Research issues for crop-livestock integration in mixed farming systems in the tropics : A review.

Stark F.[1,2], Archimède H.[3], Moulin C.H.[4,5]

[1] CIRAD, UMR SELMET, Montpellier, France
[2] AgroParisTech, Montpellier, France
[3] INRA, URZ Guadeloupe, France
[4] Montpellier SupAgro, UMR SELMET, Montpellier, France
[5] INRA, UMR SELMET, Montpellier France

fabien.stark@supagro.inra.fr

Context

- **Global context: Agricultural aims**
- Produce more and better.
- Adapt to a constraint and changing world.

- **Specific context: Mixed Farming Systems (MFS)**
- MFS = Combining livestock and cash crops at farm level.
- Predominant in the tropics.
- Good model to answer agricultural goals ?

- **Scientific context: Crop-livestock integration (CLI)**
- CLI = Integrated management of both crop and livestock productions.
- Renewed interest in this new context
- Permit to improve efficiency and resiliency of MFS ?

Objectives

- **Objectives of the study**
- Review of scientific literature.
- Analyse research approaches on CLI.
- Identify issues for further researches.

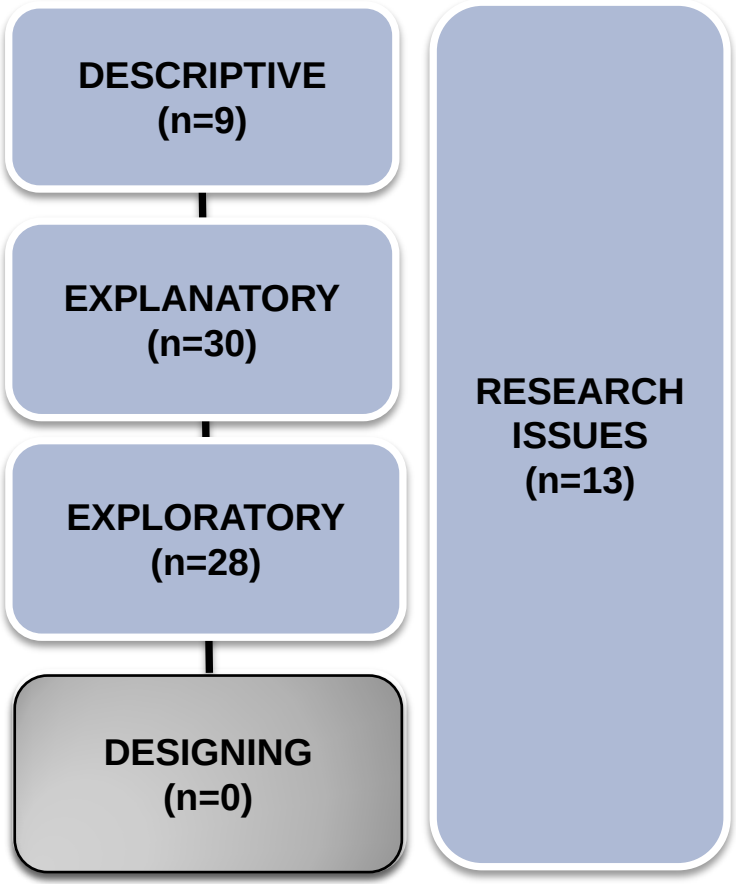
- **Scope of the study:**

∈	∉
Mixed Farming Systems	Specialized Systems
Crop-Livestock Integration	Independent management
Farming system approach	Analytical approach
Tropical climates	Temperate climates

- **Results of the study**
- 80 scientific papers identified
- Geographic areas: Africa > Asia > South America
- Characterise main research approaches on MFS and CLI.
- Specific considerations on Crop Livestock Integration analyse.

Current research approaches

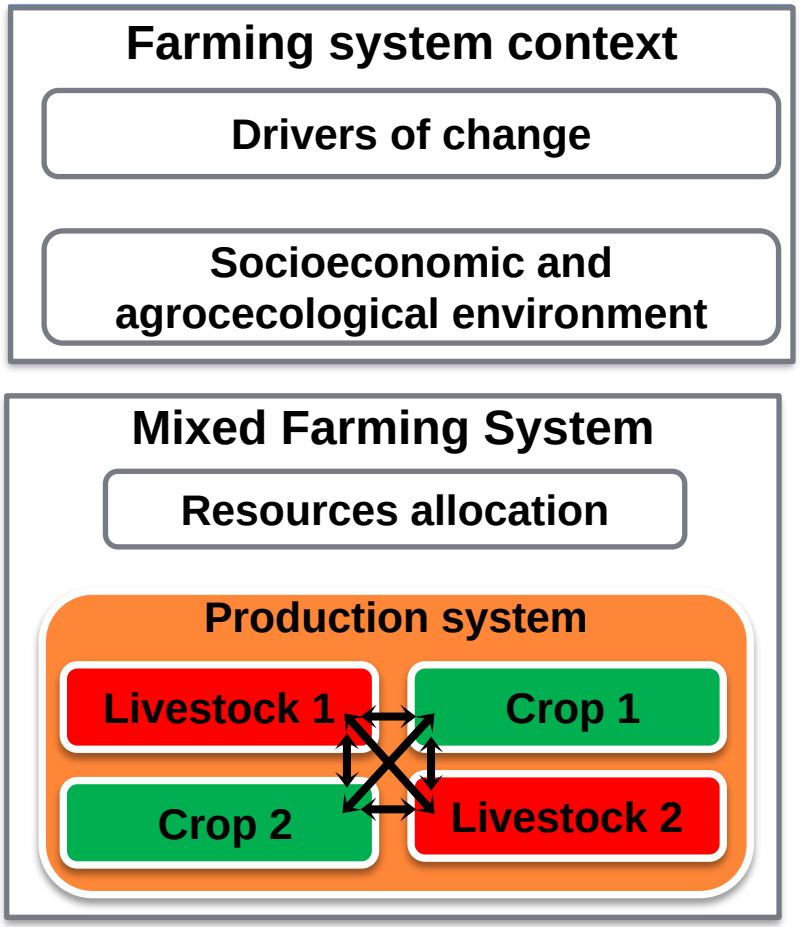
- **Classification of research approaches**
- = Farming system research framework
- + Research issues approaches
- - Designing papers



Adapted from Giller et al., 2011

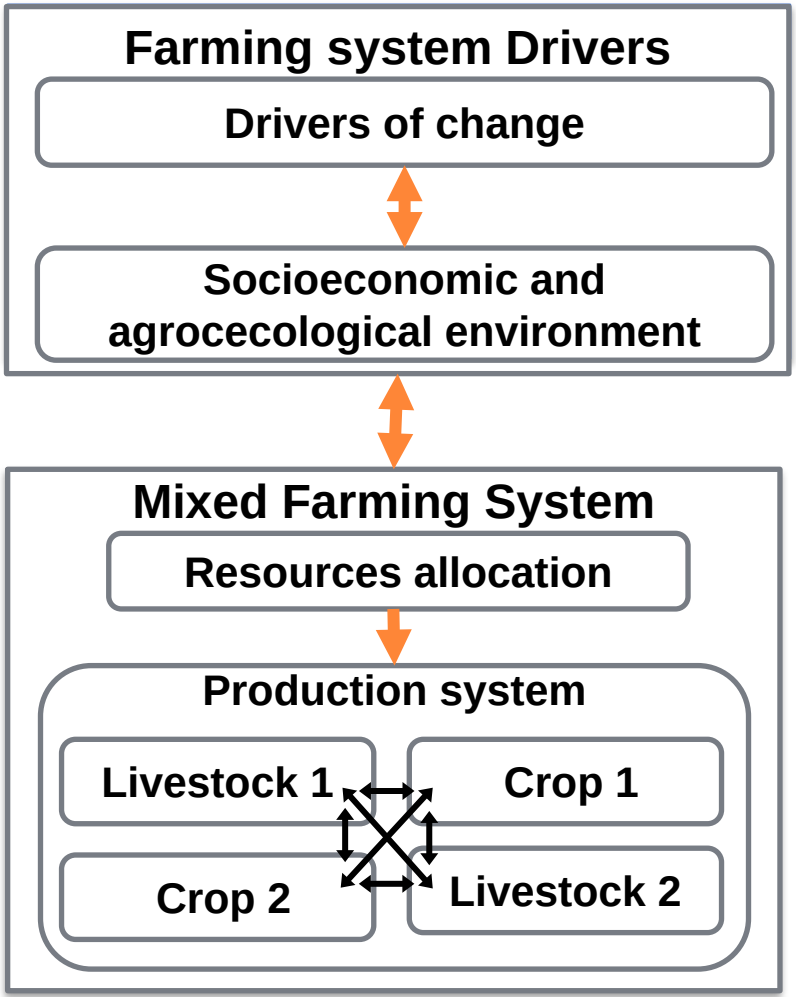
Current research approaches

- **1. Descriptive approaches:**
- Characterisation of system components
- Subject: Drivers, Farming Systems, Crop Livestock Integration
- Methodology: Conceptual framework, case study, typology



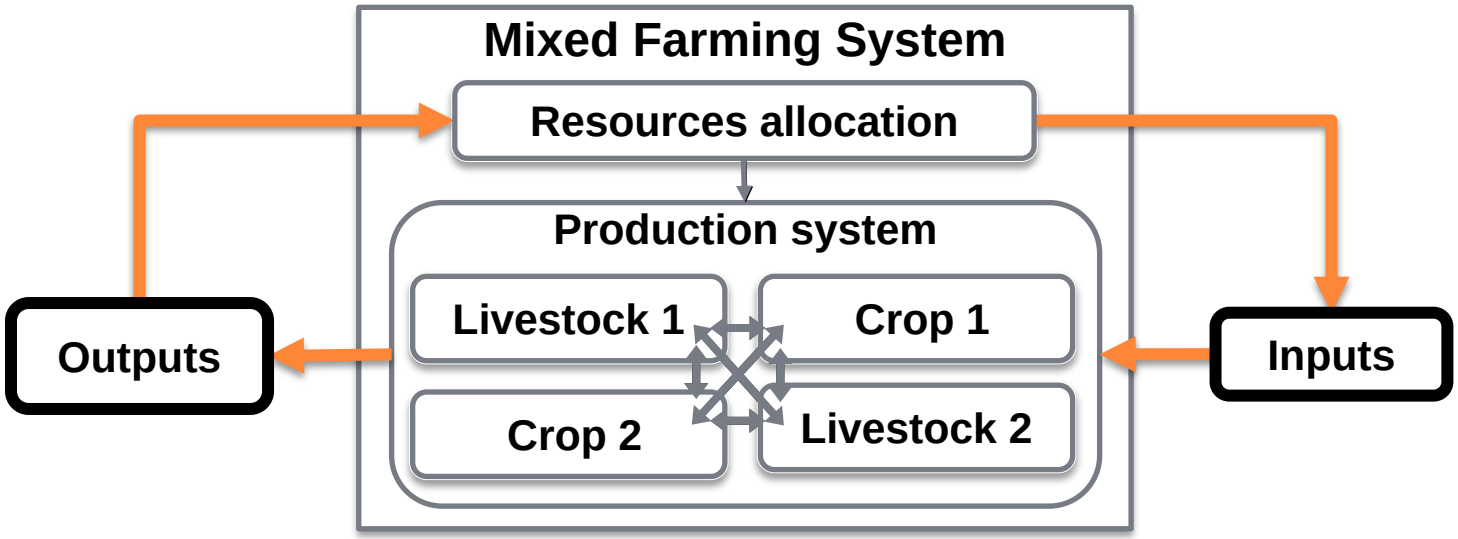
Current research approaches

- **2. Explanatory approaches:**
- Analysis of interaction between components
- Subject: Drivers influence on resource allocation, on MFS, on CLI
- Methodology: Comparative study, experimentation



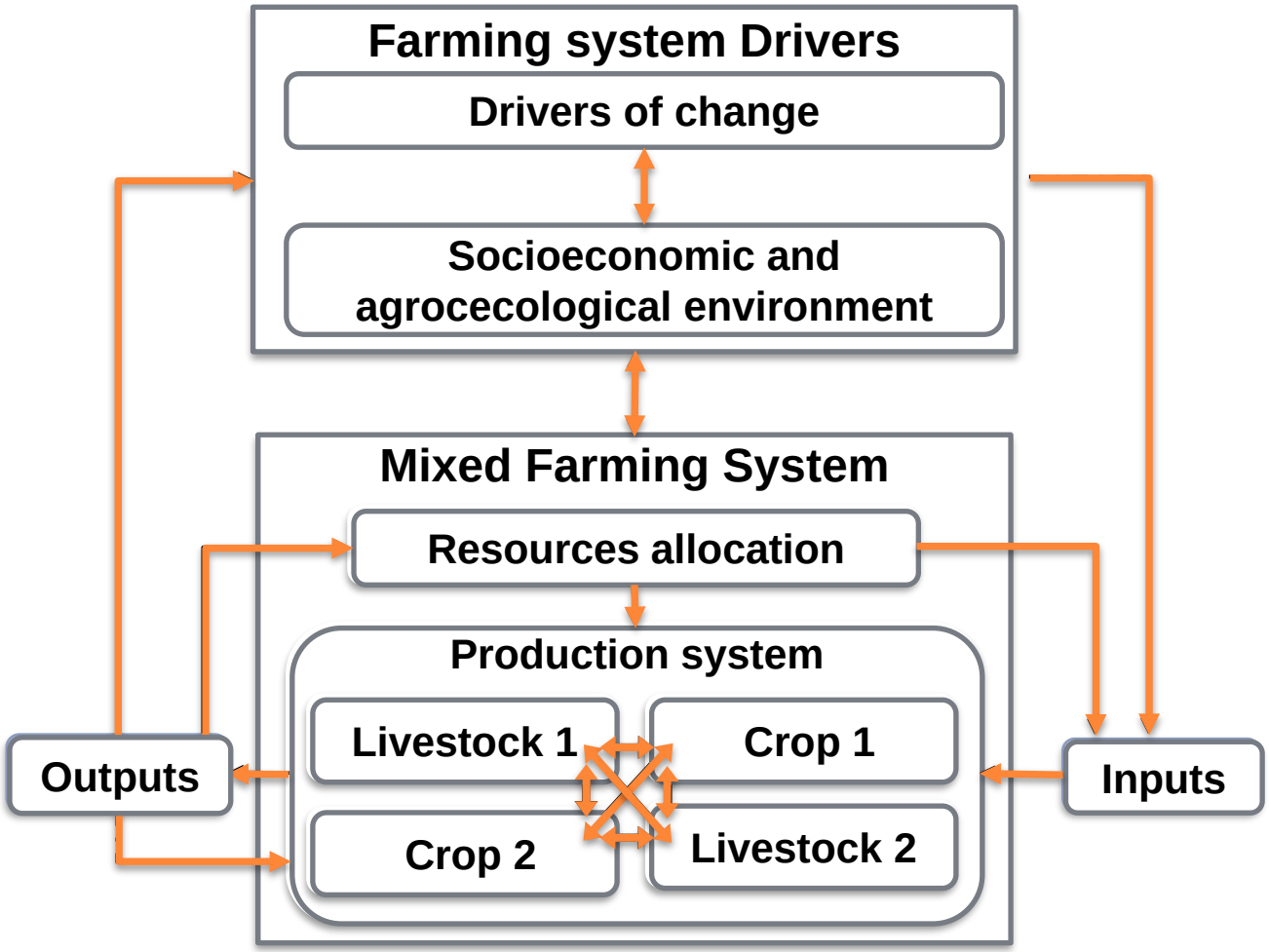
Current research approaches

- **3. Exploratory approaches:**
- Analysis of system performances and improved scenarios
- Subject: resources trade offs, CLI intensity
- Methodology: Scenario analysis, impact assessment



Current research approaches

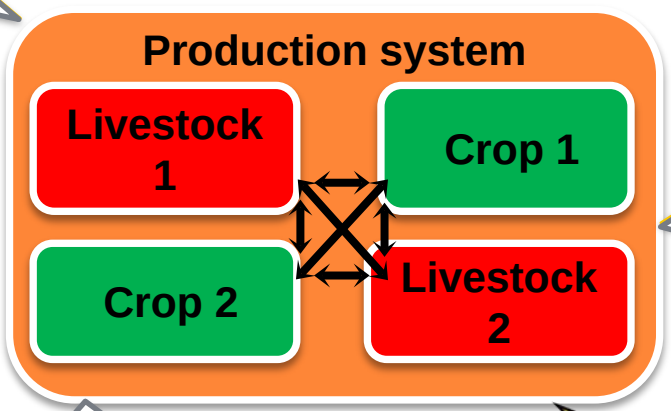
- **4. Integrated approaches:**
- Analysis of whole interactions : Drivers <-> MFS <-> CLI <-> Performances
- Subject: Resource use efficiency, sustainable intensification
- Methodology: Models, combination of methodologies



Crop Livestock Integration Analysis

Conceptual Framework
- Physical and organizational dimensions
- Integration gradient

Drivers relationship
- Intensification stage
- Integration gradient



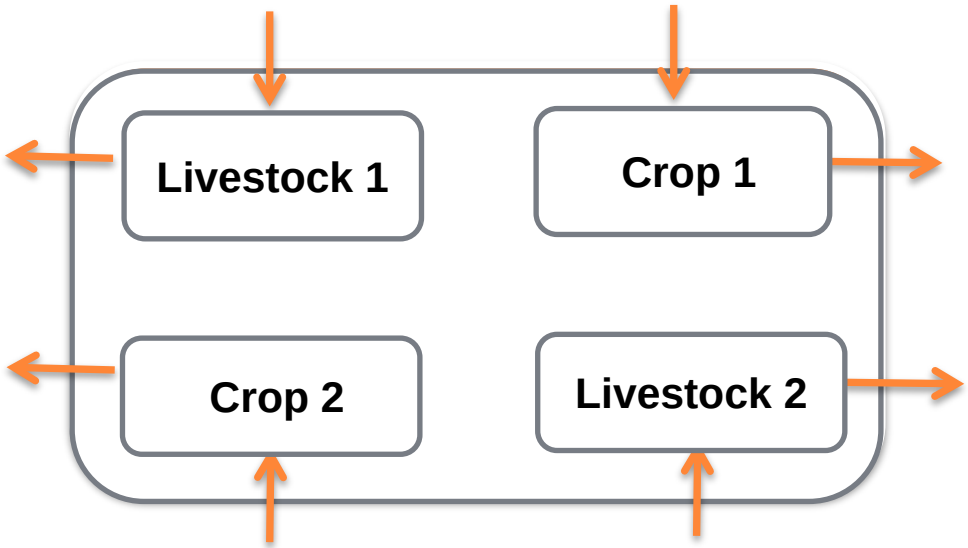
Practices
Animal feeding, Organic fertilization and Energy production

Performances
Economic: Productivity, efficiency
Social: livelihood, resiliency
Environmental: GHG, biodiversity

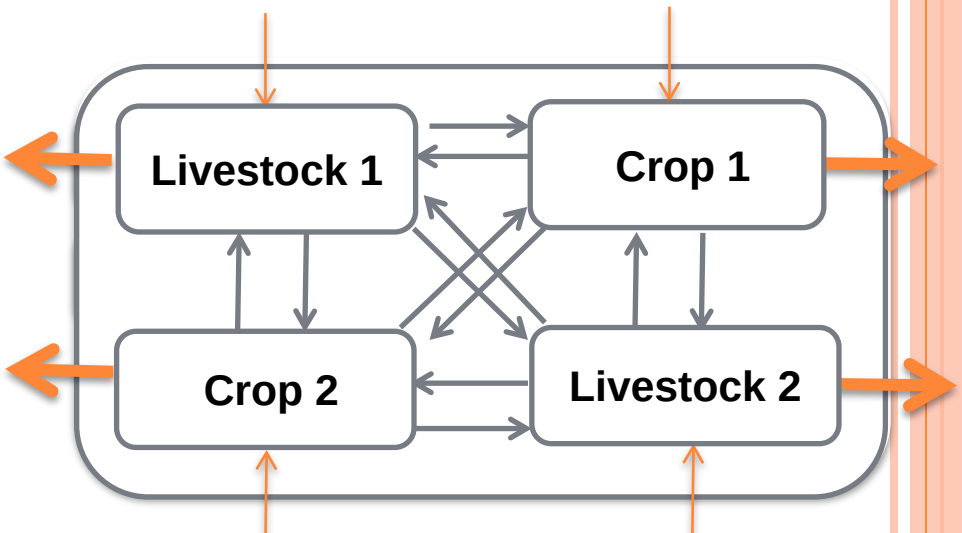
Resource flows
Resources network analysis
Diversity and integration of flows
Efficiency of resources use

Crop Livestock Integration Analysis

- **Resource flows network analysis**
- To analyse network size, activity and organisation
- Understanding flows into the system (integration)
- Link them to external flows (Input/Output analysis)

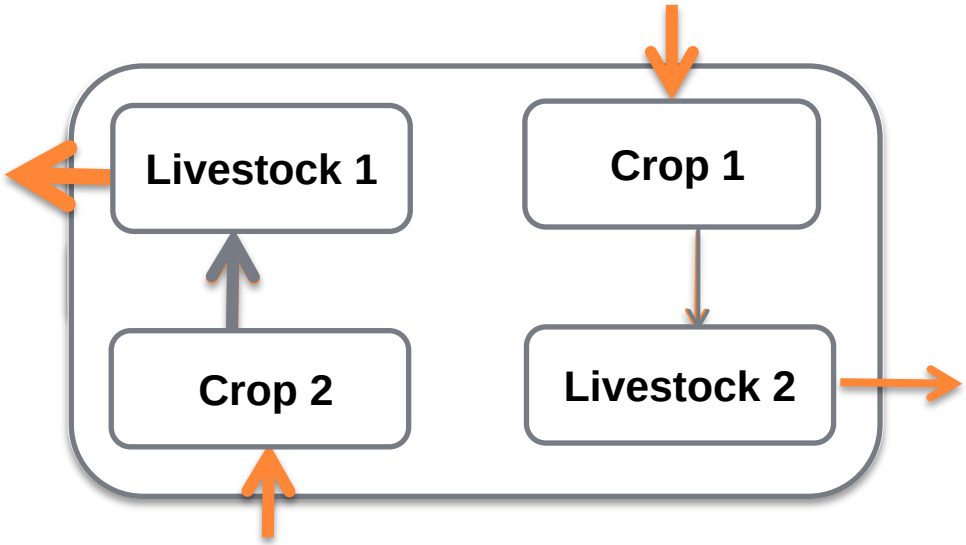


- **Self-Sufficiency**
- **Efficiency of resources use**
- **Productivity**



Crop Livestock Integration Analysis

- **Resource flows network analysis**
- To characterise diversity and integration
- Diversity in terms of number of flows
- Integration in terms of intensity of flows



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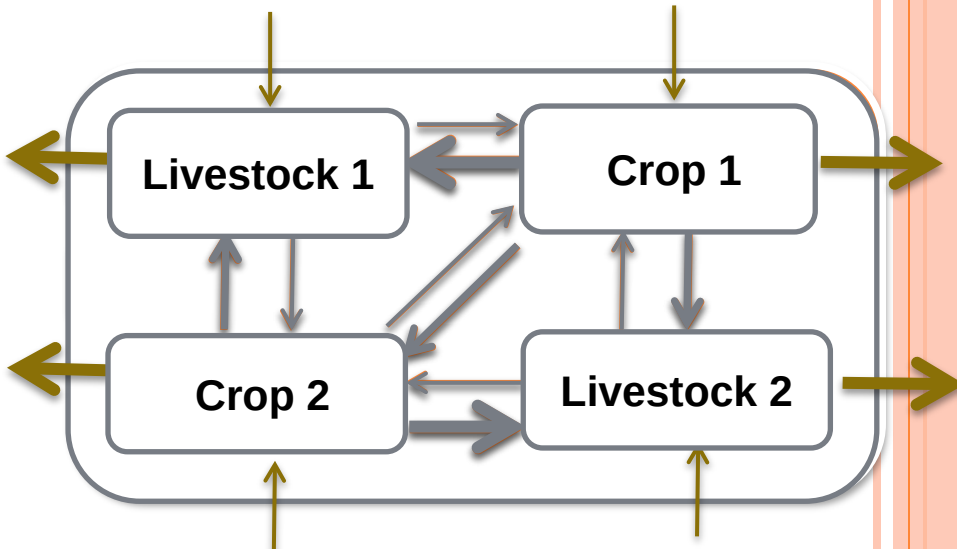


Discussion and perspectives

- **Interest of integrated approaches**
- Importance of understanding drivers influence on MFS and CLI practices
- Explore CLI improvement and associated performances

- **Interest of CLI characterization**
- CLI as a complex network of resources
- Network organisation and diversity conduct to different performances
- Resources in terms of efficiency rather than productivity

- **Phd research framework:**
- Comparative study on contrasted socioeconomic contexts:
  - Guadeloupe (FWI) – Cuba (Caribe) – Brazil (Amazonia).
- Holistic approach:
  - Drivers, CLI and performances (Farming system analysis).
- Multicriteria analyse:
  - Resources Network analysis (Efficiency and resiliency).

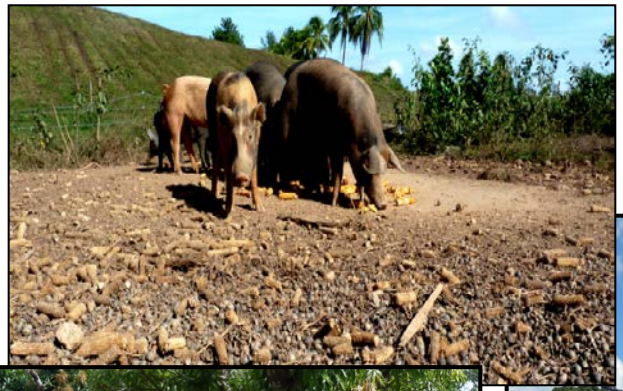
Thank you

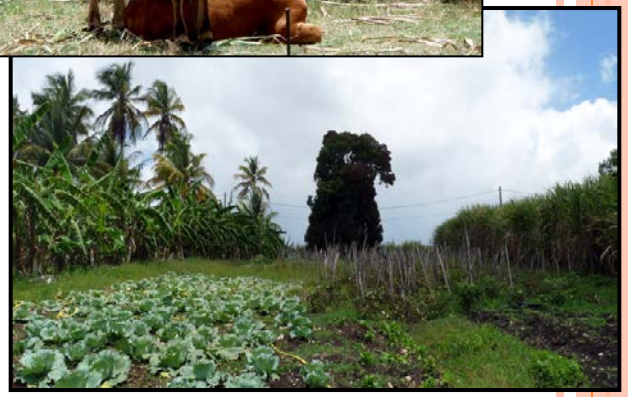
Merci

Mési

Obrigado

Gracias





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fabien.stark@supagro.inra.fr (Phd student, first year)