Scaling Sustainable Modernisation in Mountain Agriculture: Agroforestry Experiences in Kaule, Mid-Hills of Nepal

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Background

- Steady agricultural intensification in Nepal in recent years
- Especially cash crops (potatoes, vegetables, fruits) are increasingly cultivated
- Intensification threatens upland farming systems → loss of biodiversity, soil degradation
- Challenge in Kaule: implementation of agroforestry (AF) as modernized, sustainable land management practice for a fair use of resources

Objective

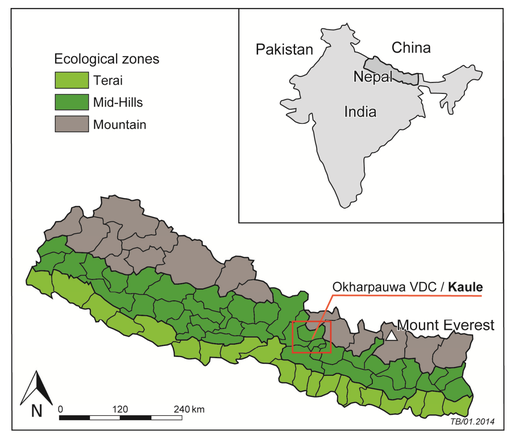
- Analysing modernization process in mountain agriculture
- Presentation of scientific findings and summary of the experiences during the transition to sustainable land management from an interdisciplinary perspective
- Hypothesis: after several years of implementation and project activities achievements along the pathway to sustainable modernization can be quantitatively and qualitatively evaluated by means of ecological, economic and social indicators

Methods

- Structured & semi-structured interviews on socio-economic and ecological issues
- Diffusion of innovations assessment: explains the reasons for adoption and rate of diffusion of new ideas and technologies within a community (Rogers 2003).
- Backcasting as transition management method to define future visions
- Comparative analyses of soil properties of AF, C, T agrosystems
- Comparative vegetation mapping of AF, C, T agrosystems

Study area

- The mountain village Kaule,
  25 km north- western of Kathmandu, in the mid-hills of Nepal

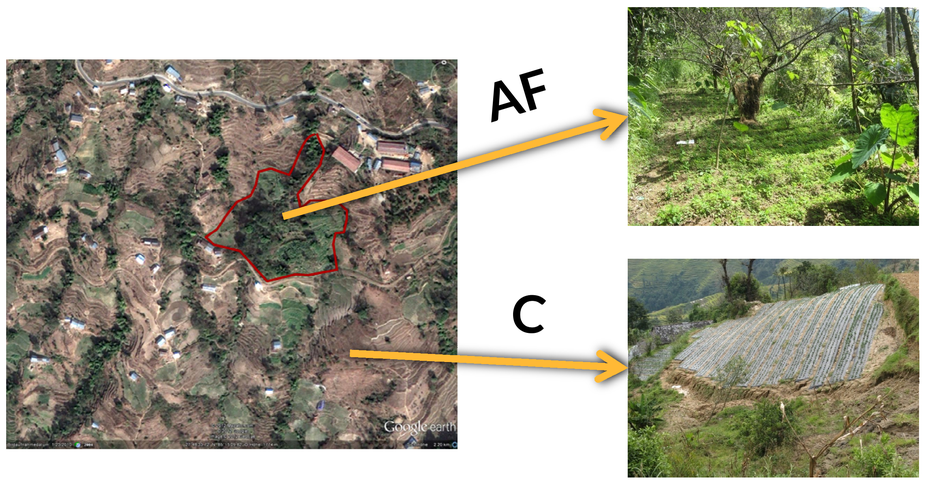


- Current agricultural land use in Kaule comprises three agrosystems:

i) Fully developed agroforestry system (**AF**): adopted in 2001

ii) Transition system (**T**): adopted in 2009 on 15 farms

iii) Conventional system (**C**): characterized by mono-cropping and dependency on fertilizer and pesticides



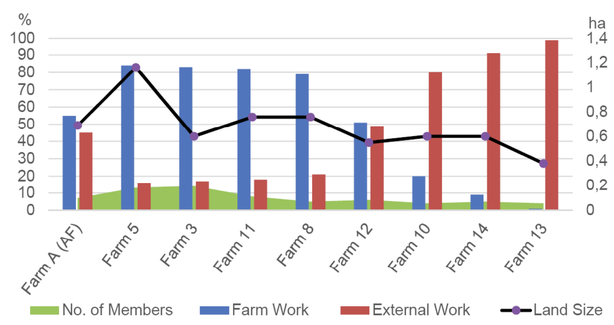
Agroforestry (AF) land (red line) surrounded by conventional crop rotating system. AF land has been established by one farmer for 15 years

Results

Livelihood generation

- Households with smaller land size wanted to transform larger land portions to AF

→ Stronger wish to diversify income generating strategies



Diffusion of innovations assessment

- After 5 years, out of 15 initially participating farms 6 farms successfully established agroforestry, 4 farms had limited success, 5 left the project and 20 more joined.
- Many of the distributed plants did not survive, mainly species previously unknown to farmers in Kaule
- Minimized risk due to only partial conversion of total farm area
- Labor intense process in the beginning, later reduced workload

<u>Evaluation</u> of 10 factors that can affect the course and speed of the diffusion process:

→ Potentially severe intricacies during the adoption process

→ Capability for enhancing livelihood security rather high

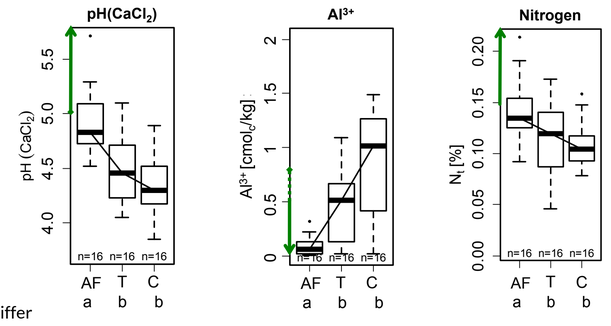
→ Potential for diffusion: very appropriate innovation with a great potential to spread throughout a village community like in Kaule

Backcasting

- Agroforestry system would incorporate main envisioned changes of farmers (more trees, better water management, new markets)

Soil analyses

- Significantly better soil quality in AF than in C systems

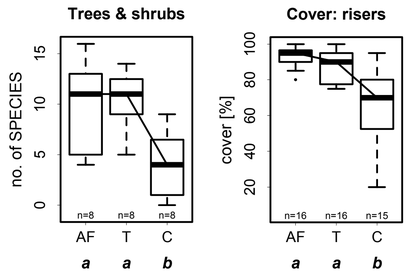


→ optimum for plant growth

systems with different small letters differ significantly at $p < 0.05$

Vegetation mapping

- Significantly increased species richness and ground cover at AF fields



Summary & Conclusion

- Participation of all social groups in all stages of project planning and implementation is of key importance for project success

→ Creating identification with the project

→ Incorporation of local knowledge

- Backcasting is a suitable method to include all social groups

- Adoption of AF → evidence of :
  - Increased willingness to implement sustainable agricultural practices
  - Obtainment of environmental benefits
  - Livelihood security

→ **Contribution to sustainable modernization processes in mountain agriculture**

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