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SELF-SUFFICIENCY FOR ANIMAL FEED: A MULTI-LEVEL FRAMEWORK TO PROMOTE AGROECOLOGICAL FARMING SYSTEMS

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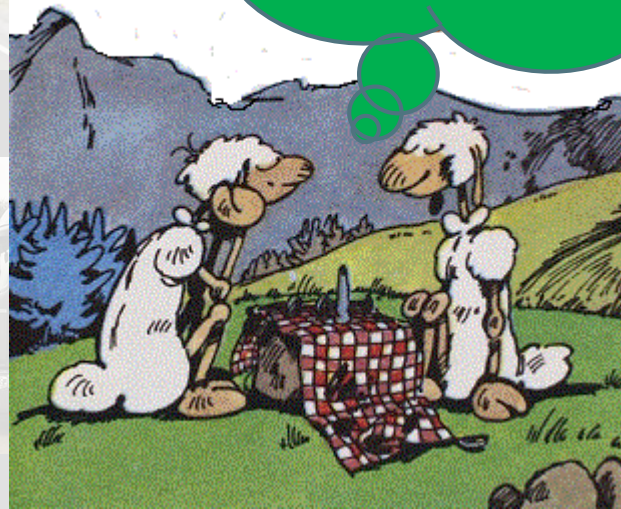
Once upon a time trucks travelling across frontier



*One 's upon a time lories
travell' ... frontier*

We want hay, straw,
ammonium nitrate, and soya
for Roquefort production

*We could be
self-sufficient for
feeding !!!*



Main points for this presentation

- ⦿ A conceptual framework and indicators to assess feed sufficiency
- ⦿ Choice of sample farms & methods
- ⦿ Using framework at farm level to define feed self-sufficiency
- ⦿ Examples and Challenge at territory and supply chain level

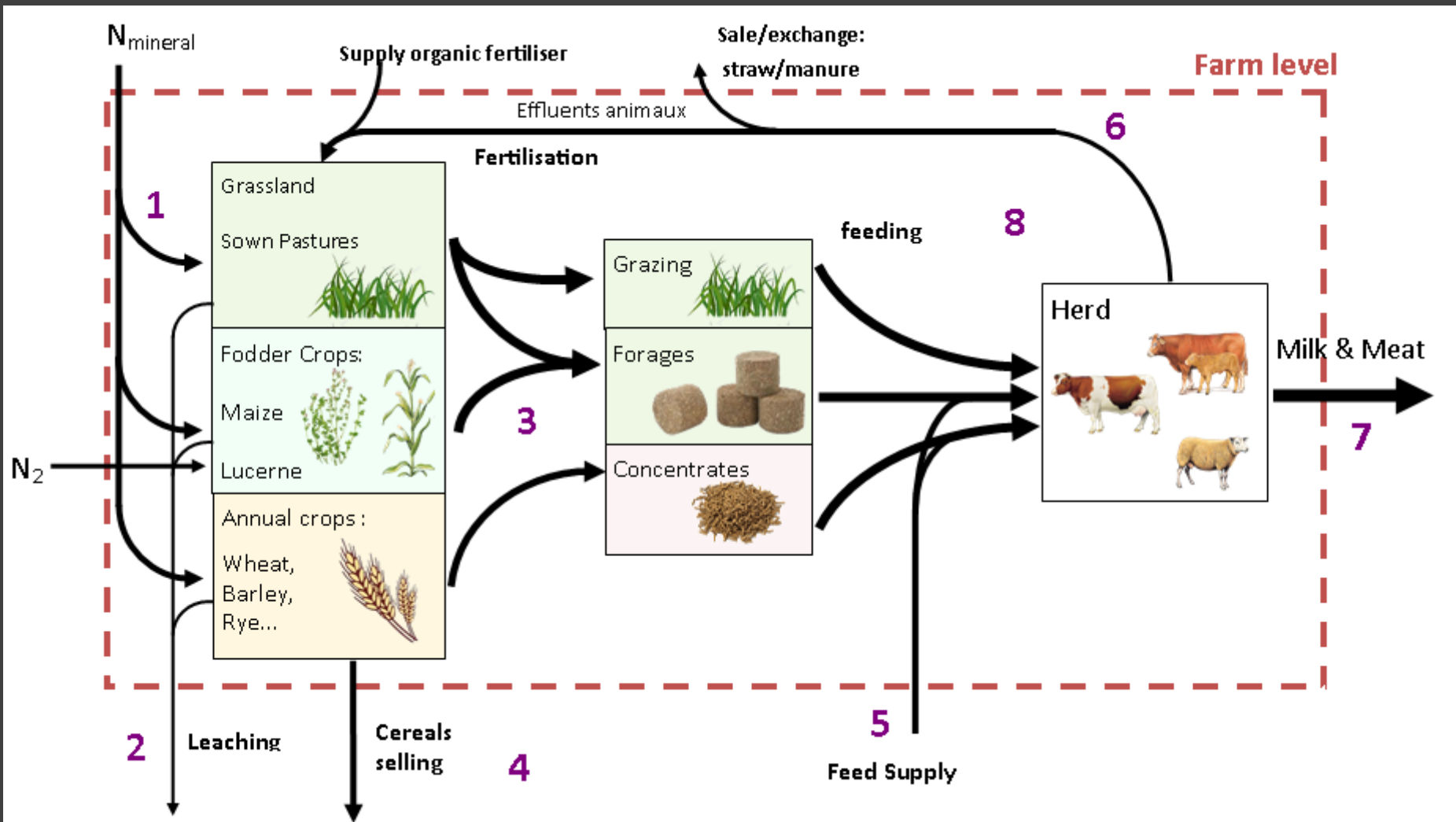
Issue and objective of the study

- ⦿ Self-sufficiency as a driver of agroecological transition.
 - ⦿ Most farmers combine livestock with forage and crop production to increase self-sufficiency for animal feeding.
 - ⦿ Few farms can develop local exchanges to use local resources.
- ↪ To build framework characterizing self-sufficiency for animal feeding at farm level in order to discuss the issue of this feed self-sufficiency at different levels :
- farm, local farmer's group, territory or supply-chain.*

Hypothesis for the conceptual framework

- ① How to scheme the feed sufficiency at farm level using stock and flow approach:
 - Explaining different feed inflow and outflow used by animals.
 - Calculating the production impacts at farm level.
- ② What is the relevance of these flows at territory level ?
 - Flows approach can be used at territory level by aggregating data.
 - Exchanges between farmers at local level can foster feed sufficiency.
 - Supply chain actors must take into account needs for self-sufficiency for animal feeding.

Conceptual framework



Methodology: Sample Farms and studies

Analysis at farm level

Agriculture census (Agreste, 2010) in Aveyron department :
Dairy cow, suckling cow and Dairy sheep farms represent 70% of the farms

Collect data from:
20 farms Dairy and suckling cows (*Dumas 2015*)
21 farms Dairy sheep (*Di Bartolomeo 2014, Galtier 2015*)

Stock&Flow Modelling and indicators assessment ①

Territory Level

Aggregation of the farms at the agricultural region "Segala" 2 199 EA
Grimaldi 2013

Stock&Flow Modelling at local region *without performances analysis* ②

Territory and Supply chain Level

Analysis of exchange and agreement between farmers in two local regions
Mélaç 2014, Péquignot 2015

Interviews of stakeholders at farmers 'groups and supply chain level ③ ④

Indicators to assess feed sufficiency

Feed Sufficiency

Forage Sufficiency Indicator → based on ratio forage production / consumption

Energy Sufficiency Indicator → based on energy part of forage and concentrates

Protein Sufficiency Indicator → based on protein part of forage and concentrates

Farm Features

Crops & Forage crops area

Rangeland per LU

Stocking rate

Animal Productivity

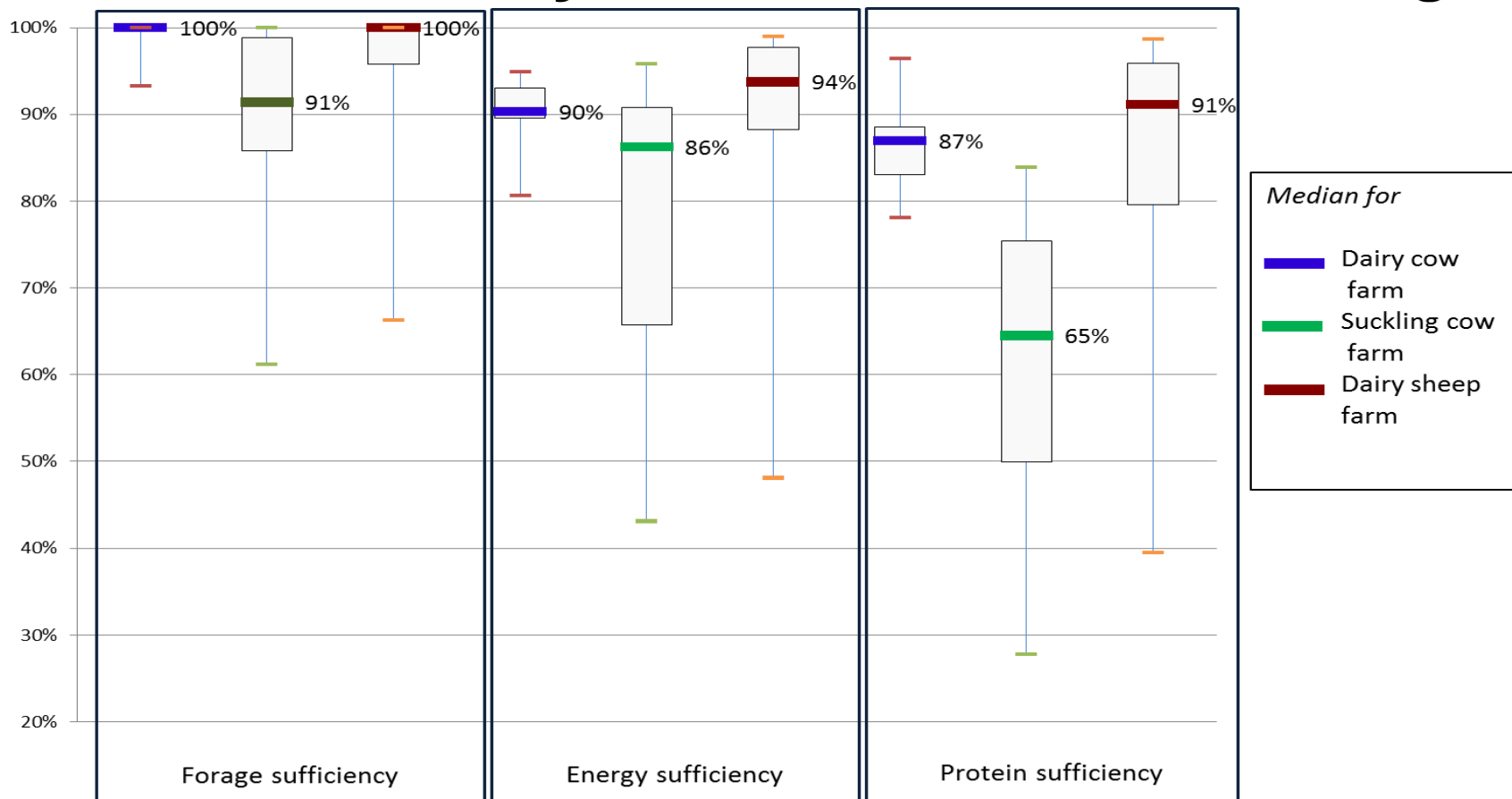
Production Impacts

Nitrogen Environmental Impact → based on nitrogen losses (kg Nitrogen lost by ha of AA)

Food Productivity Impact → based on protein production (kg protein produced by kg Nitrogen input)

Feed sufficiency at farm level

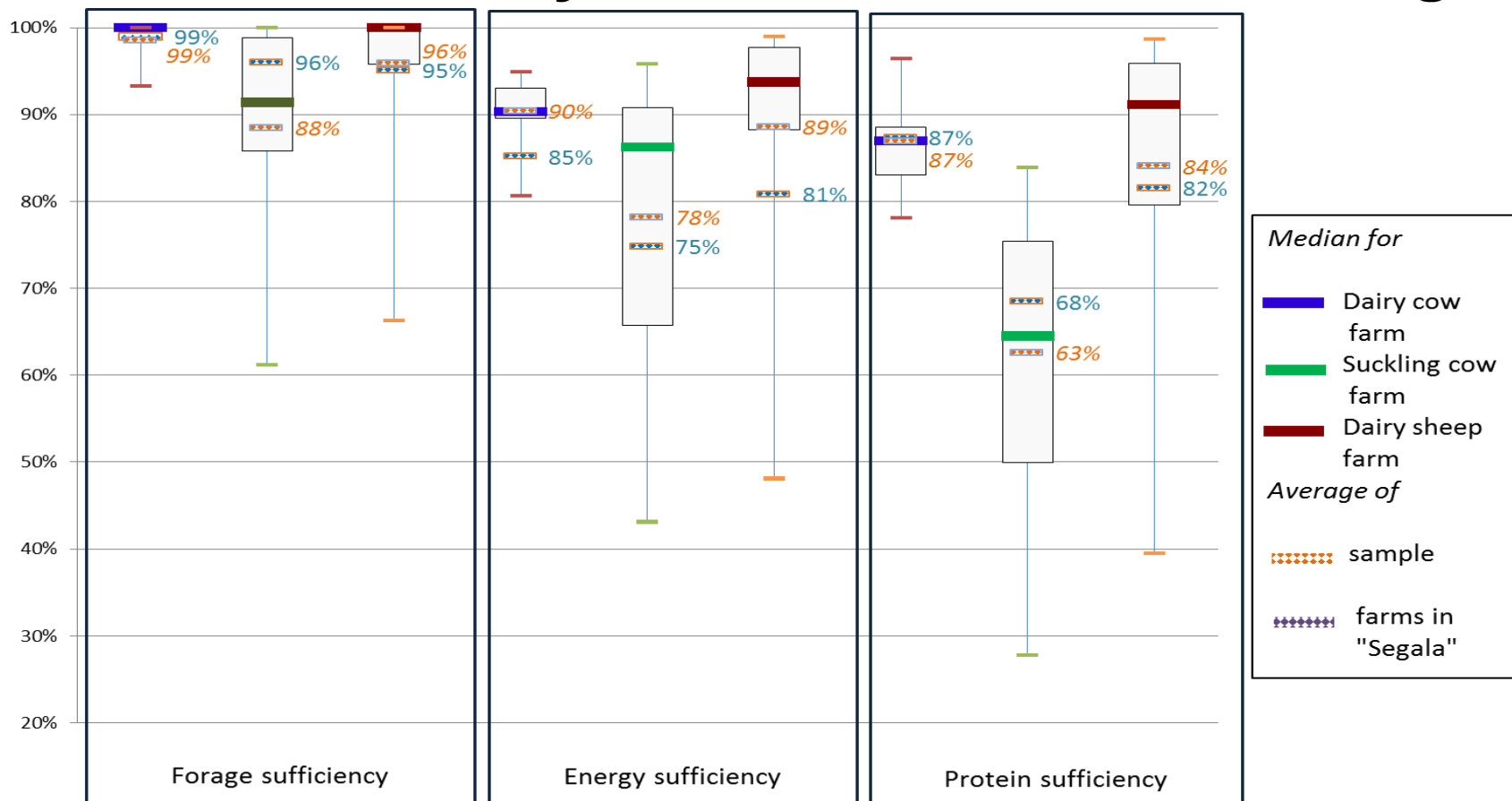
Feed self-sufficiency for different livestock farming



A large diversity in dairy farms,
mainly for Energy and Protein

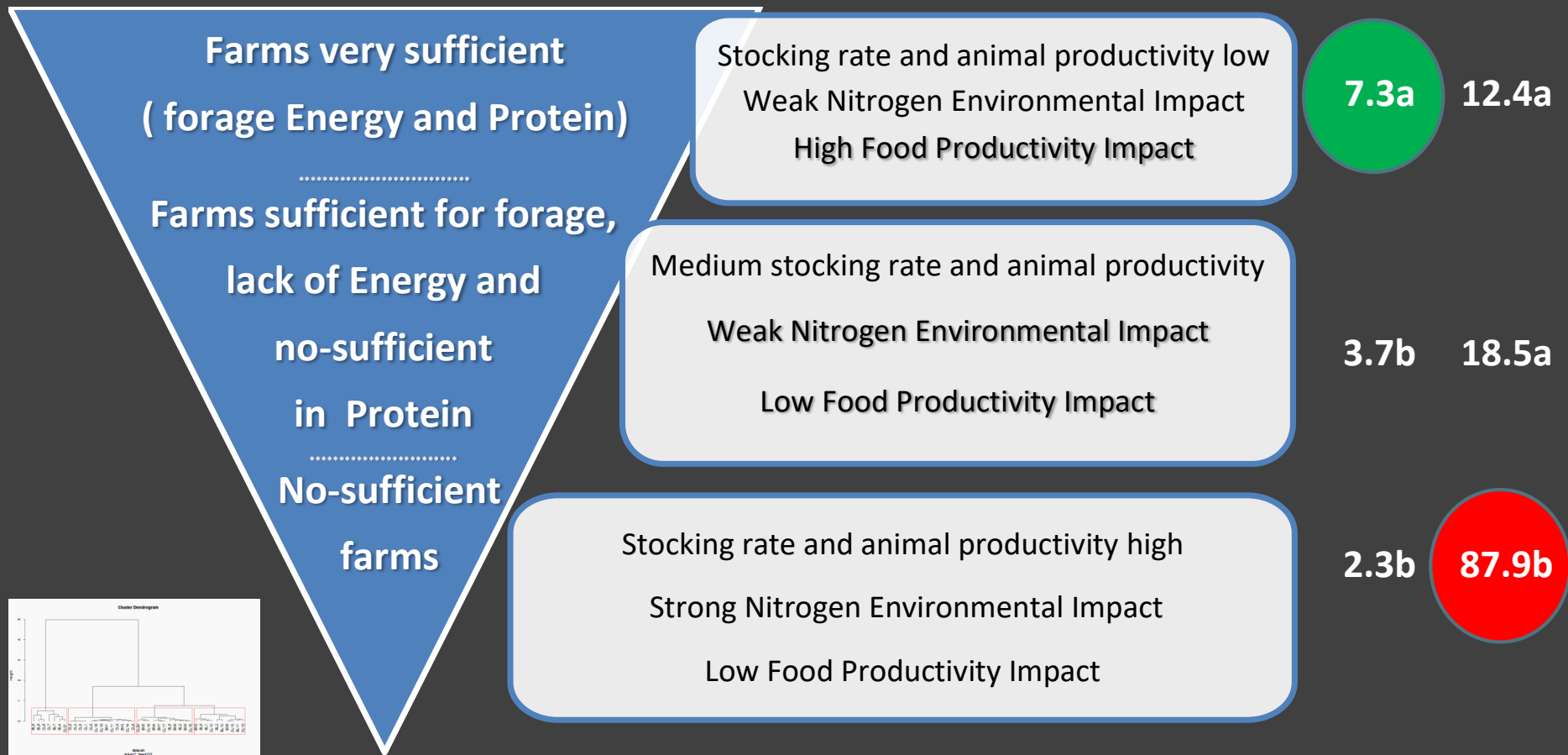
Feed sufficiency at regional scale

Feed self-sufficiency for different livestock farming



The averages of sample farms and all farms of the census in this small region are close

Impacts for different stages of farm sufficiency



Three stages of farm sufficiency defined by PCA and clustering method

Improving agreements and exchanges at Territory level

- Local initiatives arise to develop exchange between farmers



*A web-network
for organic farming*



Exchanges between crops farmers and livestock farmers : www.ecebio31.fr

After one year:

*41 livestock farmers and 65 crops farmers
95 offers (mainly hay and « meteil »)*

Stakes Limiting prices hazard
Local food network
Crops with agronomic benefits

Levers Agronomic training
Technical advises and monitoring
Economic agreements
Sustainable exchanges

Limits Web interface & design
Price agreement
Haulage and Storage services

Local protein for animal fed: a challenge for supply chain level

- Agricultural cooperatives attempt to propose new services and products to the farmers



Develop clusters of fields to produce Alfalfa

Stakes Increase the area limiting haulage
Preserve the water catchment
Add value to productive areas

Levers Alfalfa fields in irrigated areas
Small units for the dehydration of Alfalfa
Sufficient group of crops and livestock farmers

Limits 1st cutting management and use

Availability of 800ha for Alfalfa within a radius of 20km

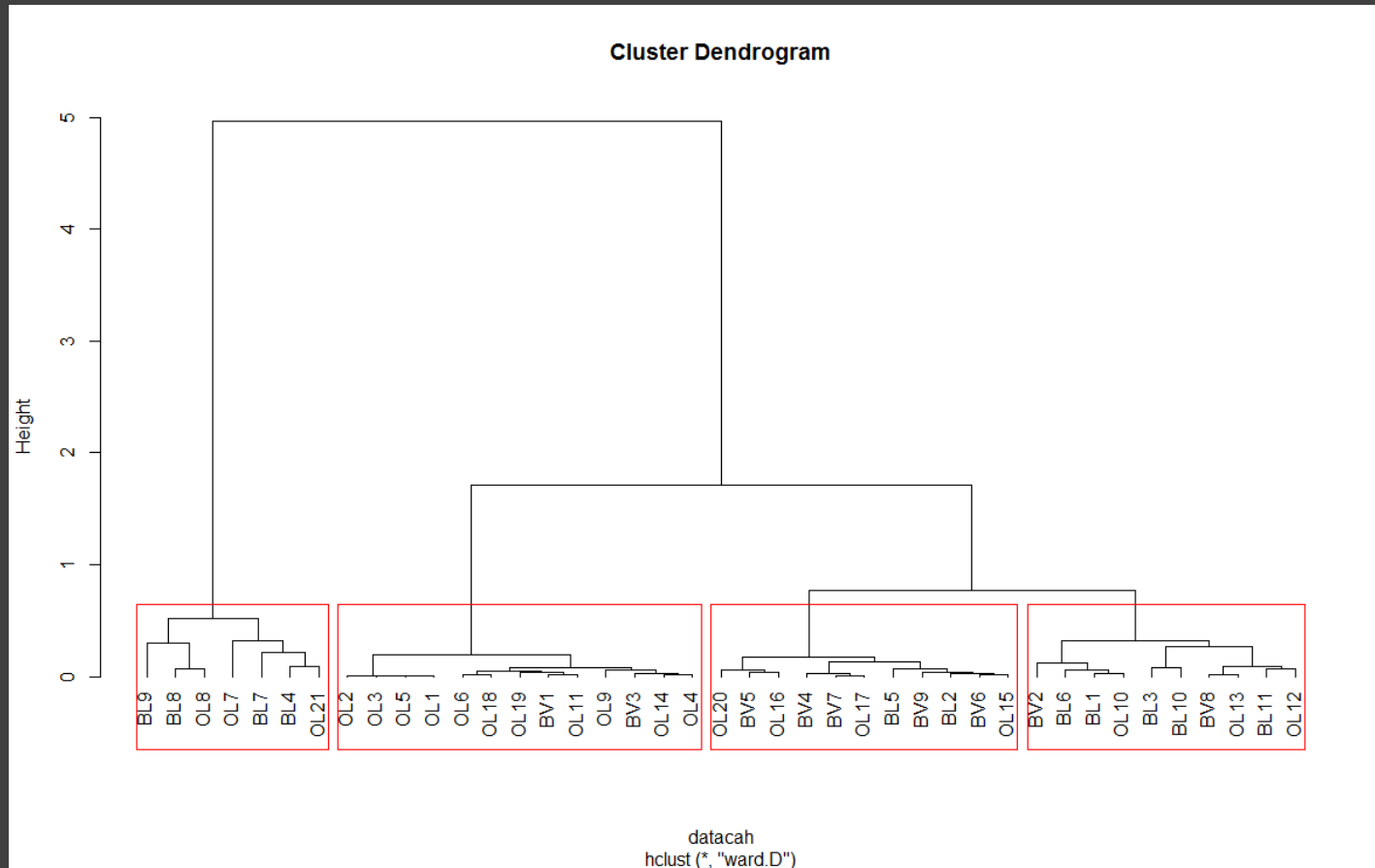
Outlook for regional level

- ⦿ The actors of territory share an incentive for local production of forages and cereals. Debate is more complex for proteins.
- ⦿ Technical weaknesses could be overcome.
- ⦿ Logistic threats could limit the local initiative.
- ⦿ Territorial sufficiency or local feed production can be improved by new cooperation between farmers and supply chain actors.
- ⦿ Large types of resources can be used by farmers (knowledge, training, experiment, technical advises...).

Conclusions: a framework for farm sufficiency

- The different stages of self-sufficiency are linked to farm performances:
 - ➔ Intensifying production and animal productivity increase energy and protein requirements .
 - ➔ Farmers need to supply animal with purchased concentrates, limiting the self-sufficiency at farm level.
- Aggregation at the regional level shows similar results to self-sufficiency for animal feeding among the main part of the farms.

Three stages of farm sufficiency defined by PCA and clustering method





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