Payments for ecosystem services: saving the monkeys and helping the people

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Payments for Ecosystem Services (PES)

- PES: <u>incentives</u> paid to <u>users</u> of natural resources to <u>protect</u> the natural systems

- Benefits:
 - Protect the **environment**
  - Protect the **people**

PES sustainability

- Lack of "permanence"
  - Resource users return to previous (or other) environmentally detrimental behavior pattern after PES ends
  - Protect the environment within a limited amount of time

Fanjingshan National Nature Reserve, China

- Guizhou Golden monkeys
  - The only and last habitat of ~800 animals
  - "Endangered" by IUCN
- Local community
  - 21,000 local residents (subsistence)
  - Over 40,000 tourists
  - PES in work
- Abundance in
  - Local biodiversity
  - Natural Beauty
  - Cultural Heritage
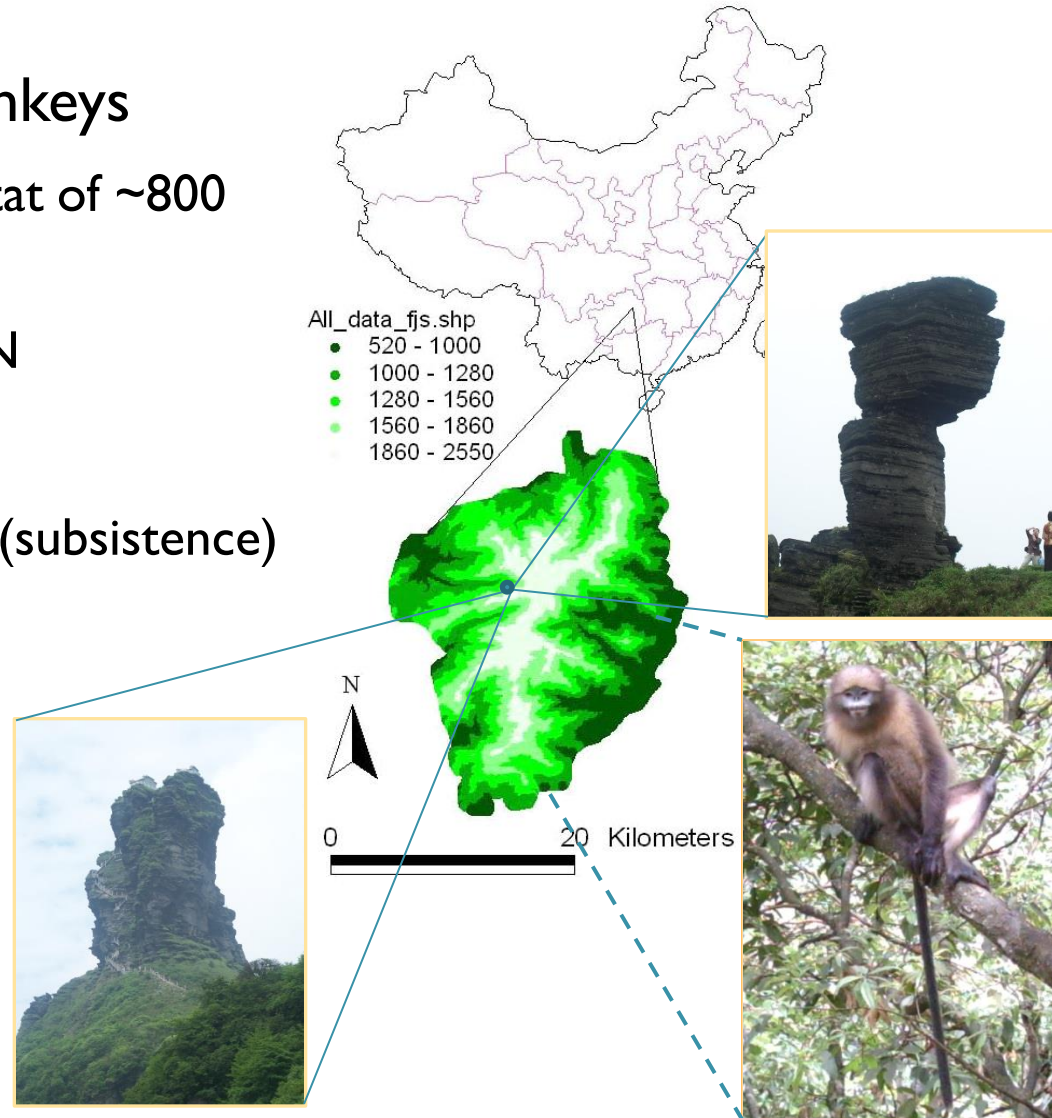
Interaction with other species/humans

- Predators
  - Less an issue
- Habitat:
  - Live in various vegetation and altitudes
  - Very shy species—avoid humans
- Humans
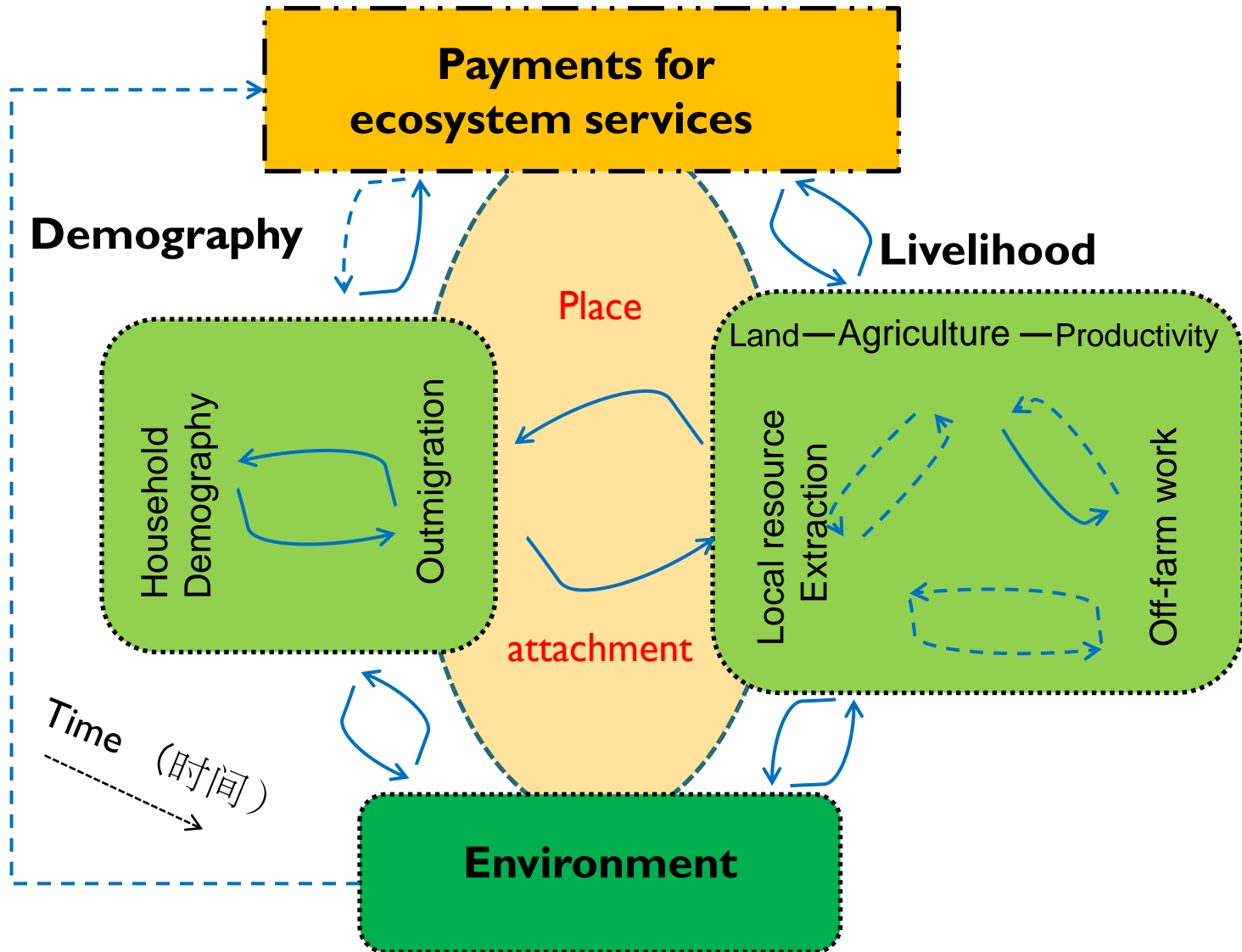 - Resource extractions
  - Herding
  - Tourisms

Grain-to-green program
(PES in China)

- Qualification: sloped land

- Contract to individual households (government)

- Incentives:
  - Grain
  - Cash
  - Seedlings and maintenance (one time)

Map courtesy: Mr. Yeqin Yang

Coupled Human And Natural Systems (CHANS) framework

The environment

- Canopy fractional cover & change
- Vegetation classification & change
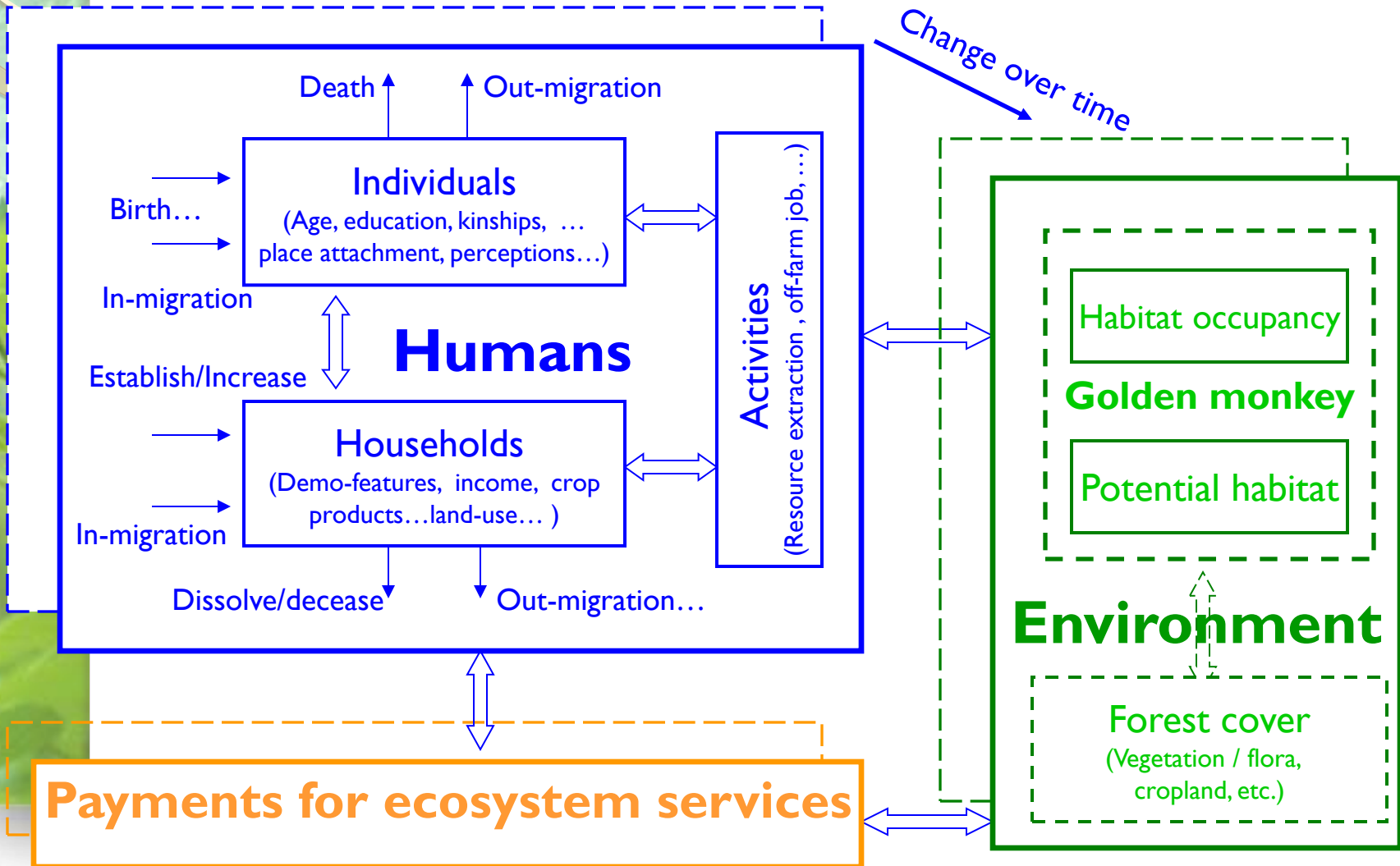- Monkey occupancy over space and time

Monkey activity: Camera trapping

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A participatory agent-based model
Coupling human and natural subsystems

Change over time

Humans

Death   Out-migration

Birth…

Individuals
(Age, education, kinships, …
place attachment, perceptions…)

In-migration

Establish/Increase

Households
(Demo-features, income, crop
products…land-use…)

In-migration

Dissolve/decease   Out-migration…

Activities
(Resource extraction , off-farm job,…)

Environment

Habitat occupancy

Golden monkey

Potential habitat

Forest cover
(Vegetation / flora,
cropland, etc.)

Payments for ecosystem services

Hypothesis testing (examples)

- **PES will stimulate outmigration**

- **PES has the potential to shift (even revolutionize) the long-term structure and dynamics of local systems**

Discussion

- Expand the theory of the multiphasic response (Davis 1963) to make it a powerful tool for explaining human behaviors in CHANS systems

- Innovative measure of forest function (or any type of ecosystem function)

- Innovative methodology from a complex systems perspective

- Facilitate better public policy formulation

QUESTIONS?

More information:

http://complexity.sdsu.edu/ (group)

http://goldenmonkey.sdsu.edu/ (project)