INITIATIVE ON Agroecology

# REPORT

## Towards a conceptual model for agroecology

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INITIATIVE ON

# Agroecology




# List of acronyms and abbreviations

| | |
|---|---|
| **AVSF** | Agronomes et vétérinaires sans frontières |
| **DyTAEL** | Dynamics for a Local Agro-Ecological Transition |
| **DyTAES** | Dynamics for an Agro-Ecological Transition in Senegal |
| **EDSTM** | Doctoral School of Science and Technology of Mali |
| **ESP** | Ecole Supérieur Polytechnique (UCAD) |
| **GMV** | Great Green Wall |
| **IAE** | AgroEcology Initiative |
| **ODD** | Sustainable Development Goals |
| **SENS** | Savoirs Environnement et Société (UMR) |
| **UCAD** | Cheikh Anta Diop University |
| **USTTB** | University of Sciences, Techniques and Technologies of Bamako |

# 1.Introduction

## 1.1. Context

The major challenge facing agriculture in the 21st century is to find the balance needed to mitigate climate change, to which it actively contributes, without compromising its sovereign role in generating resilient food systems. Mindful of this vital challenge, the international community, through the Paris climate agreements in 2015 reinforced by the IPCC report on food systems in 2019, is campaigning for ecological agriculture based on the principles of sustainable development, i.e. multidimensional performance (agronomy/environment, economic and social).

At national level, in Senegal, the economic development reference framework (Plan Sénégal émergent-PSE) initiated in 2014 for the 2035 horizon has been readjusted in 2021 in the PSE_Vert to devote 30% of agricultural land to agroecology.

However, despite the prominence of agroecology on international and national agendas, it occupies a small proportion of donor funding windows, with the exception of a few, including the European Union (EU). Indeed, it is very often reduced to its biophysical dimension. Agroecology has long been seen in this light, but there is very little scientific evidence today to prove to donors its economic profitability, scalability and ability to meet short implementation timescales, in order to be recognized as a key solution for building sustainable food systems.

To fill this information gap, a holistic vision of agroecology is being tested in Senegal along the East-Central-East transect, through initiatives such as Africa Milk and DESIRA FAIR Sahel, funded by the EU, for the sustainable intensification of food systems. These initiatives have revealed, among other things, that in the central zone, represented by the department of Fatick, farms are more sensitive to agroecological practices. The market (processor and trader) also has enormous potential to boost local production, despite the problem of destructuring.

Capitalizing on this potential by identifying key success factors for the creation of short, sustainable agroecological value chains could enrich arguments, such as the CGIAR agroecology initiative, on the profitability and scalability of agroecology in due course.

Indeed, in Senegal, the CGIAR agroecological initiative will build on proven achievements in agroecological intensification of food systems to support value chains made up of profitable, sustainable enterprises.

WP1: "Living lab and co-conception of Innovation" is organized around 3 main axes: support for DyTAEL Fatick, scaling-up of agroecological innovations, and support modeling to define viable paths for agroecological transitions.

Secondly, modeling to support the territorial dimension of the agroecological transition will be integrated with interactions between agricultural productivity (crops, livestock, forestry), resource management (water, air, biodiversity) and the production of ecosystem services (support, supply, socio-cultural). Computer modeling can help stimulate coordination and generate discussion on common issues and interests from a territorial development perspective. The aim of this WP is to support, through a computer-aided simulation process, a more productive territorial ecology.

Thirdly, the scaling-up of agroecological innovations will focus on valorizing innovations tested in co-design schemes carried out in other projects, principally the FAIR Sahel project. The FAIR Sahel scheme combines agronomic diagnostics and tests of agroecological options in central and satellite fields. Discussions will focus on identifying the obstacles and levers that will enable these innovations to reach other producers in the region. Ways of adapting innovations to potential new users will be explored.

**THIS MISSION SUPPORTS THE SECOND POINT ACCOMPANYING COMPUTER MODELING**

# 1.2. Mission objective

The proposed intervention is to equip the Fatick DyTAEL with a simulation model to support the exploration of agro-ecological management options and enable the probable impact of these options to be estimated and discussed.

**The methodology for setting up this system consists of several phases:**

**1) a conceptual modeling phase of the territory's functioning based on the issues that DyTAEL wants to address, including :**

1. a workshop with DyTAEL to present the modeling approach, define the relevant questions and sketch out an initial outline of what is expected;
2. a succession of interviews or workshops with experts/technical advisors to assemble the elements of the conceptual model (i.e. to make an inventory of both the knowledge and the data required);
3. a feedback workshop to validate the conceptual model obtained;

**2) a simulation model design phase, essentially based on expert opinion, which again involves a sequence of meetings to refine the outlines sketched out in the first phase;**

**3) a simulation model implementation phase with a feedback workshop for validation by the experts and DyTAEL (does the model correctly reflect the way their territory works as they know it);**

**4) an implementation phase with a workshop on the different agro-ecological management options.**

Phase 1 is coordinated with the FerloSiné project, insofar as it was discussed at this project's kick-off meeting in October 2023 to create a conceptual model to better specify how MAELIA can meet the needs of their project (what already exists in MAELIA and what missing modules need to be developed). As a reminder, the FerloSiné workshop held from October 2 to 5 in Dakar consisted of :

- FAIRCARBON-SLAM B-FERLOSINE project objectives (JL Chotte)
- The MAELIA platform (Olivier Théron & Manon Dardonville on video)
- Collaborative research approaches (Living Lab) (JD Cesaro, E Delay)
- Carbon & climate scenarios for Senegal (Amadou Thierno Gaye tbc)
- Data and study sites: presentation based on current projects DSCATT (D Masse / E Delay), SUSTAINSAHEL, FAIDHERBIA FLUX (F Do), CASSECS (P Salgado, JD Cesaro, H Assouma), FAIRSAHEL/Initiative Agroécologie (JD Cesaro)
- Description of activities (in particular based on recruitment profiles): by those responsible for recruitment
- Chronogram of activities, responsibilities, participation.

This was followed by work in Diohine (groundnut basin) and Labgar (reforestation in pastoral zones). We therefore felt it was important to share the workshops/interviews (at least in part), and even to develop specific modules.

In addition, Tingouro Sanogo has just been awarded a PRAPS thesis grant under the co-direction of Oumar Maïga, Jean-Pierre Müller and Souleymane Traoré. His subject is to instrument this model development methodology precisely, on the issue of pastoralism (which is linked with agroecology on the one hand, and with carbon flow problems on the other) and the production of indicators that can be used by PRAPS to assess its interventions. It will therefore support the process.

THIS MISSION REPORT CONCERNS PHASE OF THIS INTERVENTION PROPOSAL

# 1.3. Mission organization

Workshop with Labgar actors

| Date | Activity | Contact |
|---|---|---|
| June 23 | Arrival in Dakar (J.-P. Müller and T. Sanogo) | |
| June 24 | Mission planning | Etienne Delay, Alassane Bah |
| June 25 | Discussion of the question of formalizing the modeling workflow | Etienne Delay, Alassane Bah |
| June 26 | Moving to the Mampuya center | |
| June 27-28 | Reflection and exchange workshop on the co-construction of a conceptual model | FerloSine project team : Dominique Masse, Etienne Delay, Alassane Bah, Anna Ndiaye |
| July 01 | Trip to Fatick<br>Meet the DYTAEL team | Fatick DyTAEL stakeholders (Appendix 1) |
| July 02 | Meet the cast of Diohine<br>Trip to Linguère | Diohine players (Appendix 2) |
| July 03 | Interview with AVSF agents<br>Workshop with Labgar actors | AVSF agents<br>Labgar players (Appendix 3) |
| July 04 | Departure from Dakar (J.-P. Müller) | |
| July 12 | Feedback workshop | Etienne Delay, Dominique Masse |
| July 19 | Meeting of the Fatick DYTAEL technical committee | Mame Birame Sene |
| July 22 | Departure from Dakar (T. Sanogo) | |

# 2. Actions taken

## 2.1. Mission planning

The first meeting at the École Supérieure Polytechnique (ESP) de Dakar (UCAD), which took place on Monday June 24, brought together :

- Jean-Pierre Müller, CIRAD researcher, UMR SENS
- Tingouro Sanogo, doctoral student in computer science at EDSTM
- Alassane Bah, teacher-researcher at ESP
- Etienne Delay, CIRAD researcher, UMR SENS

This meeting provided an opportunity to discuss the planning of the mission's various activities, including the various workshops with local stakeholders. This planning covered both organizational and financial aspects.

## 2.2. Day of 06/25/2024

### 2.2.1. Discussion of the question of formalizing the modeling workflow

On Tuesday June 25, a discussion session took place on modeling approaches, including the phases of system interview and understanding, conceptual model design, model specification and implementation. Discussion also focused on the idea of setting up a more or less automated workflow using model-driven engineering (MDE). IDM is based on the design of successive models, from the conceptual model to the target programming language model, and transformations between these models.

**The session was attended by Jean-Pierre Müller, Tingouro Sanogo and Etienne Delay.**

### 2.2.2. Videoconference interview with the Secretary General of the Fatick DyTAEL: Mame Birame Sene

The interview took place on the evening of July 25. The aim was to establish contact, present our project and discuss key issues for the Fatick department. Following the participants' introductions, the following points were discussed:

- **Presentation of our modeling project in support of DyTAEL's needs on a scale to be defined;**
- **Details provided by the General Secretary:**

> The Secretary General thanked for the initiative and provided information on the DyTAEL of the Fatick department, which comprises 17 communes organized into 4 arrondissements, as well as an 18-member departmental council.

DyTAEL has a steering committee, a technical committee and a management committee:

- The steering committee is made up of 9 NGOs, 14 POs, 18 research institutes, 18 representatives of local authorities, 9 technical services, 3 associate members and 2 agri-food processing industries, plus the press and consumer associations;
- The technical committee is made up of 40 members, including 4 NGOs, 6 POs, 1 processing unit, 1 consumer association, 3 research institutes, 5 technical services, 18 representatives of local authorities (departmental council and 17 elected representatives) and a radio station as an associate member. It is responsible for drawing up the action plan;
- The steering committee is made up of member POs (CAREM, VIS LA JOIE ECOLOGIQUE, JAAES) and ensures the implementation of action plans.

The Fatick DyTAEL aims to promote agroecology to ensure the resilience of family farms in the Fatick département by 2035. Vision for the department: Fatick more resilient and prosperous, open and industrialized.

Four themes have been defined:

- Water management for equitable access to water in terms of quantity (from ponds to boreholes, uses) and quality (salinity, pesticides);
- Soil restoration and fertilization (forestry, composting, etc.);
- Reduction of chemical inputs (composting, integrated protection);
- Animal and human food systems (storage points for agroecological products at commune level and organization of supply chains).

One of DyTAEL's activities is to raise public awareness of agro-ecological practices, both at departmental and local level, in order to be closer to the population.

In a first analysis, our modeling experiments could support stakeholders' reflections (DYTAEL or communal-level fora) on soil fertility management (AfD AgrEco project) and the organization of supply chains (Dagana project on the dairy supply chain). This would be an opportunity to combine these two approaches to address the role of organic fertilizers (manure, compost) and animal feed. The introduction of water and food issues would considerably complicate the model.

It was suggested to organize an extended videoconference with all the members of the technical committee, or to hold a workshop with the technical committee during the next mission.

### 2.3. Reflection and exchange workshop on the co-construction of a conceptual model

**On June 27 and 28, a workshop was held at the Mampuya center to discuss the co-construction of a conceptual model.**

**It brought together :**

- Jean-Pierre Müller,
- Alassane Bah,
- Tingouro Sanogo,
- Etienne Delay,
- Dominique Masse
- Anna N'diaye

and focused on the convergence between FerloSine and IAE issues, with a particular focus on carbon neutrality in agro-sylvo-pastoral contexts and local agroecological transition dynamics (DyTAEL).

**A phase of clarification of the objectives of the two projects took place, presenting these objectives as follows:**

**FerloSine objectives :**

- Carbon neutrality: Achieving carbon neutrality in Sahelian-type agro-sylvo-pastoral contexts, in conjunction with the GMV initiative.

- Dialogue and co-construction: Establish a dialogue between local stakeholders (producers, NGOs, government departments) to co-construct viable scenarios aimed at carbon neutrality and the Sustainable Development Goals (SDGs).

- Carbon cycle: Interest in the "soil + plant" carbon cycle and a territorial approach.

**IAE objectives :**

- DyTAEL: Discussion of the Fatick DyTAEL, with a focus on the water cycle, fertility, human and animal nutrition, and the minimization of chemical inputs.
- Agroecological practices: Evaluating agroecological practices to maintain biophysical cycles and sustainable food systems.
- Social arrangements: Consideration of the practices that have an effect on the environment and the social arrangements for coordinating these practices.

**This was followed by a discussion phase on the links between the two projects, which considered the following points :**

- Common Concepts: Identity of conceptual objects with specific monitoring-evaluation indicators (more carbon for one, more organic matter for the other).
- Scales and entities: Need to define the minimum grain (e.g. the elementary unit can be the household and the associated farm area).
- Conceptual model: Importance of going beyond defined scales and taking into account geographical relationships between objects.

**For conceptual modeling, it is agreed to start with the question of how x influences y :**

$$y = f(x)$$

*where x defines the set of scenarios under consideration, and y the indicators used to assess the changes of interest.*

*With this in mind, the question is:*

*What agro-sylvo-pastoral practices (x) to achieve carbon neutrality (y_1) and the sustainability of the trajectories desired by the stakeholders of a territory (y_2): the cases of diohine and Labgar*

**NB:** *with the idea of co-constructing a conceptual model that takes into account the issues of both projects, but with y (indicators) specific to each.*

**Once the question to be answered by the model had been determined, the activities and practices inventory stage was launched, listing the following activities :**

- **Agriculture :**
  - Crop succession (= cycle of crops grown on the same plot, including fallow land)
  - Technical itineraries (annual management of a particular crop)
  - Cropping system (distribution of crops on plots = crop rotation)
- **Management strategy :**
  - Declaration and abandonment practices: Declaration and abandonment of plots at household or village level.
  - Tree protection and management
- **Breeding :**
  - Herd management.
  - Managing food and water resources.
  - Animal health.
  - Economic factors

  (Note: the "Breeding" section lacks clear details that could be added at a later date.)

**A number of recommendations were made during the workshop :**

- **Continue discussions with local players to better identify and describe their practices.**
- **Validate conceptual models with subject-matter experts (interdisciplinary model) and local stakeholders (transdisciplinary model).**
- **Reflect on and reorganize modeling activities to clarify expectations and obligations with regard to the model, the project and the participants.**

## 2.4. Meeting with DyTAEL players in Fatick

On Monday 1er July in the evening was held the meeting with the actors of the DyTAEL (see the list of participants in appendix 1). The purpose of this meeting was to establish initial contact with members of the Fatick DyTAEL as part of our project to set up a model.

**The minutes of the meeting are as follows :**

- **The session began with :**
  - Presentation of all participants
  - The presentation of the mission's objectives: which is to build a model together to understand practices on the territory and explore different scenarios. Collaboration with members of the village and DyTAEL is therefore deemed crucial.

- **Comments from participants :**
  - The importance of the project is emphasized by DYTAEL players, who feel that the model will give them an idea of their current practices, allow them to explore other practices and see their impact on their territory.
  - A number of aspects that the model could take into account were raised, including the aspect of soil fertilization, affected by salinization, the proposed market for agro-ecological products, and customer and purchasing power.

- **Practical demonstration:**
  - To help DyTAEL stakeholders understand what a model is and how it works, a demonstration of a model produced and used in Dagana (on the shepherd's dairy) is given.

- **Clarification of the model :**
  - The model is a reflection on land management, not a direct solution for fertility management, for example.
  - Use the model to understand current practices in the area, to get an idea of how to maintain what already exists, and on what trajectory for its sustainability.
  - The model can also be used to demonstrate agroecological practices.

- **Activities and structure of DyTAEL :**
  - DyTAEL members talked about their efforts to raise awareness of agroecology in the départements and communes.
  - They also mentioned the ongoing mapping of agroecology players in the Fatick department.
  - And their highly-structured workgroup.

- **Proposals for collaboration :**
  - **The question of collaboration was raised, and DyTAEL members affirmed that a possible collaboration could be with the technical committee. This issue will be discussed at their quarterly meeting scheduled for this month of July, which will be the opportunity to integrate this modeling project into their action plan and to set the period for the mission planned for September/October.**

***The meeting provided an opportunity to clarify the objectives of the modeling project and identify the key aspects to be considered. Participants expressed their support and dedication to the project. To deepen discussions and prepare for the forthcoming mission, participation in the next quarterly meeting of the DYTAEL technical committee is requested.***

## 2.5. Workshop with Diohine actors

***On Tuesday July 2, the workshop was held with local stakeholders from Diohine (see list of participants in Appendix 2). The aim of the meeting was to identify the current agropastoral practices of local stakeholders.***

**We list the results of this workshop, including activities, practices and resources:**

- **Activities :**
  - Main: Agropastoral
  - Secondary: small business, fish farming, teaching, masonry, carpentry.
- **Farming practices :**
  - Food crops: millet, sorghum, maize, cowpea (in the rainy season)
  - Cash crops: groundnuts (in the rainy season), and off-season (lemon, cashew, sorrel, and others).
  - Inputs: chemical fertilizers, manure and a little compost (generally for off-season cultivation), fungicides, pesticides.
  - Equipment used: daba, tractor
  - Crop rotation
  - Collective fallowing
  - Parking (for manuring)
  - Traditional" composting
- **Pastoral Practices :**
  - Cattle and small ruminant farming
  - Food resources: natural pasture, livestock feed, crop residues, mown grass
  - Transhumance
- **Resources :**
  - Water: marigot, well, borehole
  - Soil
  - Shrubs
- **Other activities :**
  - Reforestation
  - Salt water treatment
  - Rainwater conservation (for fish farming)
- **Problems raised by these local players :**
  - Insufficient land due to overpopulation
  - Soil degradation due to overexploitation
  - Salinization of land and water

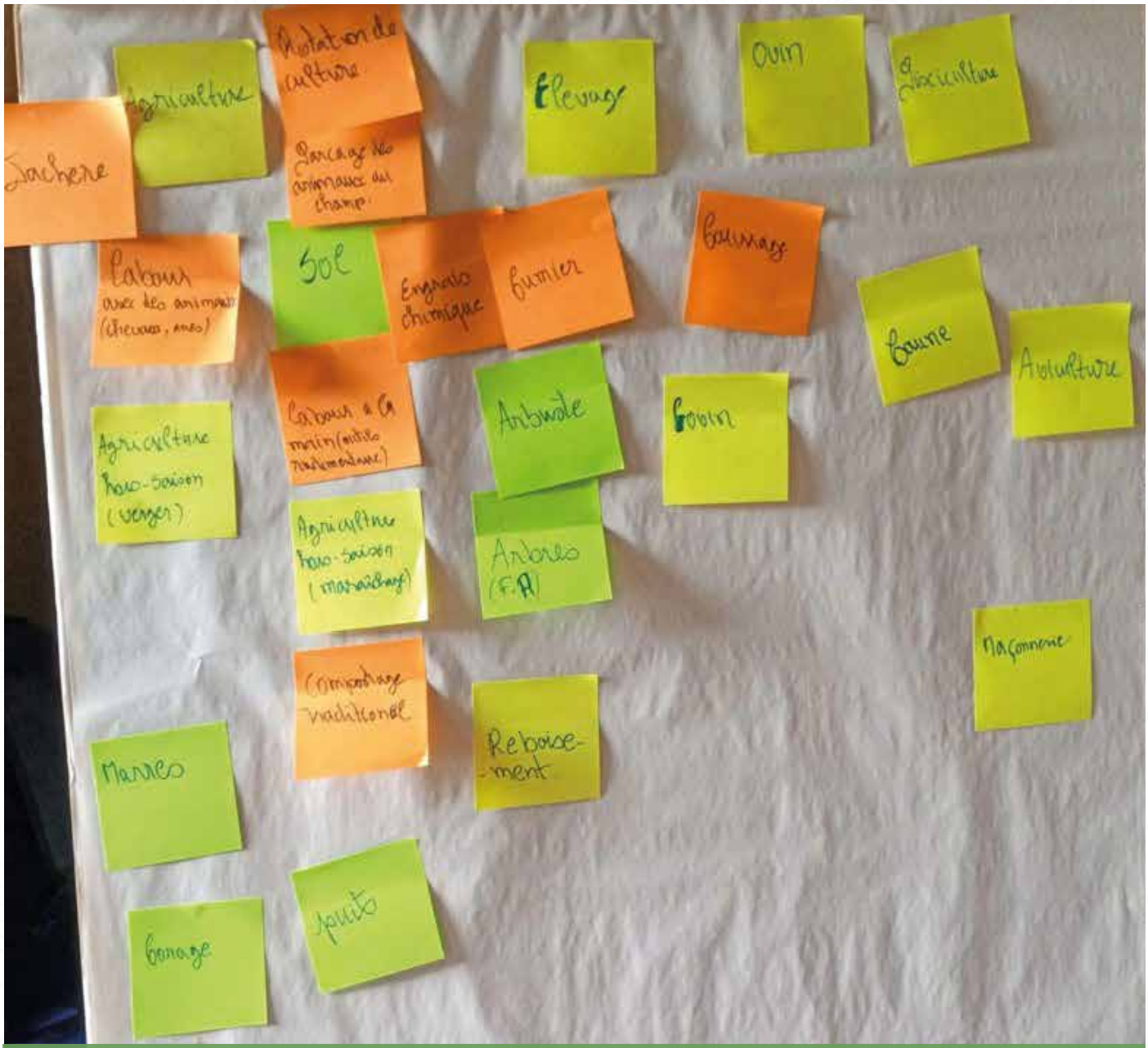



**Figure 1: Workshop with local stakeholders in Diohine - Identification of agro-pastoral practices and resources**

**The workshop provided an opportunity to gather key information on agropastoral practices in Diohine.**

## 2.6. Day of 03/07/2024

### 2.6.1. Interview with AVSF agents

***On the morning of Wednesday July 3, an interview took place with two AVSF agents from Linguère, including Seydou Badji. This meeting enabled us to establish initial contact with them, and to discuss the mission's objective and the area of intervention (Labgar).***

**A report on this interview is given below :**

- **Presentation and objective of the mission :**
  - The interview began with a presentation of the participants.
  - The purpose of our presence was explained
- **Contact recommendation :**
  - After understanding our modeling project, the AVSF agents mentioned the work of PhD student François Vendel, who is working on a similar model aimed at agroecological transition. They suggested we contact him to explore his proposals.
- **Stakeholder structure and territorial management :**
  - Labgar is a commune comprising several villages.
  - Labgar currently has just one pastoral unit.
  - The pastoral unit has a manager within a management body, as does a fenced plot, which is also managed by a manager.
- **Breeding at Labgar :**
  - Small ruminant and cattle farming
  - Food sources include natural grazing, livestock feed and fodder from fenced plots, and water sources include ponds and boreholes.
  - Labgar is a transit area for transhumance, departure and arrival, which creates competition for natural pasture when transhumant herds arrive.
- **Management plan and regulation :**
  - The pastoral unit coordinates the presence of transhumant and local herds, and raises awareness to avoid conflicts.
  - Transhumant herds leave in July, arrive in Labgar in August, and leave again in October.
  - In Labgar, support projects for income-generating activities such as poultry farming, market gardening and fodder crops are in place.
- **Transhumance management :**
  - Management of the arrival of transhumant herds is overseen by the management body, although misunderstandings sometimes arise due to installations deemed anarchic by villagers.

This interview enabled us to establish initial contact and discuss the purpose of our mission in detail. We received contact recommendations, a detailed presentation of the Labgar territory, and discussions on the management structure and livestock farming.

### 2.6.2. Workshop with Labgar actors

***On Wednesday July 03, a workshop was held with local stakeholders in Labgar (see list of participants in Appendix 3).***

**The session was opened and welcomed by the deputy mayor of Labgar, and began with a presentation of our mission's objective, followed by an introduction of the participants.**

- **Brief presentation of IAE and PRAPS project initiatives**
- **Labgar practices and activities :**
- **Breeding :**
  - Labgar is a commune made up of 39 villages and one pastoral unit.
  - There are seven protected plots, each managed by a member of a management committee.
  - Livestock consists mainly of small ruminants and cattle.
  - During the rainy season, the herds are located within a three-kilometer radius of the village. After the rainy season, they spread out over an additional radius of fifteen kilometers, then migrate to another village with the latter's authorization, in accordance with the practice of transhumance.
- **Land management :**
  - The land-use plan is managed by the town council in collaboration with the villagers.
  - Labgar is a crossroads for transhumants, who arrive and depart at different times.
- **Food resources for the herds include natural grazing, some forage crops, mown grasses, livestock feed and pruned branches (with consequences such as loss of animals and impacts on trees, according to these pastoralists).**
- **Water sources for herds include boreholes and ponds (with herd paths).**

The workshop provided crucial information on Labgar's pastoral practices. Discussions highlighted, among other things, the challenges of transhumance

### 2.7. Online conceptual model feedback workshop

***On July 12, the feedback workshop took place by videoconference with the presence of : Tingouro Sanogo, Etienne Delay and Dominique Masse. It focused on the first conceptual model, developed after the two workshops held with local stakeholders.***

- **The workshop focused on three points:**
  - first, a reminder of the question
  - followed by a presentation of all the graphs making up the conceptual model.
  - and finally, discussions on this conceptual model

A number of comments were made, in particular about considering soil as a carrier of resources, including fertility, carbon, nitrogen and biodiversity.

### 2.8. Meeting of the Fatick DyTAEL technical committee

***On July 19, 2024, the Fatick DyTAEL Technical Committee met in the presence of Tingouro Sanogo (the PhD student). The meeting agenda included, firstly, the presentation of general information and the DyTAEL quarterly report, as well as prospects and miscellaneous.***

After traditional prayers and words of welcome, the DyTAEL secretary presented the agenda, followed by general information and then the report. The presentation of the report focused on an overview of DyTAEL, with a detailed presentation of the activities carried out during the quarter, illustrated by pictures. These activities included training courses, farmers' days, awareness-raising activities, the setting up of fora, exchanges with technical partners, the updating of the DyTAEL action plan, and exchange visits with other DyTAELs to share experiences and launch projects.
Awareness-raising activities were carried out in the various member communes. The aim is to promote agroecology and the practices needed to achieve it, including the use of organic inputs.

Following the presentation of the report, comments and recommendations were made.

The meeting then focused on the outlook, with mention of upcoming training courses and their dates. The presentation of our modeling project was also discussed. The PhD student briefly explained what a model is, what constitutes it, and presented an example of a model realized on another field not related to agroecology to give a clear idea of the concept. The project was unanimously accepted by DyTAEL members and incorporated into their action plan for 2024. The next workshop with the technical committee is scheduled for September-October.

In other business, the secretary spoke of upcoming events, including Arbor Day with the participation of DyTAEL and the workshop, which concluded with a prayer and mutual thanks for everyone's involvement.

# 3.Conclusions and recommendations

At the end of this mission, the first stage of the modeling process, i.e. an initial conceptual modeling phase, was completed.

Interviews were held with DyTAEL to present the modeling approach, define key questions and sketch out a first version of expectations. This was followed by a series of interviews and workshops with local experts and stakeholders to gather the necessary elements for the conceptual model, including an inventory of the knowledge and data required. A feedback workshop was also organized to validate the conceptual model developed.

- **The results are as follows:**
  - A conceptual model has been produced;
  - A report has been drawn up.
- **The planned activities are :**
  - Validation of the conceptual model with DyTAEL
  - Detailed model specification ;
  - Simulation model design.

# APPENDIX 1. List of participants at the meeting with the Fatick DyTAEL

| First and last names | Function |
|---|---|
| Ms Oumy Gueye | Director of CEDAF in Fatick and member of DYTAEL |
| Made Diouf | Member of DYTAEL |
| Arame Diouf | DYTAEL coordinator |
| Jean-Pierre Müller | CIRAD researcher |
| Tingouro Sanogo | Doctoral student in Computer Science EDSTM |
| Anna Ndiaye | Agricultural engineer |
| Ibrahima Faye | Elected representative of Niakhar |

# APPENDIX 2. List of participants at the Diohine workshop

| First names | Name |
|---|---|
| Ablaye | Faye |
| Simon | Samb |
| Marie Elène | Diouf |
| Aissatou | Faye |
| Ahmed | Thiaw |
| Pierre | Faye |
| Mbaye | Ndiaye |
| Joseph | Sène |
| Pave | Sène |

Note: Local players (agro-pastoralists)

# APPENDIX 3. List of Labgar workshop participants

| First names | Name |
|---|---|
| Babacar | Diop |
| Abdoulaye | Sy |
| Aminata | Sow |
| Hassane | Diakhate |
| Demba Abdoulaye | Diallo |
| Mamadou Amadou | Ba |
| Adama | Diop |
| Aliou Maty | Ndiaye |
| Mahamadou | Diop |
| Djibril Abass | Sow |

# APPENDIX 4. Photos/ Illustrations

1. Workshop on the co-construction of a conceptual model

2. Meeting with DyTAEL players in Fatick

3. Workshop with Diohine actors

4. Workshop with Labgar actors

5. Meeting of the Fatick DyTAEL technical committee

CGIAR | INITIATIVE ON Agroecology

# Atelier de Restitution

## Modèle conceptuel

## FerloSine et IAE

Le 12 juillet 2024

CGIAR INITIATIVE ON Agroecology

# Programme
# Atelier

- Présentation de la question retenue
- Exposé du modèle conceptuel
- Discussions sur le modèle conceptuel

# Question

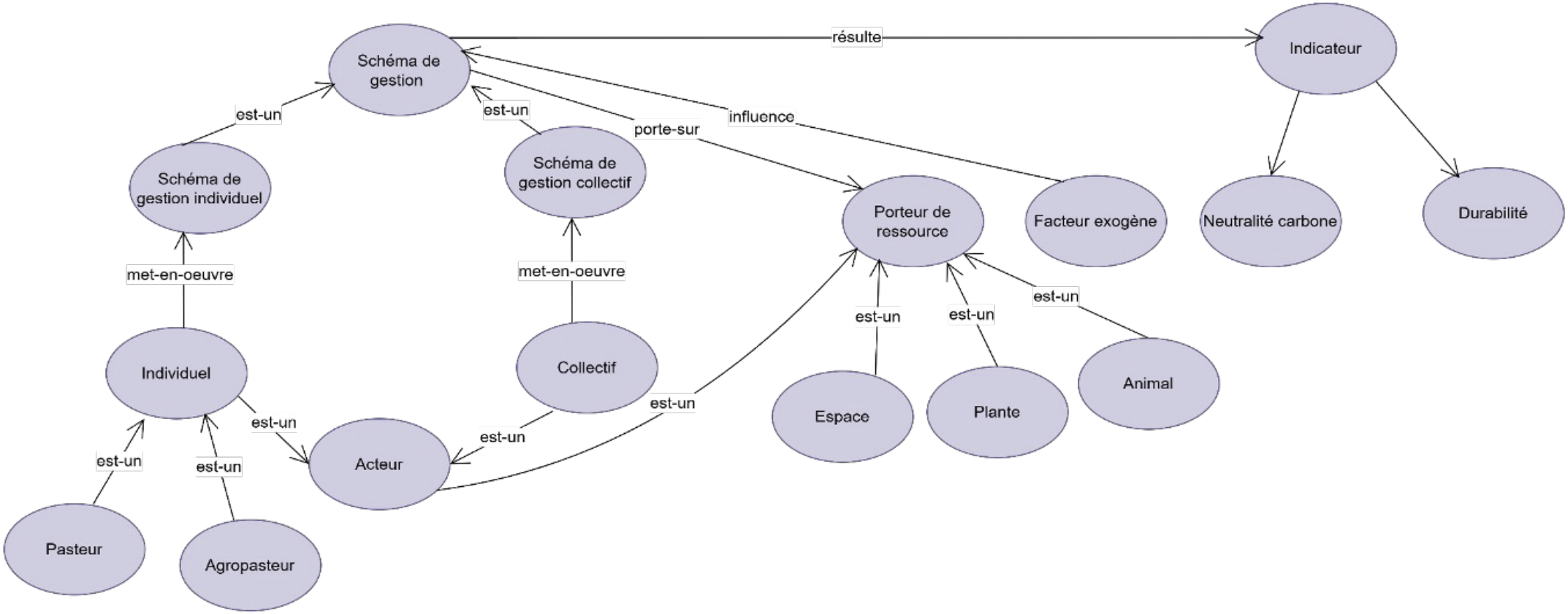
*Question de recherche que le modèle doit répondre*

**Quelles pratiques (x) agro-sylvo-pastorales pour atteindre la neutralité carbone (y_i) et la durabilité des trajectoires souhaitées par les acteurs d'un territoire (y_i) : les cas de diohine et Labgar ?**

*Un premier modèle conceptuel développé*

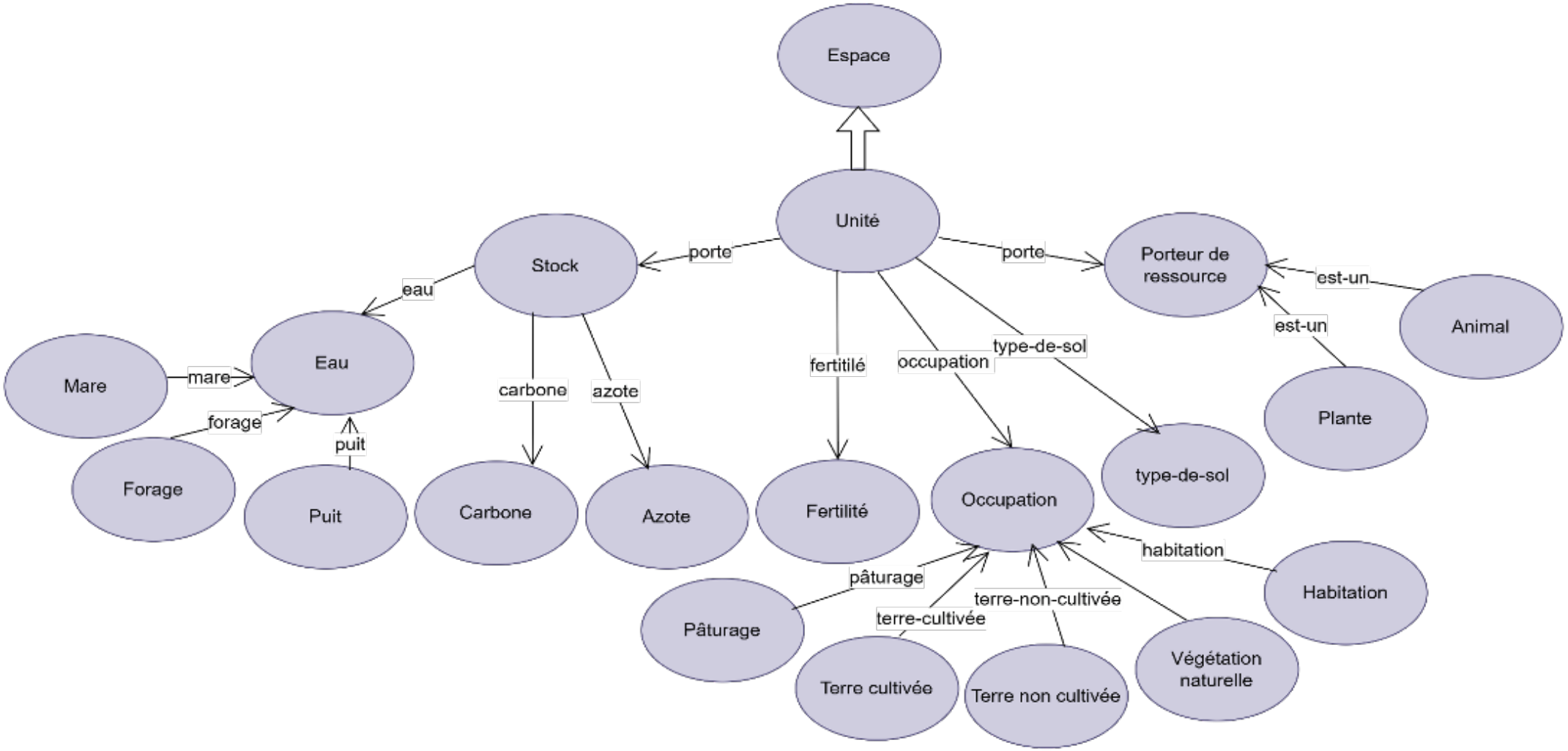
# Modèle conceptuel

*Quelles pratiques (x) agro-sylvo-pastorales pour atteindre la neutralité carbone (y_i) et la durabilité des trajectoires souhaitées par les acteurs d'un territoire (y_i) : les cas de diohine et Labgar*



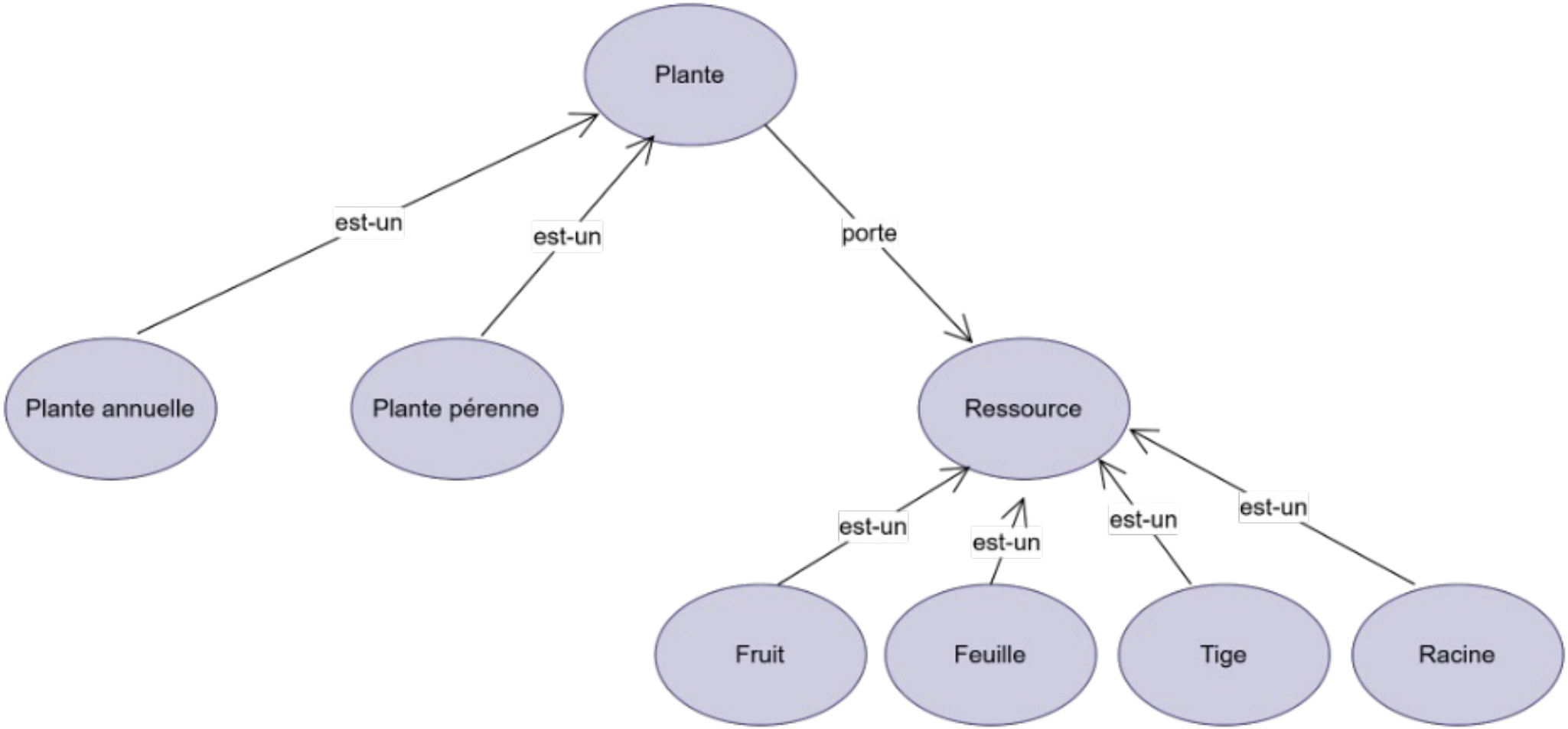
# Modèle conceptuel

*Porteur de ressource - Espace*



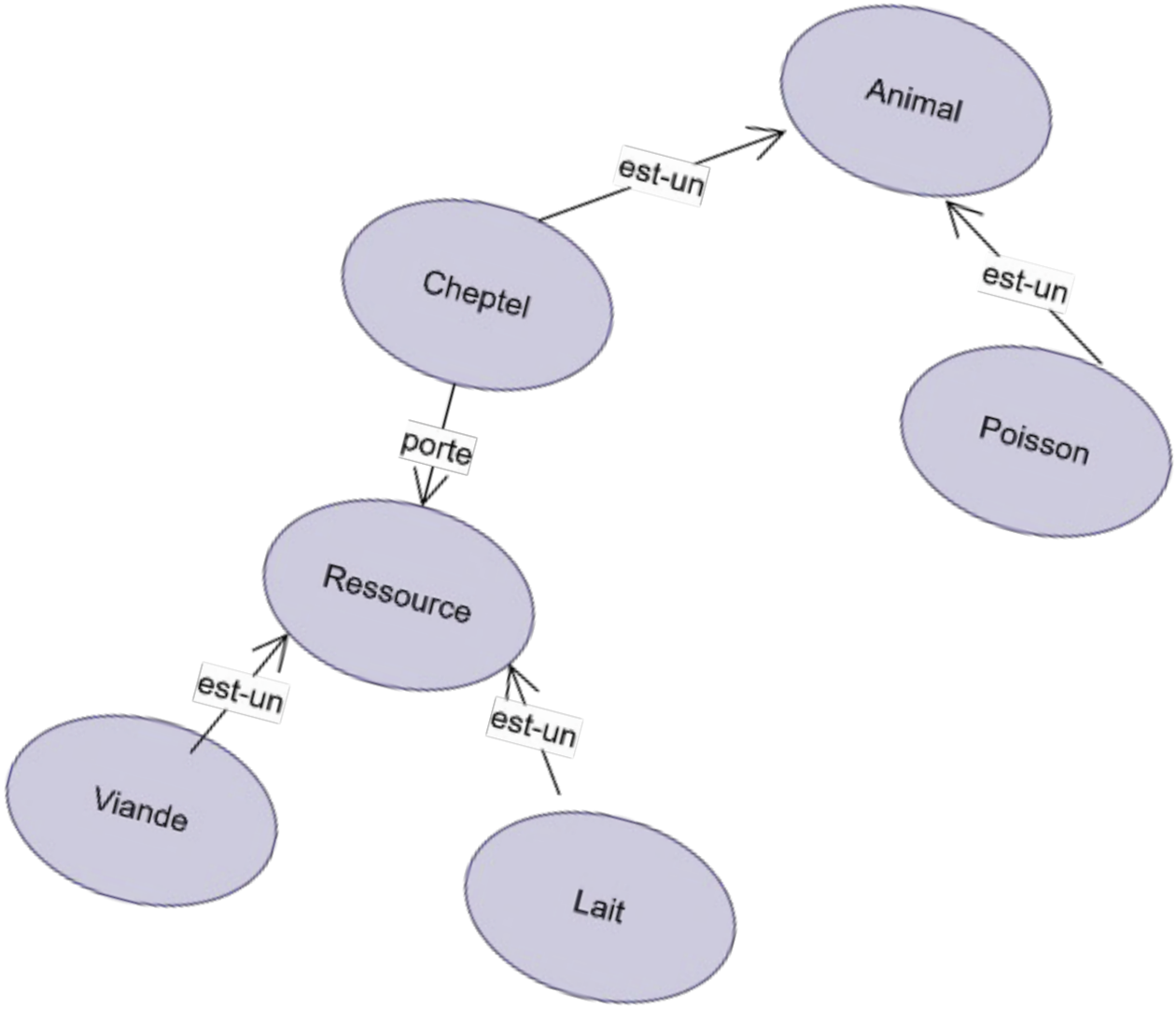
# Modèle conceptuel

*Porteur de ressource - Plante*



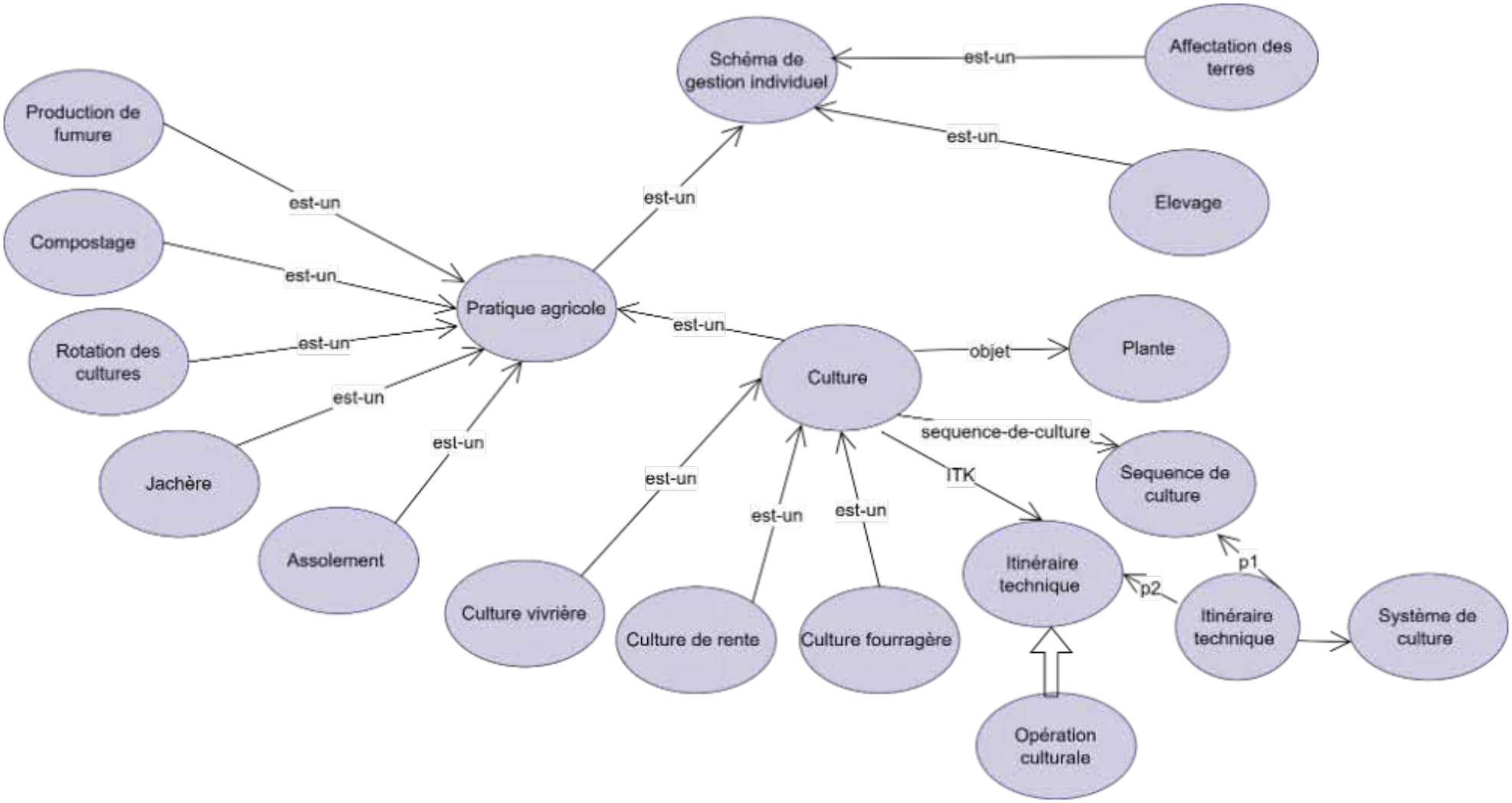
# Modèle conceptuel

*Porteur de ressource - Animal*



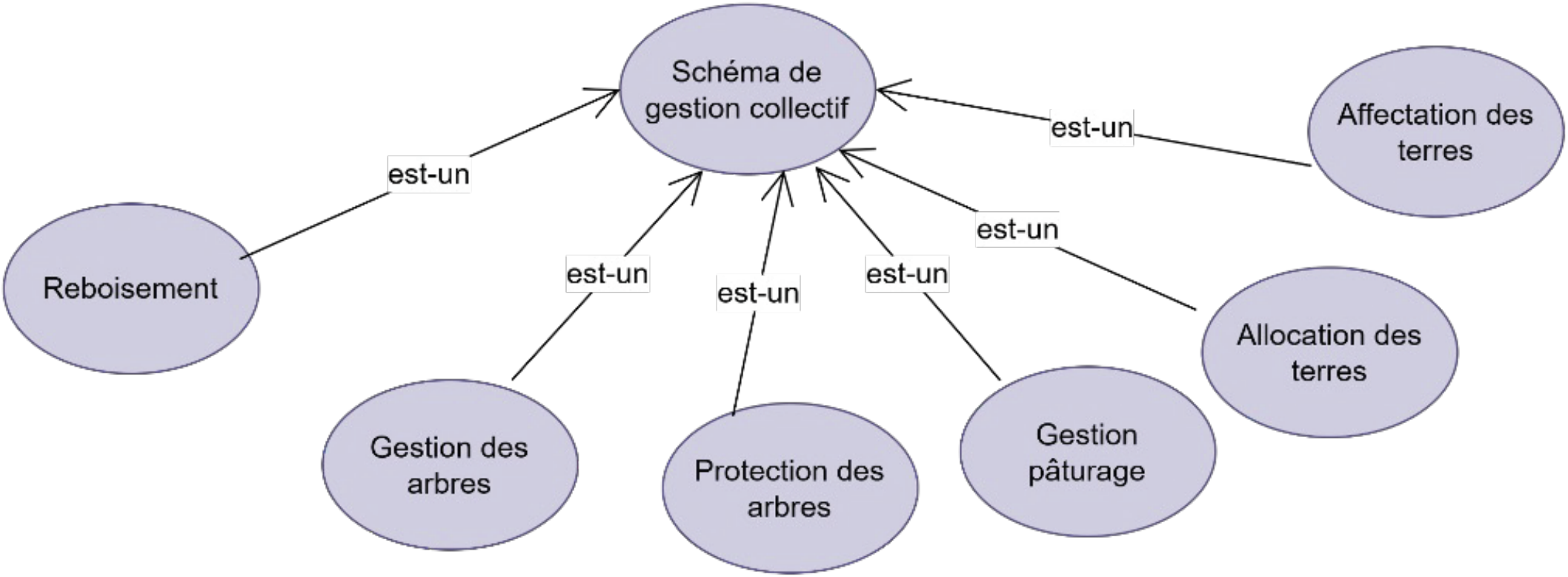
# Modèle conceptuel

*Schéma de gestion individuel*



# Modèle conceptuel

*Schéma de gestion collectif*



# Modèle conceptuel

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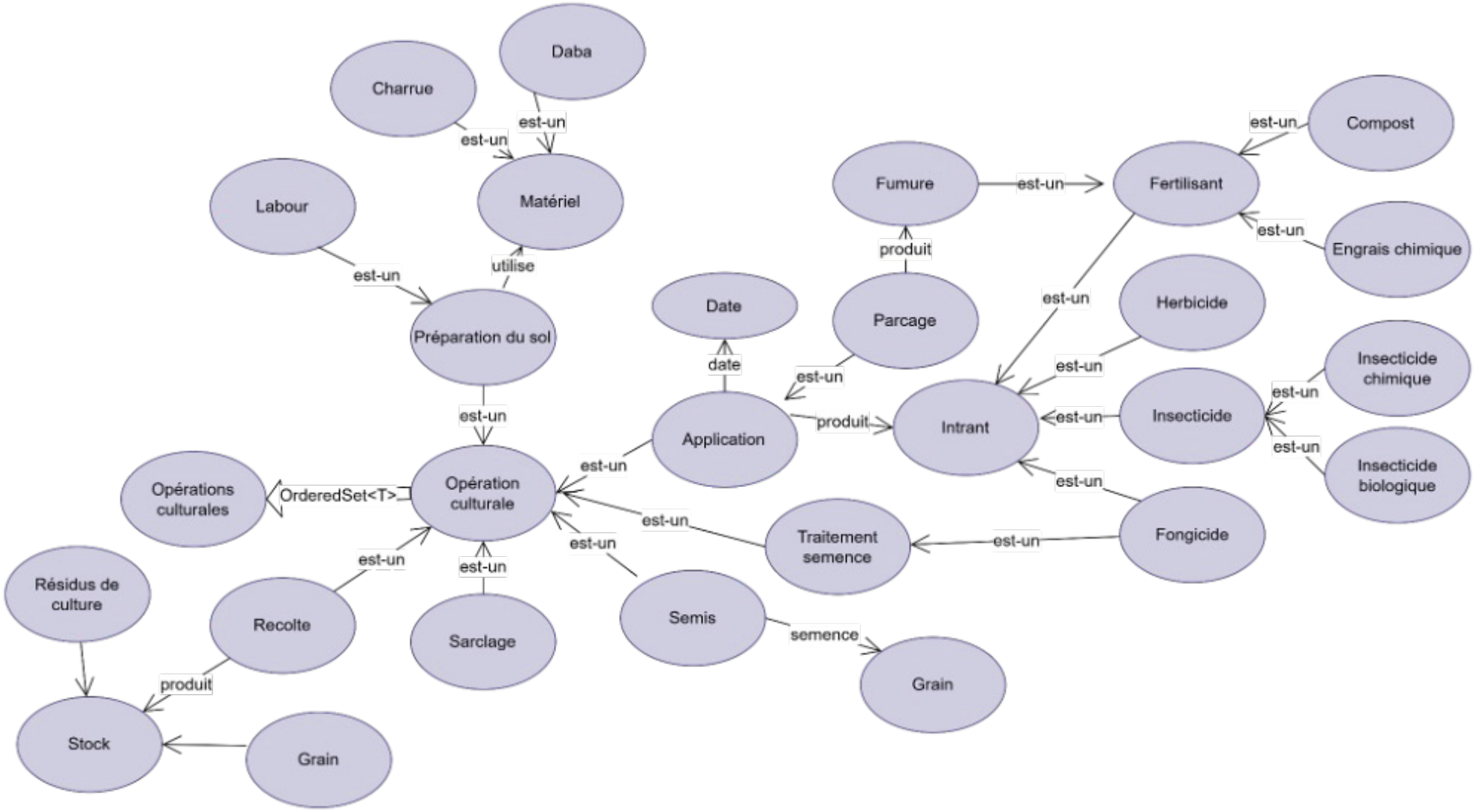
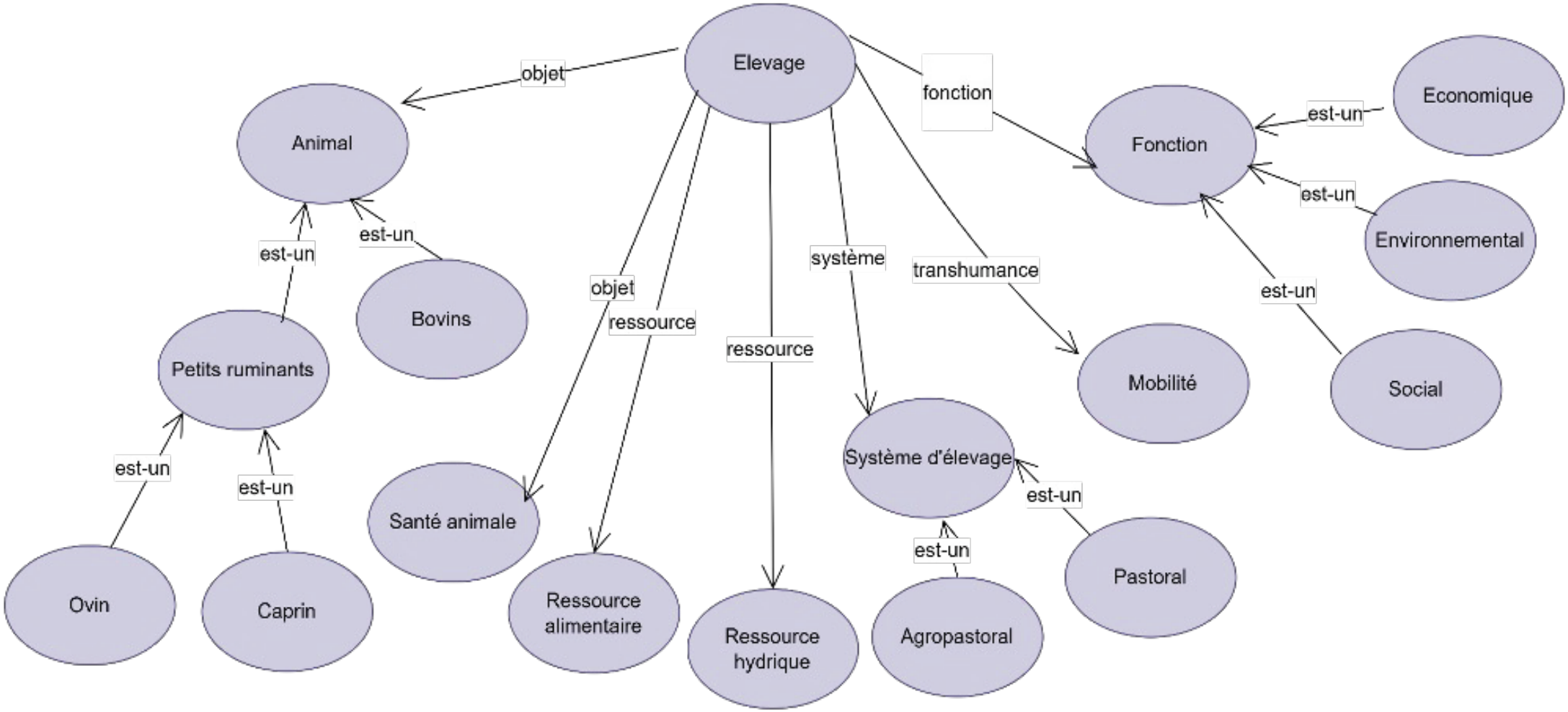
*Itinéraire technique*



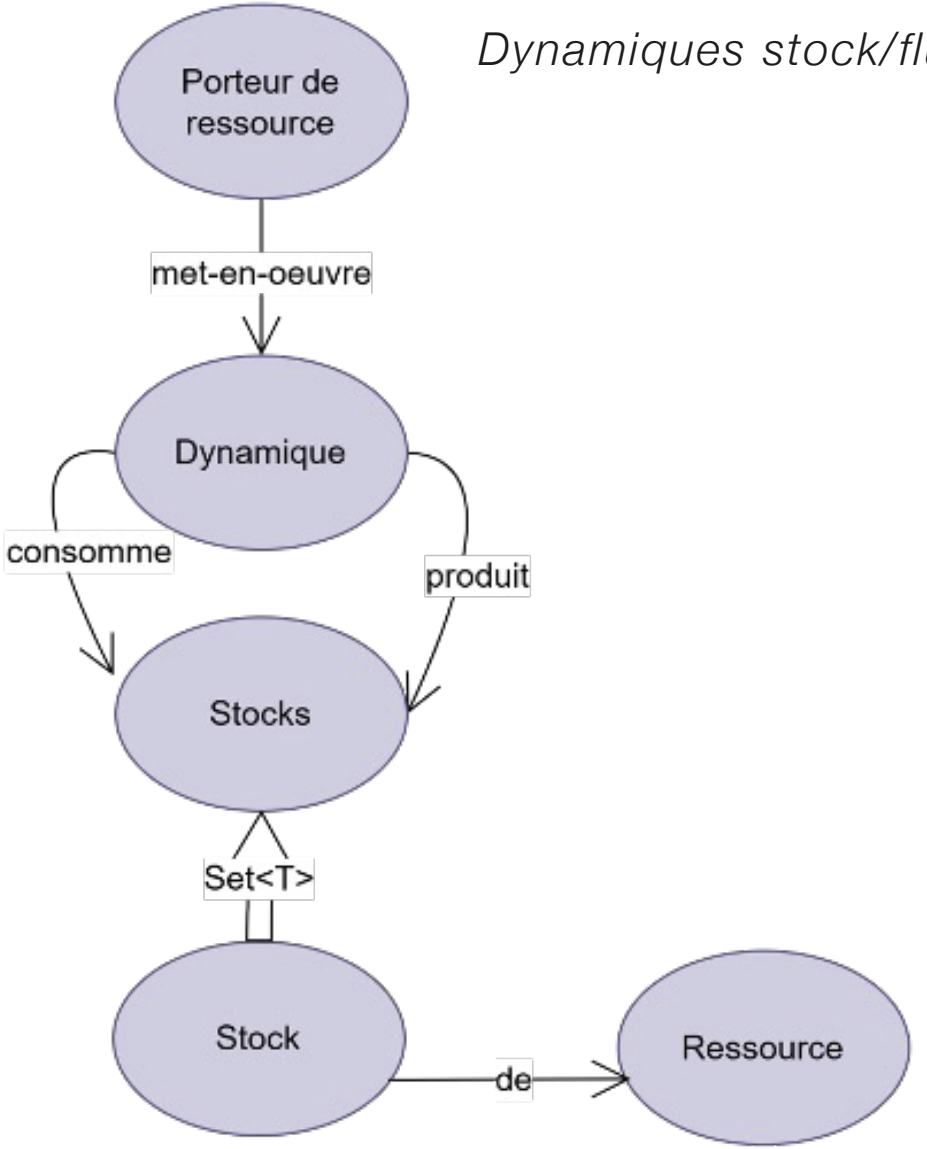
# Modèle conceptuel

*Elevage*



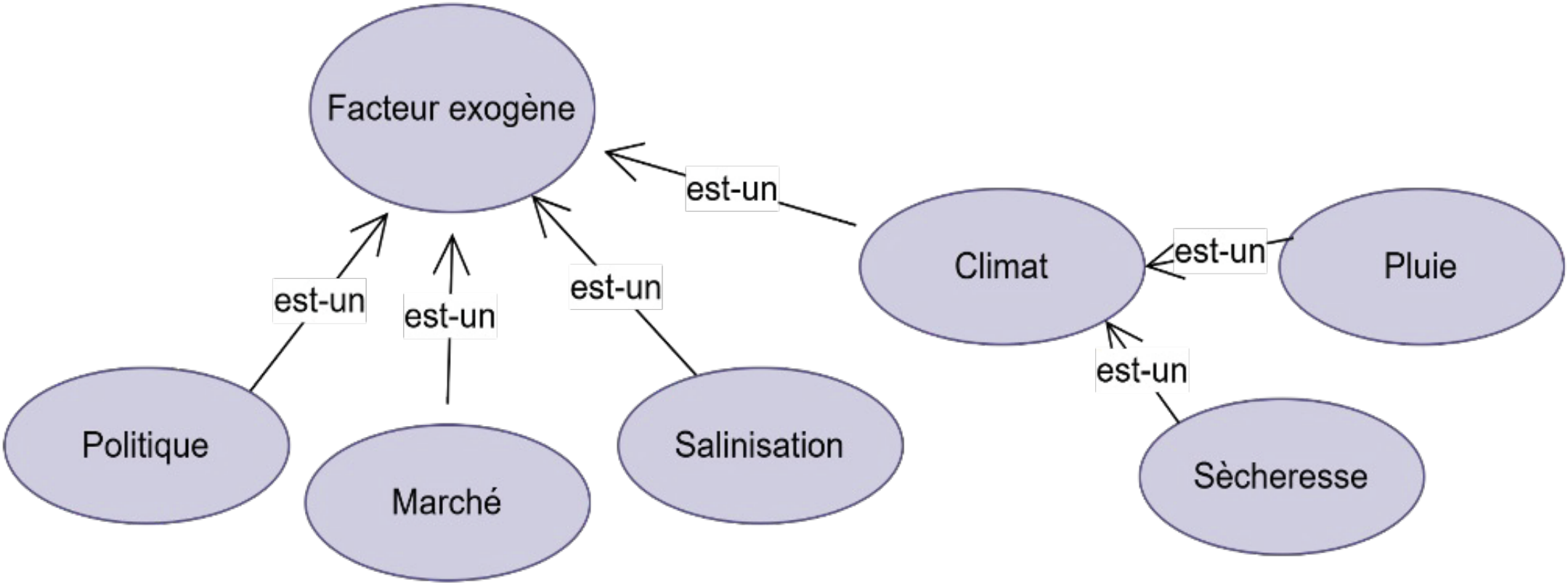
# Modèle conceptuel

*Dynamiques stock/flux*



# Modèle conceptuel

*Facteurs exogènes*



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Agroecology

# FerloSine et IAE

Le 12 juillet 2024

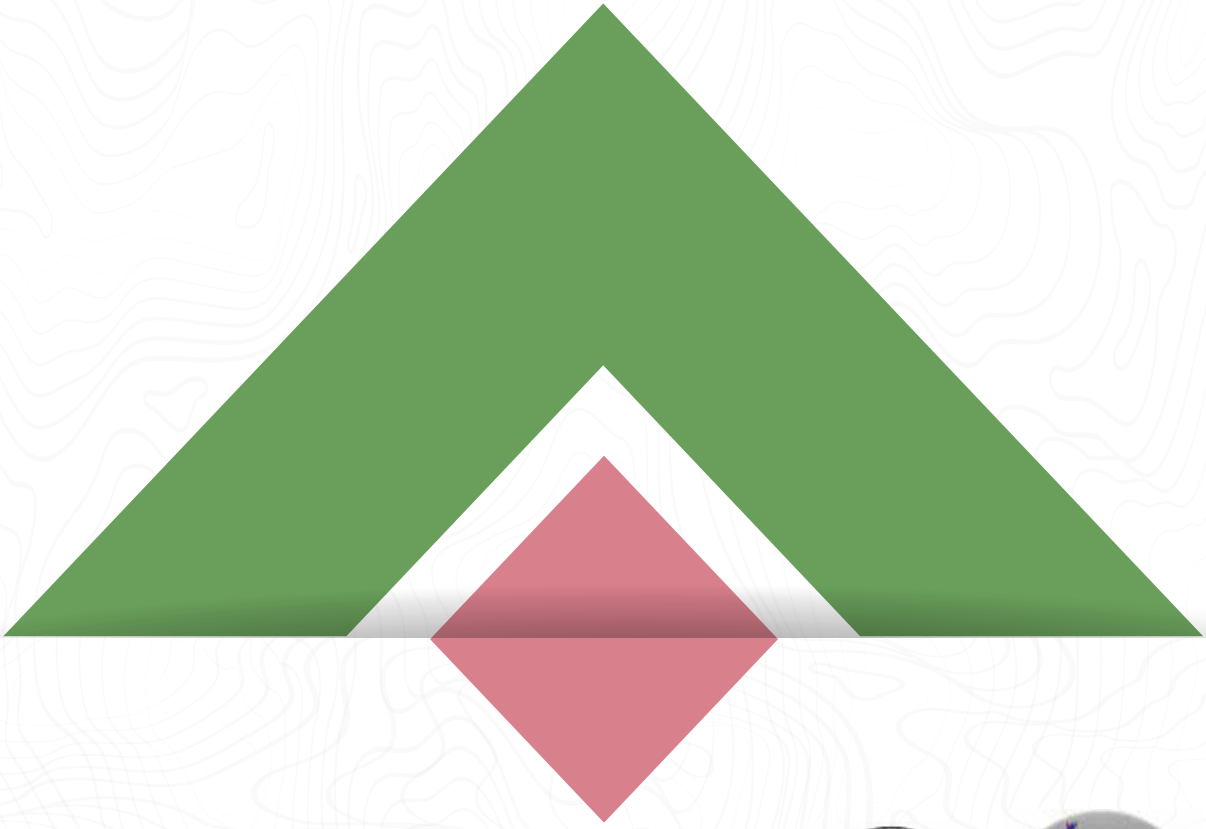
CGIAR INITIATIVE ON Agroecology

Mission to Senegal

# REPORT

June 23 to July 20, 2024

**Jean-Pierre Müller,**
Senior Researcher (CIRAD, UMR SENS)
**Tingouro Sanogo,**
PhD student in computer science (EDSTM)
**Anna NDIAYE**,
Agricultural engineer



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cirad LA RECHERCHE AGRONOMIQUE POUR LE DÉVELOPPEMENT

IER

EDSTM Ecole Doctorale Sciences et Technologies du Réel