

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

Marc Benoit, Stéphane Ingrand

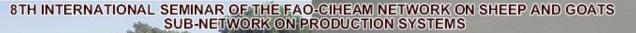
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Technology creation and transfer in small ruminants: roles of research, development services and farmer associations

Tangier, Morocco, 11 to 13 June 2013

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

Marc BENOIT – Stéphane INGRAND INRA Clermont-Ferrand Theix





CIHEAM

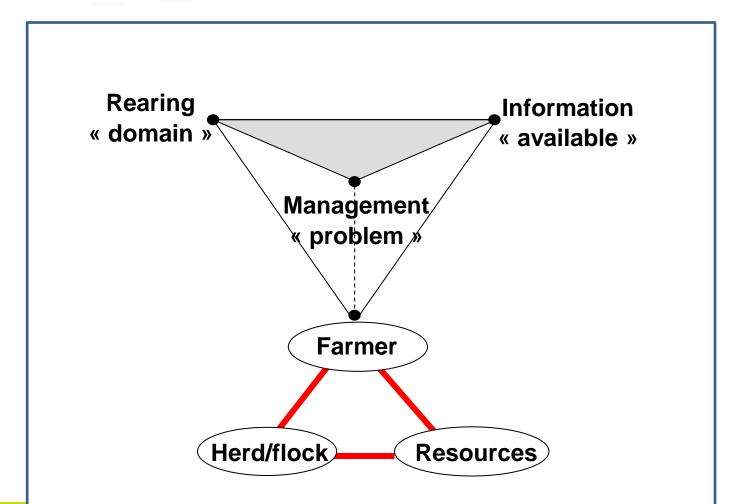
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Context

- 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

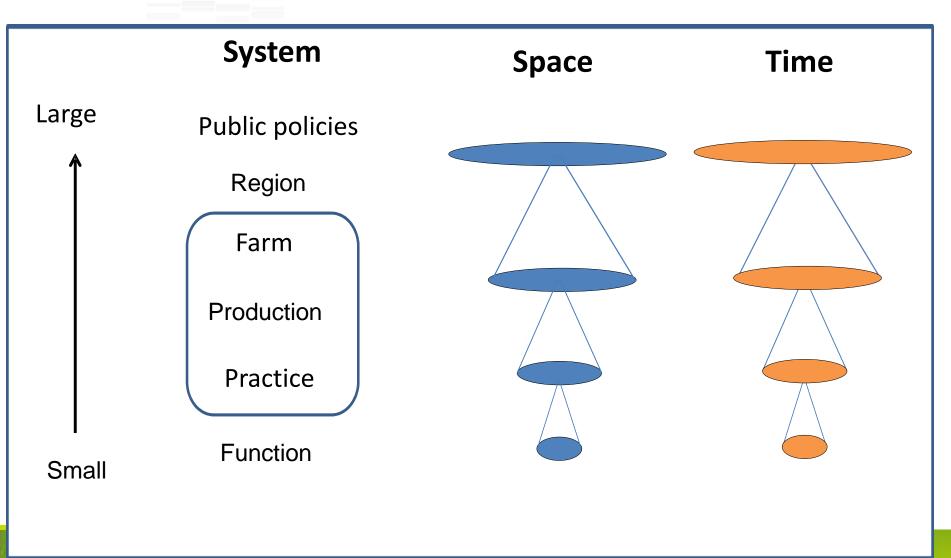


LFS management: a framework to understand what, why, how and when...





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

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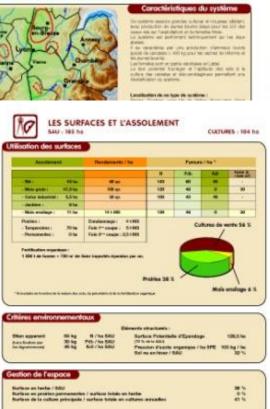
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Commentaires



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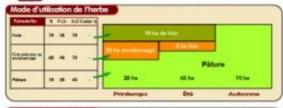
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SCIENCE & IMPACT

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

 \rightarrow how they fit in the forage systems accordingly

Developped by Inra Toulouse



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



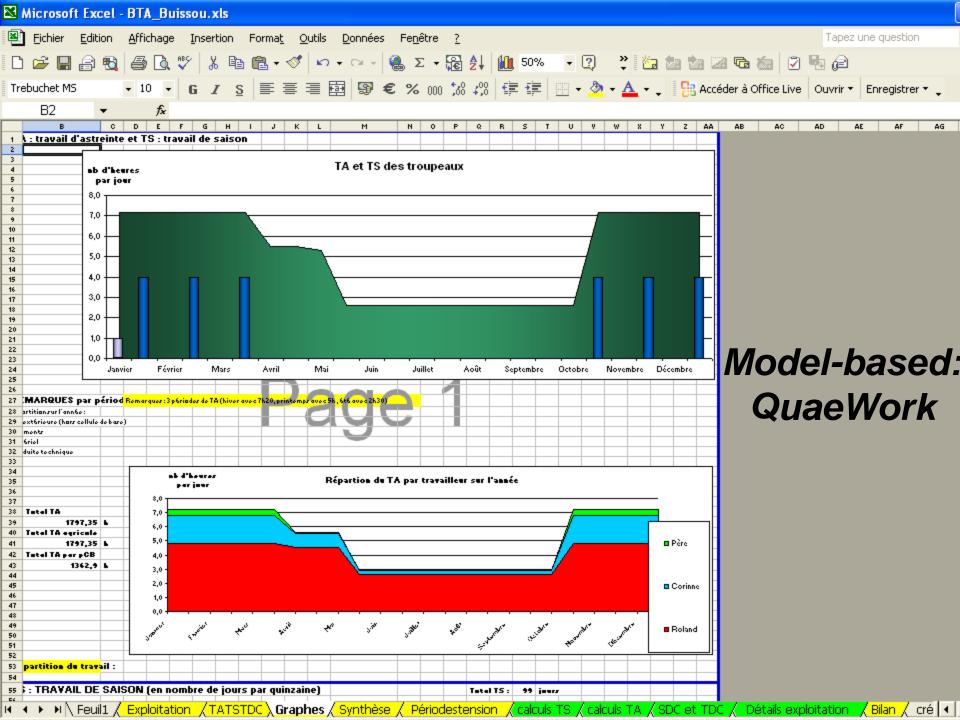




Model-based: QuaeWork

- 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







Other tools: Flock management

- 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

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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)





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





- 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**



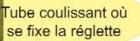
"To manage grazing, I rely more on the herbomètre than at the level of milk in the tank! "



Other tools: **Pasture management**

L'HerboMETRE® .

Réglette donnant par lecture directe la hauteur d'herbe et les conseils de gestion à la parcelle.



Plateau normalisé compressant le couvert végétal Lecture directe et automatique de la hauteur d'herbe



Possibilité de transférer les données vers un PC



Some tools among others...

Model-based tools

Farm type Ostral Forage Rummy Quae Work INRAtion

breeding / environment / economics

feeding / diets

Other tools

Flock management Accounts tools Batching management Lamb choice Pasture management Crops production

finuncial / income graphical scheme / practices

technological devices

Designers (D) and users (U)

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

Biotechnical scales

	Animal/plant	Batch	Flock/land	System
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				

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					

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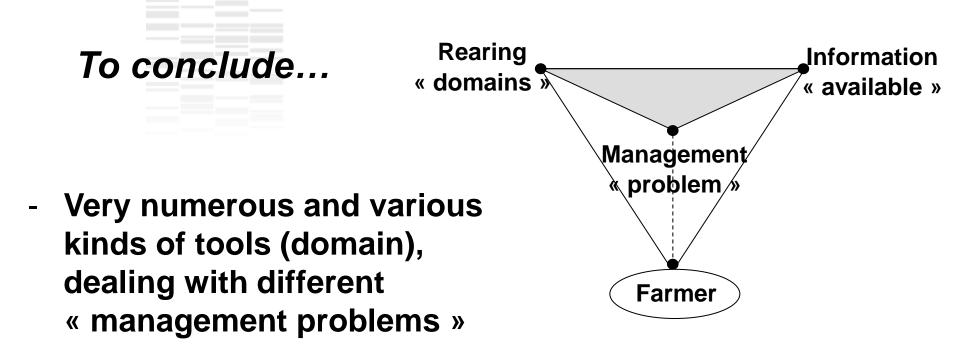
Involving users in the design process?

- 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





- 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! <u>marc.benoit@clermont.inra.fr</u> <u>stephane.ingrand@clermont.inra.fr</u>





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