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## INTRODUCTION

Tropical forests, although covering less than 10% of the land worldwide, represent the largest terrestrial reservoir of biological diversity, from the gene to the habitat level. Because of ongoing human impacts on tropical forests, suffer degradation, fragmentation, and local extinction (Amanath et al., 2001). At present, however, the driving forces and controlling factors of tropical deforestation and degradation are not yet fully understood because of the complexity of the process with many interactions and feedback systems and because of a lack of reliable data.

## PROBLEM STATEMENT

- An ongoing population growth in Ethiopia resulted in a continuing deforestation and land degradation. Deforestation and overexploitation of the land has a negative consequences which hamper further development of the county.
- Through a lot of forest still stands in SW Ethiopia which accounts for 18 % of the overall land cover of the region and 56% of the country’s total (Gole and Denich, 2001), a significant amount of deforestation took place during the last two decades.
- The negative consequences of recent land use changes (deforestation) are highly visible in the study area:
  - Loss of fertile soil material due to erosion processes and landsliding.
  - Increase of the sediment load in the rivers and accelerated sedimentation of reservoirs used for electricity production.
  - Loss of biodiversity
- Though there are multiple drivers of deforestation, it is at present not clear which drivers are active in Ethiopian landscapes in general and in SW Ethiopia in particular.

## OBJECTIVES

### Specific objectives

- To detect and map patterns of land use change during the last decades at various spatial scale levels.
- To correlate the observed change patterns with biophysical variables on the one hand and socio-economic variables on the other hand.
- To develop a database with information on land use systems of the last decades.
- To understand and quantify the role of subsistence and market farming in the household economy.

### RESEARCH HYPOTHESES

- Land use change patterns are controlled by biophysical factors: deforestation takes place on fertile and flat land units.
- Land use change patterns are controlled by socio-economic factors: deforestation is related to population density, poverty and market economy.
- Land use change is related to policy and the implementation of development plans.

### STUDY AREA

- The Gilgel Gibe catchment within the province of Jimma Zone will be taken as an example application.

## MATERIALS AND METHODS

### Land use change detection

- Land use change patterns will be mapped analysed at two spatial scales:
  - At province level on the basis of classified LANDSAT-imagery (1984 and present).
  - At individual village level using timeseries of aerial photographs (1967, 1975 and present).
- Research actions: selection and classification of images, validation of compiled land use maps.

### Analysis of biophysical factors

- Correlation analysis between biophysical variables such as topography, climate and soil type on the one hand and observed land use change on the other.
- Research actions: collection of biophysical data, statistical analysis.

### Analysis of socio-economic factors

- Correlation between population growth, market integration, way of living on the one hand and observed land use change on the other.
- Research actions: collection of population statistics, household interviews and typology and mapping of way of living, statistical analysis.

### Policy and management analysis

- Correlation between policy implementation and law enforcement on the one hand and observed land use change on the other.
- Research actions: mapping of policy implementation, interviews with key informants and administrators, literature and legislation review, statistical analysis.

## PRELIMINARY RESULTS

- A preliminary analysis on the bases of LANDSAT imagery shows that there was significantly more forest cover in SW Ethiopia in 1984 than at present

## EXPECTED OUTCOME

- Approximately 30% of the forest area in 1984 was converted from forest into other landuse categories mainly pasture and agriculture.
- The southern and south central parts of the study area are the most affected by deforestation.

## REFERENCE
