Emerging markets, emerging strategies under the genomic era

Organizational changes in the French dairy cattle industry

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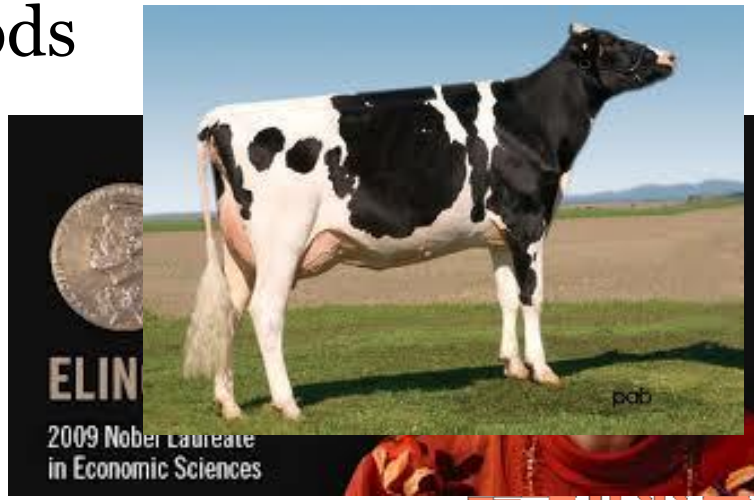
Introduction

- Genomic technologies considered as a revolution
  - A technical one, in terms of genetic progress or new selection criteria…
  - But also **organisational**!
- Development of genomic technologies:
  - How do they destabilize historical relations among actors and create new market opportunities for genetic goods and services?
  - From cooperation to competition (and back)? What risks and opportunities?
  - How to define new property rights, new relations between breeding companies and breeders, new forms of breeds governance?

The “tragedy of the Commons”

- Animal genetic resources as common goods
- Difficult and costly to exclude potential users from the resource ➔ risk of depletion by rational, utility-maximizing individuals
- The management of common goods is threatened by opportunism…
- Three solutions:
  - The market
  - The State
  - The community



Animal breeding activities require the management of different Commons

- Biological pool
  - Difficult to limit access to the resource
  - Risks of overuse/under-use (inbreeding)
  - No private owner of a breed (compared to a plant variety)
- Information pool
  - Managing genetic resources = producing information
  - Pedigree of hundred thousands of animals
  - Performances on hundred thousands of animals

http://timoelliott.com/blog/2007/09/fixing_the_bi_tragedy_of_the_ch

A public and cooperative regime of selection

- The **State** organised animal breeding: **1966 Law of breeding**
- Involving **public R&D, farmers' cooperatives** for AI and **breeders' associations** for the development of **collective** tools and **public information** on animals
- Breeding schemes managed as common goods
- **No individual property right** on breeds (collective property of farmers) nor on breeding information on animals (public EBV's)

A public and cooperative regime of selection

- **A national system for genetic data**
- Research activities organized on **mutual principles**, with public R&D
- Regulation of markets for artificial insemination and performance recording: **territorial monopoly**
- A **management structure** for each breed, defining breeding objectives.

A public and cooperative regime of selection

- **Innovation = a public good**
- Individual/**private strategies** of innovation appropriation were **limited**, due to low private funding
- Allowed French breeding industry to be efficient in terms of genetic progress and innovation, despite moderate sized herds and breeds diversity

Since 2006-2009: evolution of this cooperative regime

- Political factors:
  - European rationality turned toward neo-liberalism: opening new spaces of competition
  - Pressure from new private actors trying to invest on genetic market
  - French political reform (LOA 2006): end of territorial monopoly for AI services
- Technological factors:
  - Genomic revolution
  - Sexed semen

Since 2009 and the “genomic revolution”: a period of uncertainty

- Changes observed at four levels:
  - Research activities
  - Breeding companies
  - Farmers’ practices
  - Breeds governance

Risks and opportunities?

Changing relations between industry and research activities

- Cooperation to build large reference populations (consortia), public-private partnerships but…
  - Breeding companies develop research competencies and partnerships with foreign research labs
  - INRA may not necessarily remain the only research partner anymore
  - Development of private data as a mean for competitive advantage

Opportunities: increasing innovation diversity to better meet users' needs
Risks: loss of economies of scale and research efficiency, decreasing research capacities dedicated to small breeds

Existing consortia: successes and difficulties

intergenomics

- Intergenomics: cooperation success for the Brown Swiss (no other choice was possible…)
  - European federation and USA working together to build Intergenomics and share reference population
  - International data can be used by every member for processing national evaluations (from 100 bulls for the French reference population to 4000 bulls with Intergenomics)
  - The market for genotyping services is organized to prevent competition among Intergenomics members

Existing consortia: cooperation as an on-going objective

- Eurogenomics:
- Shared reference population among several European countries
- From suspicion to trust: a success
- Difficulties to overcome:
  - Sharing more? (toward breeding programs integration?)
  - Managing good diffusion of information (further than the few peoples who participate to Eurogenomics meetings)
  - Question of governance: who participate to the meetings? (directors, presidents-farmers, publics research, etc…)?

Changing relations between breeding companies

- Various strategies have been observed:
  - Merging companies for economies of scale, sharing investments on new technologies, increasing market shares
  - Pooling resources but keeping separate identities: investments, bulls, technologies (sexing technologies)
  - Increasing competition and breaking previous relations of cooperation

Opportunities: sharing knowledge, investment, structures to be more efficient
Risks: individualism, loss of collective capacities, loss of territorial competences

Changing relations between industry and farmers

- New types of genetic products/services:
  - Bulls with genomic indexes
  - Female genomic evaluation
- The urge for a difficult change of practices:
  - From star system to rapid turn over of young genomic bulls
  - "Anonymization" of bulls not easy to accept: farmers are used to choose their own bulls
- Questions on how to build trust in a new breeding value:
  - Potential lack of confidence in non-progeny tested bulls
  - Foreign companies take advantage of this potential distrust and develop marketing message on the importance of progeny-testing

Opportunities: new services for improving herd management
Risks: distrust, opportunism, lack of knowledge on users' needs and practices

Changing relation between industry and breeds' governance

- Breeds' associations: small financial investment capacities but important political role as "collective owners" of breeds
- Various types of relationships:
  - Opposition / competition
  - Partnership
  - Integration
- Development of private strategies in terms of types of animals: from « breeds » to « brands »?

Opportunities: ensure partnership between AI industry and Breeds' associations to favour legitimacy of breeding activities and meet users' needs
Risks: loss of breeders' implication, loss of legitimacy: users are also creators of genetic progress

Cooperation under question

- Under the "progeny-testing regime":
  - Many **rules framing** relationships between actors, **few opportunities** for **private initiatives**
- Since the genomic revolution:
  - **Fewer rules**, much **more opportunities**…
- Result:
  - Period of **high uncertainty**
  - **Cooperation** between breeding actors is not taken for granted anymore! But still **strongly needed to favour innovation, efficiency and reduce costs**
- The breeding industry in the situation of classical competitive industries…

Cooperation: opportunity… and paradoxes!

- Historical competences are not sufficient anymore: need for collective approaches which bridges multiple disciplines/competences
- Firms have to invest in research for new value creation
- Opportunities:
  - To increase reactivity to volatile markets, to develop R&D investments
  - Small organizations can cooperate to offer a diverse and creative range of products
- But…

Cooperation: opportunity… and paradoxes!

- But…
  - More than one partnership over two is a failure…
  - When actors can benefit from the collective action even if they do not participate, the incentive is to not participate, because it is costly
- How to satisfy **individual AND collective interests**?
- How to cooperate in **uncertain contexts**, when objectives, results and methods are still undefined…?

Cooperation in uncertain contexts

- Difficulty: to build cooperation dynamics when **relations of competition are not stabilized**, future is highly uncertain, **objectives are not pre-defined**.
- A **collective joint goal** design process (Segrestin, 2005) :
  - It is never intrinsically possible to develop a project in common
  - It is never intrinsically advantageous to work in tandem

Cooperation in uncertain contexts

- The example of Renault-Nissan partnership (Segrestin, 2005)

- Cooperation implies:
  - Actively managing the building of new rules and regulation tools
  - Building legitimacy and common identity while preserving individual identity: collective action requires a system of legitimacy
  - Providing "selective incentives" (individual benefits)

Conclusion

- A paradox under the genomic revolution:
  - While actors (research, industry and breeders)have increasing interests in cooperating (huge research investment, efficiency of a new technology, innovation dynamics)
  - Cooperation is increasingly difficult: the less the objects of cooperation are define, the less cooperation is easy…
- Successes are observed, but maintaining partnerships is a long-run activity in itself

Perspectives for breeding actors

- Breeding industry must have a body that has the authority to represent the “common good”: what is the “good” level for cooperation? The breed? The data system?...
- When building new partnerships: importance of building evolving rules of coordination and collective identity
- With the development of new genetic services, need to identify the evolution of relations between actors: who are new competitors in the field? Who could be new partners?
- What processes and tools for cooperation in other countries? Opportunity to take advantage of cross-learning and other experiences

Many thanks for your attention!

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