Managing water ressources within Mediterranean agrosystems bu accounting for spatial structures and connectivities - ALTOS

KOM ALTOS-Tunisie

Actions prévues par INRGREF & collaborations

WP4: Task 4.1 : Crops distribution evolution scenarios

April 20-21, 2020

Landscape evolution scenarios: projections 2040
ANR TRANSMED ALMIRA

In **Agroforestry** scenario, a large part of the crops in marginal areas is transformed into a mixture of arboriculture (fig, olive, carob, acacia) or aromatic or medicinal plants (thyme, rosemary, lavender) in association with cereal and legume crops.

In **Livestock and fodder crop extension** scenario, the region is betting on the development of meat food, with sheep meat being exported. Agricultural land is transformed into forage crops on clay soils. Part of the agricultural land is transformed into grazing areas.

In **Intensification of food legumes and cereals** scenario, the exploitation of food and cereal leguminous crops, located mainly on clay soils with steep slopes, as well as market gardening by pumping, is on the rise. The breeding is gradually abandoned.

Validated

Workshops with stakeholders

Landscape evolution scenarios: projections 2040
ANR TRANSMED ALMIRA

The LUCC model to translate the narrative scenarios in spatially explicit maps is based on one function applied directly at polygon (or farm field) grain:

The set of land uses selected for diffusion is based on expert knowledge. There is a **constraint map** for each land use, calculated on a spatial combination of geomorphological and soil characteristics variables and distance maps.

The **transition function** between land uses based on a transition matrix at the annual time step: Each year, the land use of each polygon (or farm field) of the watershed changes according to a probability given by a **transition matrix.**

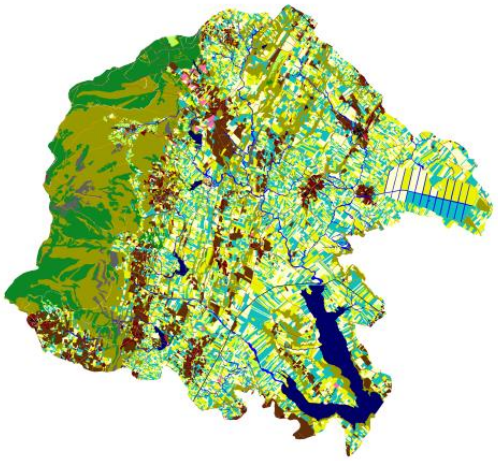
The transition and **diffusion functions** are finely estimated a priori at the annual time step to obtain, at the end of the simulation, the frequency tables from narrative scenarios aggregated at the watershed level.

Landscape evolution scenarios: projections 2040
ANR TRANSMED ALMIRA

- ✓ **<u>Calibration of the land use model</u>** : Use of BV Kamech for BV Lebna
  - ✓ Optimal use of surveys conducted with farmers and instituions within BV.
- ✓ **Workshops**
  - ➢ Present, debate, qualitative evaluation of landscape evolution scenarios with stakeholders

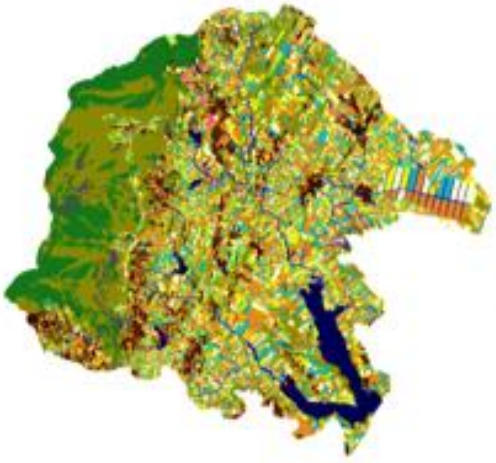
Landscape evolution scenarios: projections 2040
ANR TRANSMED ALMIRA

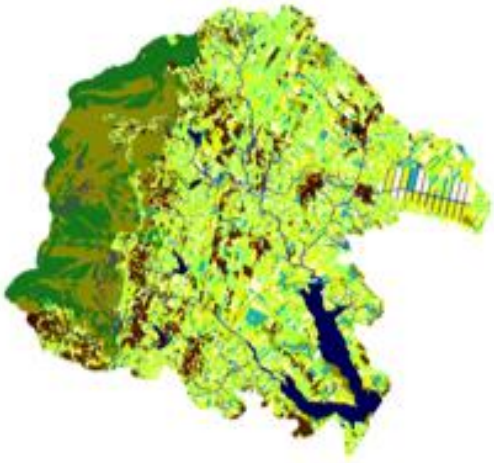
2015

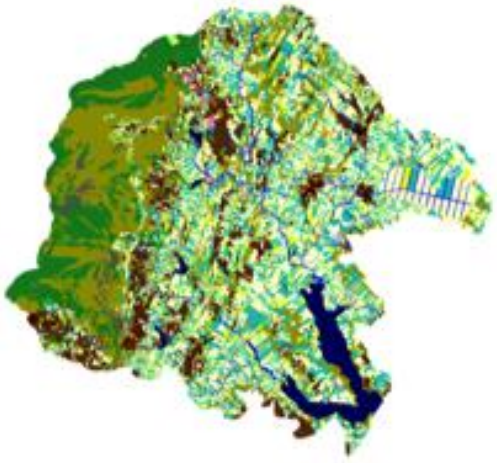


Agroforestr **Livestock and fodder** **Food legumes and**

2040







WP4: Task 4.1 : Realistic crop distribution scenarios

Take into account the spatial distribution of annual crops into aggregates of fields with the same crop type.

WP4: Task 4.1 : Realistic crop distribution scenarios

Objectif

We explored, in the context of the Lebna catchment, the decisions made by farmers about annual crop allocation within the collective contexts in which farmers operate.

Travaux 2015-2019 (LMI Naila, ANR ALMIRA)

- Characterization of landscape mosaics at the scale of watershed
- PhD (ARTS scholarship)
  - Crop allocation drivers at the field level
  - 2018-2019
  - Land tenure evolution

WP4: Task 4.1 : Realistic crop distribution scenarios

3 approaches:

1. Identification of crops clusters classified according to crops successions and individual/collective crop allocation rules (geostatsical)

2. Identification of physical linear elements of the landscape impacting the crops clusters

3. Individual or collective interviews collectives of actors to validate the identified crops distribution rules

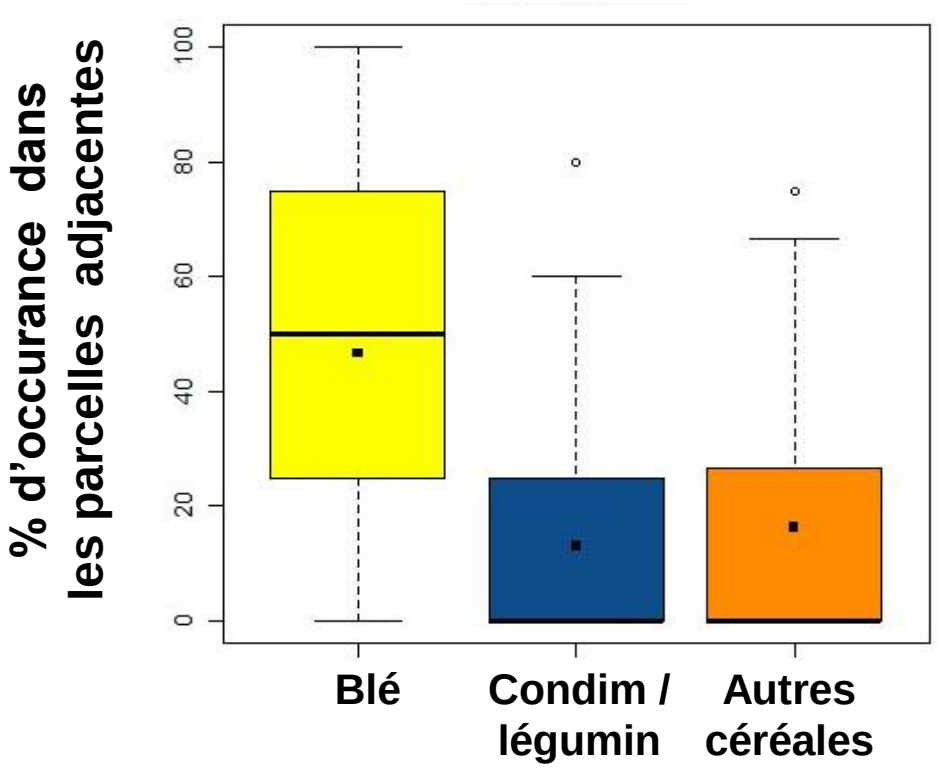
WP4: Task 4.1 : Realistic crop distribution scenarios

1. Collective rules of crop allocation

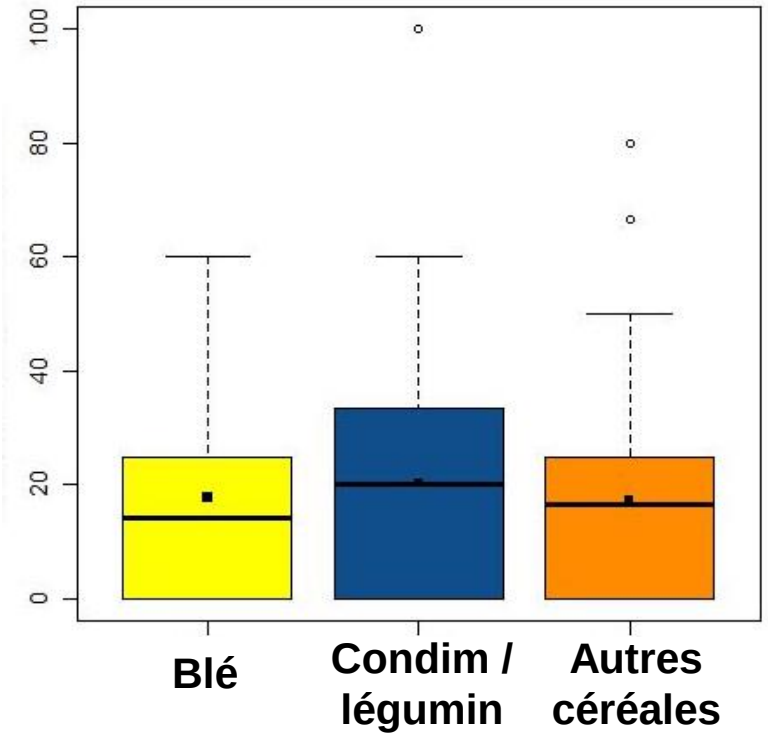
-> management of constraints related to field accessibility and free grazing after crop harvest

- Distribution of crop types depends on the crop of neighboring field and the context of the field

Isolated fields

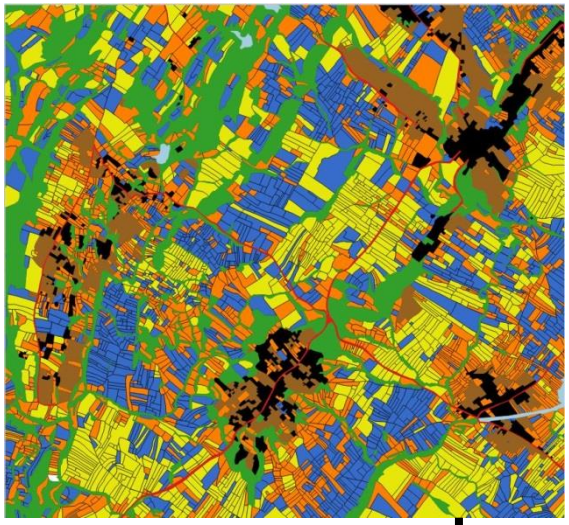


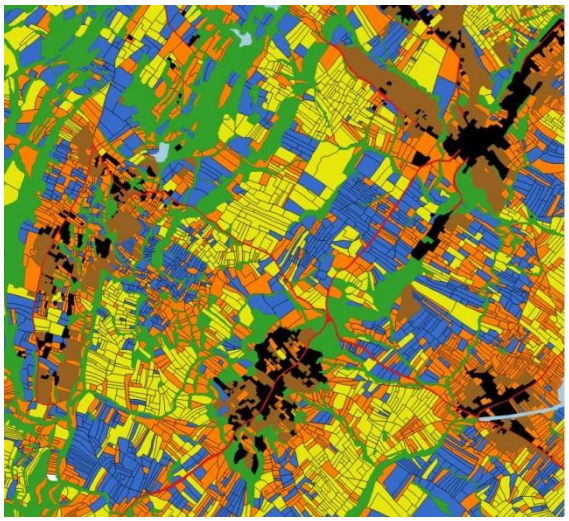
Non Isolated fields



WP4: Task 4.1 : Realistic crop distribution scenarios

Cycle 2015-2016





Cycle 2016-2017

Aggregates of fields with the same crop type

Condiments et légumineuses (CLM)

Fourrages (Four)

Blé (BL)

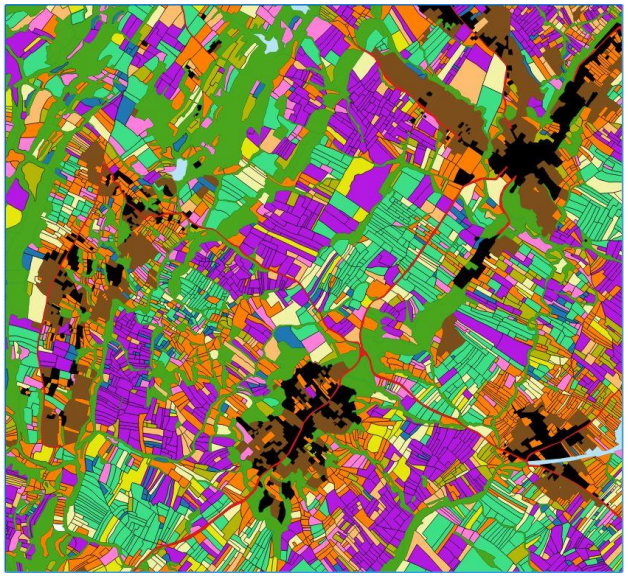
Lac

Vég. Nat.

Urbain

Route

Aggregates of fields with the same crop successions



Successions dominantes

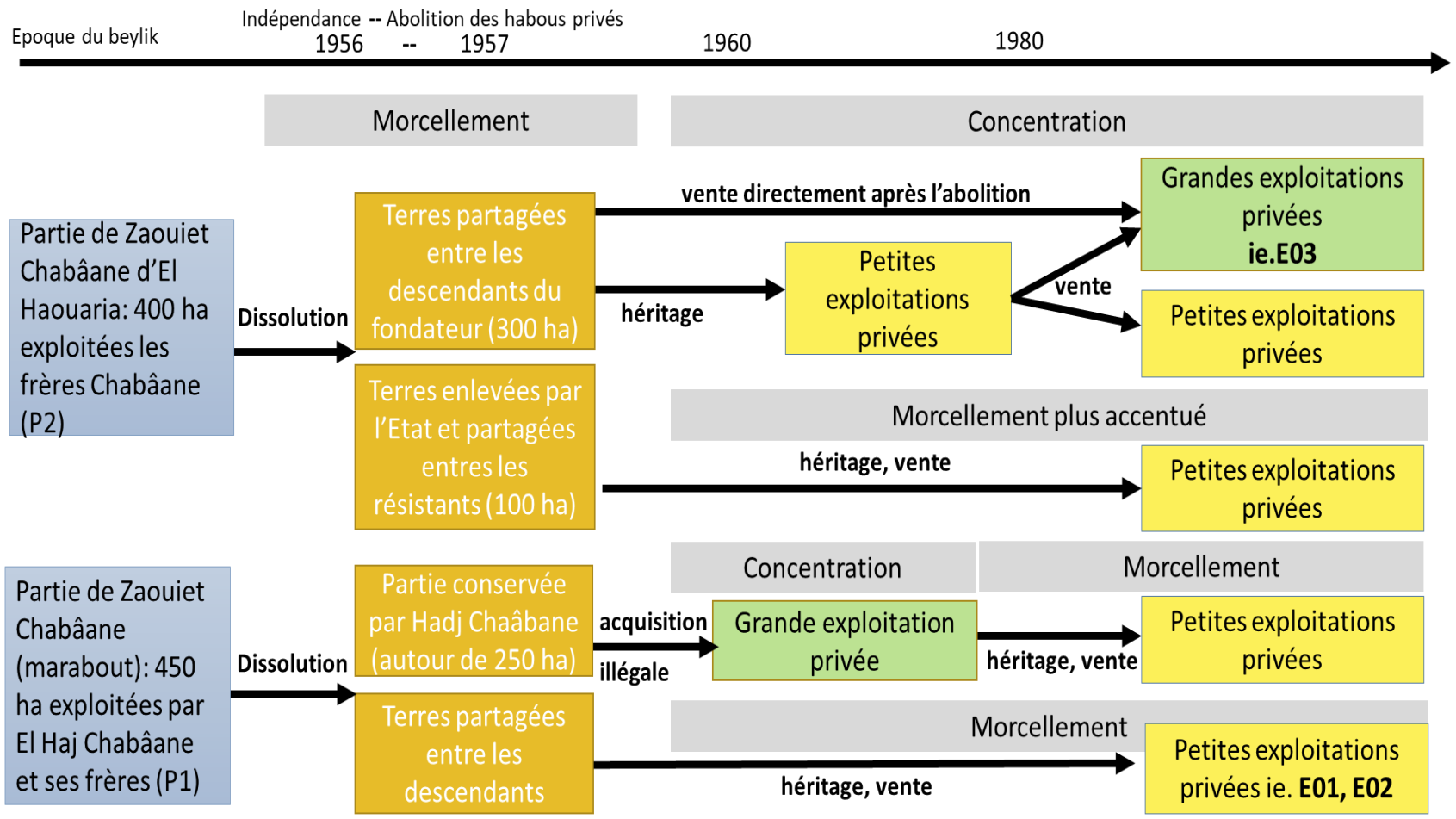
CLM / BL

BL / CLM

Four / Four

WP4: Task 4.1 : Realistic crop distribution scenarios

Trajectoires d'évolution foncières des terres dans la zone collinaire



Perspectives

2020-2021

- Characterize the clusters of crops at the landscape scale
  - *Geostatistics, images classification 2019-2020, 2020-21*
  - *Identification of physical linear elements of the landscape impacting the crops clusters*
  - *Publications*
- Characterize the impact of land tenure
- Individual or collective interviews collectives of actors to validate the identified crops distribution rules
- Present, debate, qualitative evaluation of landscape evolution scenarios with stakeholders