



# IMPETUS Benin

## Assessing and Modelling Land Use and Land Cover for Decision Making

H.-P. Thamm<sup>1</sup> & M. Judex<sup>1</sup>

<sup>1</sup>ZFL, Center for Remote Sensing of Land Surfaces, University of Bonn, Walter-Flex-Str. 3, 53114 Bonn, Germany

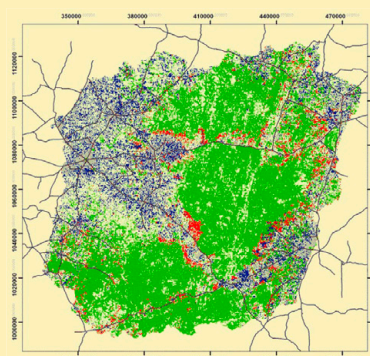
### Introduction

- Land use and land cover in West Africa was subject to severe changes within the last decades with serious consequences for the ecosystem and the life of the people.
- There is a demand to assess the land use and land cover changes (LUCC) and the underlying processes, the actors and their motivations and to create models to compute future LUCC scenarios.
- It is a challenge to provide decision maker with sound information about future LUCC according to specific boundary conditions and to estimate the impact of decisions on the land use / land cover.

### Conclusion

Within IMPETUS an advanced decision support system **LUMIS** has been developed, providing decision makers with sound information about the future state of land use and land cover for different boundary conditions. The challenge was to integrate a complex scientific LUCC model (**XULU**) in an easy to use decision support systems. **LUMIS** is step forward to make scientific results available for decision makers and to bridge the gap between science and application.

### Detection of land use and land cover changes HVO

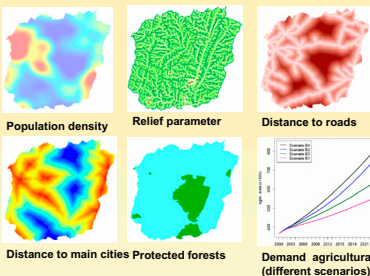


Changes in the land use and land cover between 1991 and 2000 were detected on the base of LANDSAT images with a sophisticated decision tree approach.

**+ 45% agricultural area  
- 23.700 ha forest**

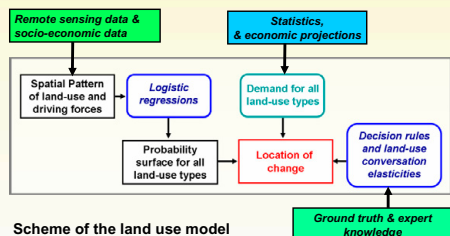
- Legend**
- Forest to agricultural area
  - All new agricultural area
  - Settlement
  - Agricultural area
  - Forest
  - Savannah and other classes
  - Roads

### Explaining land use and land cover changes



To explain and understand the underlying processes detailed statistical analysis had been performed. Although population is an important factor, it cannot explain solely the complex land cover changes. Land availability, infrastructure and land tenure are also important factors

### Modelling land use and land cover changes



On the base of the process understanding a statistic-dynamic land use and land cover change model (CLUE-Type) was set up and integrated in a new developed spatial explicit modelling platform (**XULU**).

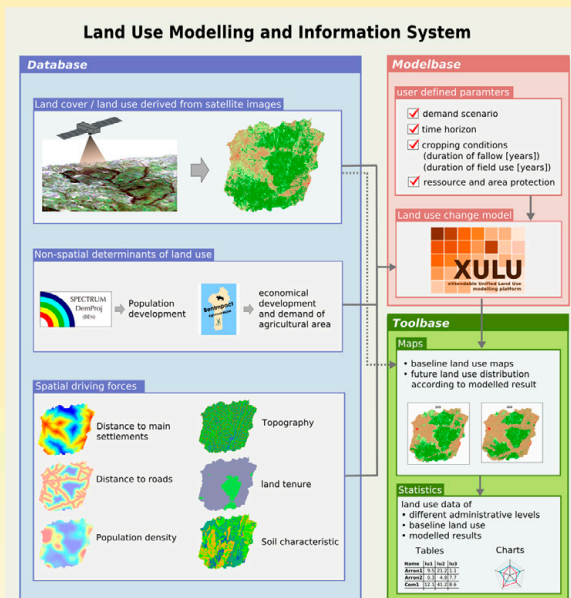


With the **XULU** platform it is possible to compute the changes of land use and land cover patterns for different scenarios with different boundary conditions in a user friendly way. As well impact of intervention measures (eg. construction of roads) can be assessed.

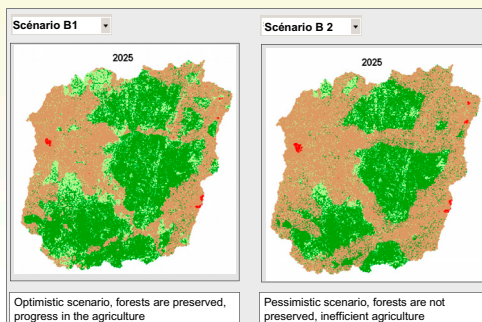
### Creating a decision support system for land change scenarios

**Challenge:** How to design a spatial decision support system (SDSS) that compute land use and land cover changes for different boundary conditions and management options? It must be easy to use for non experts, but represent the complexity of the process.

**Realisation:** The core of the SDSS is the sophisticated XULU land use model. A special programmed user interface allows to choose different pre-defined scenarios or the definition of own scenarios. It has a modular design and is quite flexible.



### LUMIS – Application Example



The result of different boundary conditions can be evaluated. This allows the detection of critical developments and helps to optimise appropriate measures by showing the effect of every measure.



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