

SESSION 3 : DAIRY LAND, SUSTAINABLE LAND?

Presided by Bernard Faye

What Species for What Spaces?

What Systems for What Territories?

The Challenges of Sustainability in Dairy Breeding

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Of all livestock breeding activities, that which involves living off of the milk of domesticated animals probably requires the greatest know-how, is probably the most stimulating from the technical standpoint and the most constraining in terms of task organization. It is also one of the most diverse. To parody Paul Eluard who wrote that there are a hundred ways to make wine or one's children, it could easily be said that **there are a hundred ways of making milk**, of milking animals and of processing this biological product that has both specific and universal aspects. Indeed, although milk consumption is universal because it is to mother's milk that every mammal, be it calf, young camel, baby mouse, elephant calf, whale calf or little human first has access, milk production is related to species that man has domesticated for this aim and in specified areas associated with the species in question, thus creating remarkably diverse dairy lands.

Dairy ecosystems

Dairy breeding has taken over many little anthropized ecosystems (mountains, steppes, deserts), as well as more favored areas in fertile plains and valleys. In many countries, dairy farming is tending to move closer to cities (periurban dairy systems), even entering them (urban dairy systems). Dairy development thus fits **on a scale that ranges from extensive to hyper-intensive**, much broader overall than any other type of agricultural production. The link with the land in a given environment thus creates complex production systems that attest to their flexibility and adaptation to highly contrasting situations. This complexity is deeply rooted in history (dairy tradition or not), the variety of dairy species involved, spatial constraints, strengths and weaknesses of the social and economic fabric that does or does not enable the development of milk production and sale.

On a global scale, although dairy cow breeding has shown remarkable flexibility, making it adaptable to nearly all environments where animal husbandry is possible, the breeding of dairy sheep is mainly done in the Mediterranean basin, Eastern Europe and Western Asia. Dairy goats, "the poor man's cow," have proven to be more invasive probably because they are more productive on average than ewes. Dairy water buffalos are mainly found in South Asia (India, Pakistan, Bangladesh, Burma) with a few surprising introductions in Bulgaria, Italy and more recently Brazil. Camels are confined to deserts and yaks to the mountains. The dairy mare tradition is typical of Central Asia, whereas the dairy reindeer remains an isolated practice limited to the polar regions. Lamas, once the only dairy animal at the time of the Inca Empire, have been supplanted by cows in the Andean ecosystem.

At the more local level, various systems often cohabit, but **the notion of "dairy basin" or "dairy belt" reflects** more specialized production areas enmeshed with regional socio-economic concerns, the sustainability of which is dependent on both local and international geographic and economic constraints. There are thus periurban dairy systems of which the sustainability remains directly confronted with pressure on land resources, or the development of dairy basins that depend on world milk prices.

Inscription in the landscape

Family consumption alone is enough to justify dairy production, but dairy is increasingly commercialized to meeting the rising demand from constantly growing urban areas. That then requires the emergence of market channels both short (i.e. fresh milk) and long (processed dairy products). **Getting the raw material to the market or processing plant** requires actors (carriers) who exploit all the local possibilities. For instance, we could mention **the milk collectors on mopeds in Chad** that cover a radius of several dozen kilometers around the capital, N'Djamena.

Dairy production also contributes to developing the input sector (concentrated feed, fodder suppliers, veterinary protection, milking equipment) and the downstream sector (dairies, cheese dairies, distributors), thus partaking of the construction of a more or less complex chain that often has a particularly important



structuring role in a given area, if only because it provides [a lasting economic foundation for rural activity](#). In cases where dairy processing enters into the supply of typical local products with a possible quality seal attached to it (mountain milk, PDO cheese, for instance), milk then becomes a product that marks a region and contributes to its identity. Thus Roquefort cheese or fermented mare's milk are associated with a more or less vast geographical area that both actors in the chain and consumers like to identify with.

Dairy systems thus largely contribute to an area's development and the construction of a regional identity. They also pose considerable challenges regarding key environmental issues (impact on resources, management of breeding effluents, contribution to greenhouse gases) that vary depending on the environment and the species concerned. [Meeting environmental challenges as well as the challenges of local development](#) are thus key to the sustainability of dairy lands.

The few examples mentioned in this session, whether in Mexico, the United States, Ethiopia or Europe, attest if need be to the [extraordinary vitality](#) of dairy production in the world and the particular issues related to an animal product that human beings have managed to exploit to their best dietary, cultural, social and economic interests.

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Veterinarian, PhD from the University of Paris XII and Accreditation to Direct Research (HDR) from the University of Montpellier (France), INRA research engineer assigned to the CIRAD. For many years he headed a research network on milk in tropical environments (Laitrop) and is interested in both the production and processing conditions of milk from various species as well as the study of dairy breeding systems throughout the world. He has supervised a good number of theses on the technological, organoleptic and health properties of milk from various species as well as dairy productivity in harsh environments. Having traveled in many countries, he has broad knowledge of world dairy systems in all types of environment, from the desert to urban areas. He is the author of many scientific publications on the dairy production of various species and in a wide variety of areas in the world, from Africa to the Central Asian steppes as well as an illustrated book, *Bergers du Monde*, Editions Quae, 2008. He has just published, co-edited with Guillaume Duteurtre, *L'élevage, richesse des pauvres*, Editions Quae, 2009.