Livestock farming system management: models, tools, goals and users...

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Livestock farming system management: models, tools, goals and users…

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INRA SCIENCE & IMPACT

Context

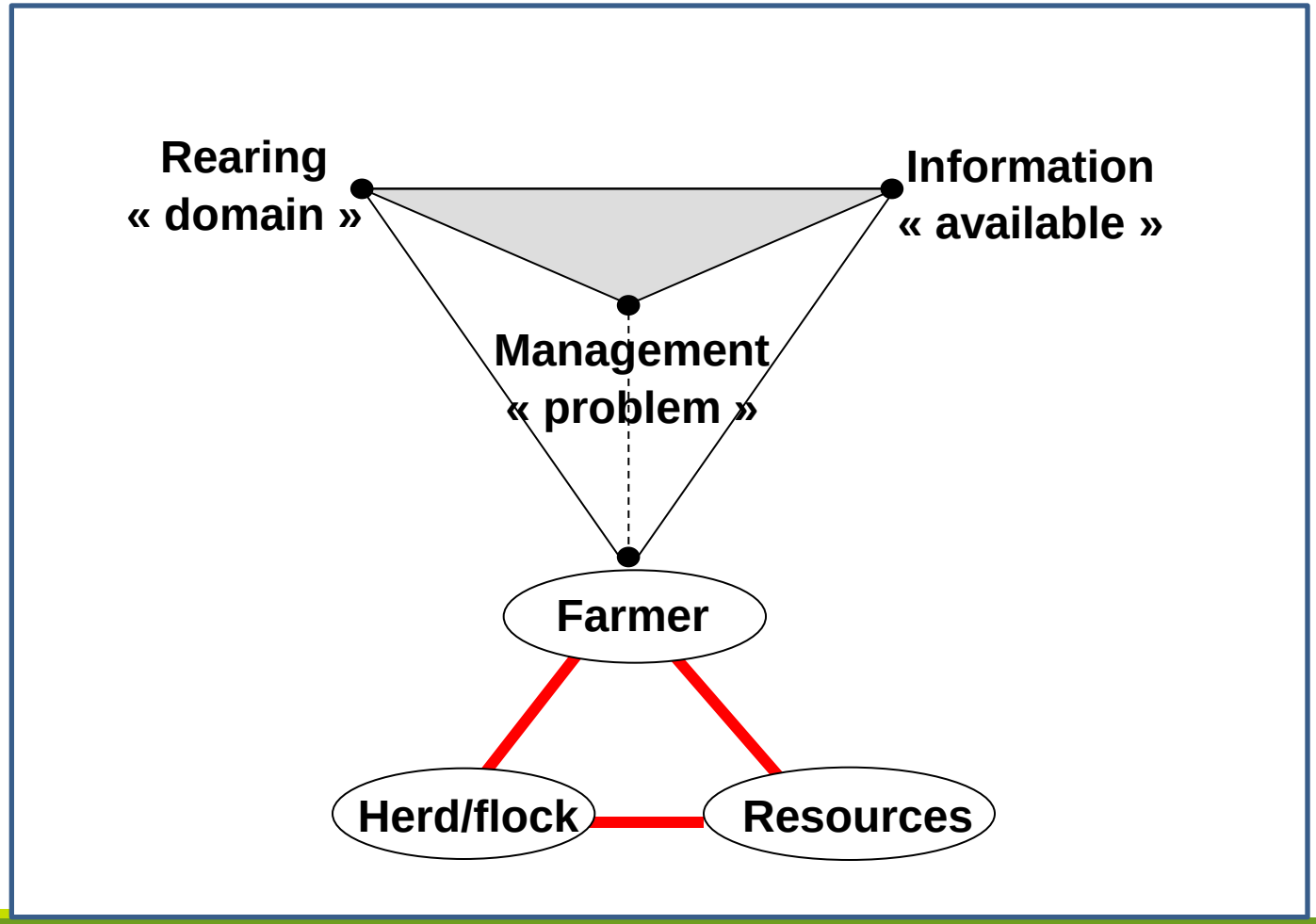
- **LFS in a complex and changing world (uncertainty):**
  → necessity to:
  - adapt (prices, market…)
  - think about long-term consequences of short-term decisions

- **Increasing pressure on farmers about their practices**

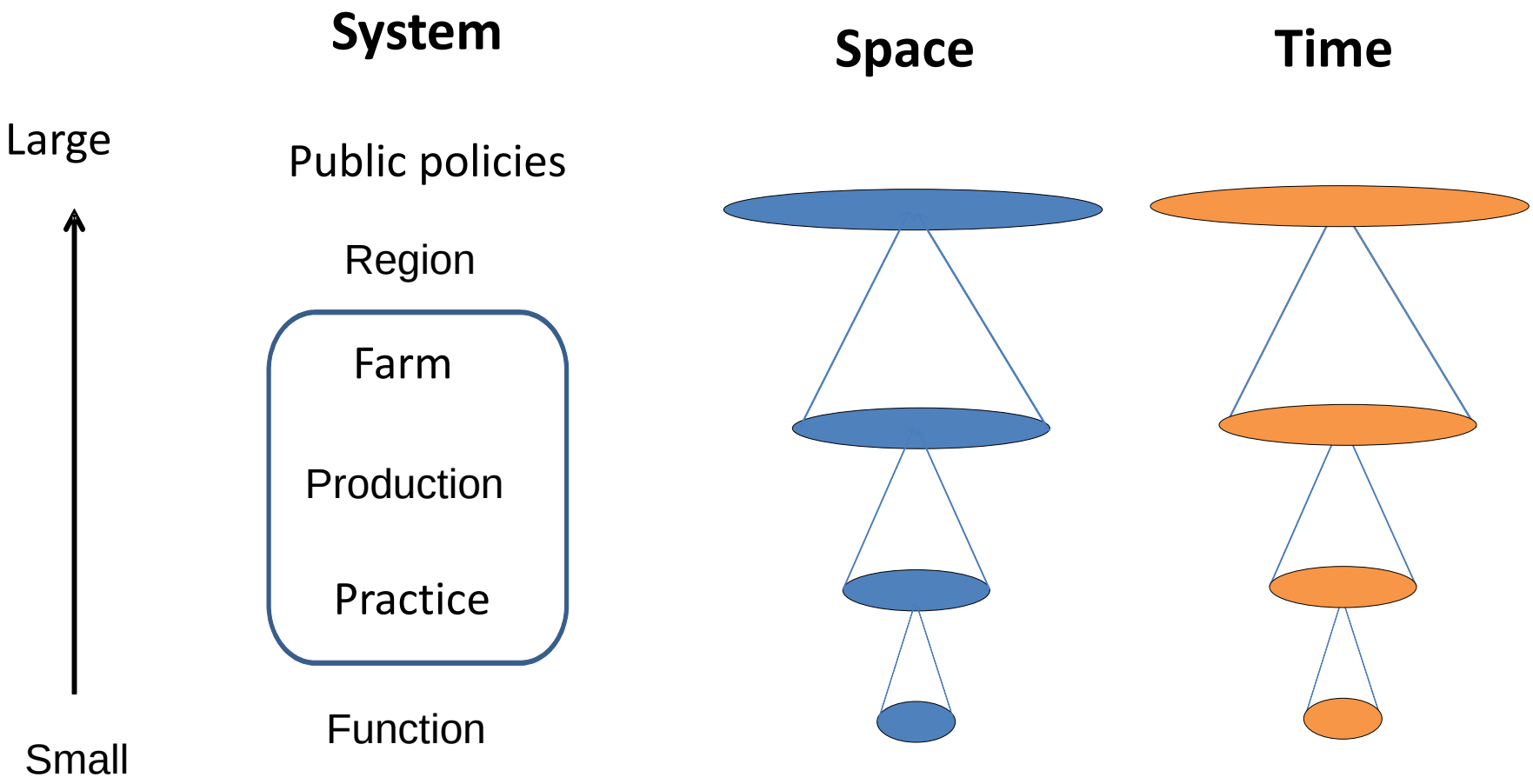
- **French organization within the agricultural sector: many actors, involved at many levels**

- **Increasing part of modelling in research projects, assuming an operational impact on the ground**

LFS management: a framework to understand what, why, how and when…



Models and tools: a question of scale



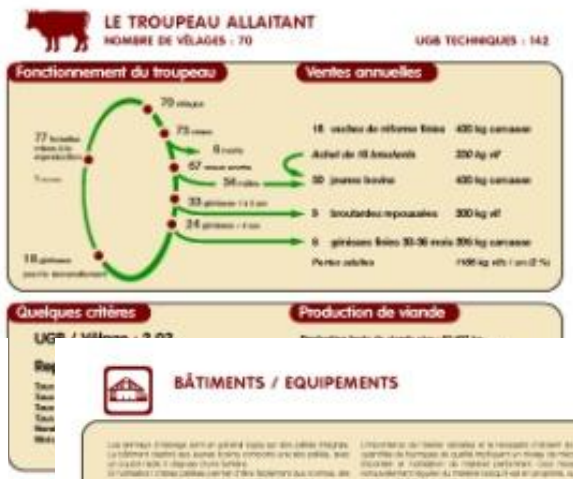
A sample of tools: how did we choose?

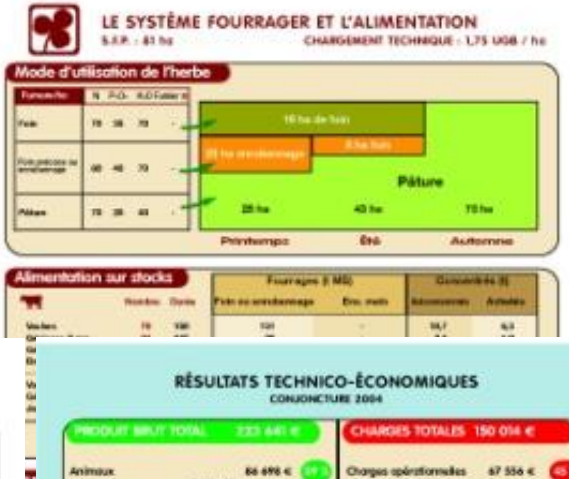
- From France
- At different scales (time and biotechnical)
- Two main kinds of tools:
  - Model-based, usually complex (n=5, 3 presented)
  - Other tools, sometimes very simple (n=6, 3 presented)

Model-based tools:
Farm types

- **Based on the national device "breeding Networks" hosted by the French Livestock Institute**
- **380 sheep farms in France (all regions) → allow the development of regional typologies of farming systems**
- **"farm types" = farms modelled, each illustrating a case of the typology (a farm with its structures, functioning and performance)**
- **The modelling process combines observation, analysis of results on many years, "alleviation" of the impact of remarkable years, optimization and coherence of the structure and levels of technical and economic performances**
- **The farm types can be used in different situations: technical advice, training, prospective , changes in support of the CAP and prices.**

Model-based: **Farm types**





Model-based: The Forage Rummy ("Rami Fourrager")

- **A game: players are farmers**
- **Goal : to build a coherent forage system to feed a herd over a year**
- **To trigger discussions between farmers and analyse systems built on the basis of their knowledge (participatory process)**
- **Example: application of a global warming scenario**

  → how they fit in the forage systems accordingly
- **Developped by Inra Toulouse**

Model-based:
The Forage Rummy ("Rami Fourrager")

Model-based:
QuaeWork

- **QUAlification and Evaluation of Work in livestock farms**
- **To assess work productivity: work duration (routine work, seasonal work) and work efficiency (per livestock unit or hectare)**
- **To assess work flexibility: room for manoeuvre and adjustments face to internal and external events**
- **To analye work organization**
- **To integrate work objectives (productivity, flexibility) into technical and economic goals**

Microsoft Excel - BTA_Buissou.xls

Fichier Edition Affichage Insertion Format Outils Données Fenêtre ?

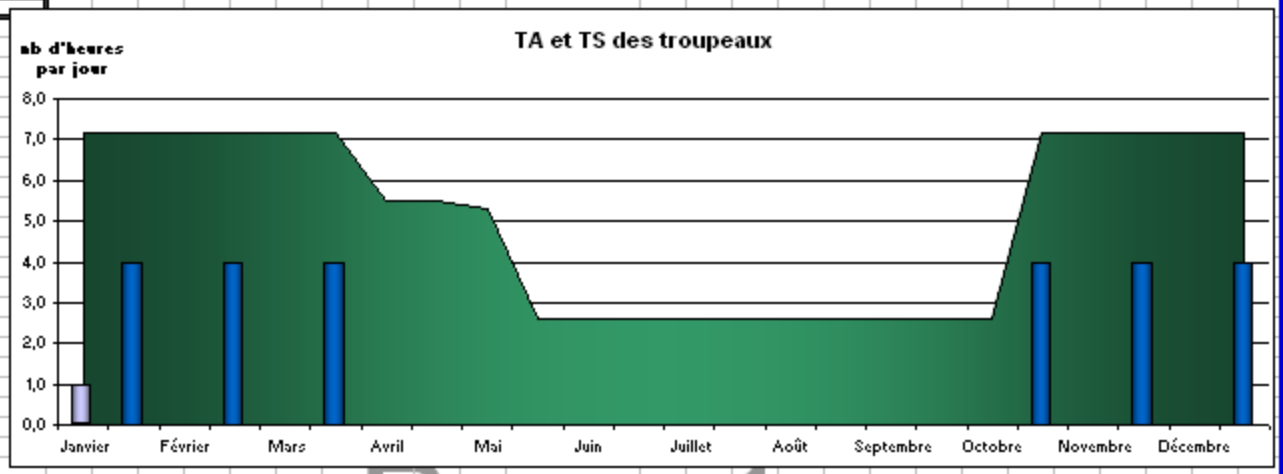
Tapez une question

Trebuchet MS 10 G I S

Accéder à Office Live Ouvrir Enregistrer

B2

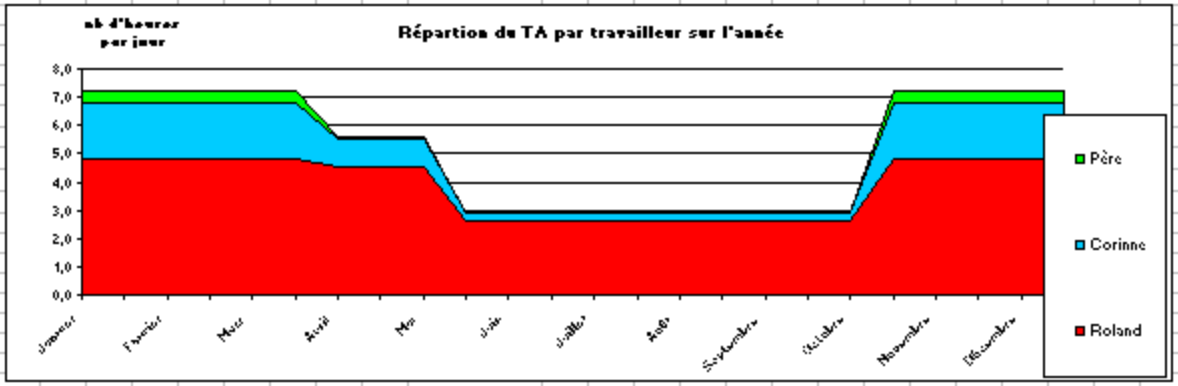
: travail d'astreinte et TS : travail de saison



Page 1

MARQUES par période Remarquer : 3 périodes de TA (hiver avec 7h20, printemps avec 5h, été avec 2h30)

artition sur l'année :
extérieure (barre cellule de base)
monte
ériel
duite technique



Total TA	
1797,35	h
Total TA agricole	
1797,35	h
Total TA par pCB	
1362,9	h

partition du travail :

: TRAVAIL DE SAISON (en nombre de jours par quinzaine)

Total TS : 99 jours

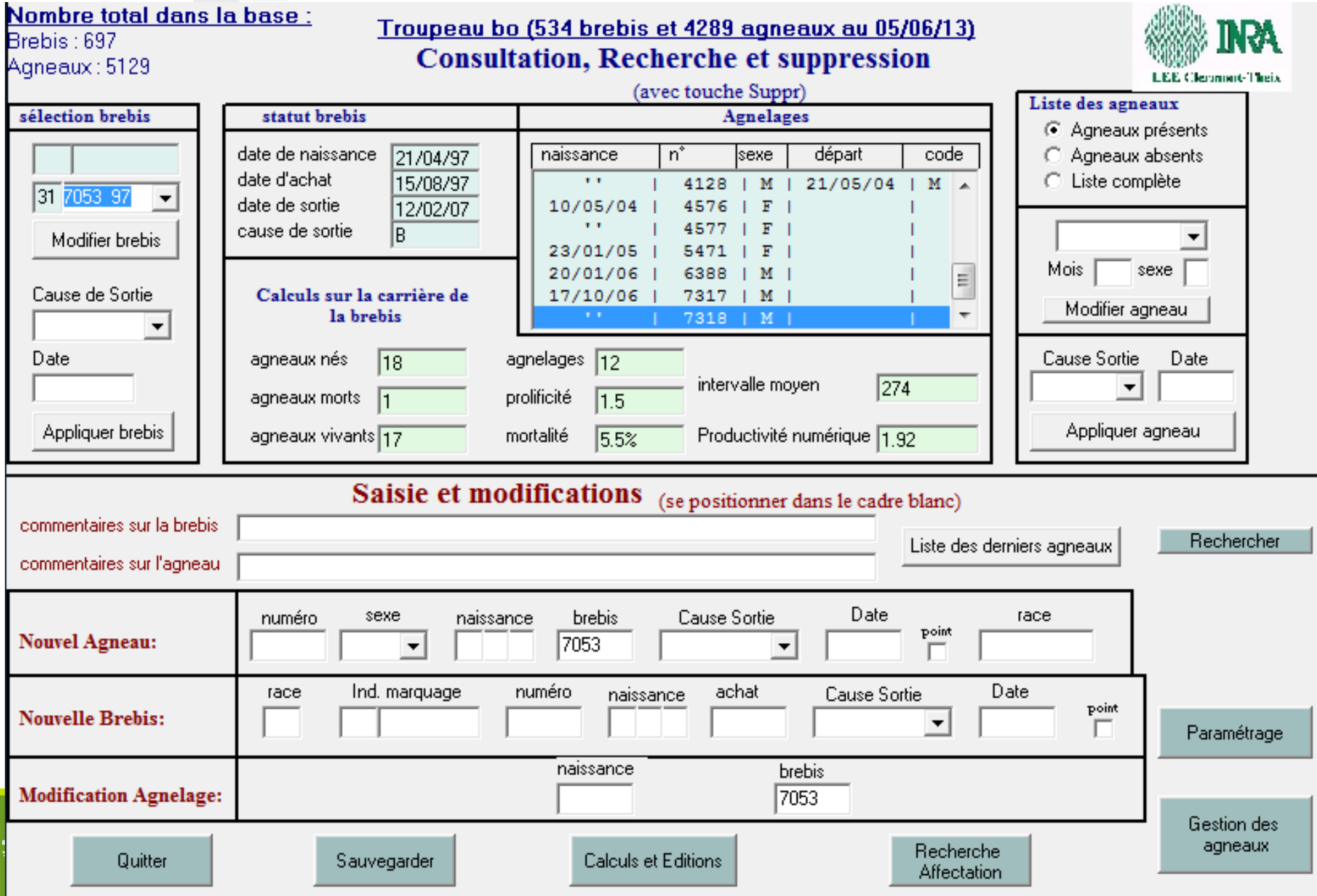
Feuil1 | Exploitation | TATSTDC | Graphes | Synthèse | Périodestension | calculs TS | calculs TA | SDC et TDC | Détails exploitation | Bilan | cré

Model-based: QuaeWork

Other tools:
Flock management

- → **Software tools possibly coupled to electronic identification of animals.**
  - **To register transfers of animals and interventions: mating, lambing, mortality, veterinary treatments, …**
  - **To identify production of each animal**
  - **Automatic sorting of animals (electronic identification)**
  - **Genetic monitoring through breeding programs: farm's data are gathered in collective databases**

Other tools: **Flock management**



Other tools:
Lamb selling

- **Developed by researchers (Inra) under Excel® software**
- **Calculation of the difference of gross margin between 2 types of lambs: 17-19 kg carcass vs 24 kg alive (light exported in Spain or Italy)**
- **It takes into account: the selling price of the lamb, production costs (concentrate, hay, veterinary), daily gain, amount of daily concentrates**
- **Used for 15 years by the main regional cooperative for sheep production (Auvergne)**

Other tools:
Lamb selling

values to be modified	
	Males
Price light lamb €/H	**65**
Price heavy lamb €/Kg	**4.737**
weight light lamb	25.00
Carcass weight heavy lamb	**17.00**
Daily gain	260
Concentrate price	0.31
Veterinary	0.30
lamb mortality %	1.0
Hay price €/kg	0.12
Quantity per day Kg	
concentrates	0.900
hay	0.400

Difference in gross margin for heavy lambs compared to light lambs

	Light lambs (€/head)							
	56	59	62	**65**	68	71	74	77
Heavy:4.3 €/kg	4	1	-2	-5	-8	-11	-14	-17
4.5 €/kg	7	4	1	-2	-5	-8	-11	-14
4.7 €/kg	11	7	4	1	-2	-5	-8	-11
4.9 €/kg	14	11	8	5	2	-1	-4	-7
5.1 €/kg	17	14	11	8	5	2	-1	-4

Other tools:
Pasture management

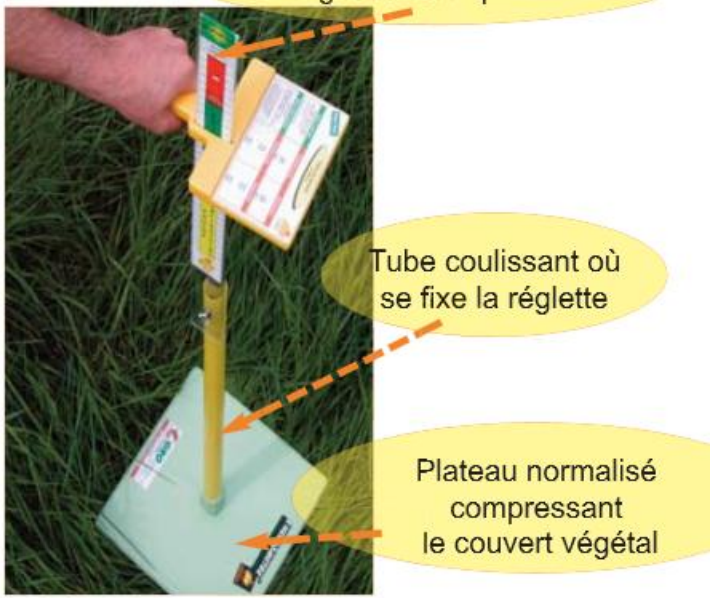
- **Context: Increasing input prices**
- **Need to maximize forage self-sufficiency**
- **Need to plan the use of paddocks to provide quality grass to animals**
- **→A tool to measure standing biomass and to calculate “days before grazing”**
- **Example in France: Herbomètre® tool, easily used by breeders**

Other tools:
Pasture management

"To manage grazing, I rely more on the herbomètre than at the level of milk in the tank! "

Other tools:
Pasture management

L'HerboMETRE®



Some tools among others…

Model-based tools

Farm type	
Ostral	*breeding / environment / economics*
Forage Rummy	
Quae Work	
INRAtion	*feeding / diets*

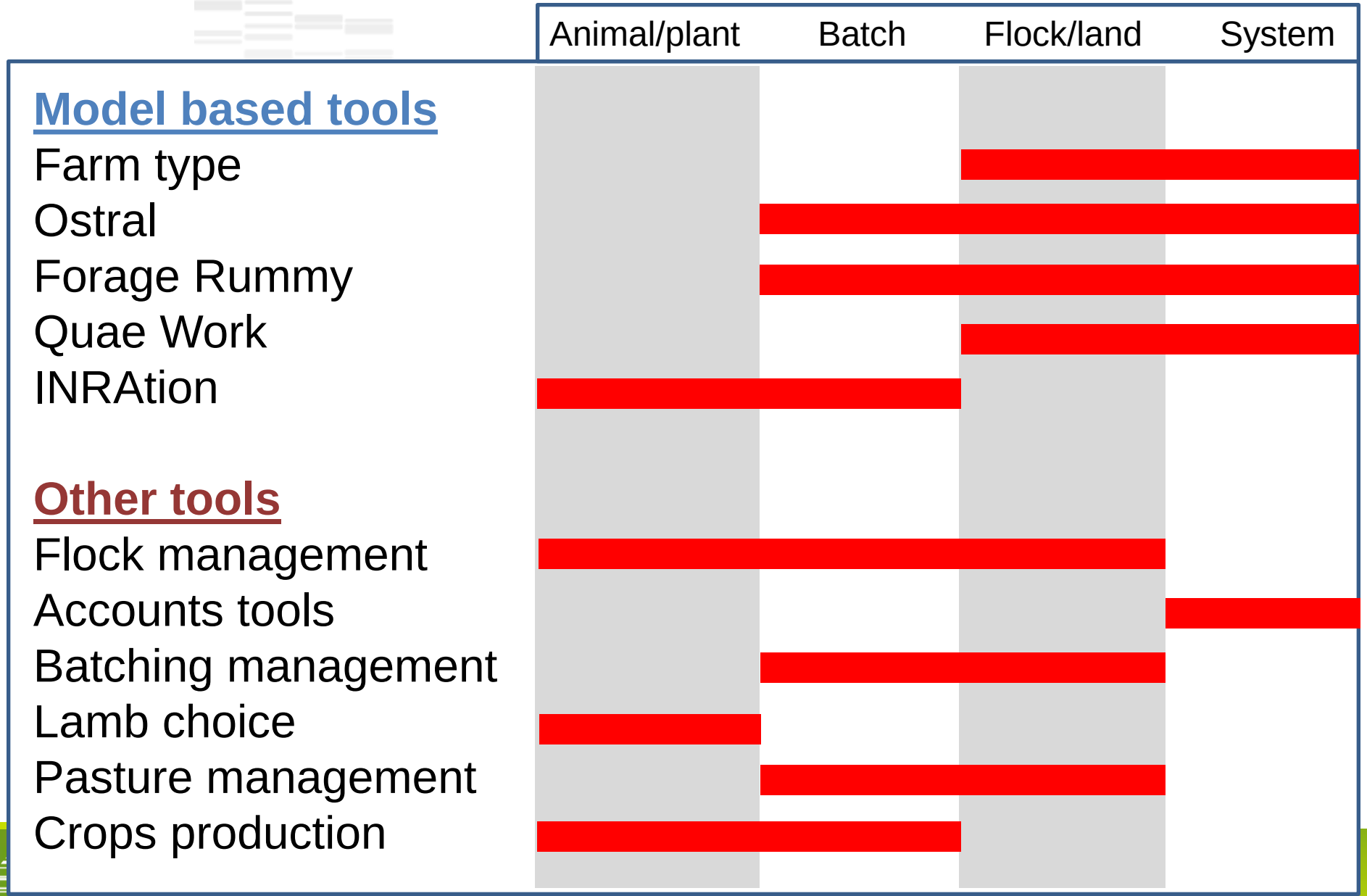
Other tools

Flock management	
Accounts tools	*finuncial / income*
Batching management	*graphical scheme / practices*
Lamb choice	
Pasture management	
Crops production	*technological devices*

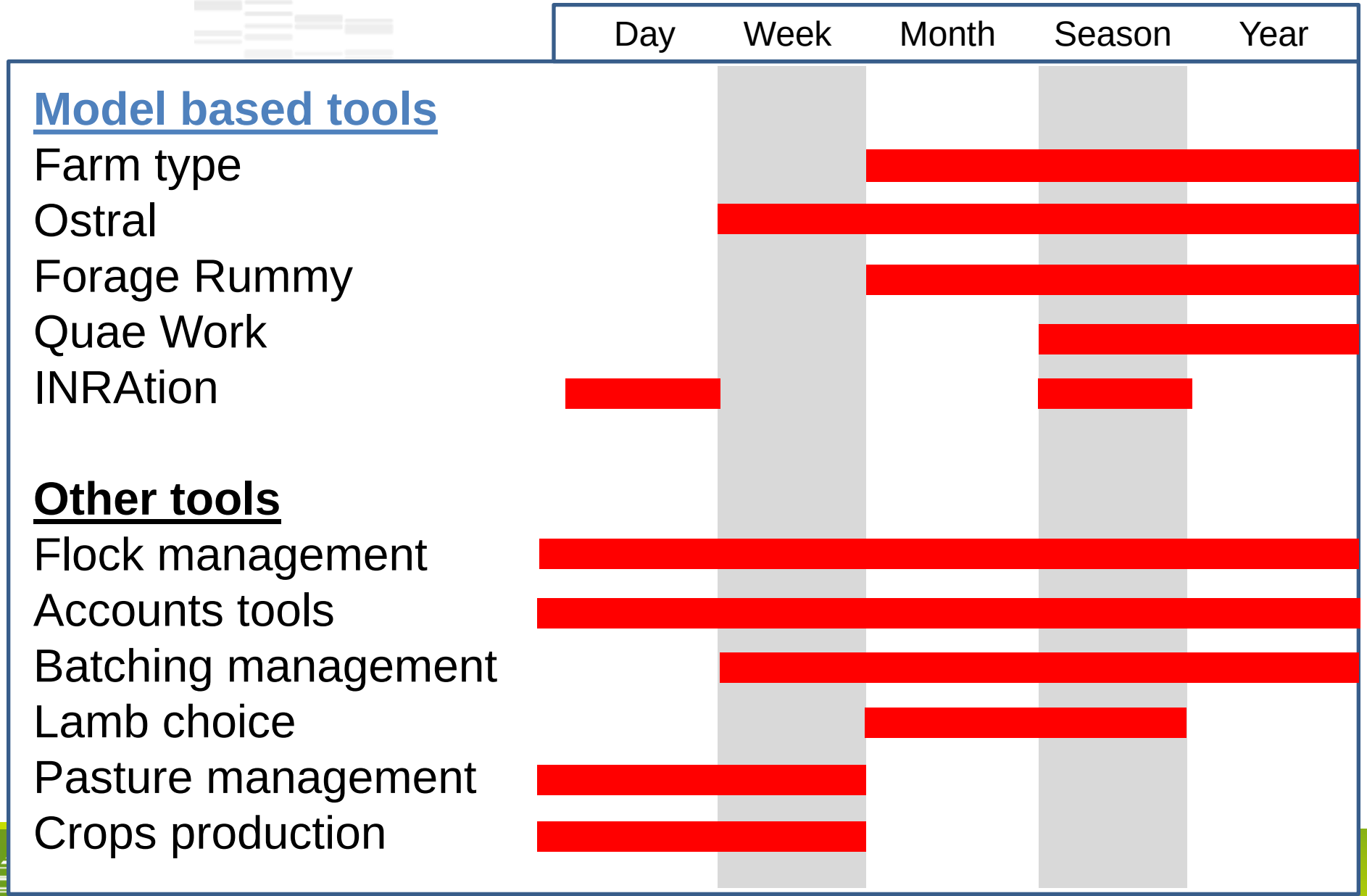
Designers (D) and users (U)

	Farmers	Technicians	Researchers	Trainers	Private
Model based tools					
Farm type		UD	U D	U	
Ostral			U D		
Forage Rummy	U +	U	U D		
Quae Work		U	U D	U	
INRAtion	U	U	U D	U	U
Other tools					
Flock management	U			U	D
Accounts tools	U	U		U	D
Batching management		U	U D	U	
Lamb choice	U	U	D		
Pasture management	U	U	U D	U	
Crops production	U		D		D

Biotechnical scales



Time scales


Day
Week
Month
Season
Year
Model based tools
Farm type
Ostral
Forage Rummy
Quae Work
INRAtion
Other tools
Flock management
Accounts tools
Batching management
Lamb choice
Pasture management
Crops production

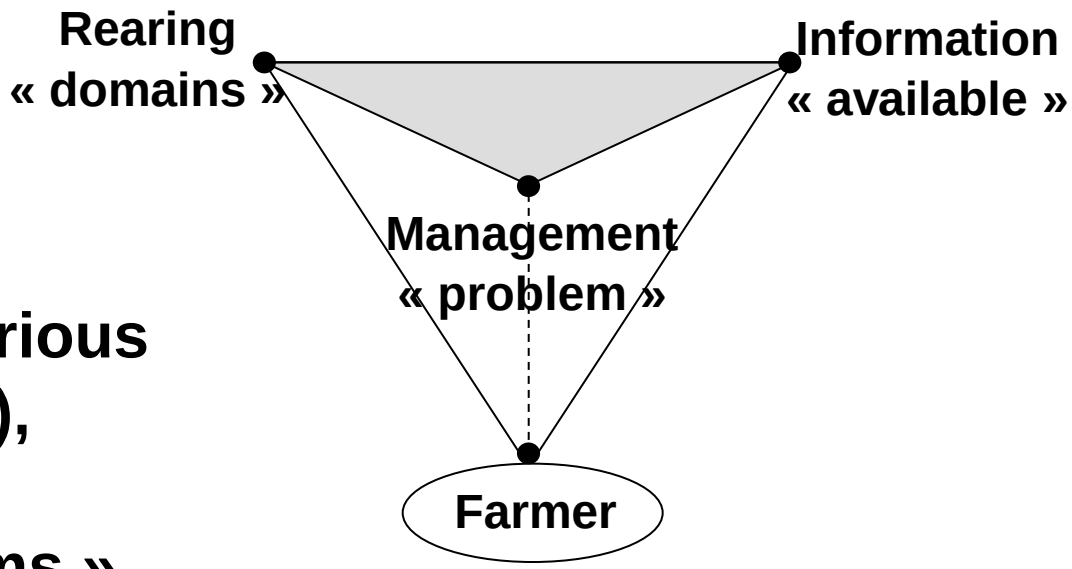
Involving users in the design process?

- **Short term X technical, economic aspects:**
  - **Maybe no need**
  - **But often problem finding vs problem solving**

- **Long term X global issues:**
  - **A great advantage to avoid prescription**
  - **To help decision making by comparing scenarios**

→ Models as roadsigns rather than the destination

To conclude…



- **Very numerous and various kinds of tools (domain), dealing with different « management problems »**

- **Some tools cannot be used by farmers, because of their complexity but also information needed**

- **Different disciplines are needed to manage a farming system; the training of users is then essential (animal science, agronomy, economics, computer)**

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Thank you for your attention!

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