of non-timber products.
- Forestry management
 - -- Tree layer management: artificial introduction, rational logging;
 - -- Understory management: multi-dimensional model of forestry, planting grasses and fruits, Dendrobe and other shade-requiring plants;





5. Customary management of biological resources by Hani People

• **(1) conservation of agro-biodiversity**

• **--diversified crops**

- There are totally 92 crops being planted in Yuanyuang county, among which, 6 are grain crops, 29 are economic crops, 24 are vegetables, 13 are fruits, 10 are husbandary varieties, 21 are from fisheries.

• **--diversified traditional rice varieties**

- There were totally 193 of traditional crop varieties back in 1990;
- Rice varieties currently being planted are 135, among which, 100 are traditional rice varieties, 12 are hybrid ones, 23 are modernly cultivated ones;
- Diversified rice germplasm resources could adapt to various altitudes, temperatures, soil conditions, nutrition conditions, and other site conditions, such as alpine, drought stricken and barren areas, especially adapt to areas with altitude higher than 2000m.





5. Customary management of biological resources by Hani People

(2) use of wild biological resources

- **--Edible wild biological resources**
- Hani People have collected more than 110 species of wild plants and fungi, captured 4 species of insects, and more than 10 species of fish.
- **--Medicinal wild biological resources**
- Medicinal wild biological resources that made use by Hani People are more than 300 items;
- **--Used as timber and firewood**
- More than 10 tree species made use by Hani People;



文明示范村

生男自然 生女其顺

心苗圃 行业有限

买车卖车 电话: 1390881

买车卖车 电话: 1390881

电话: 0875-8991666 3118466





5. Customary management of biological resources by Hani People

(1) Developing traditional knowledge system

- Applying adaptive management, fully understanding the natural and social spheres of various natural resources;

(2) Principles of wholeness and balance

- Mainly demonstrated in land use management, such as “forest-village-terraces-valleys” four-pillar structure, village layout and size control, ratio between cultivated land and forest, etc.

(3) Principle of sustainable development

- Mainly demonstrated in management of biological resources, such as conservation of agro-biodiversity;

(4) clear ownership and obligation

- Defining ownership and obligation of various sorts of natural resources, water allocation system in particular;

(5) punishment system

- Applying customary laws to guarantee the operation of management system of natural resources

Recommendation

1. As to crop varieties planted in Hani Terraces, locally adapted traditional crop varieties shall be prioritized as for farming, while introduced varieties shall be localized before considering planting;

2. As to Hani Terraces' water resource management, view it as an integral whole, where people's customary farming ,management practices and underlying traditional beliefs and knowledge systems are of core elements contributing to sustainable and resilient ecosystems;

3. As to scientific research on issues concerning Hani Terraces' water resource management, multi-worldview,disciplinary ethno-ecological approaches and methodologies are recommended to apply;

4. As to policy design concerning water resource management, it could be more inclusive, integrating as many impacting factors as possible, especially, scientific, social, cultural, religious beliefs spheres;

-

Thanks for your attention!

xuedayuan@hotmail.com