INITIATIVE ON
Agroecology

REPORT

A conceptual model of organic matter flows

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September 16 to October 13
2024

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INITIATIVE ON

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EDSTM Ecole Doctorale Sciences et Technologies du Mali

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 issue, 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 some donors, 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 currently very little scientific evidence 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 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 agroecological 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 of profitable and sustainable enterprises.

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

Firstly, DyTAEL support will involve defining objectives and scope, roles and responsibilities, governance rules, type of facilitation, visioning, collective construction of a shared vision of the most desirable agroecological transition paths, and action plan fine-tuning.

Secondly, modeling to support the territorial dimension of 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 the valorization of innovations tested within the framework of co-design schemes carried out in other projects, mainly 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 also be explored.

THIS MISSION WILL SUPPORT THE 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 to enable the probable impact of these options to be estimated and discussed.

The methodology used to set up this system comprises 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 will be coordinated with FerloSiné, insofar as the kick-off meeting in October 2023 discussed the creation of 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). For the record, the FerloSiné workshop held in Dakar from October 2 to 5 consisted of the following :

- Reminder of the FAIRCARBON-SLAM B-FERLOSINE project objectives (JL Chotte)
- The MAELIA platform (Olivier Théron & Manon Dardonville en visio)
- Collaborative research approaches (Living Lab) (JD Cesaro, E Delay)
- Carbon and climate scenarios in 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 (based in particular on recruitment profiles): by those responsible for recruitment
- Chronogram of activities, responsibilities, participation.

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It was followed by work on the Diohine (groundnut basin) and Labgar (reforestation in pastoral areas) sites. It is therefore important to share workshops/interviews (at least in part), or even develop specific modules.

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 the continuation of phase 1 of this intervention proposal, following an initial mission in which a first version of the conceptual model was developed on the basis of consultations with local stakeholders and partners in Diohine, Labgar and DyTAEL.

1.3. Mission organization

Workshop with Labgar actors

Date	Activity	Contact
Septembre 16th	Arrival in Dakar (J.-P. Müller and T. Sanogo)	
Septembre 17th	Mission planning and discussion of conceptual model	Etienne Delay
September 18th - 20th	Work session on the conceptual model	Etienne Delay
September 23rd	Work session on the conceptual model Meeting with F. Vendel	François Vendel
September 24th	Working session on workshop slides Trip to Fatick	
Septembre 25th	Workshop at CEDAF in Fatick	DyTAEL Technical Committee
September 26th	Interviews with resource persons Field visit	Mr Adama FAYE Cheick Amar
Septembre 27th	Return to Dakar Acceptance of modifications to the conceptual model	
Septembre 30th	Departure from Dakar (J.-P. Müller)	
October 1 - 4	Work session	François Vendel
October 8th	Trip to Linguère	
October 9 - 11	Workshop with local players in Velingara	
October 13th	Departure from Dakar (T. Sanogo)	

2. Actions taken

2.1. Day of 09/17/2024

The first meeting took place at the Ecole Supérieure Polytechnique (ESP) in Dakar (UCAD), on Tuesday September 17, and brought together :

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

The aim was to work on the conceptual model and discuss the overall approach, including generating a table of contents for specification documents from the conceptual model.

Key points of the discussion

- **Overall approach :**
  - Transition from conceptual model to simulation model.
  - Choice of scales, particularly spatial, with notions of granularity, aggregation and model extension.
- **Resource management :**
  - Concept of resource carriers and their management, as well as their use in the model.
- **Category theory:**
  - Concept of push-back and its application.

This session helped refine the overall approach and deepen key aspects of the conceptual model, while discussing resource management and theoretical notions useful for the project.

2.2. Days from 09/18/2024 to 09/20/2024

2.2.1. September 18, 2024 - École Supérieure Polytechnique

During this session, we deepened the structuring of the conceptual model while discussing the integration of stereotypes based on category theory, which could further formalize the model and improve its internal organization.

At the same time, discussions focused on technical itineraries for both livestock and crops, in order to better define and structure activities in these fields. The issue of soil salinization was also raised. A specific example of a plant resistant to salty soils was discussed, suggesting that certain crops, such as "fonio" close to "quinoa", could also adapt to these conditions.

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

2.2.2. September 19, 2024 - Institut de Recherche pour le Développement (IRD)

Reflection on the **conceptual model** continued. Etienne noted the similarities between the ARDI and PARDI approaches, and that using category theory from the moment the equivalent of stereotypes is added.

Workshop preparation was also discussed. It was proposed to use an interactive approach with **post-it notes** and the model, enabling participants' ideas to be visualized and structured in a more participative way.

Discussions also covered **reverse engineering and Maelia's decision rules.**

A key point raised was the implementation of a validator for the model. The idea would be to display **tooltips** in the event of inconsistencies, enabling conceptual errors to be detected and corrected efficiently.

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

2.2.3. September 20, 2024 - CIRAD Regional Office

The following points were discussed:

- Approach to dynamics in the form of Time-Place-Form: change of time (in its "pure" form: storage), change of place (transport), and change of form (transformation).

- Commodity chains: design of a diagram to represent commodity chains made up of transport, storage and transformation of resources. We began by exploring transformation processes, in particular composting. This led to the design of an overall diagram of the value chain, including aspects relating to transport, storage and processing. This schema captures the complexity of the value chain and will be essential for representing the different dynamics at play in the model.

In addition, we had discussions with the regional director of CIRAD, Ibra Touré, who is one of the inspirers of the PRAPS project and has sent us numerous documents on pastoralism in Sahelian countries?

These three days of activities enabled us to continue improving the conceptual model.

2.3. Day of 09/23/2024

On September 23, 2024, we held an exchange session with François Vendel, a PhD student in the **Dundi Ferlo** project, who is working on terrain modeling in the Ferlo. The main aim of this meeting was to make initial contact and identify potential avenues for collaboration between our modeling work.

We began the meeting by presenting our respective conceptual models, giving everyone a better understanding of each other's work. This presentation laid the foundations for constructive exchanges and enabled F. Vendel to see the similarities and points of divergence between our approaches.

Following the presentations, we exchanged views on the points we share. These discussions focused in particular on methodologies.

This first meeting opened up interesting prospects for future collaboration.

2.4. Day of 24/09/2024

On September 24, a working session took place at IRD to prepare the visual aids for the validation workshop of our conceptual model. The aim of this session was to make the presentation clear, understandable and engaging for a non-computer-savvy audience, while ensuring the effective transmission of the technical aspects of the model.

With :

- **Element clarification :**

We have structured the presentation so as to gradually introduce the various elements of the conceptual model.

- **Adding illustrative images to liven up the presentation and encourage greater participation by stakeholders during the workshop:**

To liven up the presentation and improve clarity, illustrative images have been integrated into the slides. These visuals are intended to facilitate understanding of abstract concepts, particularly for participants with no experience of computer modeling. The images also help to capture attention and stimulate active participation during the workshop.

The visual additions were designed not only to clarify key points, but also to make the presentation more engaging and interactive. This approach was designed to encourage participants to ask questions and interact with the content, which is essential for participatory model validation.

2.5. Workshop with the Fatick DyTAEL technical committee

On Wednesday September 25, the DyTAEL technical committee held a workshop to validate the conceptual model. The aim of this workshop, entitled "Workshop on modeling organic matter flows at territorial level", was to present and validate an initial conceptual model of how territories function around organic matter flows.

Moderated by the CDCAR of Fatick (representative of the prefect), the meeting began at 10 hours 10 minutes with the formulation of prayers followed by words of welcome by the members of the presidium which are: Mrs GUEYE (Director CEDAF), Mr SENE (SG DyTAEL Fatick), Mr FAYE (Rep. of the department's communities), Mr PIREAUX (Rep. ISRA) and Mr DIOUF (CDCAR and Rep. of the Prefect). A round-table presentation of the various players present at the meeting was made before tackling the second point.

Before presenting the conceptual model, the ISRA representative reminded participants of the day's general objective, which was to present and validate a conceptual model of how territories function around organic matter flows, by identifying the territory on which the simulation model will be developed (department, commune, village, theoretical territory) and the resource persons who will enable relevant agricultural practices, including agroecological practices, to be studied in greater depth.

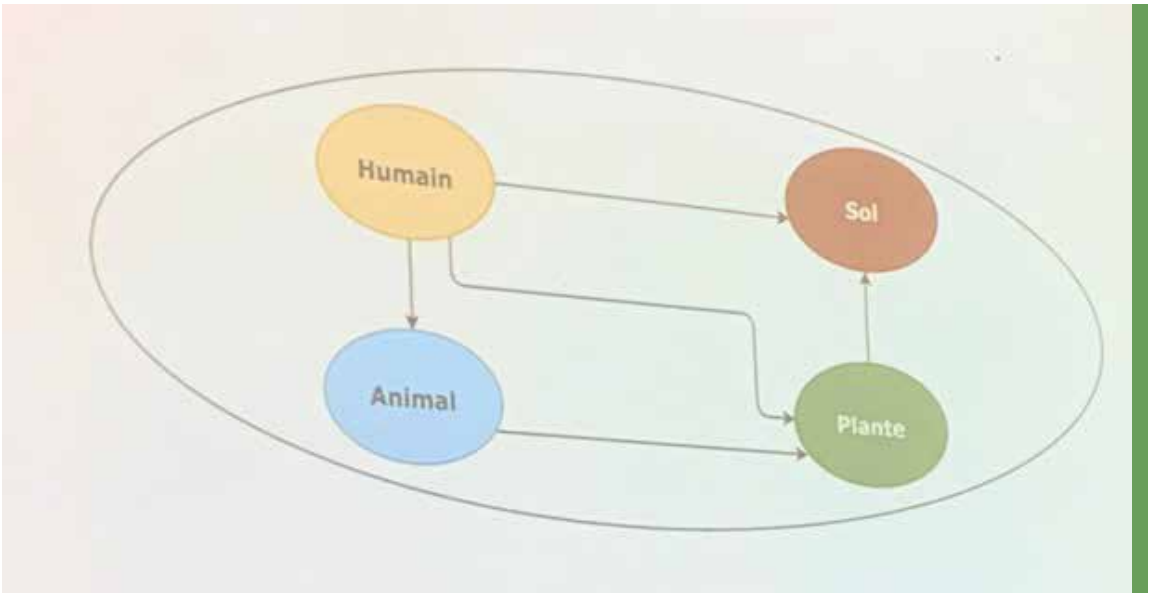
The presentation was made by the partner Mr. Muller, who explained that we model from a question (experimental territory...) by making an analysis grid of the territory to explain the basic concepts (taking the example of a tree with all its interactions and assets in the living system).

Then we had :

- **Topics covered :**

Within the framework of our modelling of organic matter material flows, the actors in the territory are :

- **The human**
- **The floor**
- **The animal**
- **The plant**



- Modeling organic matter fluxes: the workshop presented concepts related to organic matter and its modeling within the framework of the current project. Discussion focused on the use of modeling to answer specific questions, notably the assessment of organic matter flows and their impact on agro-ecological practices.

- Co-design of the model: it was emphasized that the success of this model depended on the active involvement of participants in the co-design process. The model aims to be a useful tool for local users, taking into account the particularities of the territories concerned.

- Territorial scenarios and impact assessment: several scenarios were discussed, in particular those concerning the transformation of organic matter in agro-ecological systems. These scenarios are linked to agricultural and livestock activities, and seek to assess the impact of various practices on system sustainability.

- **Technical discussions :**

  - Distinction between litter and root biomass: a debate has emerged over the definition of litter and root biomass. It was concluded that litter refers to material present on the soil surface, while root biomass, although sometimes referred to as "root litter", is not part of traditional litter;
  - Feed supplements: the discussion highlighted the importance of feed supplements for animals, which are not always included in organic matter flow models. And to add concentrates, i.e. feed supplements, as components of the model;
  - An additional element, water, was proposed for inclusion in the model to better reflect the realities of farming systems.
  - For human transformation, there is the proposal of forest management as a technical itinerary;
  - Assumptions for current yield of the territory for more information for the model;
  - Technical itineraries for crops and livestock were presented and discussed. Emphasis was placed on the need to eliminate chemical inputs, such as pesticides and herbicides, which are not in line with the agro-ecological principles promoted. Suggestions were made for modifying the initial diagrams to better align practices with these principles. For the technical itineraries of livestock farming, to include the share of pastoral biomass, crop residues and feed supplements.

- **Choice of site :**

This part consisted in giving for the course of the project: the group of actor, the scale of execution and the data arranged for the model breeding in plenary and we agreed after discussion:

- Stakeholder group : DyTAEL Fatick
- Communal scale: Diarrere commune (Diohine and Sasseme villages) and Ngayokhème commune (sobb village).
- Available data: the colossal amount of work done by the IRD in this area will enable us to have all the data for livestock farming, of course, with the support and help of resource persons.

The workshop helped define the spatial scale of the model, with the commune as the level of analysis. However, it was noted that some data were still missing and would need to be estimated or collected to complete the model. Resource persons were identified to provide additional information and refine the available data.

- **Identification of resource persons for further work :**

- **Departmental Livestock Service:** Khadim Ndiaye 77 781 03 41
- **Chief veterinary officer Niakhar :** Mrs Ndoye 77 303 91 68
- **Tattaguine postmaster :** Mor Gueye 77 306 13 03
- **Eaux et Forêts: Niakhar :** Chekh Amar 77 362 75 05,
- **Tattaguine :** David Dantan 77 718 02 75
- **Elected representatives : Ngayokheme :** Pierre Dieng 77 361 99 51
- **Diarere :** Adama Faye 77 264 28 99
- **CPDT Manager: Niakhar** Bassirou Sarr 77 800 34 96
- **Tattaguine** Diouma Kally 77 985 89 69
- **ANAT Director:** Dr. Modou Fall), Kaolack 77 539 11 54
- **SDDR Fatick:** Felix Malou 77 537 04 00
- **Statistics Office:** Mrs Fatou Dieng 77 685 21 27

The workshop concluded with a discussion on the next steps, with the identification of resource persons who will contribute to future discussions. Stakeholder collaboration and commitment were reaffirmed as essential to the modeling of organic matter flows.

The workshop provided an opportunity to take forward thinking on the modeling of organic matter flows at territorial level, taking into account local specificities. Participants actively contributed to improving the model, and several avenues of work were identified for future phases.

2.6. Interviews with resource persons and site visits

On September 26, 2024, we had the opportunity to talk with Mr. Adama Faye (community representative), a key resource person, as well as to carry out a field visit. The meeting with Mr. Faye provided an opportunity to discuss local issues relating to agriculture, livestock and natural resource management in the department. We also met with a root specialist and an Eaux et Forêts agent, who shared their perspectives on soil management and reforestation.

- **Report on our interview with Mr Faye :**

Mr. Adama Faye expressed his satisfaction with the workshop he had attended, describing it as a forum for exchange, mutual understanding and experience sharing. He appreciated the diversity of the participants and the opportunity to learn from the other players present.

One of the first points discussed with Mr. Faye concerned the problems encountered in the department, particularly linked to population growth. This population increase has led to a shortage of arable land, creating a major challenge for local farmers.
Mr. Faye emphasized the importance of adopting good agricultural practices in line with the principles of agro-ecology to guarantee healthy, sustainable food. He recommended abandoning chemical products in favor of more environmentally-friendly farming methods.

On the subject of animal feed, Mr. Faye detailed local practices, explaining that herds are fed mainly on hay and groundnut stalks. During the rainy season, herders move their flocks to Djolof, where pastures are more abundant. In October, crop residues become a key resource for animal feed, and this practice continues until June. When pasture is in short supply, herders resort to pruning tree branches.

Water, an essential resource, is available in ponds from October to December, but beyond this period, livestock farmers have to rely on boreholes and wells to water their herds. Mr. Faye also expressed concern about the lack of good practice in forest regeneration, which is often neglected in natural resource management.

The interview also touched on the village's community orchard, where women are primarily responsible for vegetable production. This activity contributes to local food security. However, milk marketing remains underdeveloped, and could be improved to diversify farmers' sources of income.

- **Field visit and discussions with a root system specialist and a water and forestry officer**

Following the interview with Mr. Faye, we visited the Niakhar site and met with a root specialist. The discussion focused on technical aspects relating to litter, roots and plant growth. These exchanges enabled us to gain a better understanding of the interactions between organic matter and soil health, as well as the importance of these dynamics for the sustainable management of agricultural land.

The visit continued to Niakhar, where we spoke with a Water and Forestry officer. This agent shared his experience of reforestation, highlighting the challenges he faces, notably uncontrolled fires and excessive collection of crop residues, which weaken the soil. He also mentioned that several forest regeneration projects had failed due to the population's inability to adopt the good practices necessary for their success.

In terms of forest regeneration, the agent mentioned that initiatives include Assisted Natural Regeneration (ANR), reforestation and, to a lesser extent, alley cropping.

The interview with Mr. Adama Faye and the field visits provided a comprehensive overview of local farming and livestock practices, while identifying the challenges to be met for a more sustainable management of natural resources. Integrating agro-ecology into these practices appears to be a promising way of meeting these challenges, while ensuring greater community resilience in the face of demographic and environmental pressures.

Discussions also highlighted the need for close collaboration between the various local players to promote sustainable agricultural practices, and for greater awareness of the importance of forest regeneration.

2.7. Work session with F. Vendel and workshop in Velingara

From October 1 to 4, 2024, T. Sanogo and F. Vendel held working sessions on the Dundi Ferlo project model, in particular the breeding strategies. They discussed the strategies and implemented the basics so as to be able to approach local players and list the strategies in detail so as to be able to implement them.

From September 9 to 11, 2024, F. Vendel organized a workshop with the aim of presenting the current version of the simulation model and exchanging with local players to validate the strategies implemented.

Here is a report on the workshop:

The workshop in Vélingara with François began with an introduction of the participants, including the facilitation team and local players, the vast majority of whom were village chiefs. The first day was marked by the presentation of a report on activities to date, with a focus on transhumance-related problems.

Discussions focused on the coordination of transhumant settlements to avoid conflicts. Although management rules exist, their application remains limited. A number of solutions were proposed, including reducing herd size, promoting good practices or allocating private land to each household. A key suggestion was to give more power to sector chiefs to control anarchic settlements, or to reorganize the territory into zones dedicated to agriculture and livestock farming. A more drastic solution was to deprive transhumants of access to water from boreholes, although this would be difficult to implement.

Discussions also covered the two types of transhumance: that of local inhabitants during the dry season, and that of agro-pastoralists from the south during the rainy season. The day concluded with a presentation of the simulation model, explaining its various functions and its simulation environment.

The second day began with a recap, followed by a discussion of breeding strategies. This included practices such as grazing, pruning in case of food deficit during the dry season, and the benefits of pruning for certain tree species. However, some destructive practices, such as the direct cutting of trees, were denounced. Solutions, such as educating and raising the awareness of shepherds, as well as forest regeneration actions, were discussed.

The third day focused on the use of crop residues, mainly used to feed herds prior to transhumance. The residues are stored in the houses and consumed by the cows, contributing to more efficient management of local food resources.

3.Conclusions and recommendations

The mission carried out from September 16 to October 13, 2024 in Senegal enabled considerable progress to be made on several fronts linked to the modeling of agro-ecological dynamics and pastoral livestock farming. Through various workshops, meetings and exchanges with local players, several key results emerged.

In-depth discussions around the conceptual model laid the foundations for a better structuring of territorial dynamics, particularly around organic matter flows. The active involvement of stakeholders, whether through the workshop with DyTAEL or work sessions plus, facilitated the adaptation of the model to local realities and the specific needs of the project. The usefulness of a simulation model was appropriated by stakeholders along different dimensions:

- Exploring the impact of different management scenarios to provide input for the various technical committees at different scales (from village to department);
- Building the case for agroecological practices;
- Demonstration of different agroecological practices and their impacts for awareness campaigns;

The various workshops, notably in **Fatick** *and* **Vélingara**, *reinforced the importance of* **co-design** *and the involvement of local stakeholders in the modeling process. These workshops helped validate the model's assumptions and integrate concrete feedback to refine the scenarios.*

Discussions on livestock strategies, transhumance and the regeneration of natural resources also highlighted challenges to be met, but also opportunities to improve current practices.

Recommendations

- Continue to involve local stakeholders in the modeling process to ensure greater ownership of the model and the scenarios envisaged. The reactivation of village committees was highlighted.
- Strengthen synergies between various ongoing projects, such as FerloSine and Dundi Ferlo, to share resources and best practices in modeling agro-ecological dynamics.

In conclusion, this mission has enabled significant progress to be made, particularly on the conceptual model. The next phases are :

- Detailed model specification ;
- Simulation model design.

APPENDIX . Photos/ Illustrations

1. DyTAEL technical committee workshop in Fatick

APPENDIX 2. PPT of the workshop on the modelling of organic matter flows at the territorial level

CGIAR INITIATIVE ON Agroecology

Mission to Senegal REPORT

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Jean-Pierre Müller,
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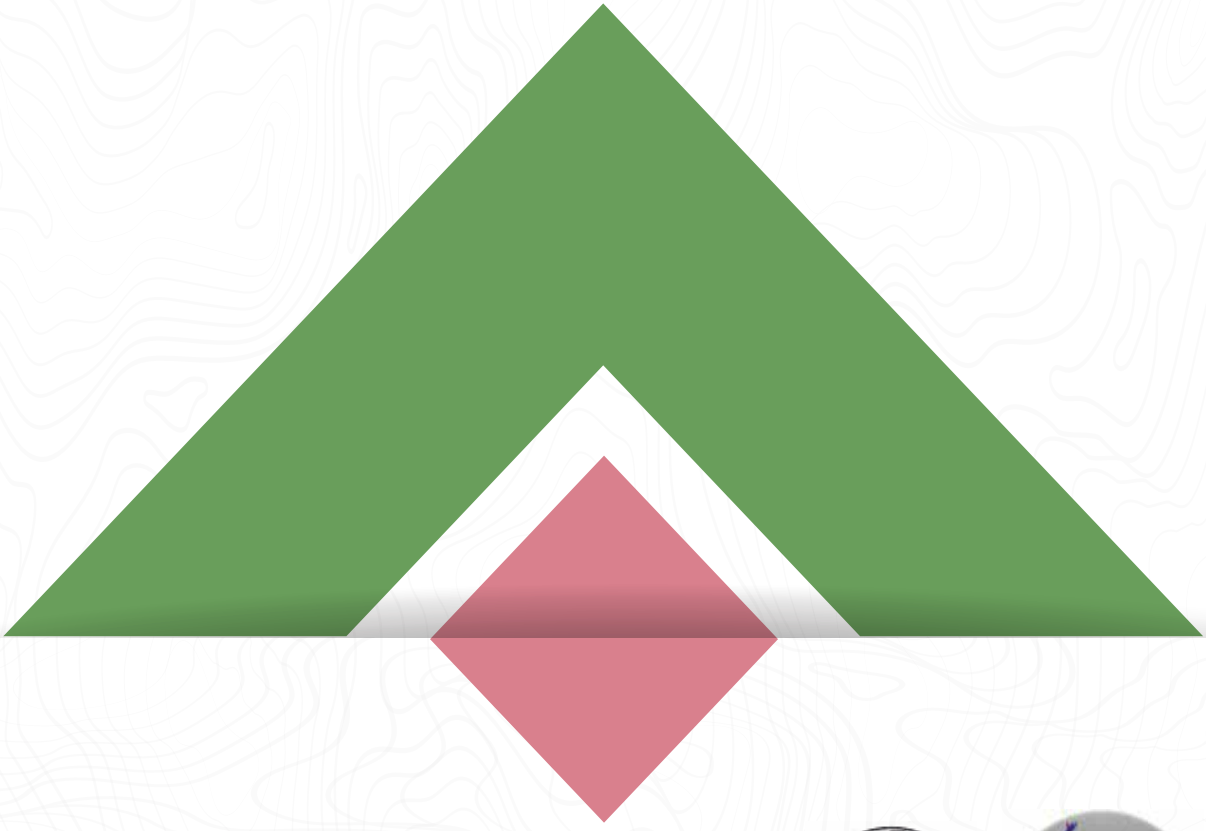

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Atelier sur la modélisation des flux de matière organique au niveau du territoire

25 septembre 2024 au CEDAF à Fatick

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DyTAES

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Objectif

Suite à une première rencontre avec la DyTAEL et d'un travail de conceptualisation à Diohine au mois de juin 2024, l'objectif général de cette journée est de présenter et faire valider un premier modèle conceptuel du fonctionnement des territoires autour des flux de matières organiques.

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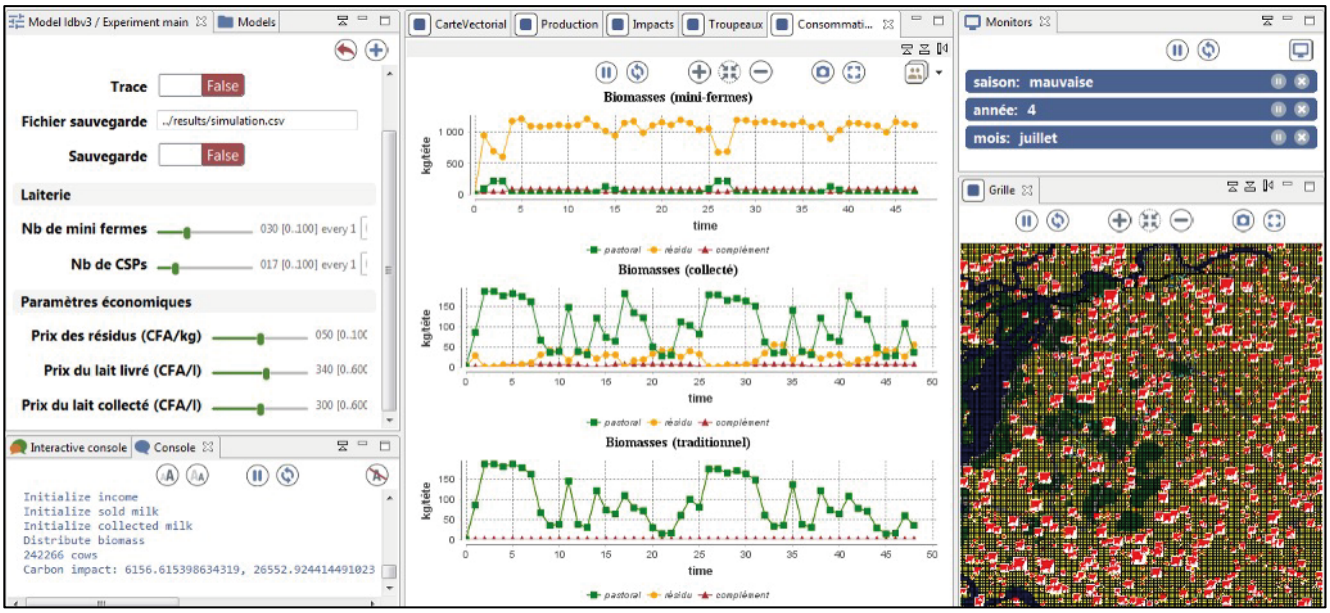
Objectifs spécifiques

- ✔ Présentation du modèle conceptuel
- ✔ Débat autour du modèle
- ✔ Identification du terrain cible
- ✔ Identification des personnes ressources

Présentation du modèle conceptuel



Scénarios d'intensification laitière

- Créer un approvisionnement alimentaire (% des agriculteurs accèdent)
- Création de l'intensification des ménages (nombre de petites exploitations)

Variabilité des ressources de prix

- Prix du lait
- Prix des résidus et des aliments

Sortie de simulation:

- **Production (tête / troupeau)**
- **Collecte de produits laitiers, marché informel,**
- **consommation locale**
- **Système d'alimentation par biomasse (tête)**
- **Impact économique et social**
- **Densité du bétail...**

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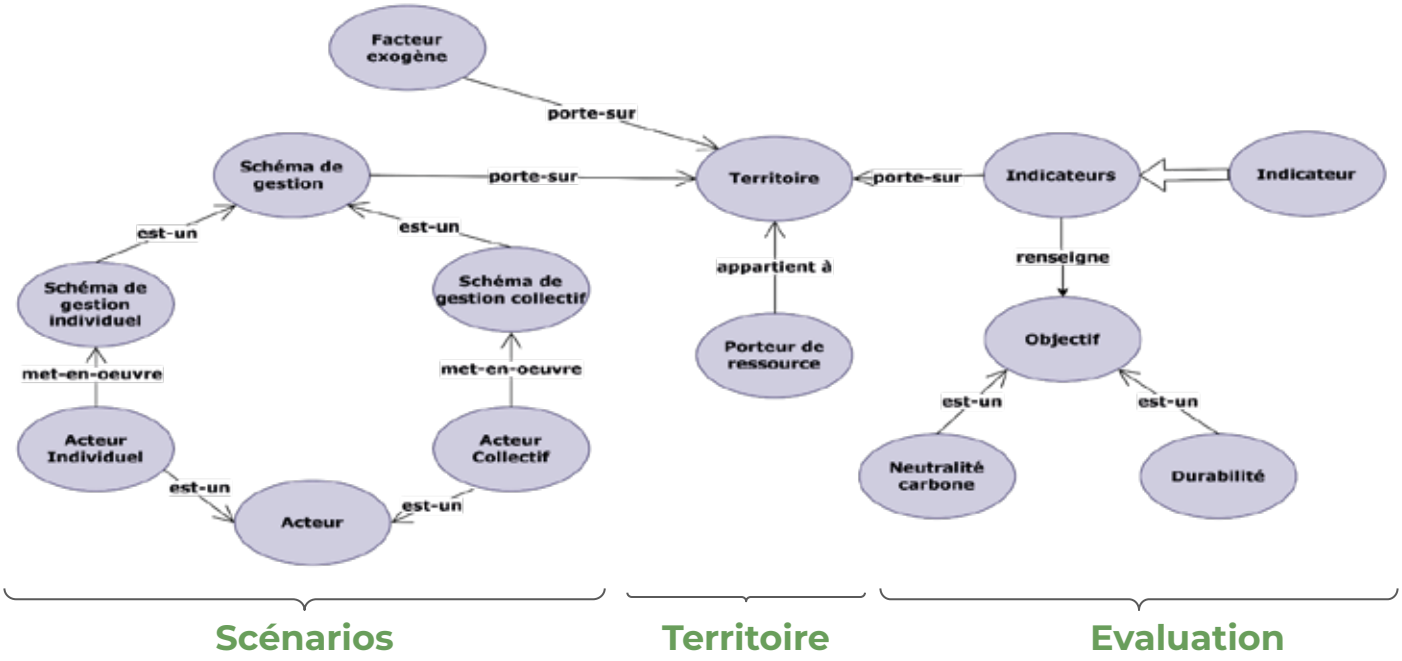
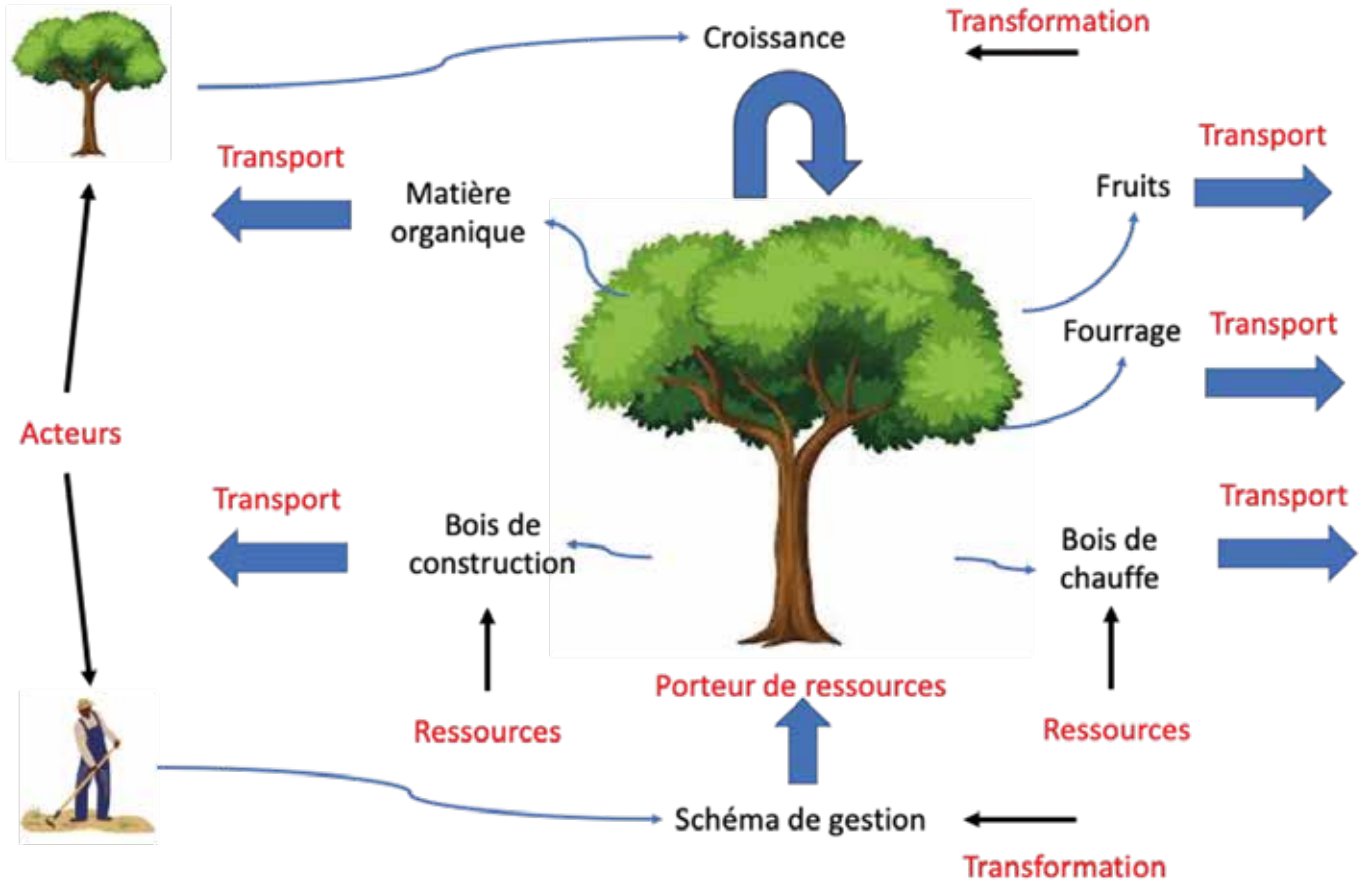
Objectif du modèle conceptuel

Comprendre les dynamiques des territoires comme des flux (eau, matières organiques) et leur reconfiguration (gestion).

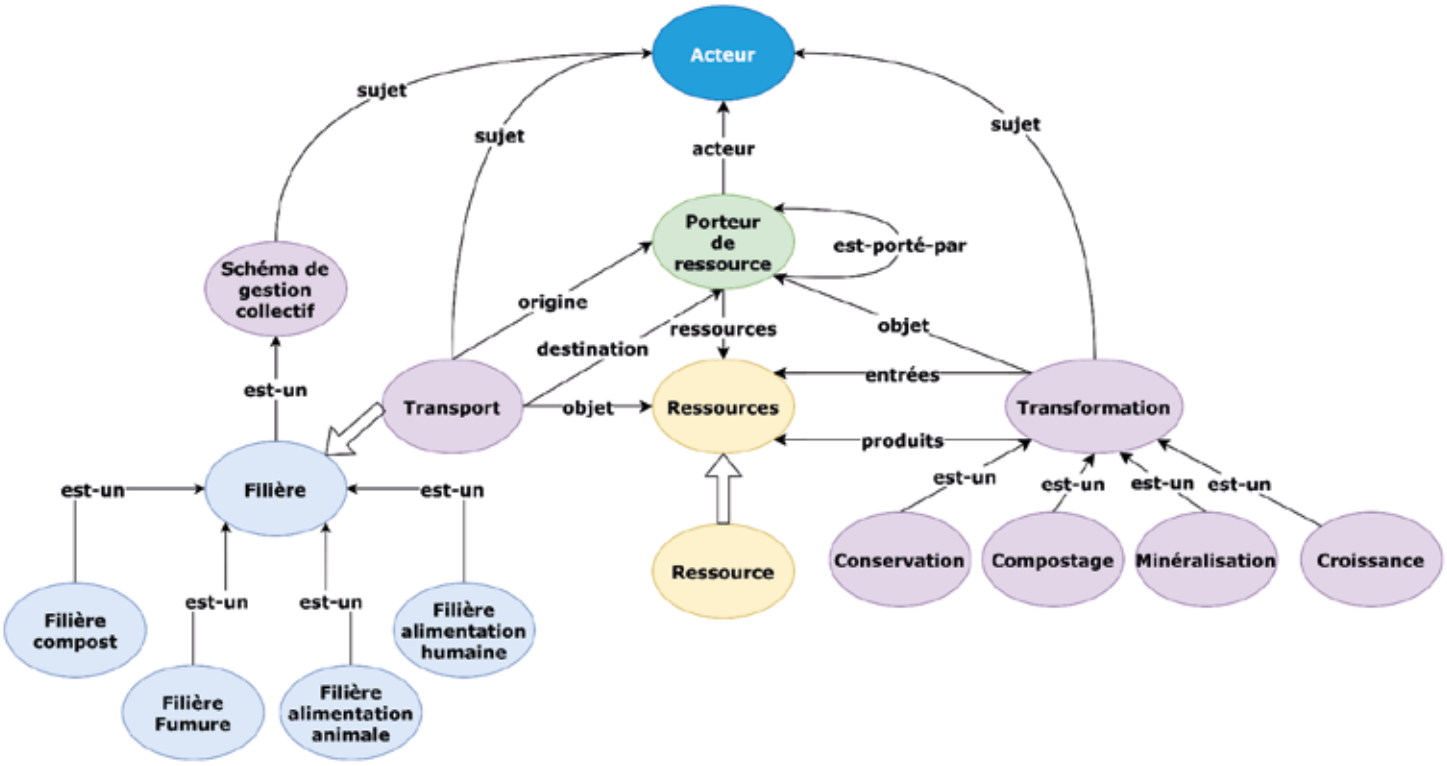
Un modèle répond à une question



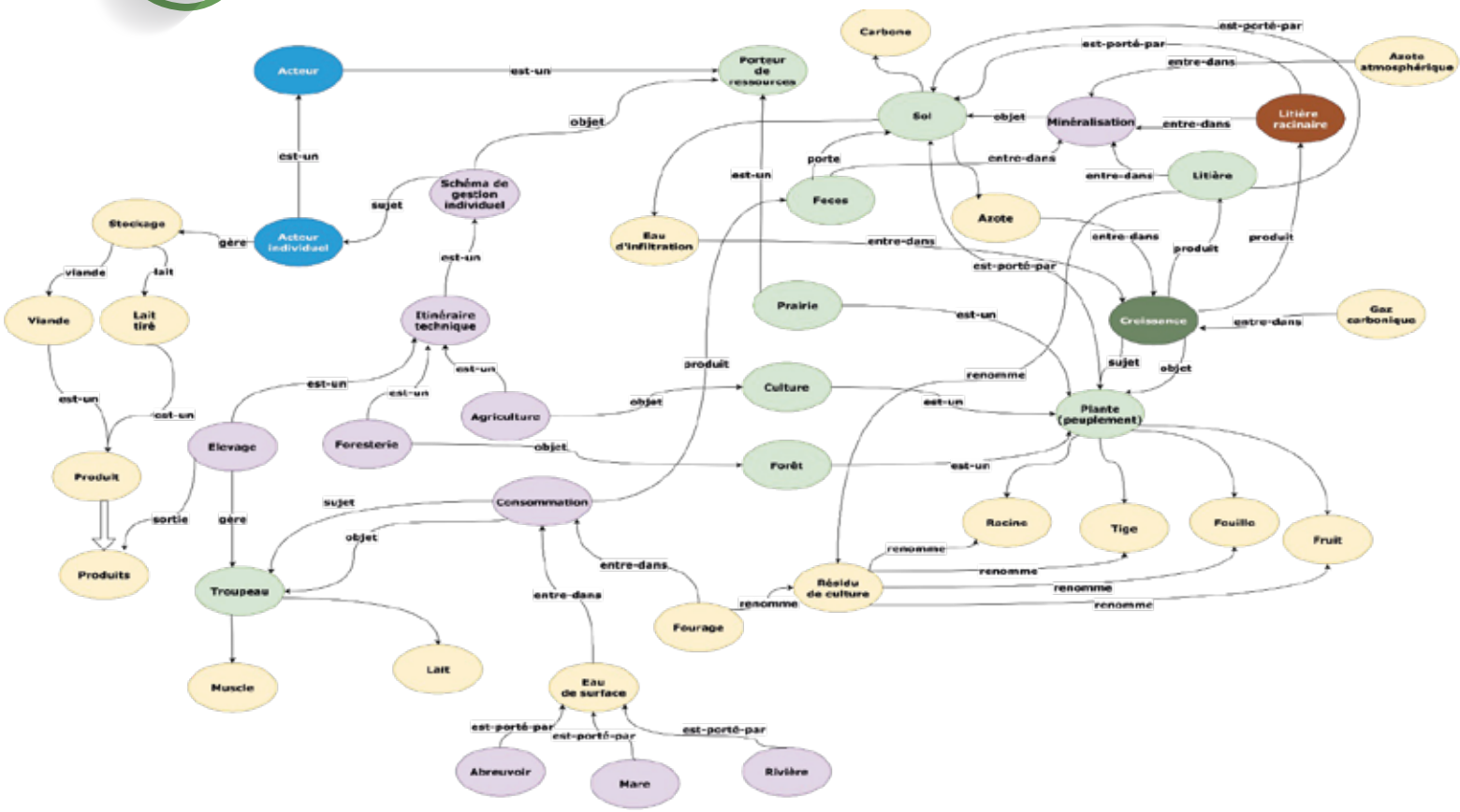
Grille d'analyse du territoire : concepts de base



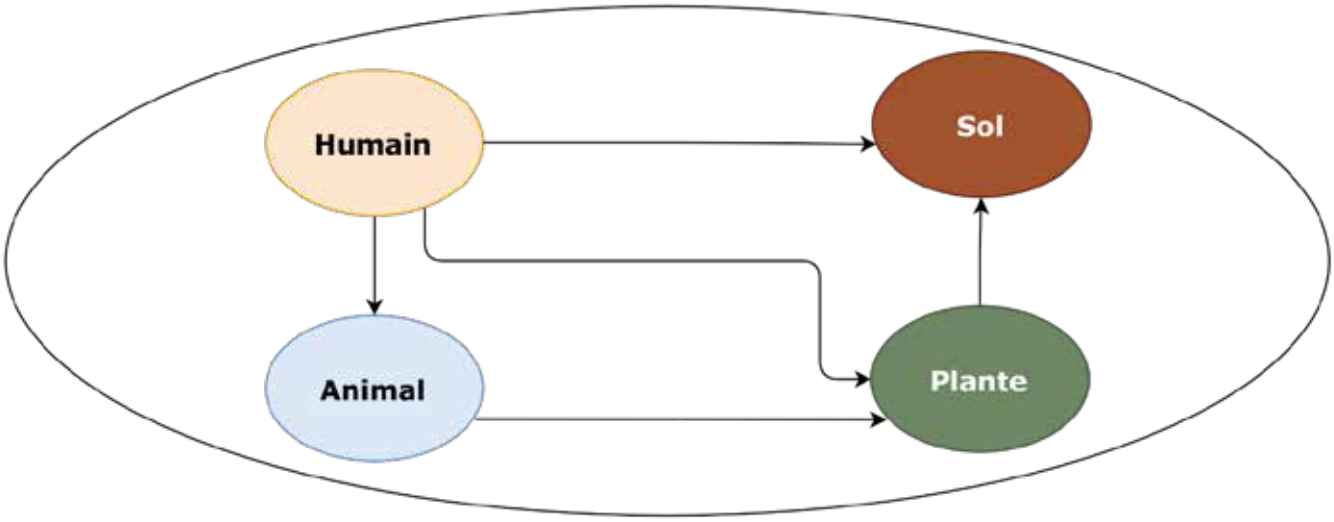
La structure du modèle conceptuel



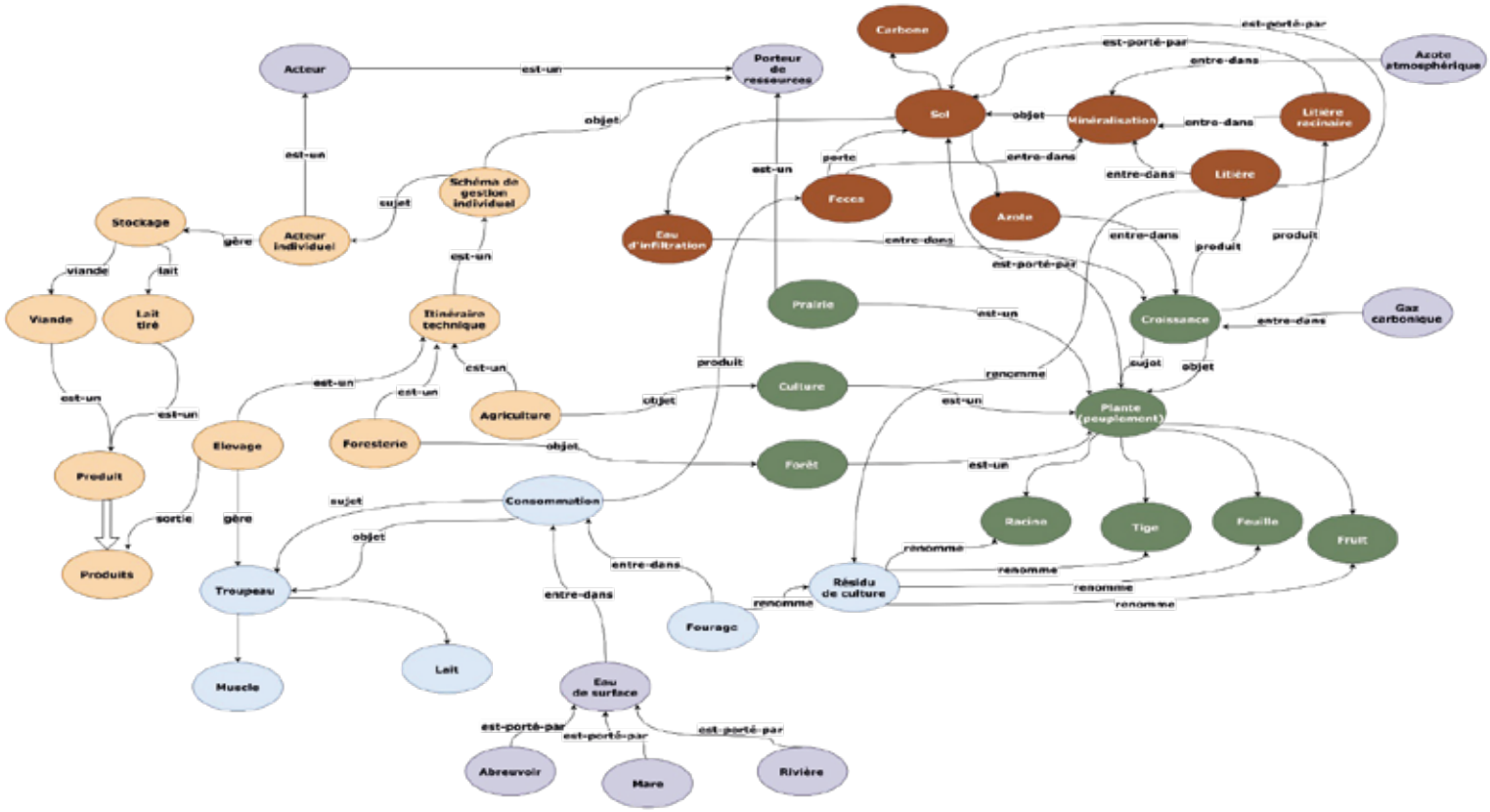
Vue d'ensemble du modèle conceptuel



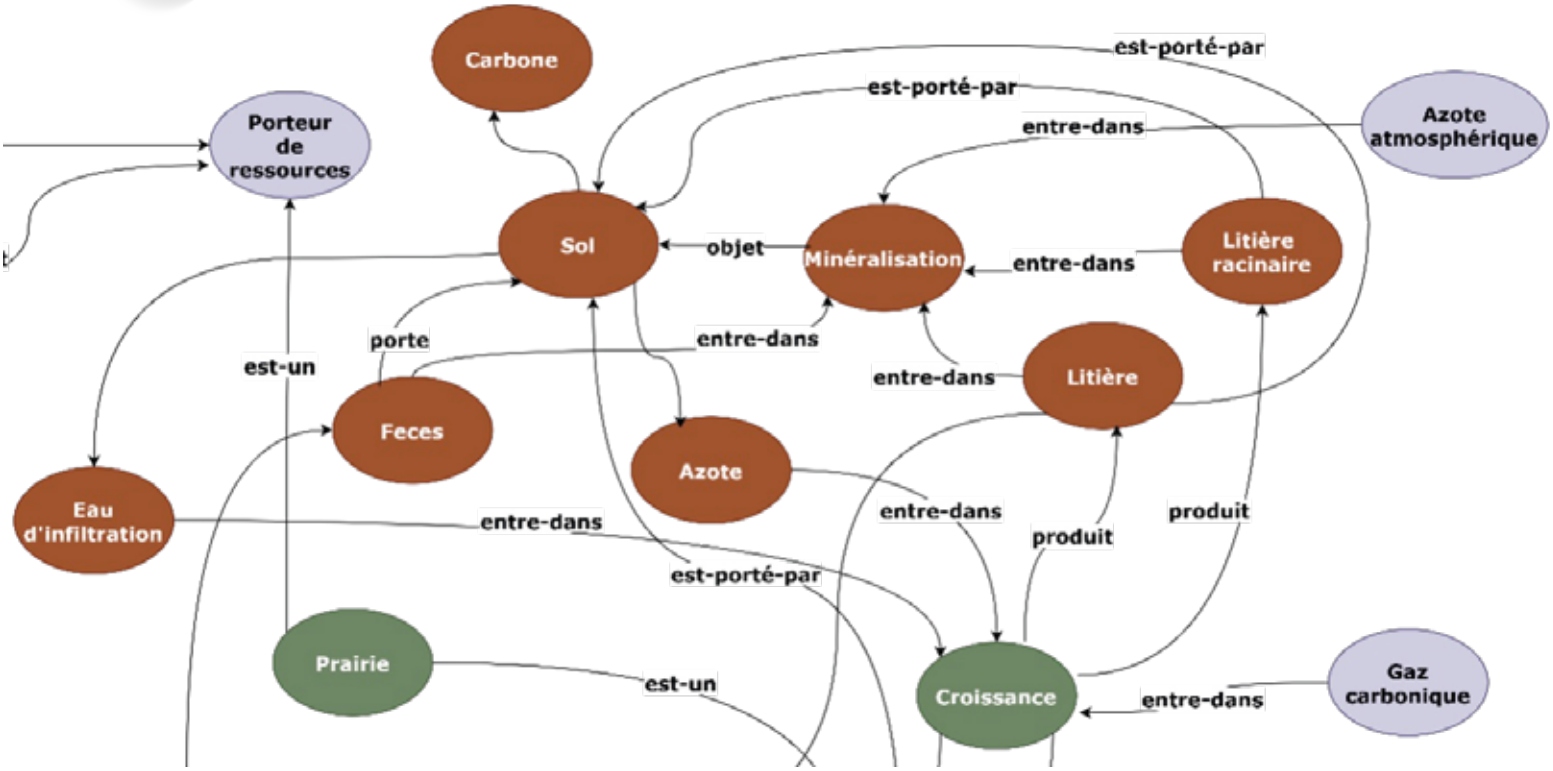
Les acteurs du territoire



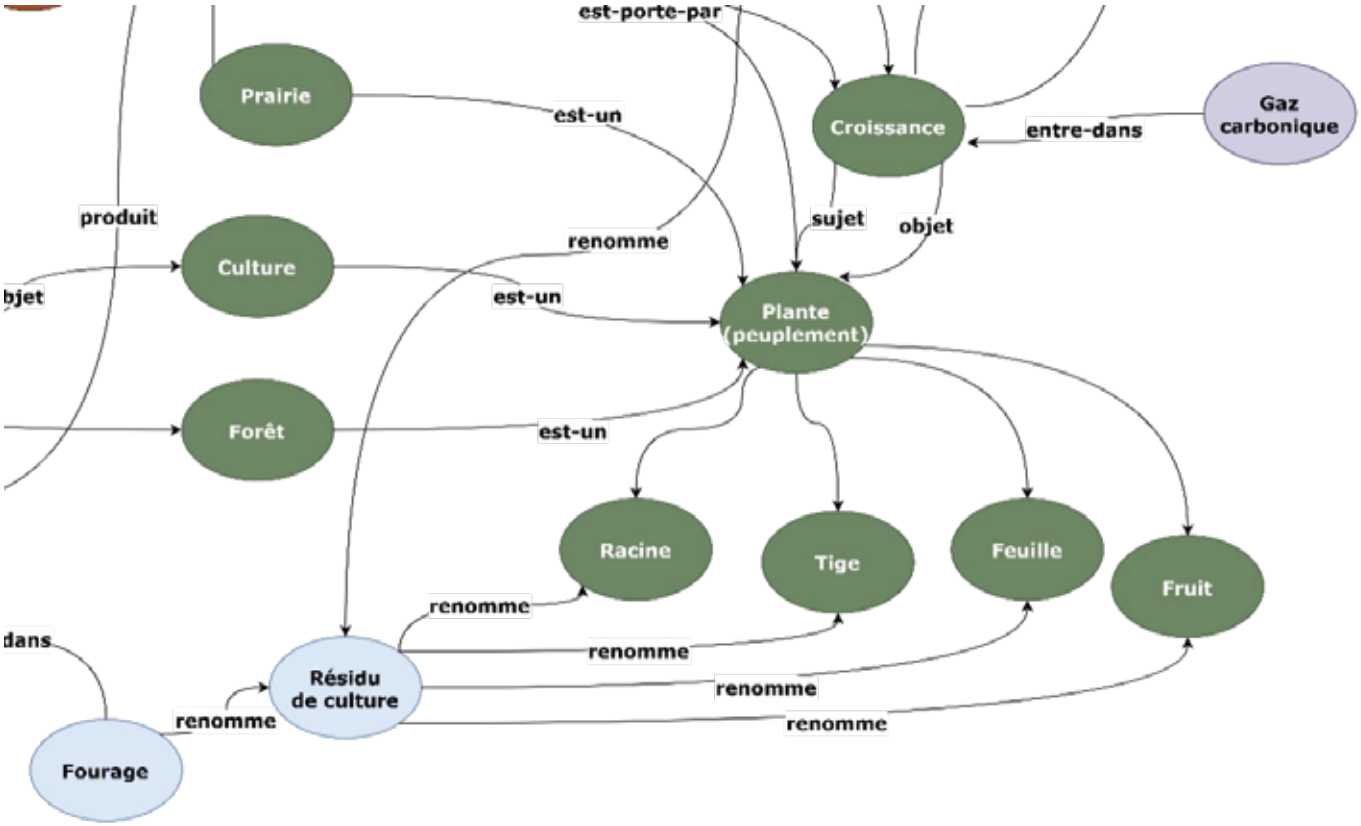
Vue d'ensemble du modèle conceptuel par acteurs



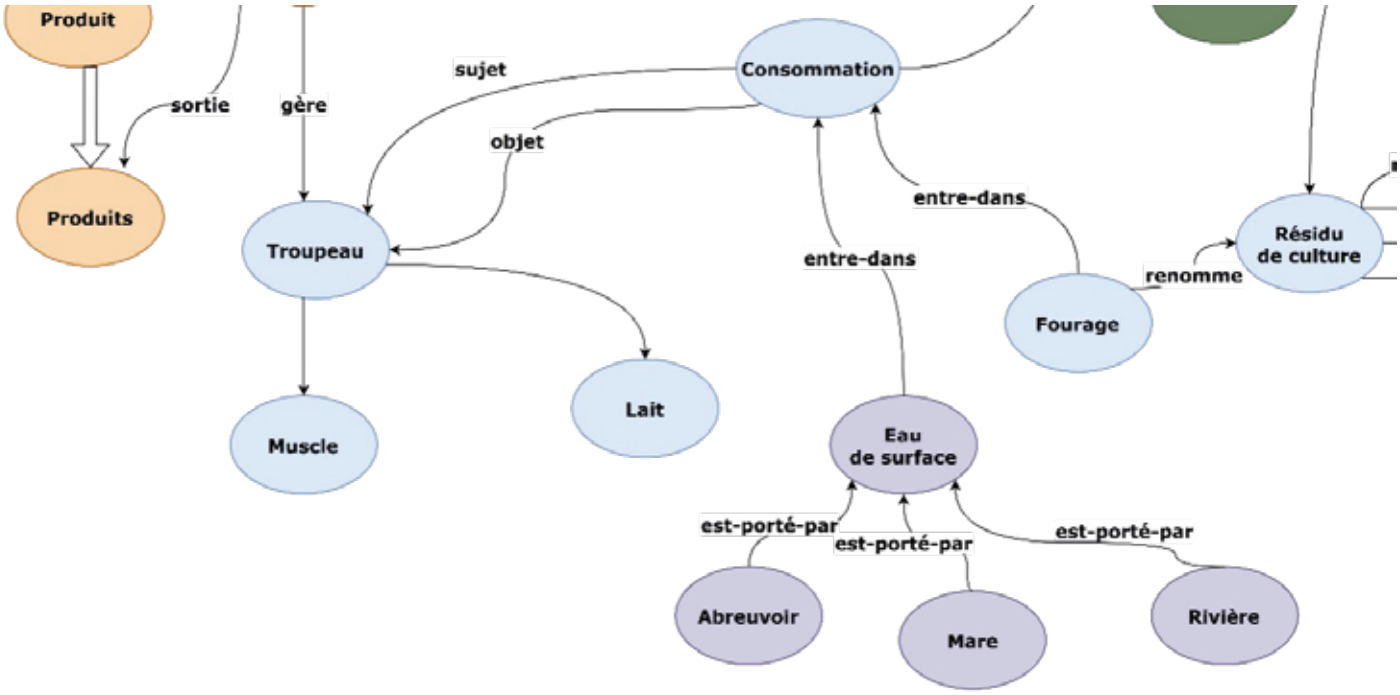
Les transformations du sol



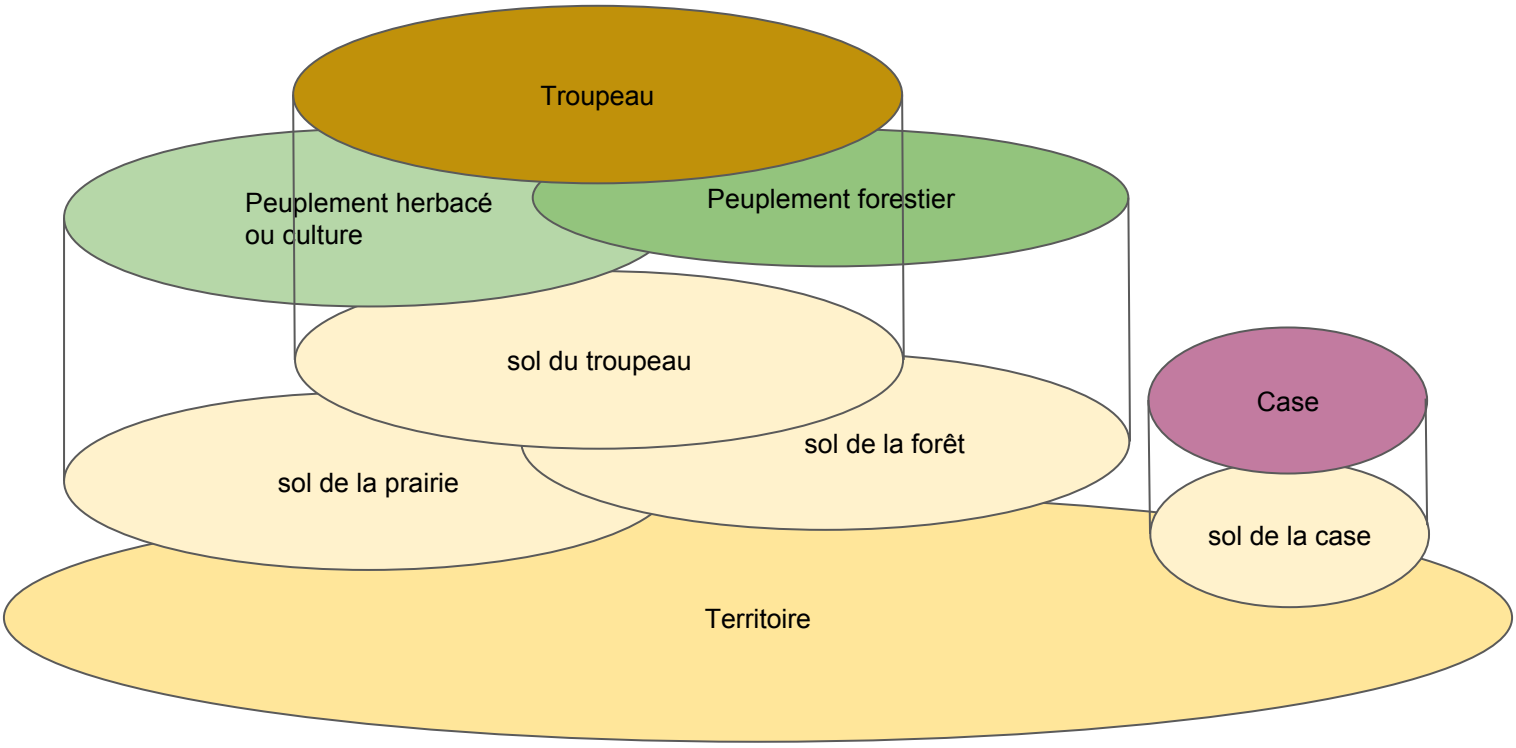
Les transformations végétales



Les transformations animales

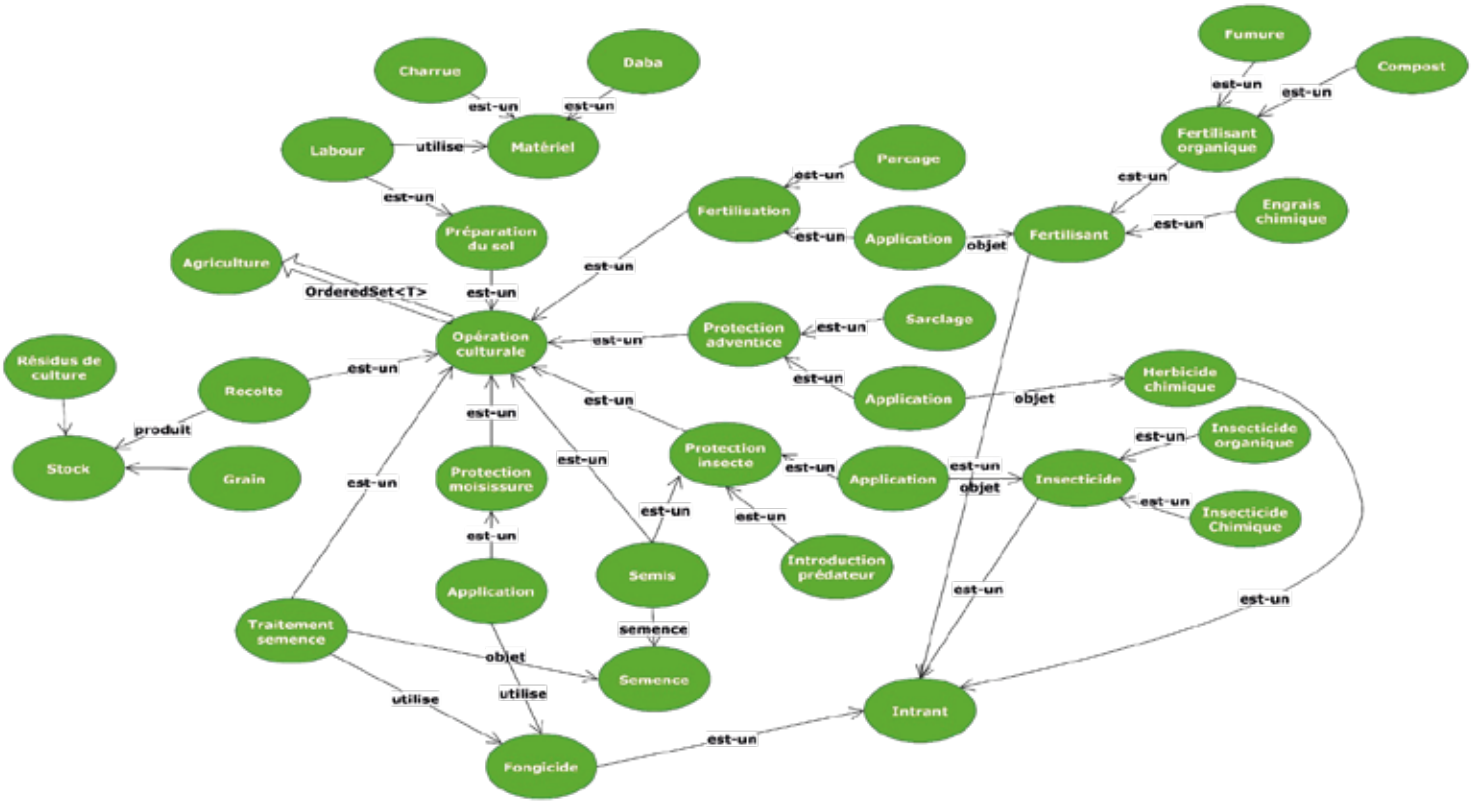


Porteur de ressources et espaces

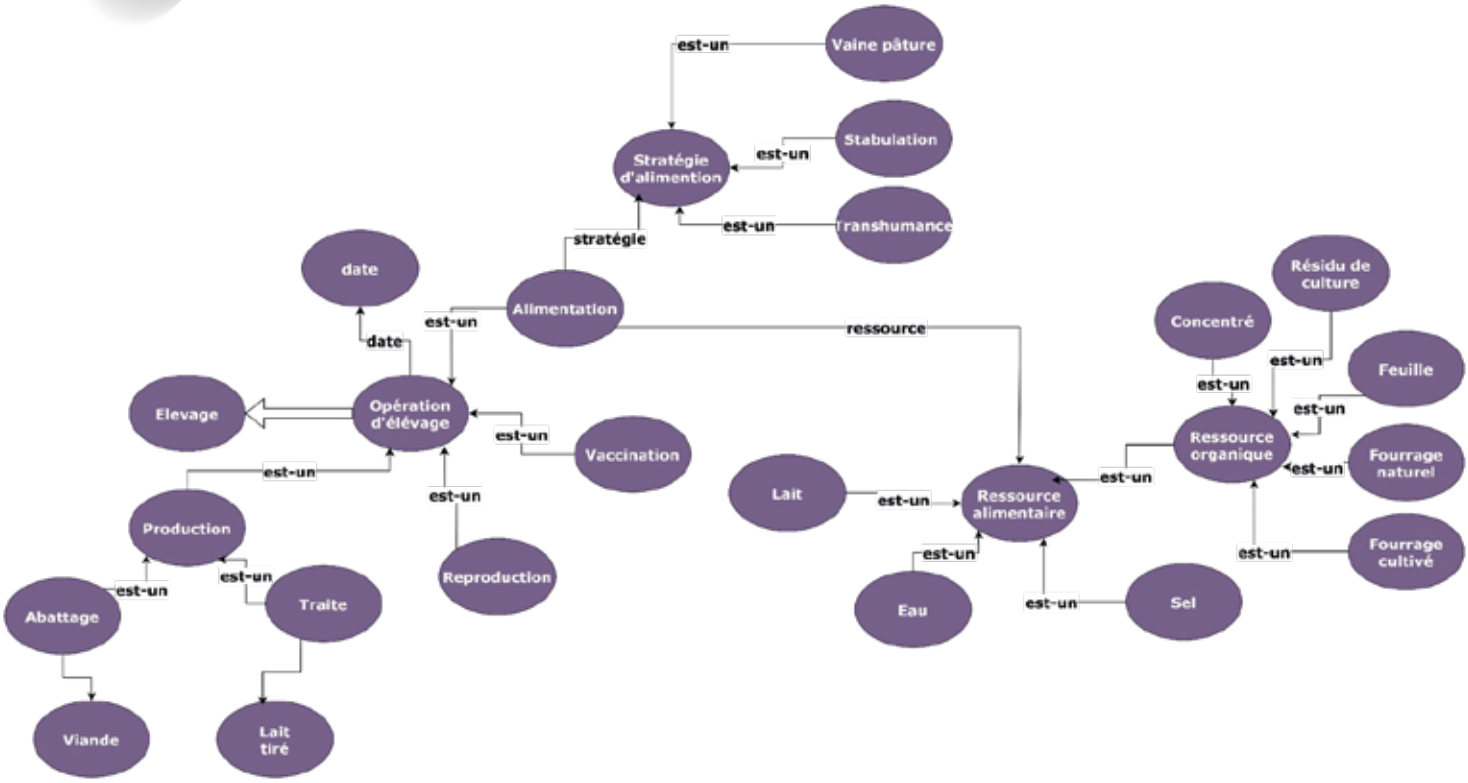


Les transformations humaines

Itinéraire technique cultural



Itinéraire technique pour l'élevage



Déroulement

Quel groupe d'acteurs est intéressé pour discuter de leur projet de territoire en utilisant le modèle:
CT DyTAEL ?
Forum communal ?
Groupement villageois ?

Quelle échelle:
département ?
commune
plusieurs villages ?
un village ?

Lequel ? a-t-on des données ? etc.

Personnes ressources

Ayant identifié le groupe d'acteurs concerné et le territoire du modèle:

QUI POUR CONTINUER A DISCUTER LE MODELE AVEC NOUS, ET NOUS APPORTER DES INFORMATIONS SUR LE FONCTIONNEMENT DU TERRITOIRE IDENTIFIE ?

Service de l'élevage départemental (Khadim Ndiaye 77 781 03 41)

et chef poste vétérinaire Niakhar : Madame Ndoye 77 303 91 68)

chef poste Tattaguine (Mor Gueye 77 306 13 03)

Eaux et Forets : Niakhar : Chekh Amar (77 362 75 05), Tattaguine (David Danfan 77 718 02 75)

Elus référents de Ngayokheme (Pierre Dieng 77 361 99 51) et de Diarere (Adama Faye 77 264 28 99)

Chef de CPDT de Niakhar (Bassirou Sarr 77 800 34 96) et Tattaguine (Diouma Kally 77 985 89 69)

ANAT (Directeur : Dr. Modou Fall), Kaolack 77 539 11 54

SDDR Fatick (Felix Malou) Fatick 77 537 04 00

Bureau de la statistique : Madame Fatou Dieng (77 685 21 27

RDV à prendre jeudi et vendredi

MERCI BEAUCOUP POUR VOTRE PARTICIPATION !!!