

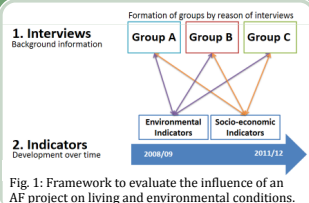
# Transition to Agroforestry in the Mid-Hills of Nepal: Implications for Livelihoods and Environment

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In Nepal, where farming systems are still largely conventional, further extension of agroforestry (AF) practices is needed to counteract unsustainable agricultural intensification. Farmers are increasingly encouraged to adopt AF farming systems. Kaule e.V., a Nepalese-German NGO for socially sustainable agro-projects, initiates and supports the transition to AF practices in Kaule village, Nuwakot District. In addition, we conduct concomitant scientific studies aiming at analysing the transition process from social and natural sciences' perspectives.

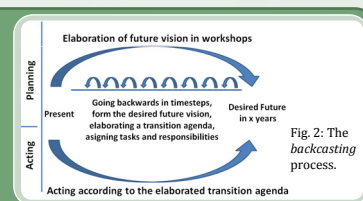
## Development of an AF project and its influence on living conditions



- Participatory action research in system development to show influence and development of an AF project on certain living and environmental conditions. Collection of indicator data from 2008 to 2012.
- Identification of groups by family background and personal ability: finances, level of education, family size, daily life routine and workload distribution among the household members.
- We found diverging degrees of progress in implementation of AF cultivation methods in the identified groups after 3 years of transition process.

## Transition to sustainability – A case study from Nepal

- Objective: Applicability of *backcasting* and its potential to enable people to think and act in the long term.
- Workshops revealed a gap between perceptions of the leaders and perceptions of the farmers about problems and needed transitions; insights which ease successful planning in the local community in future.
- Preliminary results: Participation in a *backcasting* process seems to trigger long term thinking and in consequence investment in sustainable systems like AF.



## Comparative soil and vegetation studies

### Comparative evaluation of green manure legumes for reclamation of degraded terraces

- Biomass accumulation and  $N_2$ -fixation of fallow species were analysed and compared.
- Solely Nepal-native *Mucuna* sp. fixed substantial amounts of N from the atmosphere ( $N_{dfa} > 60\%$ ).
- Growth and biomass accumulation were generally low, however, fallow legumes have the potential to contribute to the restoration of degraded terrace soils, provided that the limiting nutrients K, Ca, and Mg are added.

### Estimation of lime deficits and implementation of lime amelioration

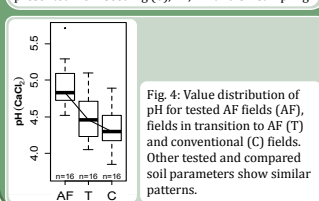
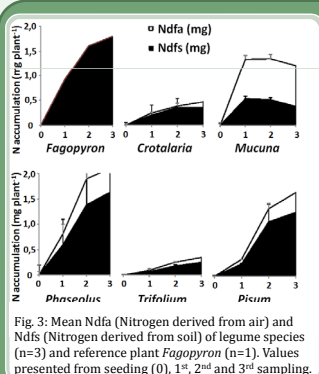
- Soils of the Kaule region show low pH values, therefore lime was spread on one field (treatment) to compare growth of crops and trend of pH to an adjacent field w/o treatment (control) over time.
- First results after 9 months showed higher biomass accumulation, more vitality and raised pH at the treatment.
- To ensure sustainable recovery of the soils and to raise CEC more measures, e.g. humus application are required.

### Comparison of soil properties: conventional land use versus AF

- More favorable soil conditions for plant growth in AF system, compared parameters: pH, OM,  $Al^{3+}$ , CEC, nutrients
- Contrasting soil quality is a result of differing management practices
- Improved soil conditions of transition land detectable already after few years

### Comparison of vegetation diversity: conventional land use versus AF

- Tree and shrub diversity of AF fields is inherently higher compared to conventional fields.
- Vegetation cover on AF land is significantly higher, thus protects the soil better from erosion by heavy rain.



## Market evaluation and survey for smallholders' cash crops

- Methods: interviews, questionnaire, (participant) observation, group discussion
- Promising and potential markets for cash crops, e.g. kiwi and asparagus exist in Nepal: tourist sector with restaurants, hotels and merchants trading with tourists and expatriates
- Cash crop harvest seasons coincides with low income seasons and can reduce these periods.
- Prerequisite for successful marketing: sufficient amount of harvested fruits



The studies have been conducted in frame of combined development assistance and research projects since 2007; organized by the Nepalese NGO "Kaule Environment" and the German NGO "Kaule e.V.", financed by and in cooperation with many private donors and several foundations.



**Conclusion:**  
The adoption of Agroforestry (AF) practices contributes to natural resource and socio-economic sustainability.

meeting subsistence requirements

improving livelihood security of households

providing ecosystem goods and services

improving economic conditions

improving livelihood security of households

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