Webinar CLAND/GABI/MOSAR

Evaluation of intensification potentials and sustainability of ruminant farming systems at the global scale

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PHD'S OBJECTIVES

Objectives :

(1) Assess economic, environmental and social impacts of different ruminant farming systems on a global scale

(2) Compare potential systems for conventional and unconventional intensification

(3) Identify sustainable development paths of ruminant farming systems

PHD WORK SCHEME

Define different ruminant farming systems

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Model systems

↓

Assess environmental, economic and social impacts

↓

Comparison of potential systems for conventional and unconventional intensification

↓

Identify sustainable development paths of ruminant farming

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RUMINANT FARMING SYSTEMS

1. Transhumance and nomadism pastoralism
2. Sylvo-pastoralism
3. Sylvo-pastoralism associated with agriculture
4. Pasture based livestock farming, without association with agriculture
5. Pasture based livestock farming, associated with industry (semi-containment)
6. Monoculture/pasture based livestock farming (semi-containment)
7. Polyculture/pasture based livestock farming (semi-containment)
8. External or internal containment
9. Urban and peri-urban livestock farming

HOW ARE THESE SYSTEMS DEFINED?

1st step:

→ systems defined normatively/potential systems and not actual systems

→ derive from existing ruminant farming system from all over the world

→ a **combination of criteria** (e.g. herd management and mobility, feeding system, integration with agricultural components…)

2nd step:

→ match it with data and actual systems

Issue 1: mapping the potential systems and matching them with actual ones

Issue 2: issue of the mix of systems & having proper parameters to take into account the diversity of potential systems

HOW IS OUR TYPOLOGY DIFFERENT FROM OTHERS?

One reference typology: Seré & Steinfeld typology (FAO)

Agro-ecological gradient

Used criteria
Relation to land, integration with crops

Other criteria
Herd mgmt & mobility, soc. & env. impacts

Our typology is defined by various practices, in particular in:

→ intensity and management of input use (land, feed, grass)

→ relationship between livestock and other agricultural system components

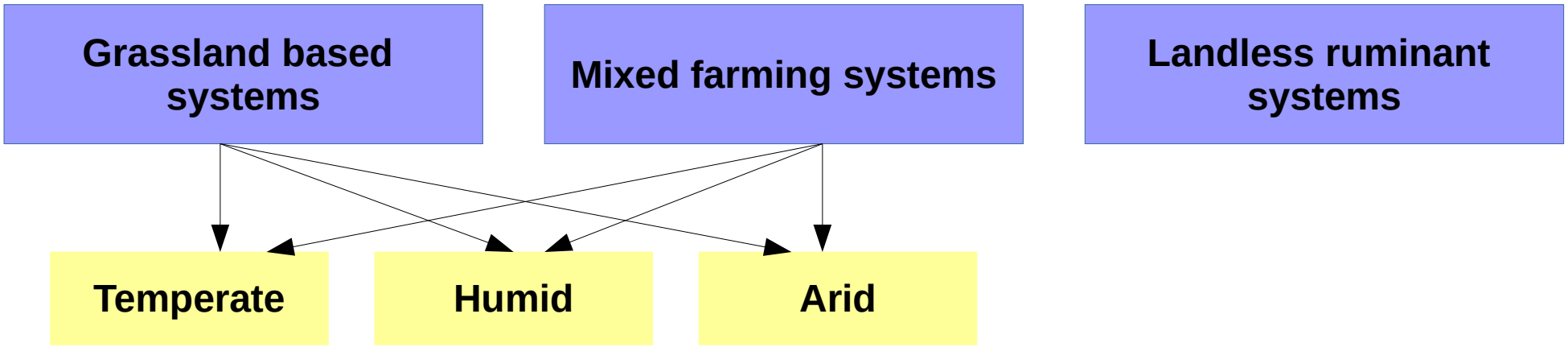
→ social en environmental impacts/contributions

SERE & STEINFELD TYPOLOGY (1996)

→ a reference in ruminant production studies

→ developed by FAO and used in GLEAM (Global Livestock Emissions Assessement Model)

Production systems of ruminant*



* Seré, C. & Steinfeld, H. 1996. World livestock production systems: current status, issues and trends. FAO Animal Production and Health Paper 127. Rome, FAO.

GOALS OF OUR TYPOLOGY

(1) have a global and holistic view of the sustainable pathways for ruminant systems

(2) could be added to another already existing model or could wok as a model on its own and be improved by other modules to make it fit to reality even more

(3) explore both conventional and unconventional intensification pathways

(4) best describe the diversity of ruminant systems and analyze effects on the environment, economic and society/livelihoods

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MODULES

Feed
Diet composition, digestibility, energy requirements

Recycling
Use of wastes and crop residues

On farm feed crop cultivation
Manure management, fertilization, crop/livestock integration indicator

Herd management
Herd, composition, mortality, fertility, replacement rates, growth rates, bodyweights

Climatic conditions
NPP, yields

Pasture management
Mowing and cut and carry data, carrying capacity, fertilization

Herd moblity
Time spent in a barn and on pastures

USE OF EXISTING MODELS

Based on existing models :

- **Orchidee-GM**
  - → global pasture coverage
  - → pasture management
- **LPJmL outputs**
  - → potential and actual yields of crops

COLLABORATIONS

Collaborations and potential ones :

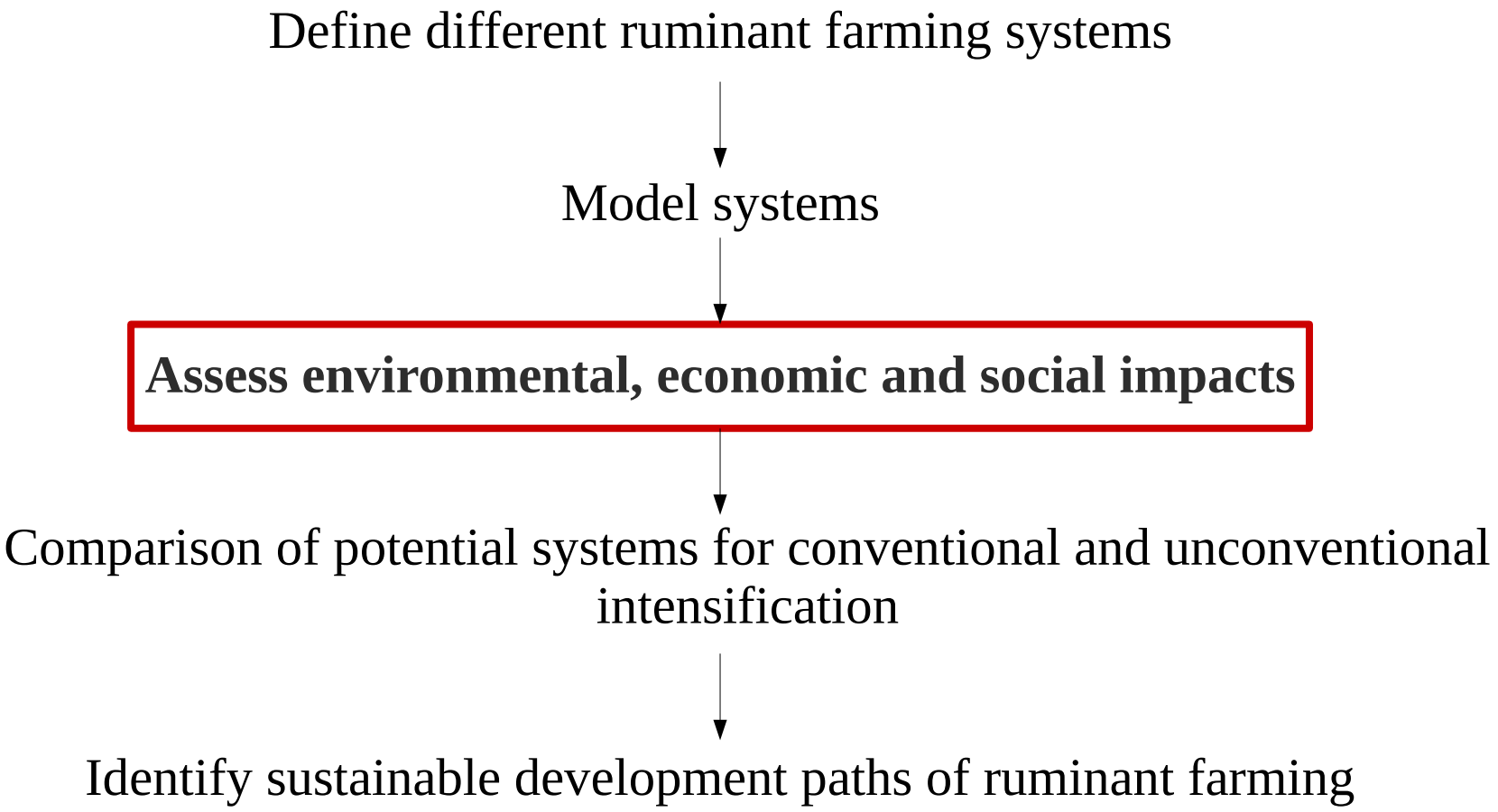
→ CIRAD

→ GLEAM/FAO

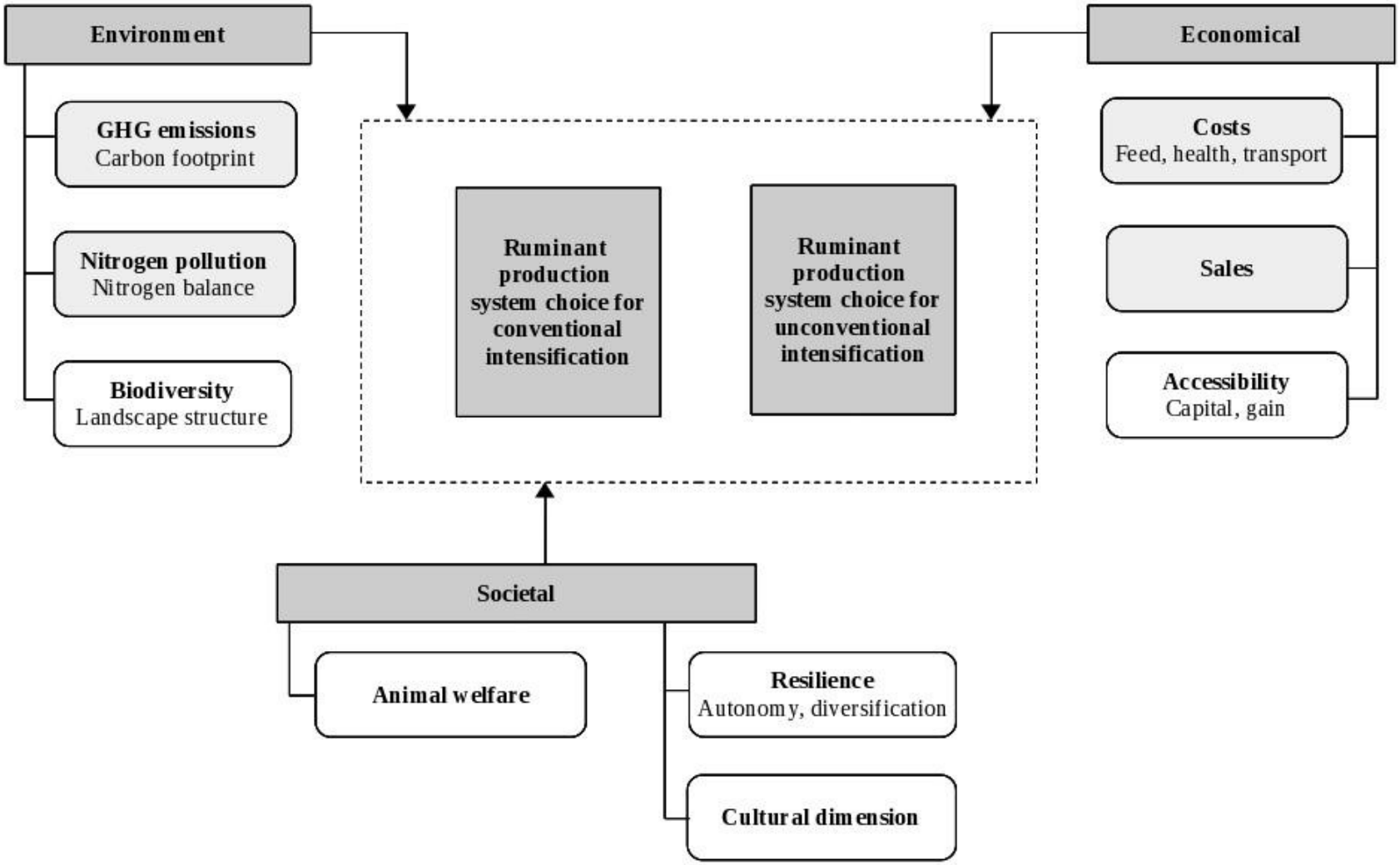
→ Stefan Wirsenius (Chalmers Uni.)

→ Philippe Faverdin (INRAE)

PHD WORK SCHEME



IMPACTS ASSESSMENT



OTHER MODELS & SUSTAINABILITY ASSESSMENTS IN LITERATURE

What are their approach?

→ studying a specific system (e.g. grassland based systems)

→ studying a specific region/country

→ studying one aspect (or two) of sustainability

→ focused on one strategy for sustainable ruminant farming (e.g. feeding strategy)

→ a different typology (characterized by AEZ and the link with crops)

→ intensification take place through the modification of the shares of different systems

What are their results?

→ outline opportunities for sustainable or ecological intensification

→ identify practices or strategies for sustainable or ecological intensification

→ relationship between ruminant production/productivity and environmental impact

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POTENTIAL FOR INTENSIFICATION

Potential for **conventional intensification** or **“profit-maximizing” intensification**

→ farming practices with the highest economic output and the highest return

→ aiming at obtaining high zootechnical yields and maximizing income and profit by breeders

Potential for **unconventional intensification** or **“non-profit-maximizing” intensification**

→ farming practices with a balance between social, environmental, and economic objective

→ reaching a social and environmental optimum while still being economically viable

MY PHD IN CLAND

CLAND - Challenge 3:

Understanding and managing the transition towards integrated land management

→ explores the conditions and policy options for managing the transition towards land use systems integrating adaptation, mitigation and biodiversity objectives

→ 3 research lines

My PhD in CLAND:

→ potential solutions for managing the ecological transition of the 21st century

→ cross-disciplinary research in modelling food production, ecosystem functioning and land-use socio-economics

→ help understand key feedbacks and assess risks and sustainable options for integrated management of land ecosystems