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## Abstract

By focusing on the concept of "model", we emphasize the plurality of the visions worn by actors about dairy development. In the case of West Africa, we show that actors refer to several models at farm scale such as "intensive dairy farms", "smallholder farming", etc. At value chain scale, they refer to models of "large industries", of "mini-dairies", etc. Debates between different models reflect a conflict between 2 visions of agricultural development. "Conventional" agriculture refers to the evolution of the sector towards intensive dairy farming. And "sustainable" agriculture gives priority to family farming, small processing enterprises and agro-pastoral development.

In the reality, farms and dairy enterprises rarely refer to only one of the models that are presented here. Value chain studies rather show a great diversity of actors that underline the specificity of local development trajectories.



In US, 40% of the milk comes from farms of more than 2000 cows. In France, farmers unions protest against a new farm project of only 1000 cows...

## Introduction

In many regions of the world, dairy development policies refer to different models. Some policy programs aim at promoting "mega-farms", or "industrial processing plants", whereas some other may support "smallholders", "Small-scale processing", "cooperatives", "collective barns", "contract farming", or "rural collection schemes"...

Is it possible to identify such models in the west-African context? What are their role and importance in the institutional changes that shape the dairy value chains in the region? In particular, what can we say about the model of "mini-dairies" which seem to be the priority of many current projects?

## Objectives and Method

Our objective is to identify the dairy development models referred to by stakeholders and policy makers. To characterize those patterns, we study the discourses and arguments developed by scientists, journalists, policy deciders, development agents, but also by the actors themselves. In addition to stakeholders' interviews, we refer to technical manuals, projects literature, regulations and media documents.

The concept of "model" has 2 meanings: it can be considered (i) as a "source of imitation", and (ii) as an "explanation" of the reality (fig. 1).

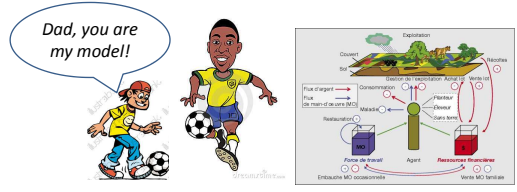


Fig. 1. Model as a "source of imitation" / Model as an "explanation" (signification)

## Results

We present here-below the dairy development models according to their scale of application : at the farm level, at the value chain level, and at the food sector level.

## Milk production models

### Milk production techniques



**Holstein-based industrial model for large farms**  
Exotic imported breed + AI + stalls + forage cultivation + industrial feed + automatic milking parlors



**Cross-bred cows model for smallholders**  
Local bred x imported bred + AI + stalls + forage cultivatoin + Agric. & agro-indus. by-products + Hand milk

### Types of farms



**Specialized intensive dairy farm model**  
Periurban commercial farm 100% of milk marketed Managed by investor/manager High inputs systems (no grazing, high breed, vet services). Specialization in dairy



**Family / Household farm model**  
Pluri-active family farm Part of the milk is non marketed Essentially family labour / managt Low input systems (grazing + by-products, local breeds) Agriculture and animal production

## Milk marketing and processing models

### Models of economic organization



**Cooperative model**  
Based on "1 member, 1 vote"  
Collective management Services delivery to producers



**Contract-farming model**  
Partnership processor-producers Business relationships Collection contracts / credit

### Models of processing units



**Industrial dairy processing plants**  
Mainly use of imported powder milk Installation near urban centers Based on imported technologies Steam / cold water system Produce standardized products



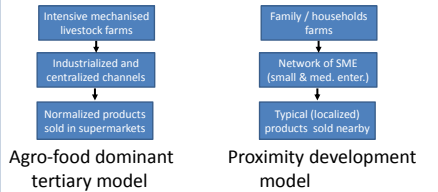
**Small-scale processing units (Mini-dairies)**  
Mainly use of local milk Involvement with local community Based on cottage-types technique No steam / no cold water Produce typical dairy products



**"Social-business" model**  
Engagement for collecting local milk Seeking economic performance and profitability Building partnerships with devt organisations and producers groups

## Rural development models

### Agri-food sector development models



### Agriculture development models



Conventional agriculture



Alternative – sustainable agriculture

## Discussion and Conclusion

In West-Africa, after some years focused on industrial development, dairy development policies have been more recently focusing on 2 different value chain models: in peri-urban areas, they intend to promote specialized dairy farms connected to large industries. But in rural regions, they promote mini-dairies and rural collection schemes that can help agro-pastoralists to market their milk. Therefore, dairy policies often include 2 components : 1 "industrial" and 1 "inclusive".

Dairy development models are socially constructed. They are built in our minds individually and collectively. They result from our desire to replicate success stories ("imitative" dimension) and from our own vision of the development ("significative" dimension).

In the reality, however, no real enterprise or organization is the exact realization of one single model. There is a great diversity of productive forms that appear to be resulting from compromises between several models – hence many specific local trajectories.



Figure 2. Between 2000 and 2012, the number of "Minilaiteries" tripled in Burkina, Mali, Niger, and Senegal. Today, 125 units are still in activity.

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