# Land Pressure and Agrarian Mutation:

# a spatial modelling of farming system evolution from plot to regional scale in West Burkina Faso

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Farming System Design 2015

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LA RECHERCHE AGRONOMIQUE POUR LE DÉVELOPPEMENT

TETIS

SIGMA

asap

## Context


Notable developments in West Burkina Faso these last two decades :

- high population growth,
- cultivated area reaching its saturation point,
- new cropping practices…

Result of many processes occurring at different scales

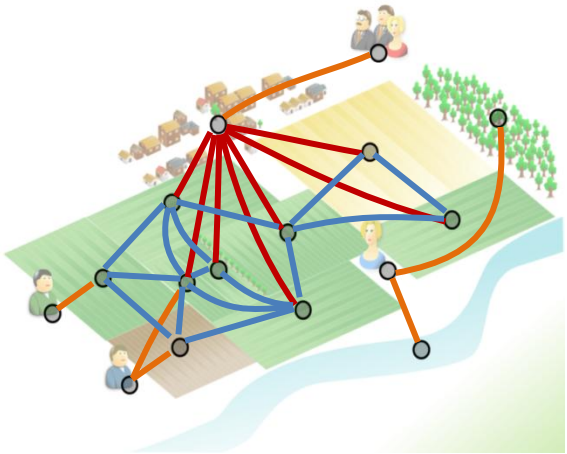
## Objective

To develop a multi-scalar methodology to estimate the spatial variability and the time dynamics of agrarian systems in order to analyse for this last fifteen years :

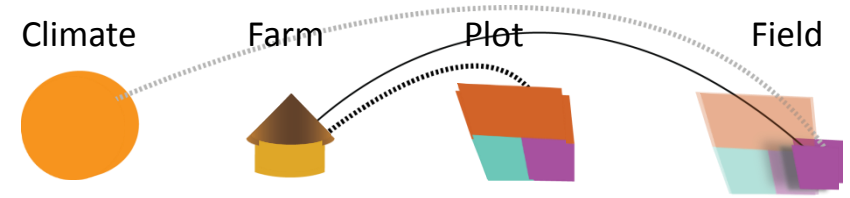
i) the production trends
ii) the land cover change

approach integrating a crop model into a spatial dynamics modelling environment

## Ocelet, the modelling platform



## Model structure

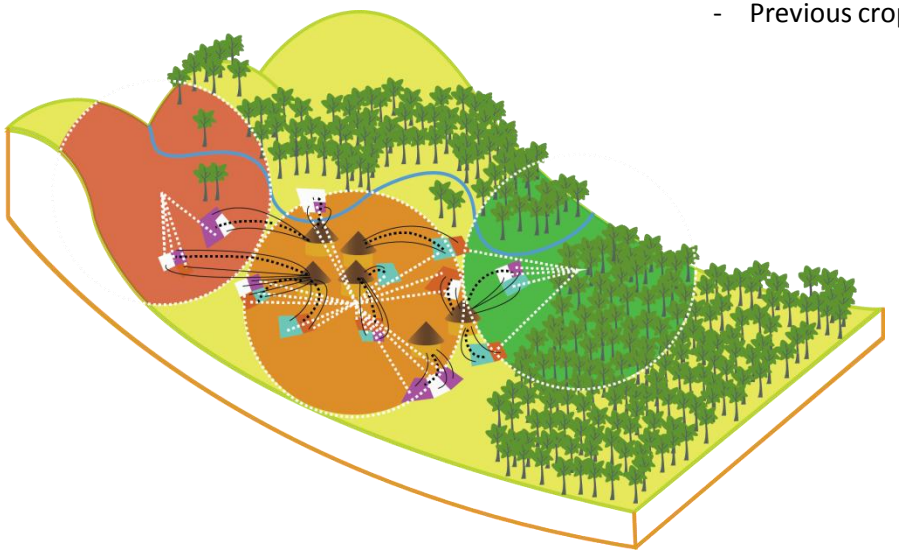



Properties :
- Température
- Relative humidity

Properties :
- type
- size

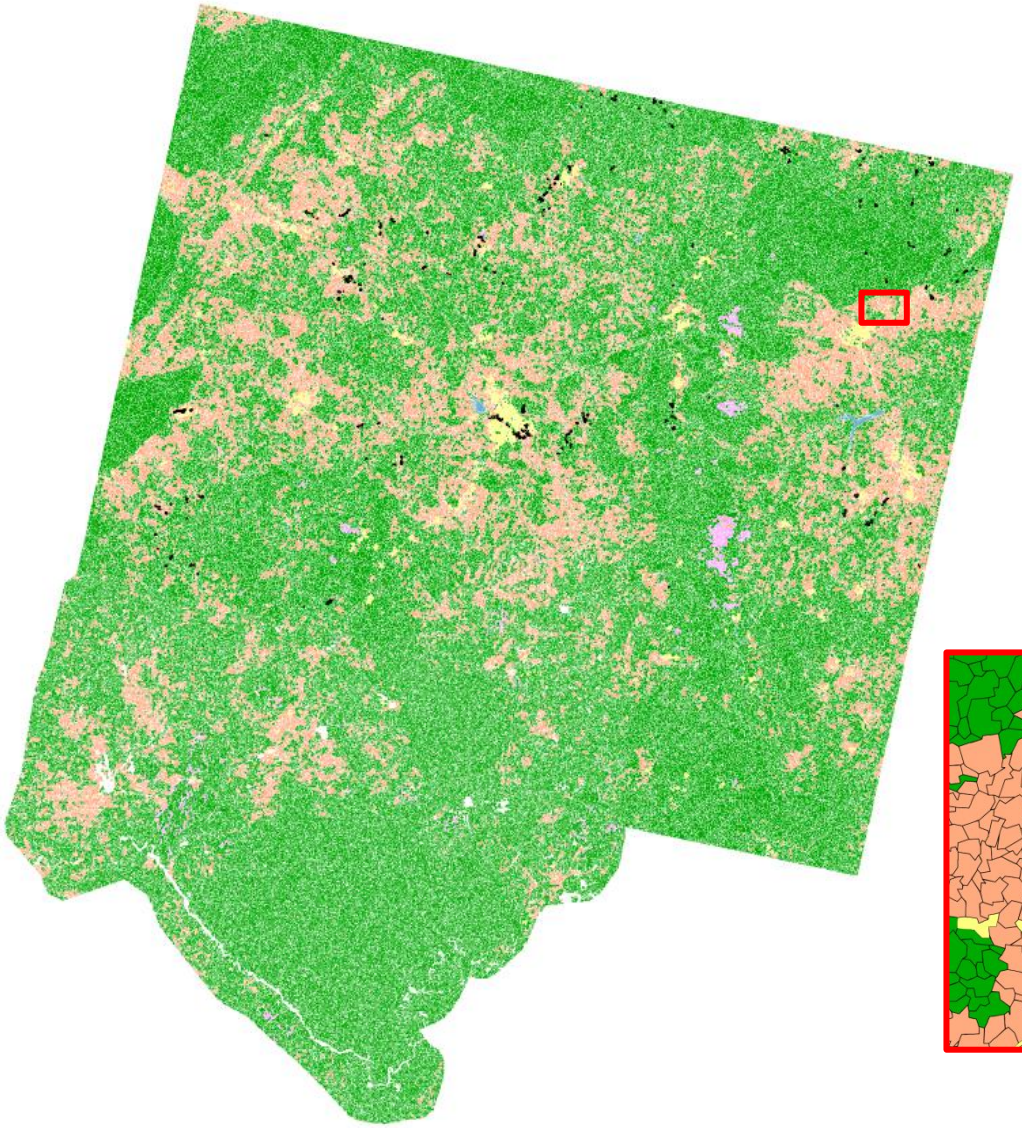
Properties :
- Land use
- size

Properties :
- soil
- Crop
- Previous crop

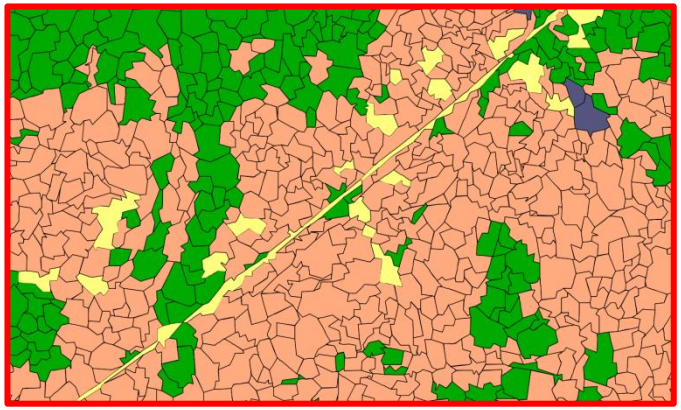


# Processes modeled

## Initialisation



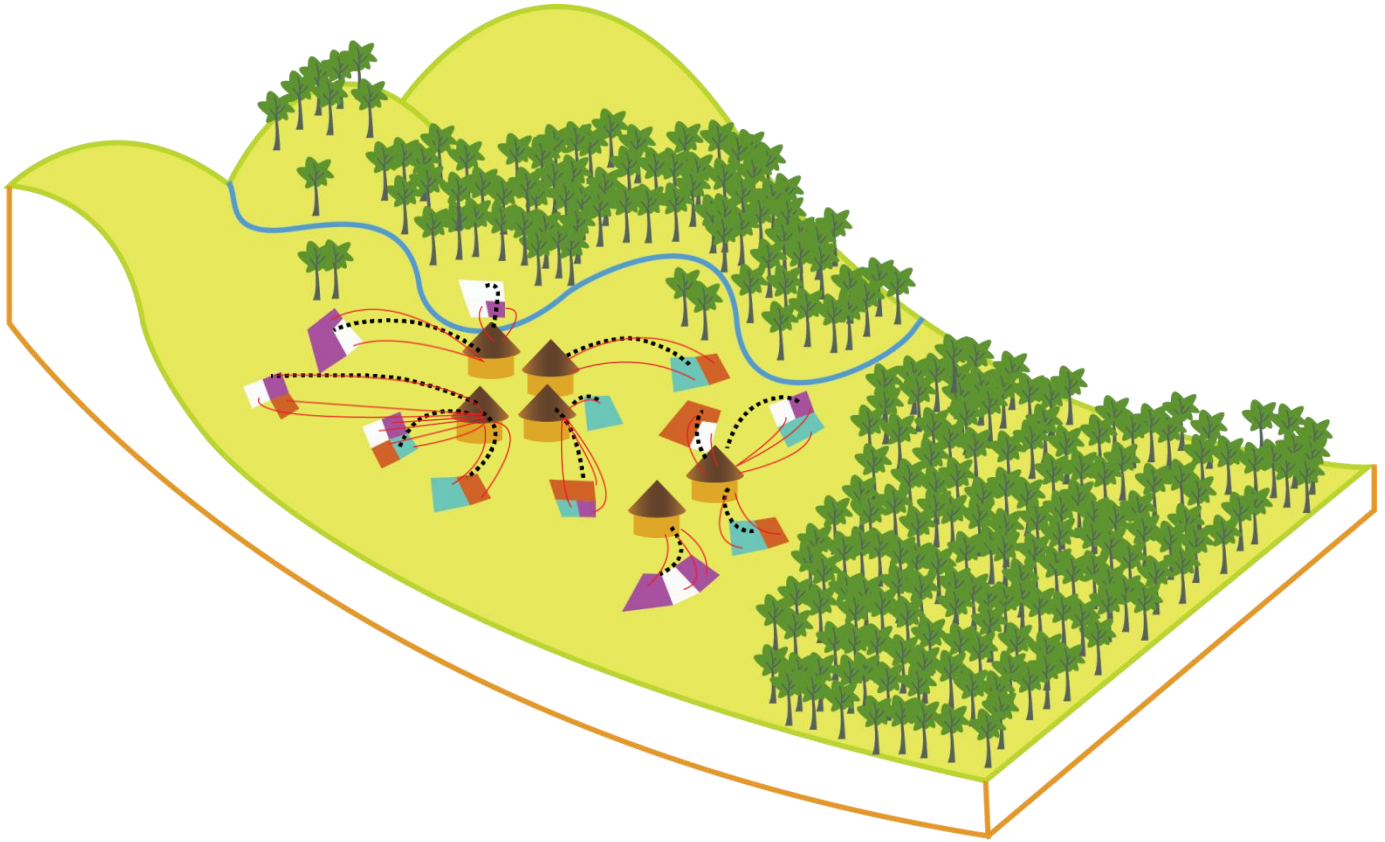
Crop
Natural vegetation
Crust
Water
Soil
Urbanization



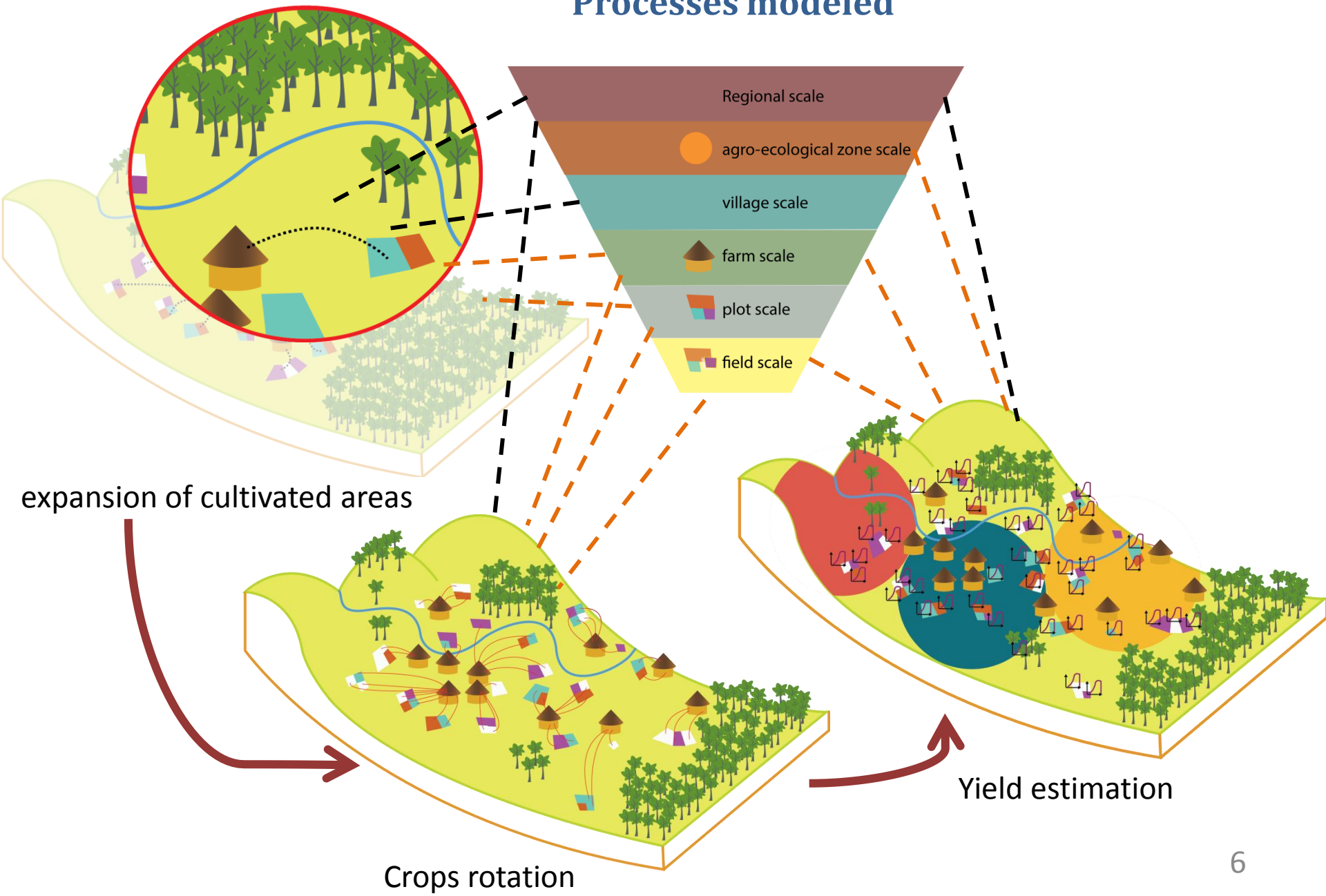
Initial state : landscape of the year 2000

# Processes modeled

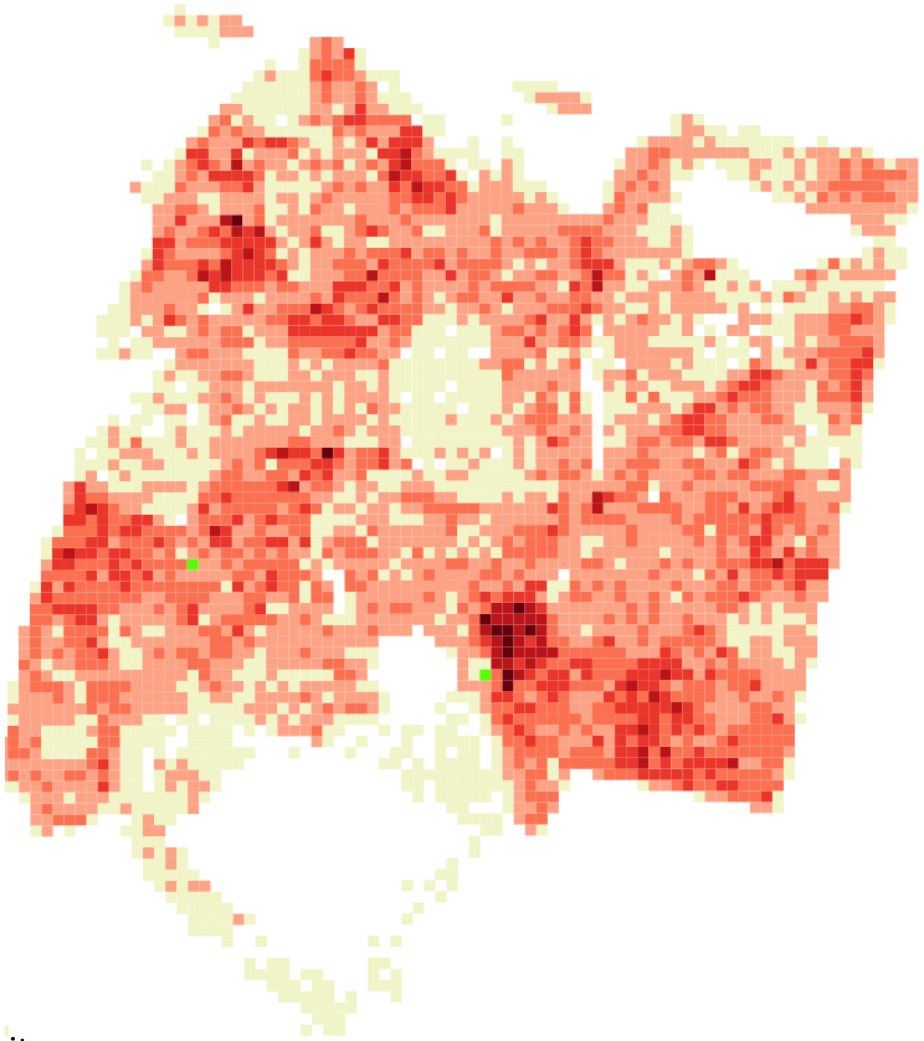
## Initialisation

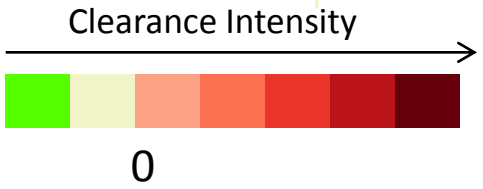


# Processes modeled

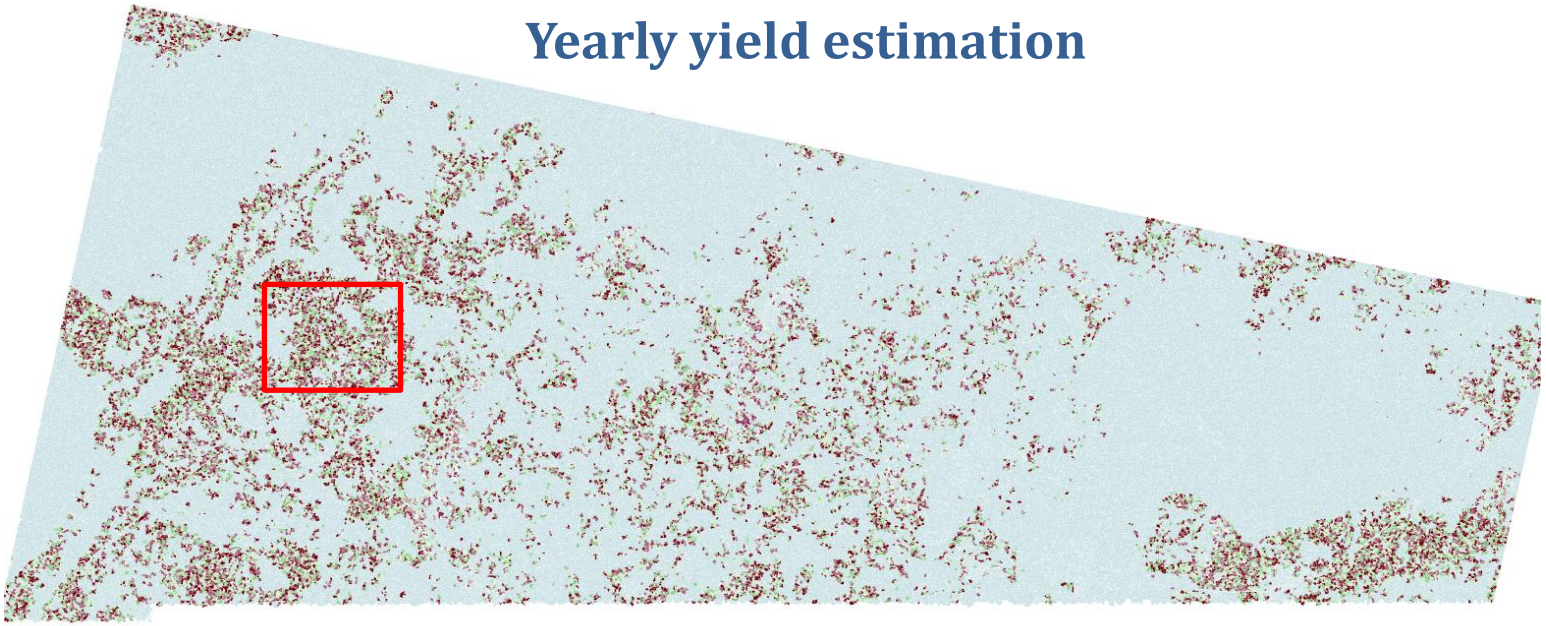


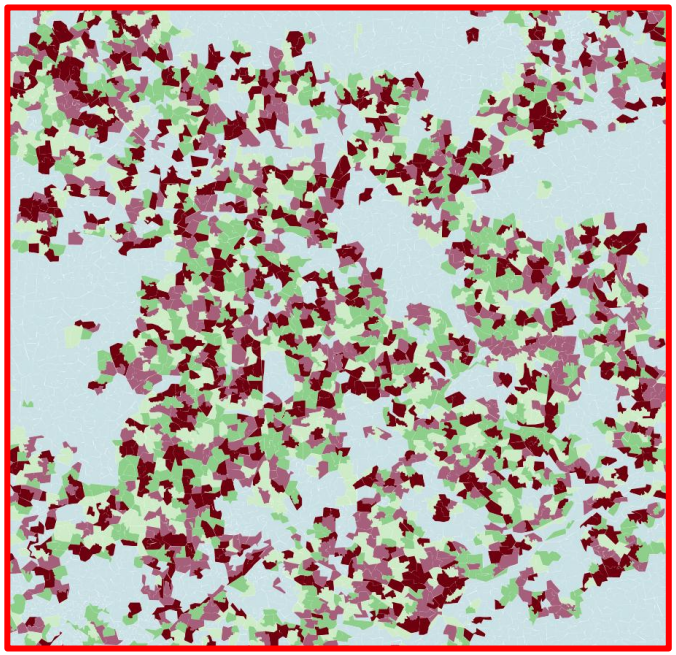
# Spatial distribution of forest clearance between 2000 and 2007





## Yearly yield estimation





Non crop

sorgho variety 1

sorgho variety 2

Kg/ ha

0
1749.45711586405
1765.65907425721
1768.17063939006
1770.84863561379
1884.12529469434
1911.09469491491
1914.39118494633
1941.03308708731

# RESULTS

- We developed a model where coarser scale processes (migration, farm life cycle) are linked with finer scale processes (farm strategy, local agricultural practices) to simulate annually, and for the last fifteen years,

  i) the expansion of cultivated areas at the expense of forests, and
  ii) the crop production.

The new methodology developed, based on interactions graphs, proved capable of linking and handling processes across scales.

- Work is ongoing to use expert knowledge and field surveys to better estimate model parameters.

# Thanks for your attention

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