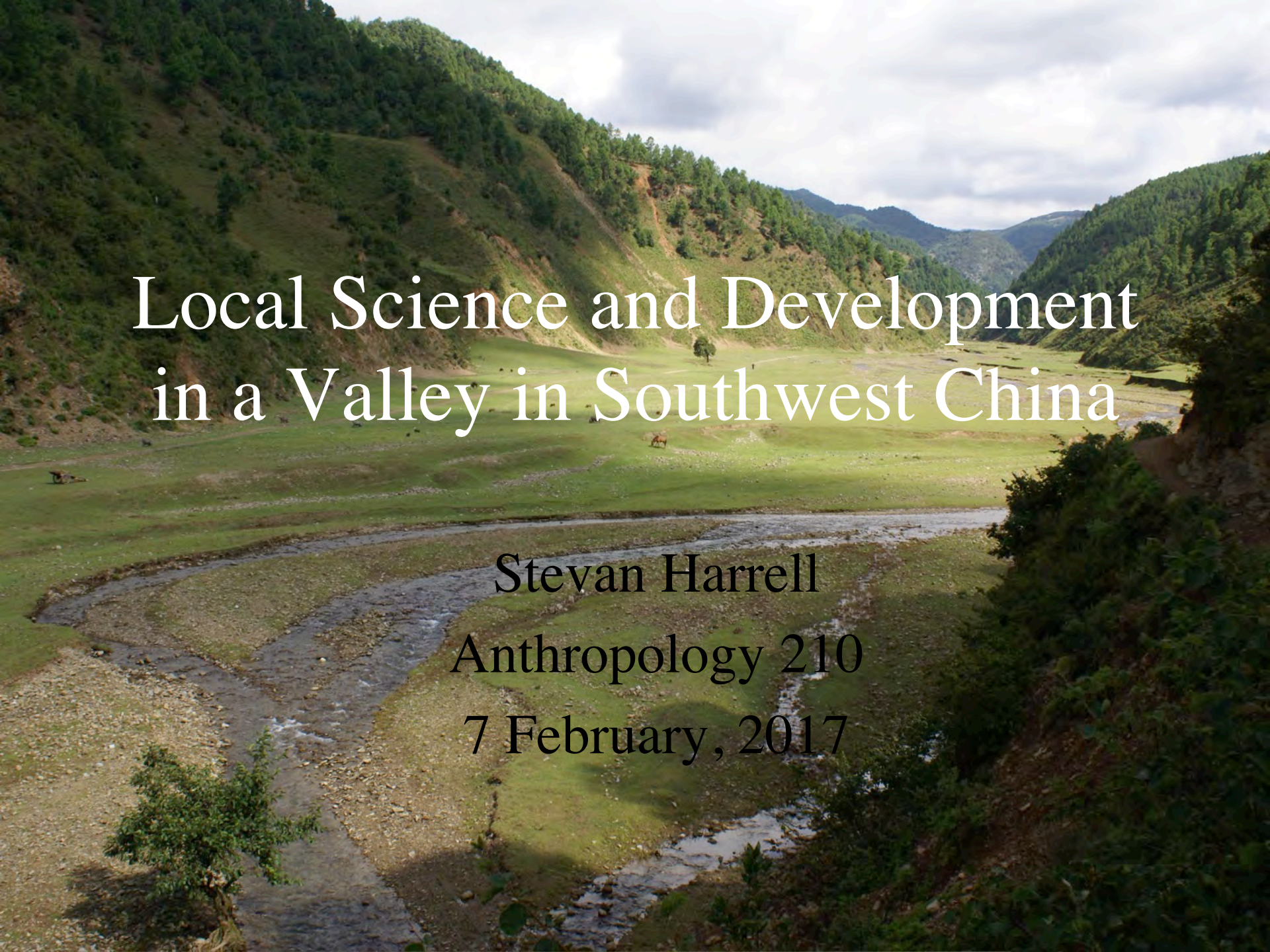


Local Science and Development in a Valley in Southwest China

Stevan Harrell

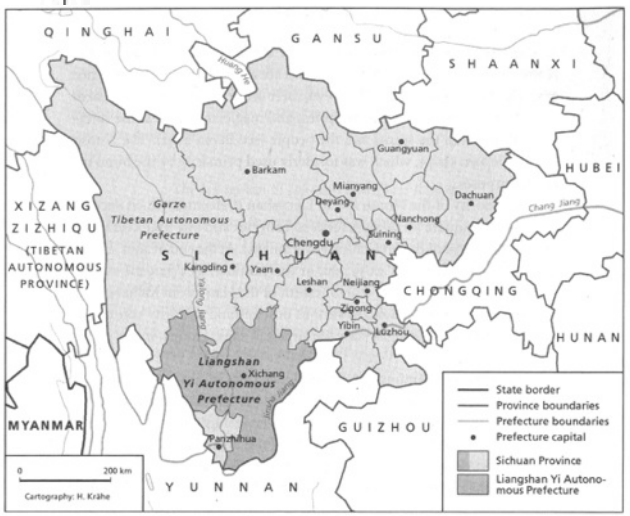
Anthropology 210

7 February, 2017

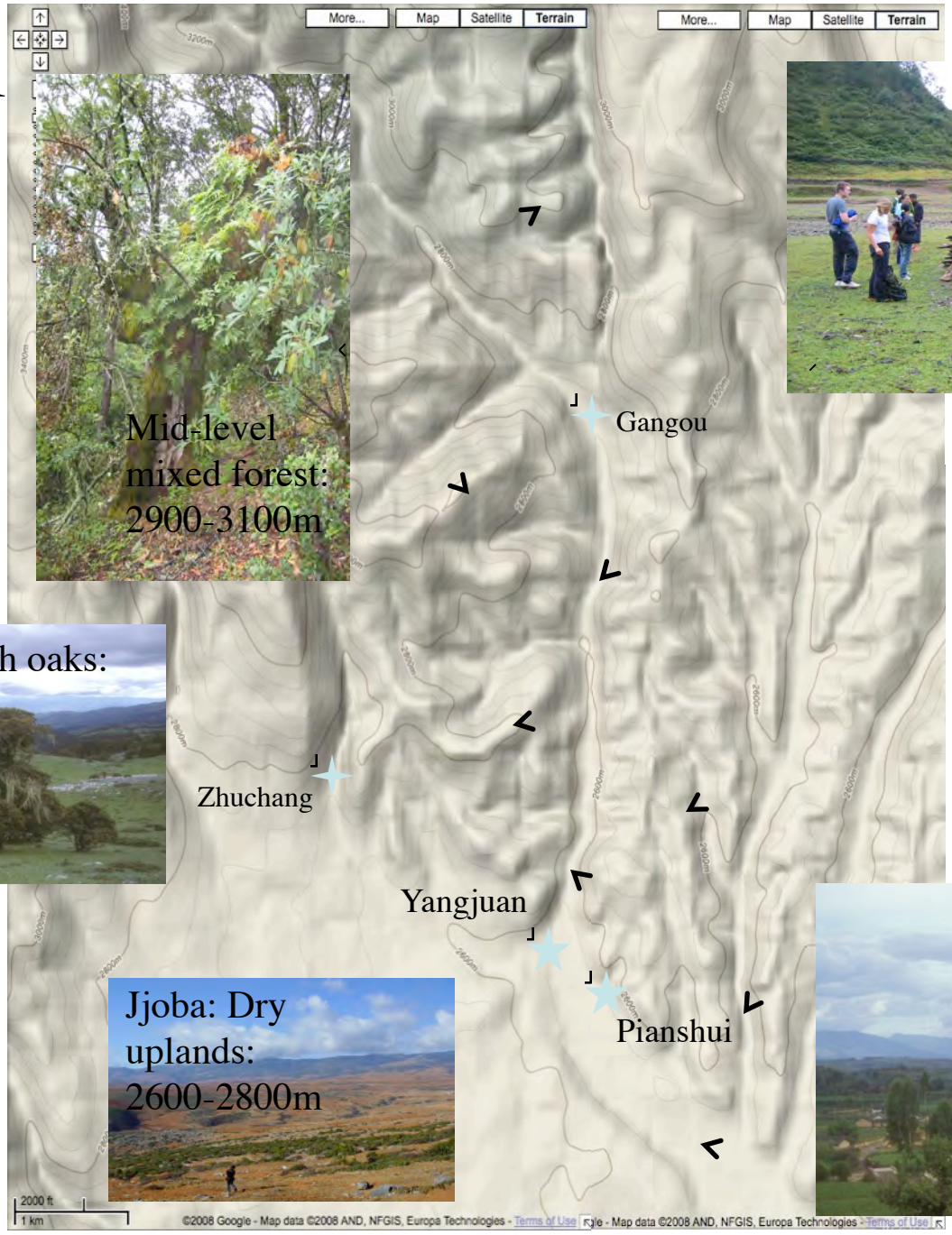
Liangshan and the Nuosu

Nuosu Quick Facts:

- 2,000,000 population
- Of 7.5m Yi 彝
- Most in Liangshan
- “Independent Lolo”
- Patriclan organization
- Caste stratification
- Tibeto-burman language
- Syllabary script

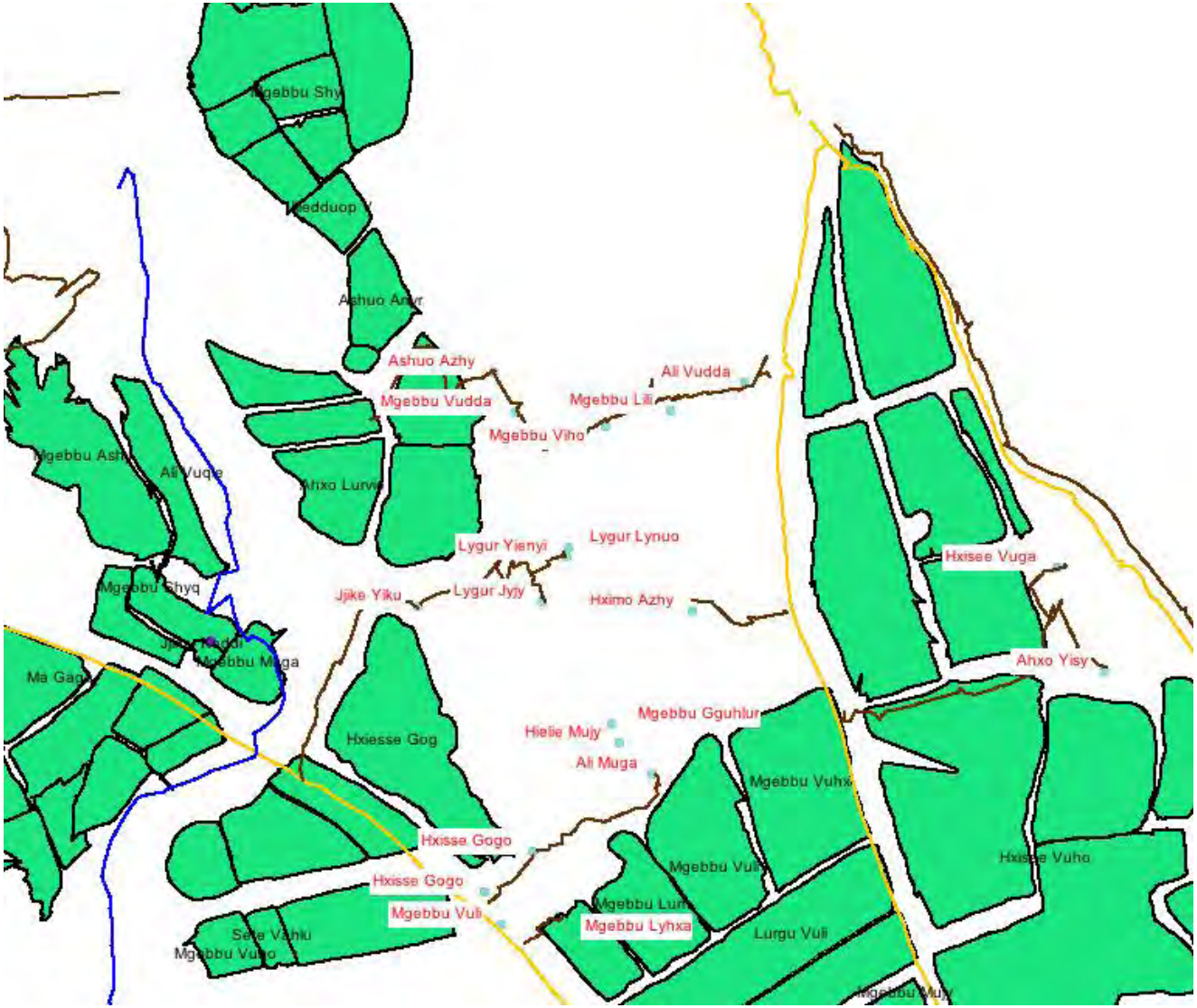


Ecological Zones



Interdisciplinary Research

Mapping

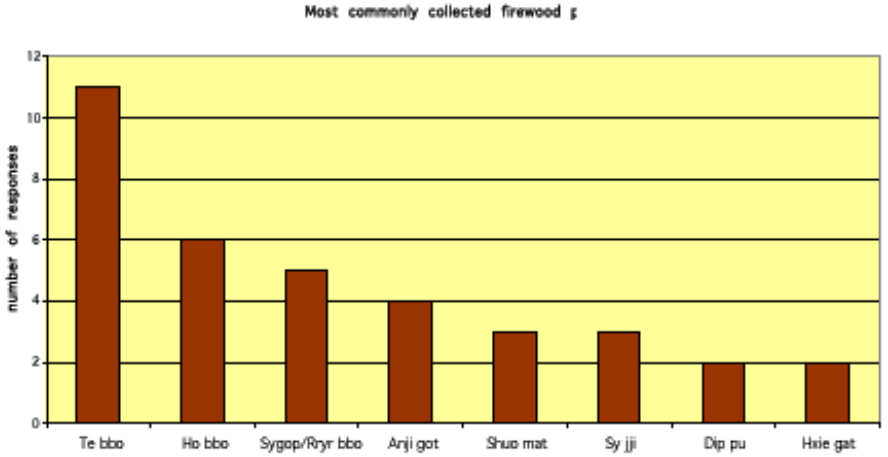


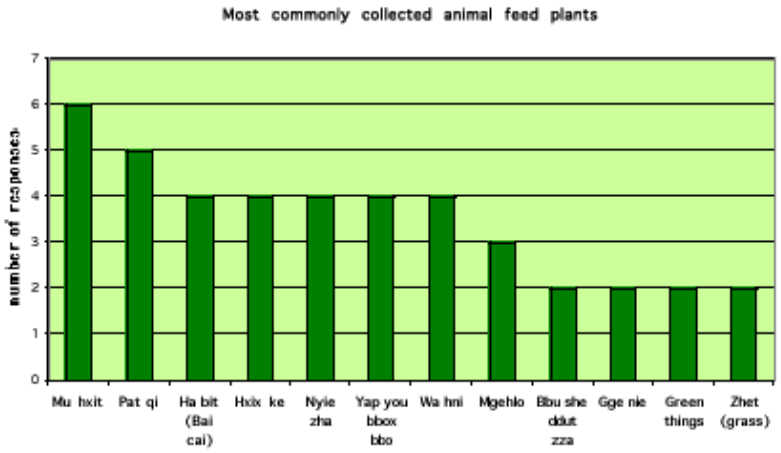
Interdisciplinary Research

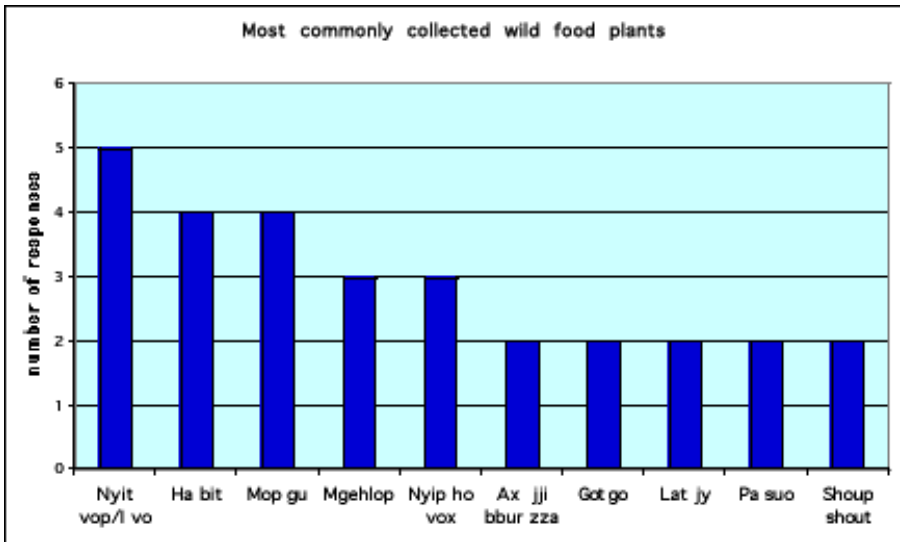
Biodiversity

Interdisciplinary Research

Ethnobotany

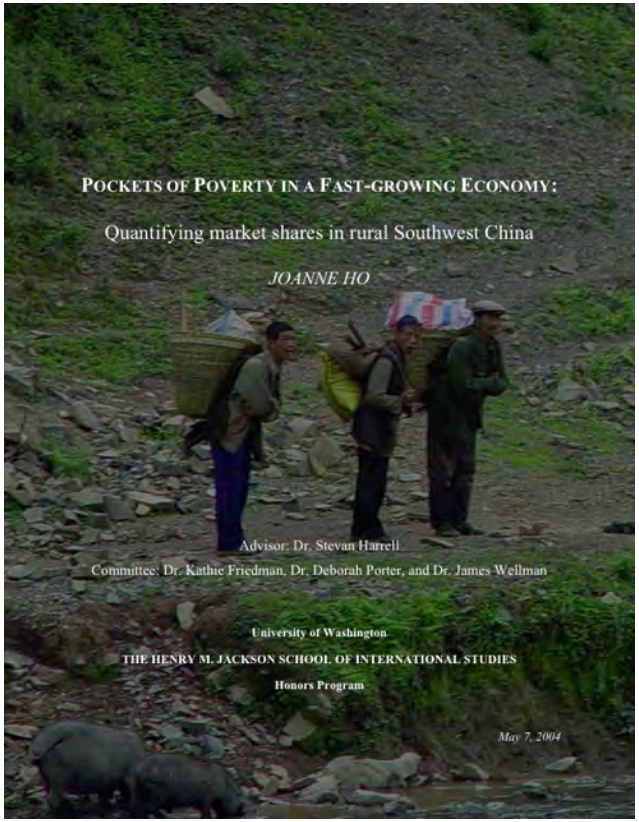






Interdisciplinary Research

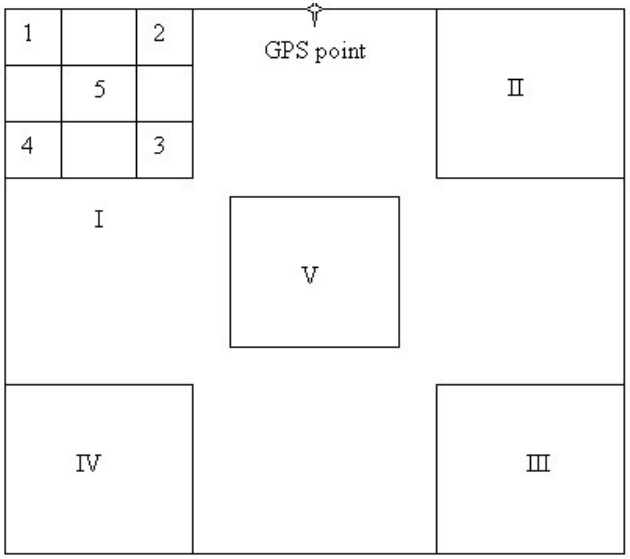
Economic-Agricultural Anthropology

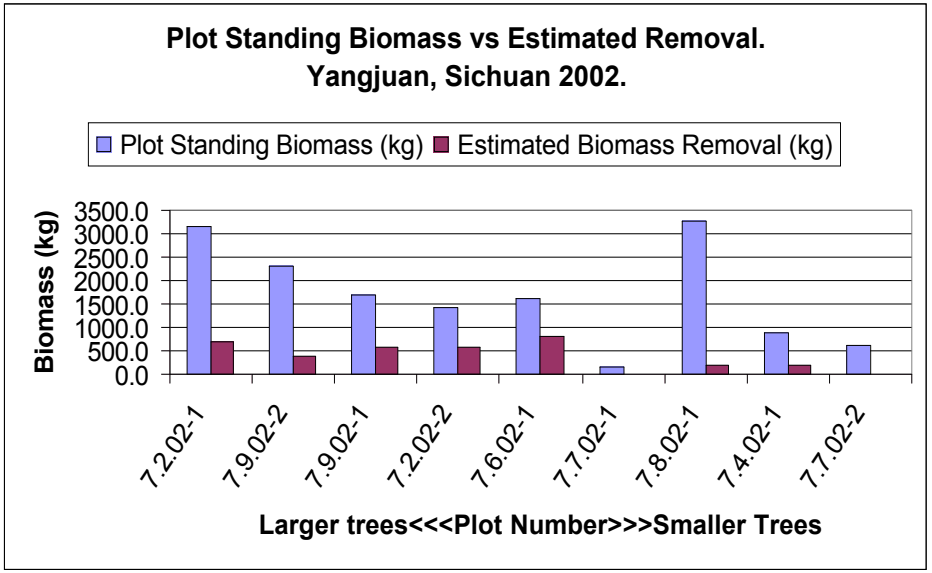


Apples

Interdisciplinary Research

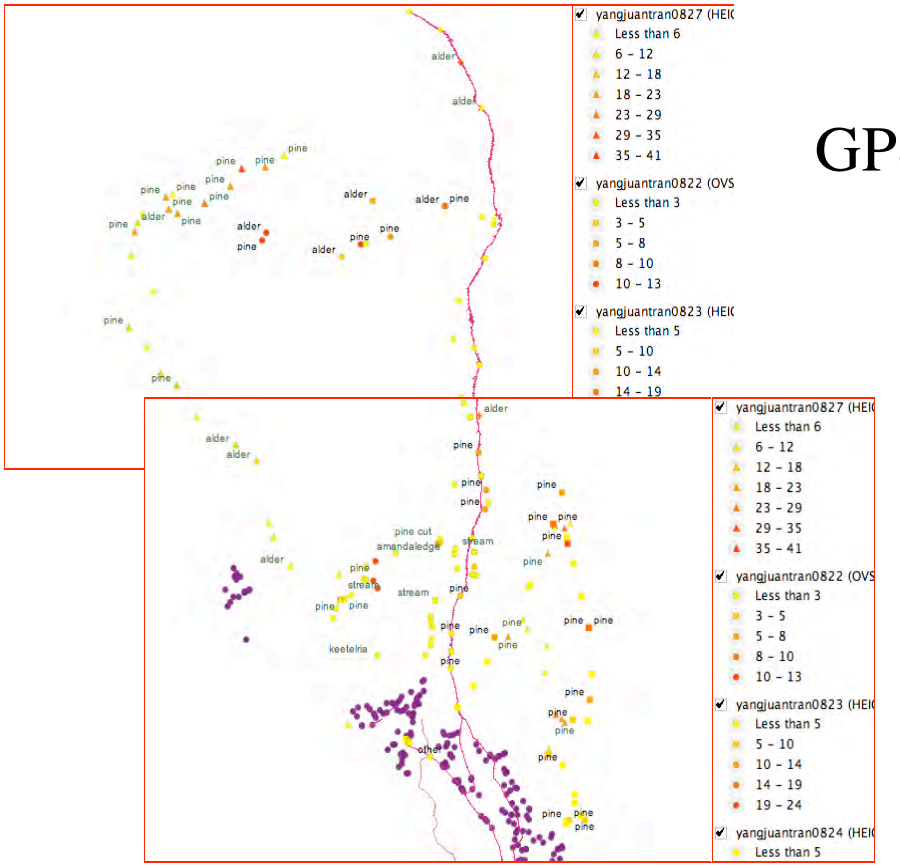
Forest Ecology 2002-03





Interdisciplinary Research

Forest Ecology 2008

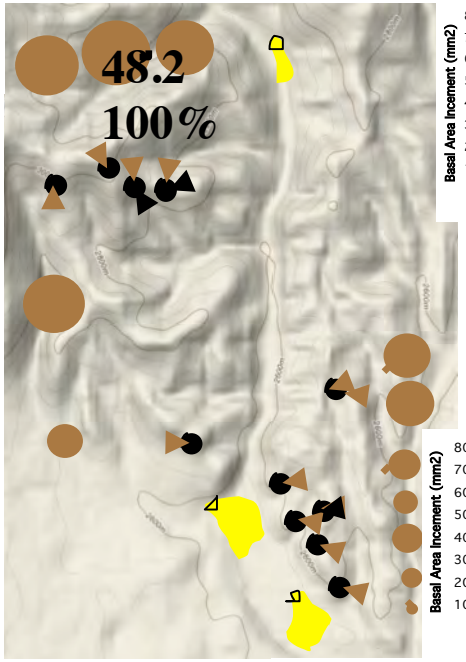


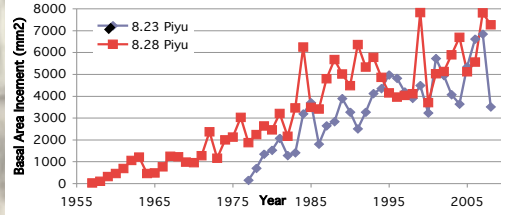
GPS Walks

Interdisciplinary Research

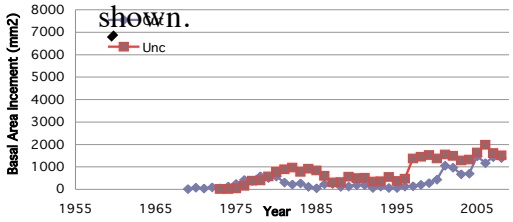
Forest Ecology 2008

Quantitative forest assesment





Comparison of stand basal areas between 12 different study sites. Maximum = 48.2 $m^2 h^{-1}$. Plus individual tree growth (BAI, mm^2) is shown.



Interdisciplinary Research: Geology

- Erosion: when, where, and why?

  Ethnography; field-map soil profile truncation; remote sensing land use, topography, and soils; ^{137}Cs and ^{210}Pb



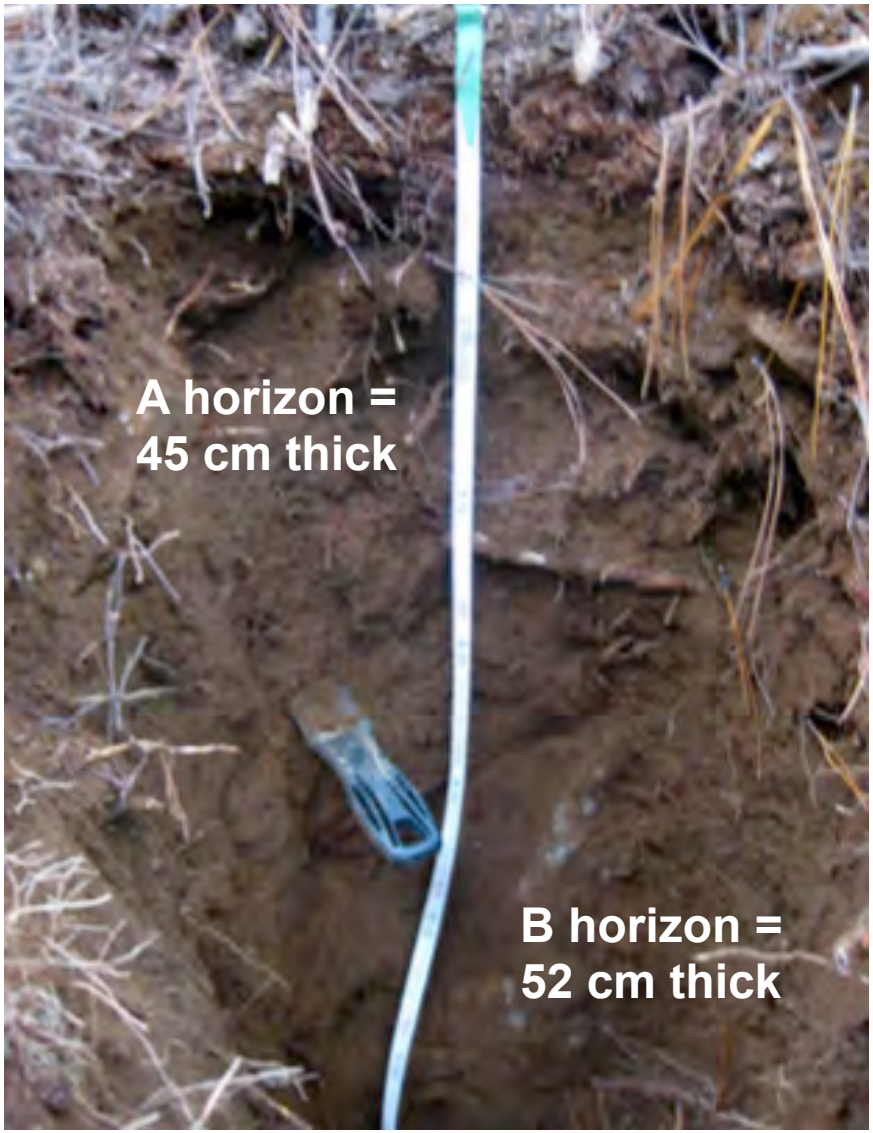
- Sedimentation and fluvial adjustments: when and why?

  Topographic mapping; radiometric dating (^{137}Cs, ^{210}Pb, OSL, ^{14}C), ethnography; remote sensing

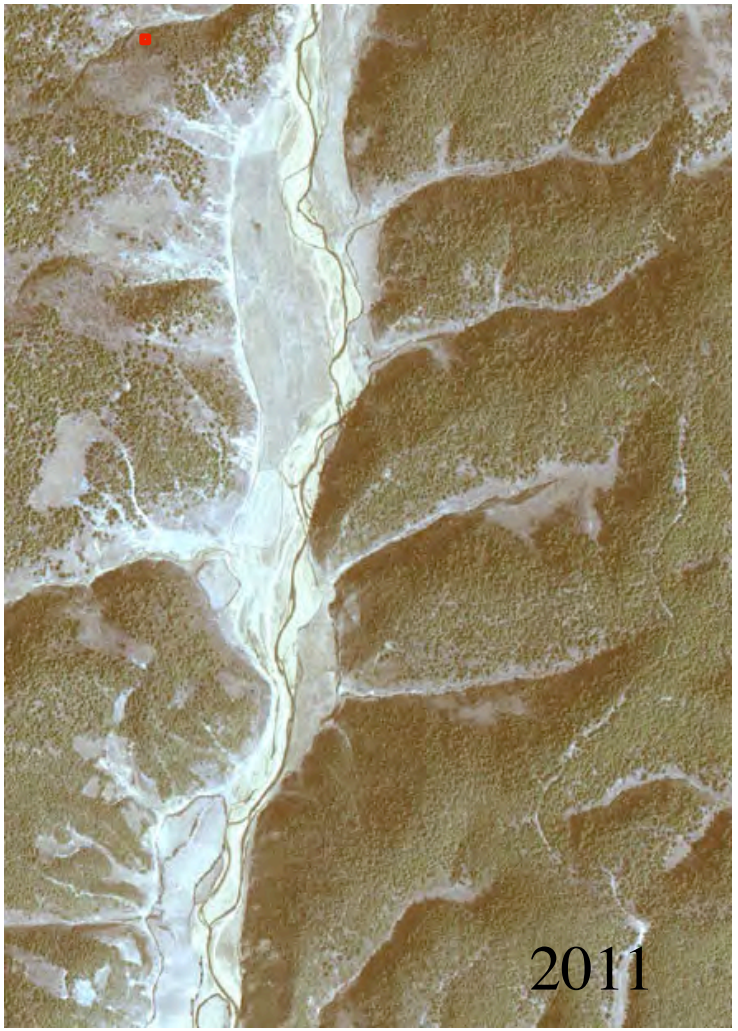
Erosion: where, why and when?

Very thin topsoil near the village

Soils nearly a meter thick in some more remote parts of the watershed



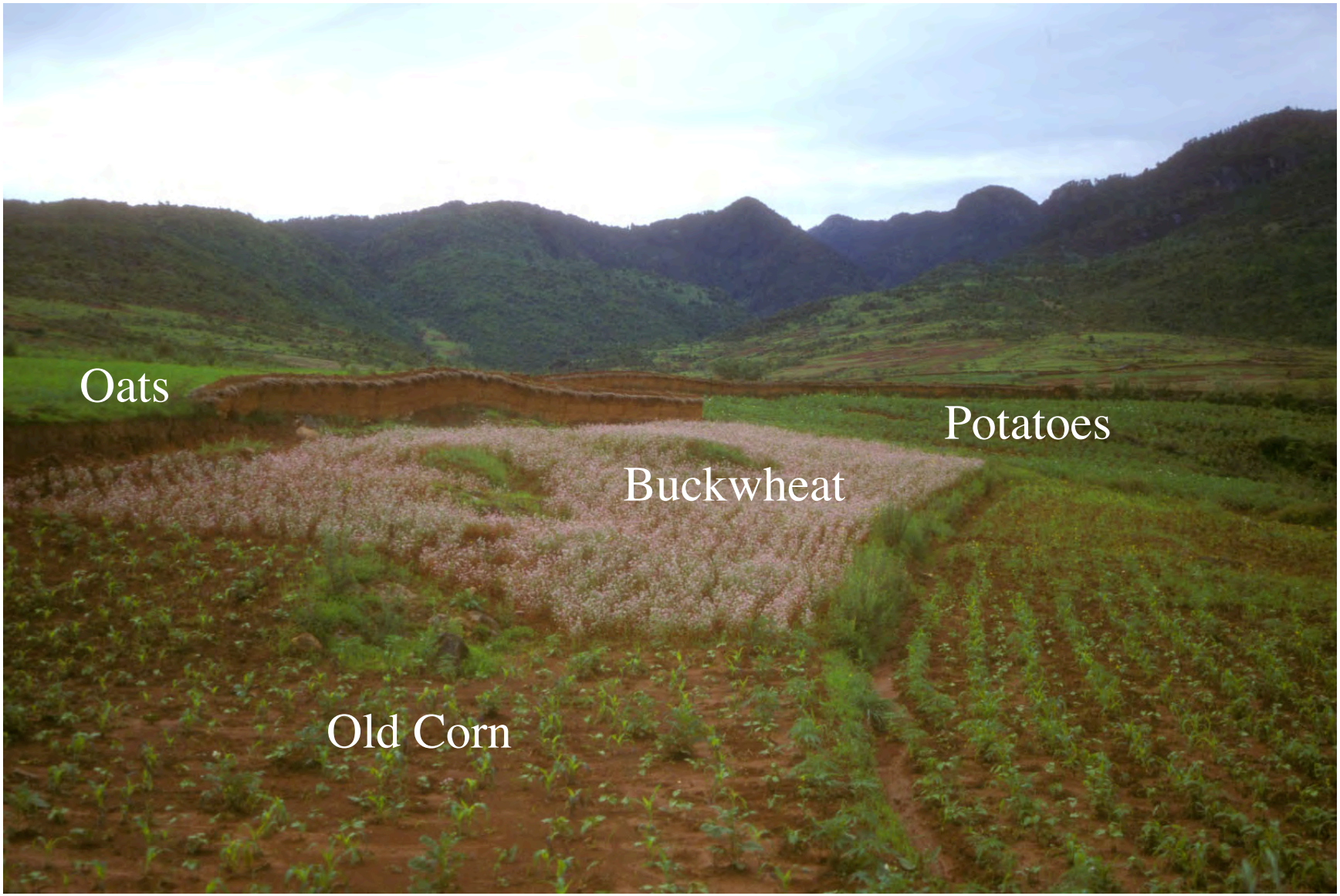
Interdisciplinary Research: Using Satellite Photos



The system before 1956

- Combination of swidden and short-fallow agriculture
- Livestock herding
- Use of forest products
- Dispersed housing
- Can’t recreate in detail--

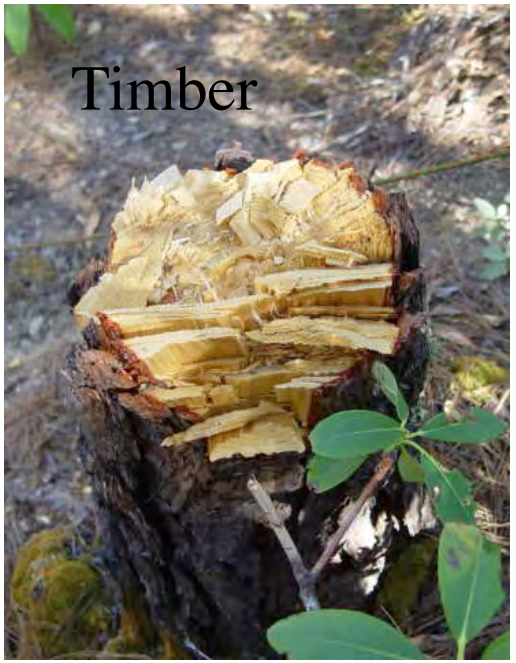
Subsistence Crops



Livestock

Forest Products


Firewood


Timber


Bamboo


Foods and medicines

Reasons to think the system was resilient and sustainable on a century-scale

- Low intensity use
- Diversity of patches and strategies
- System of indigenous knowledge for living in this environment

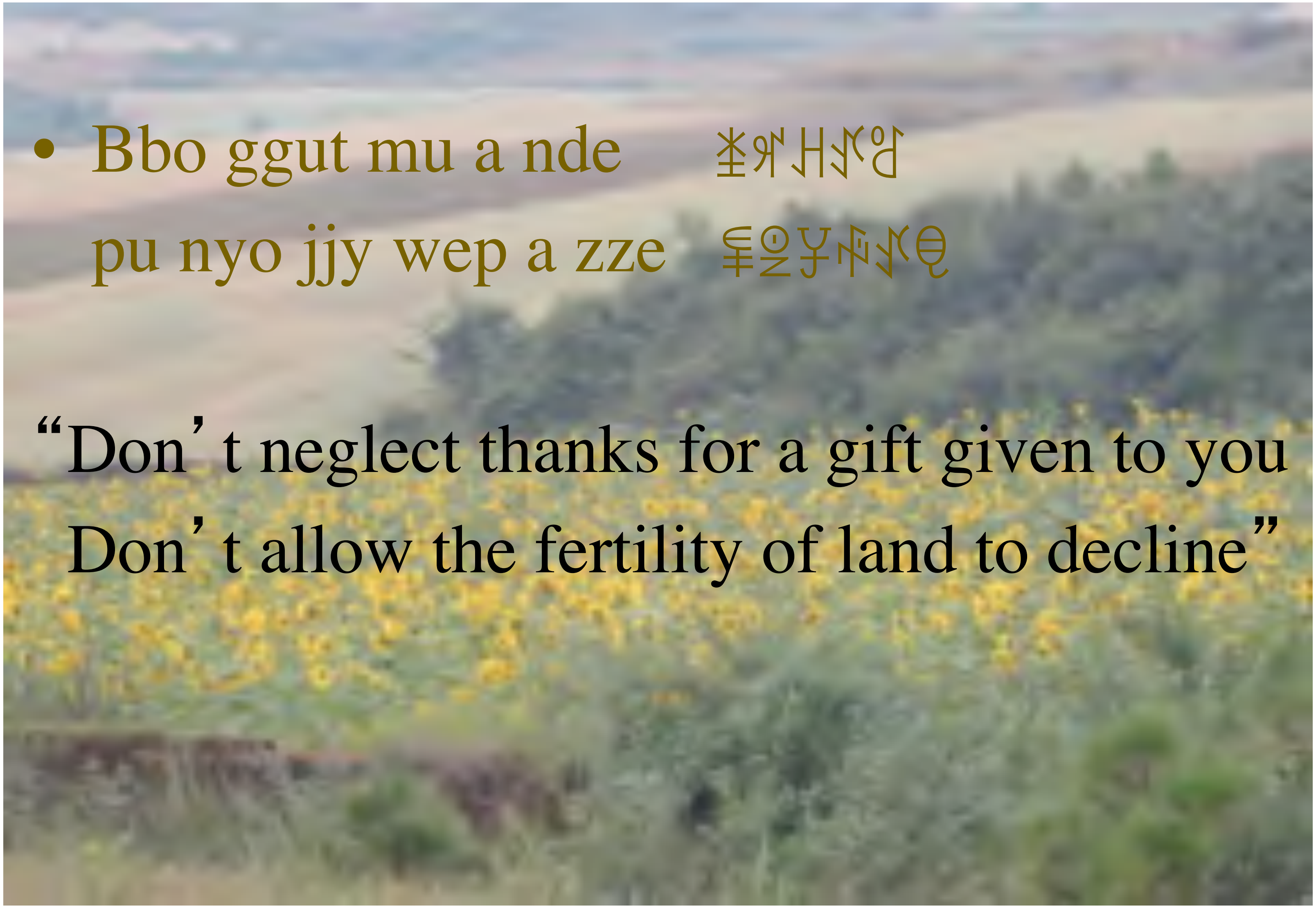
A Nuosu Poetic Pastorale

We come to the mountains
behind our house to raise
sheep;
The sheep are like massed
clouds.

We come to the plains in front
of our door to grow grain;
The piles of grain are like
mountains.

We come to the stream to the
side of the house to catch fish;
The fish are like piles of
firewood.

Nature–Society Parallel in *lurby*
1. Soil



- Bbo ggut mu a nde
  pu nyo jjy wep a zze

"Don't neglect thanks for a gift given to you
Don't allow the fertility of land to decline"

Nature–Society Parallel in *lurby*
1. Soil

- Pu nyo mu su vi
  vi ke she su vi

𐑐𐑵 𐑯𐑿 𐑥𐑵 𐑕𐑵 𐑝𐑦

𐑝𐑦 𐑒𐑱 𐑖𐑱 𐑕𐑵 𐑝𐑦

“Land belongs to those who work it;
Affairs belong to those who commit them”

As you are responsible for your actions, you are responsible for the land that you work.

Nature–Society Parallel in *lurby*
2. Water

- Yy ge ge a hxi ꒉꇥꇥꉢꉻ
  “Don’t ruin the source of your own water”

Nature–Society Parallel in *lurby*
2. Water

- Onyi abbo mi; yy ki lo ji she
- [illegible]

  Mother's brother gives to father

  Water flow is maintained

  "The gift of the the wife-giving affines is like the gift of flowing water"

  This is an analogy between the structure of reproduction of the clan as human resources, and the structure of production of food resources.

Nuosu Paleo-Pinchot-ism and structuralism in *lurby*
3. Trees

- Aqu mu, aqu zze
- ꀊꏦꃅ, ꀊꏦꋍ

"Do the white, eat the white"

If you cut white trees (pine etc), then you are consuming the white trees

If you consume non-renewable resources improperly, you are using up the resources that you depend on.

Nuosu Paleo-Pinchot-ism in *lurby*
3. Trees

- Sy zzu i pa mu; yy zzu i pa mu
- ꌦꍈꀉꁈꃅ; ꒊꍈꀉꁈꃅ

“Trees are parents; water is parents”

Again, analogy between the origin of production in watersheds, and the origin of reproduction in parents.

Nuosu landscape aesthetics in *lurby*

- Ahlo njike ggule rry a zze
  Jjuonuo njike ggule a qy

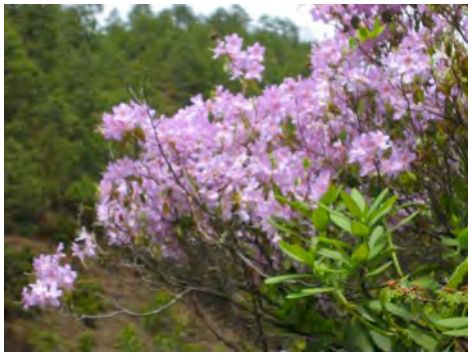
ꀊꆿꆏꇁꇬꇊꏦꀋꊪ; ꏢꆀꆏꇁꇬꇊꀋꏸ

A rabbit does not eat the grass around its own den

An eagle does not poop around its own nest

Nuosu Structuralism: 1. Seasonality

- Growing Season
  - Starts with rhody bloom (or beginning of rains)
  - Crops in fields
  - No hunting
  - No cutting trees
  - Ends with last harvest (or end of rains)



- Killing Season
  - Starts after harvest
  - Fields bare, then dry or snowy
  - Hunting allowed
  - Tree cutting allowed
  - Ends with rhody bloom

Nuosu Structuralism
2. Prohibitions

- Prohibitions on
  - Cutting out of season
  - Hunting out of season
  - Killing magpie
  - Killing cuckoo
  - Killing owl
  - Killing frogs
  - Killing crow
  - Eating vondi
- Consequences of violation
  - Hailstorms
  - Hailstorms
  - Loss of visitors
  - Loss of calendrical knoweldge
  - Rats!
  - Bugs!
  - Return curse
  - Need to ask

What's "missing" from Nuosu conservationism?

- No forest commons: forests held privately
- Reasons it works?
  - Ritual enforcement?
  - Low intensity use?
  - Clan-based sanctions?
  - Threat of warfare?
- Need to investigate further

What's "missing" from Nuosu conservationism?

- No conservation ideas about domestic animals or pasture
- Reasons why not
  - Source of wealth and prestige in a tribal system
  - "Animals take care of themselves; no human prohibitions needed"
- Need to investigate further

Revolution as Disturbance: Four Disturbances 1956-59

- Concentrated villages
- Socialist collective agriculture
- The Great Leap forward
- Developmentalist ideas

Revolution as Disturbance: The ideas behind it

- Developmentalism
- Class Struggle
- “Science”

Communist Developmentalism Exclusionism: Humans are separate from Nature

人定胜天: Humanity is destined to conquer nature

与天斗，与地斗，与人斗，其乐无穷：There is boundless joy in fighting with heaven, fighting with earth, fighting with people

Communist Developmentalism: Limitless Resources

- 人多力量大 With more people, our strength is greater
- 人有多大但，地有多大產 The productivity of the land is as great as the courage of the people (目前為止比較合適的翻譯！)

Communist Scientism

- The world can be engineered
- Production is a variable that can be maximized by human labor (Marx)
- Native peoples and their systems of knowledge are “backward” and “superstitious”
- What definition of science does this fit?

Communist Scientism

- *Natural science is one of man's weapons in his fight for freedom. For the purpose of attaining freedom in society, man must use social science to understand and change society and carry out social revolution. For the purpose of attaining freedom in the world of nature, man must use natural science to understand, conquer and change nature and thus attain freedom from nature.*

  Mao Zedong, 1940

- What definition of science does this fit?

The Quadruple Disturbance of 1956-59: Ecosystem results

- Three years famine and starvation
- Local deforestation; increased distance for fuel collection
- Erosion on hillsides above Apiladda and Pianshui
- Biodiversity loss

Relative stability, 1960s-present

- Continued residence in concentrated villages
- New agricultural techniques
- New varieties of crops and livestock
- Collective social and political organization
- Diminished biodiversity
- Diminished forest access (see next slide)
- New principles: socialism and science
- Perceived lower quality of life (by some people)

Slow variables, 1960s-present: hydrological changes

- More Runoff from upper reaches
- Higher sediment load in runoff
- More frequent flooding
- Braided stream course
- Re-incised alluvial fans
- Lacking the pools of a natural river

Slow variables, 1960s-present: human and livestock population growth and positive feedbacks

Increased forest use → Deforestation

Higher stocking rates → Erosion

Resource scarcity → Pasture degradation

Unwise use

Slow variables, 1960s-present: devaluation and loss of local science

- Causes
  - Encounter with communist scientism
  - Increased time spent in school, migrating for work
  - Environmental change and inadequate adaptive speed
- Consequences
  - Behavior that violates traditional norms
  - Lack of effective sanctions
  - Regret and perhaps re-integration with real science

Disturbances since 1960

- 1963-65 Rice Cultivation
- 1971-73 Taking Grain as the Key Link: Second Clearcuts
- 1988-98 Commercial Apple Cultivation
- 2000- High-yielding Hybrid Corn
- 2004- Sheep Project
- 2002- Long-distance labor migration
- 2005-06, 2009- Charcoal Production

More Disturbances :
1963-65 Wet-Rice Cultivation
Goals: Local Food Production
Results: Mostly wasted effort

Reported yield:
250-300 jin/mu

Good yield:
1200-1500 jin/mu

Enough water, level land, what was the problem?

More Disturbances
1971-73 “Grain as the Key Link”
Goals: Food Production
Result: More clearcuts

Not recovered in 1993

Oldest Trees 50 years, 2002

More Disturbances : Apple cultivation

Goals: cash income

Results: market dependency, eventual bust

More Disturbances:
2000- High-yielding Hybrid Corn

Goals: Market Food Production

Results: Market Dependency, Soil changes, White Pollution, Increased Income

More Disturbances : Sheep project

Goals: Conserve Pasture, Improve Breeds, Increase Income
Results: Basically Unchanged

More Disturbances : Labor Migration

Goals: Increase income, learn about the world

Results: Increased income for some, consumer goods in village, loss of local science, failure of local language education

More Disturbances: 2005- Charcoal Production

Goals: Income

Result: Deforestation Again

Why didn't the valley forest regrow naturally? Key Variables, <1962 and >1984

	Before 1962	1962-84	1984-Present
Valley floor forested	Yes	No	No
Grazing in valley	Yes	Yes	Yes
Farming in valley	No	Yes	No
Runoff into valley	Low	High	High
Stream morphology	Single course	Single to Braided	Braided

Dependent variable

Inependent variable, not different, can't explain

Intermediate variables

Variable whose effect depends on dependent and intermediate variables

In prose: Stream runoff prevents regrowth; in the absence of trees and in the presence of runoff, grazing also prevents regrowth.

What is Happening Recently?

- Apiladda is, in technical terms according ecologist Dr. Thomas M. Hinckley, hammered
- 2008: Project to reforest Apiladda with poplars
  - Seen as necessary for restoration
  - Opposed by herders
  - Herders' opposition scorned by officials

What is Happening Recently?

- 2010-13:
  - Herding has decreased and increased a little again
  - Planting walnuts where pigs once rooted the poplars
  - Pigs are being kept in pens

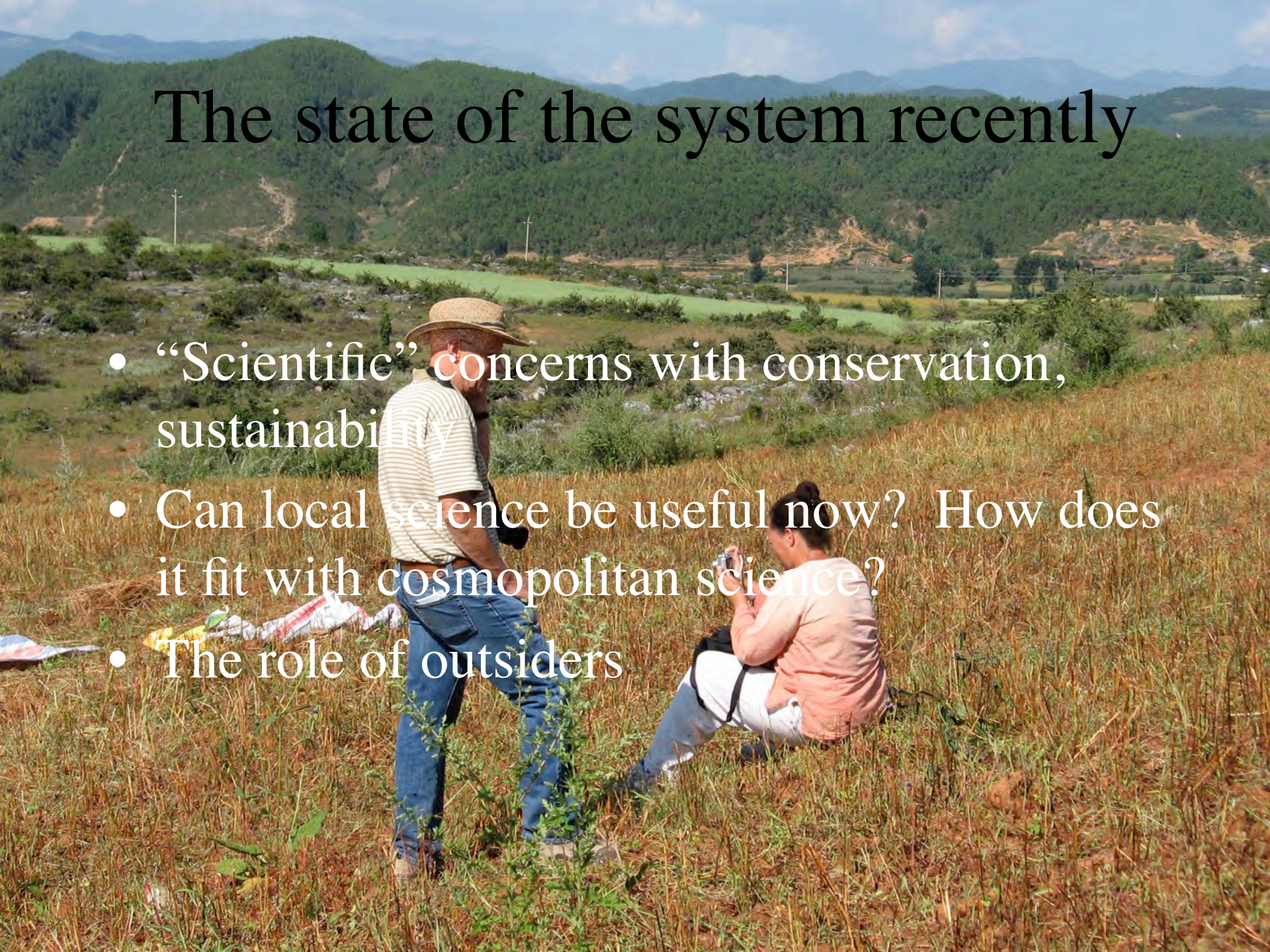
  - Farming in Apiladda, first time since 1983: Hybrid corn and buckwheat.

The state of the system now

- Forest varies from healthy to not so
- Concern of some individuals with restoration
- New law on reform of the property rights to forests

Restoration, 2008-2013

The state of the system recently



- "Scientific" concerns with conservation, sustainability
- Can local science be useful now? How does it fit with cosmopolitan science?
- The role of outsiders

And then it flooded again, 2015

Thank you
The people of Yangjuan and Pianshui

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UW Quaternary Research Center
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