Circular Agriculture and Ecosystem-based Solution for Climate Change Mitigation and Adaptation

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Outline

- What is EBS in Mountain?
- Why circular agriculture?
- How we do it? Case studies
In 2019, IPBES announced a Biodiversity Crisis

2019 Scientific Consensus: “Climate Change” to “Climate Crisis”

UN Sustainable Development Goals Suffer Major Setbacks
The Seeds of Diversity
- 25% of land surface
- 80% of biological diversity
- 60% of freshwater
- High cultural diversity
- People are adaptive
Developing Climate S&T and building new relationship

 Integrating science, technology and traditional ecological knowledge

 Optimizing natural resources & social capital

 Cross-culture learning and promoting better livelihoods
India-China Collaboration on Climate Change

Prof. Jianchu Xu, Kunming Institute of Botany met CIM @sureshprabhu to discuss on collaboration and investment opportunities in the field of climate change.

Meeting with former Ambassador S Jaishankar
23 Prithviraj Road, New Delhi
Public Engagement
The Five Pillars of Biodiversity and Ecosystems

Our wealth. Our health. Our beauty. Our lives are maintained by countless other living things.

These five pillars, intertwined and interdependent, are the result of hundreds of millions of years of evolution.
Circular Agriculture means that Outputs from all processes are Inputs to other processes.

Nature-based solution

- Resources-saving
- Environment-friendly
What is ethnoecology?

• 'Ethno' refers to human culture and 'ecology' refers to interactions between organisms and the physical environment.

• Ethnoecology is the way of looking at the relationship between people and the ecology of the environments in which they live.

• Ethnoecology is the cross-cultural study of how people perceive and interact with their environments.

• (Conklin, Trans of NYAS, 1954)
Perennial, vertical and circular agriculture

Desertification

Modern Agriculture

Future Agriculture

Forest biodiversity

Degraded lands & monoculture systems

Biodiverse systems / Agroforestry

Nature

Time
My childhood: extremely scarce resources, but with circular use

- Fishpond + mulberry trees + vegetable garden
- 0.7 ha paddy fields
- Mulberry
- silkworm
- 1 dog
- 5~10 rabbits
- 1 goat
- 2 pigs
- Livestock
Four Steps to restoring landscapes

- The right species in circular loop
- Vertical planting of tree-shrub-grass
- Tree-crop-livestock integration
- Biomass-based circular agriculture
UNESCO Heritage Sites: Fish-duck-in-rice paddy
Innovations based on traditional rice paddy terraces
Ecological Planting of *Coffee arabica*

The lifespan of a coffee tree is approximately 20 to 30 years. They thus grow from generation to generation. Decisions today are gains for tomorrow. Mountain Futures will cooperate with Agricultural Research for Development (CIRAD) to cultivate a new F1 coffee variety called *starmaya*, which is drought resistant, high quality and high yield, thus making it adapted to a post-climate change environment. We will carry out shade tree planting in Honghe and Pu’er City, putting into effect an international coffee chain by which Yunnan coffee can enter both European markets and artisanal domestic markets.
Chickens, Insects, and Fishfarm
Edible Mushrooms in Agroforestry Systems

Industrial level production systems

- Renewable energy
- Solar power
- Cultivation/green houses
- Processing facilities

Management buildings

Integrated forestry, agriculture and livestock systems

- Woodland
  - Trees
  - N-fixation
  - Fast-growing
  - Pioneer sp.

- Grass/farmland
  - C4 plants
  - Elephant grass
  - Rice
  - Sugar cane

- Livestock systems
  - Meat production
  - CH4 emissions
  - Substrates/fertilizers

Smallholder driven landscape management

Rural community

Circular economy

Supermarket

Feed

Substrate
Smart Mushroom Factory
Nature Based Solution: Ants-farmed mushroom
Circular Agriculture

- Photovoltaic-driven
- Innovation & incubation
- Circular economy & Society
Photovoltaics
Photovoltaic-driven Innovation & Incubation Hubs
Global Team for Interdisciplinary learning and innovations

Innovation and Incubation Hubs

- Insects (昆虫资源)
- Seeds (种子库)
- Clouds
- Soils (土壤库)
- Fodder (生物饲料)
- Livestock (动物资源)
- Plant Protection (生物防控)
- Food & medicine (药食同源)

Innovation flows:
- Energy
- Nutrition
- Knowledge
- Data
- Biomass
- Capitals
Innovation and Incubation Hubs

(土壤、种子、饲料、植保、药食、动物、食用菌、昆虫、加工、人工智能等等)
## Technology Integration and Demonstration for Circular Agriculture

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<th>New Plant Varieties</th>
<th>New Fungal Varieties</th>
<th>New Insect Species</th>
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### Innovation Programs
- New Agro Tech
- Biofertilizer
- Organic feed
- Healthy products

### Innovation Centre
- Circular Agriculture Technology Integration and Professional Cooperative Industry Demonstration

### Technological Indicator Systems
- New Insect Species
- New animal species
- New aquatic species

The transformation of agricultural production
Mountain Futures represents a new chapter in biodiversity conservation and ecological civilization construction.

Tree-Crop-Livestock Systems and Circular Economies are the future.

Circular agriculture and ethnoecology offers new pathways for developing a green cultural economy and montane ecological management systems.