



Introduction

- ❖ The ecological, social, and economic values of different forms of traditional land-use practices followed by various ethnic communities and indigenous groups in different parts of the world have seldom been studied and understood
- ❖ Rice + fish farming is practiced in many places in the tropics (Ahmed and Garnett 2011; Lu and Li 2006; Mishra and Mohanty 2004)
- ❖ But the system practiced by the Apatani tribe in Ziro valley of Arunachal Pradesh, northeast India, is a quite unique and ingenious one
- ❖ This study highlights the key aspects of management of this system and its future potential as an example of resource management efficiency in fragile eastern Himalaya region in particular and other mountainous regions in general.

Objective

Documentation and analyses of traditional integrated rice + fish farming in Ziro Valley of Arunachal Pradesh, North-east India.

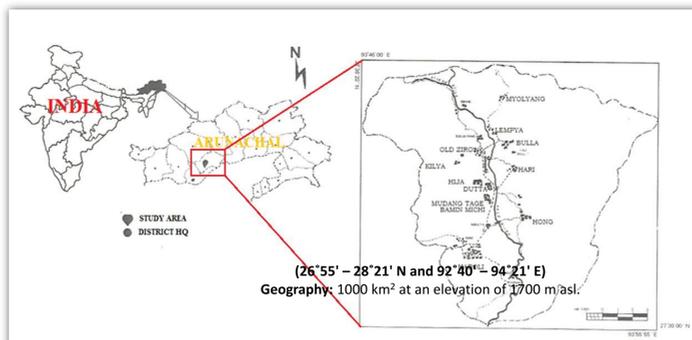
Methods

Field Survey

- ❖ Survey using structured questionnaire
- ❖ 50 households from each village selected randomly
- ❖ Extensive interviews with farmers of 25 – 65 years age group
- ❖ Interviews at farmers' home and on-farm sites
- ❖ Group interviews (in mornings and evenings)



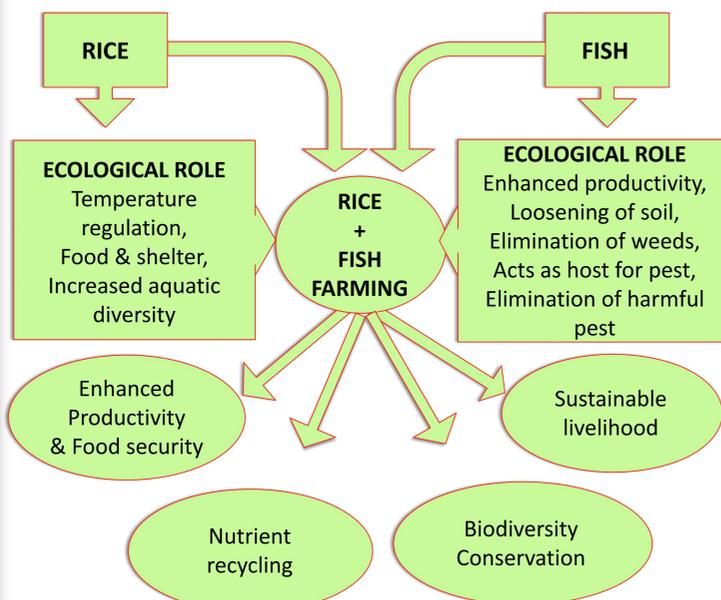
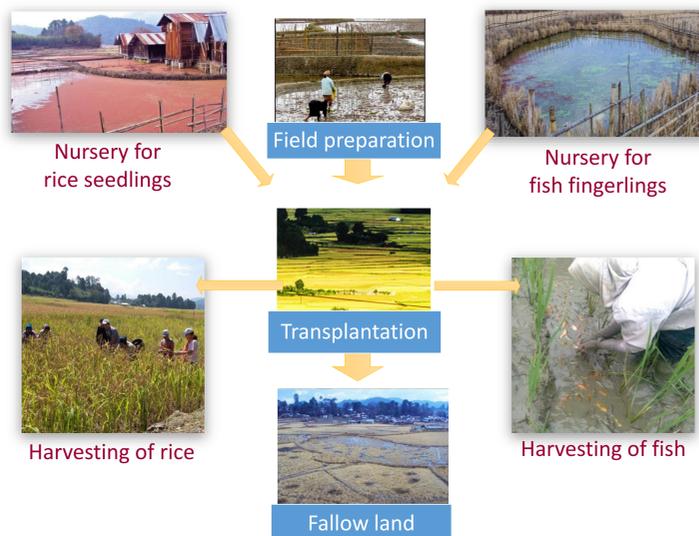
MAP OF STUDY AREA



WATER MANAGEMENT



RICE + FISH FARMING PRACTICE



Components of Rice + Fish farming

Description of the system

MANAGEMENT PRACTICES

Water Management

- ❖ Complex network of intricate irrigation canals and channels
- ❖ Network of primary, secondary and tertiary channels for water diversion
- ❖ Bamboo fences alongside main canals to avoid soil erosion
- ❖ Bamboo and wooden clips for bunds to hold the water and retain the nutrient-rich soils
- ❖ Concrete embankments are also constructed along the canals
- ❖ Opening and closing of inlets and outlets.

FIELD MANAGEMENT

Field Preparation

Dec – Jan : Provision of inlets and outlets with bamboo pipes, raising and widening of bunds, loosening and leveling of soil, etc.

Feb : Manual weeding in groups

- ❖ Traditional implements used : *Daos*, spades and hoes
- ❖ *Houttuynia cordata* Thunb, a weed species (soil binder and bunds stabilizer)
- ❖ Completely organic farming : Recycling of crop residues and use of organic wastes to restore soil fertility. Weeds used as compost.

SYSTEM EVALUATION

- ❖ High Productivity (3700 kg of rice ha⁻¹ and about 550 kg of fish ha⁻¹ annually)
- ❖ Increased livelihood sustainability.
- ❖ Better recycling of nutrients (N and P for rice)
- ❖ Improved aeration of soil and water due to fish movements beneficial to rice.

Challenges

- ✓ Lack of technical knowledge of farmers, and risks associated with flood and drought
- ✓ Location specific nature of the practice.

Lessons learned

- ❖ **Ecological Conservation:** The Apatani have appreciation for natural resource conservation
- ❖ **Economic Benefits and Ecosystem Services:** The traditional conservational attitude of farmers to managing the rich natural resources helps them reap economic benefits and ecosystem services
- ❖ **Traditional Ecological Knowledge:** The system provides an excellent example of integration of TEK with scientific and eco-friendly techniques of conservation practices
- ❖ **Avoidance of Chemical Inputs:** All the management practices adopted for system management are highly self-reliant with little external input or technologies and low dependency from external resources, making the system extremely sustainable
- ❖ **Ecotourism Potential:** The uniqueness of the system and its tentative recognition as a UNESCO World Heritage Center enormously enhances its ecotourism potential.

Acknowledgments

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References

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