

# REPASTOL

## *The raw milk agrifood systems: revisiting the pasteurian obviousness*

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**Indian Field work section: recent evolutions in the dairy food  
systems**

*Synthetic interim report N°2*

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## Dairy food systems in Tamil Nadu

This interim report presents the intermediary results relative to the first 18 months of the research conducted within the « Indian Field work section » of the Repastol Program.

The Indian work section of the Repastol program is dedicated to the study of the dairy food systems organisations in Tamil Nadu.

The analysis has been resorting to empiric field study techniques that is interviews, field visits and participant observation whenever possible.

Most of the empiric work has been conducted within Chennai, a large city where consumption habits and cultures are prone to evolutions and changes, and Pondicherry, a medium city where changes regarding dairy products and above all cheese consumption are mostly driven by the presence of a foreign community. (For a recap of the visits and interview, please see Annexe A.)

The first four following sections present the 4 main categories of dairy systems, which emerged from the field data and lists a few interesting issues to deepen in the second part of the program. The fifth section addresses more specifically the cheese production.

### 1. The coexistence of a variety of dairy systems

Since India's independence milk production has been seen as a major instrument for rural development, which resulted in a large array of dairy projects since the 1970s. At first federated within the famous "Operation Flood" programs, these projects have fostered a significant development of the dairy production and cooperatives, aiming at supplying the steadily increasing urban demand for milk and dairy products.

This development has promoted a particular organisation of the dairy food system with a three-stepwise milk-gathering organisation known as the "Anand system". Through this organisation, milk is not only collected; because growing cities are more and more remote from the rural producing areas, milk has to be preserved and the milk recollection basins constantly widened. In the cities, the early in plant heating (pasteurisation or sterilization) of the milk, has replaced its late at home boiling by the customer. Last but not least, milk has become standardised (toned, double toned etc...) on a limited set of characteristics (fat and protein content, microbial load) and packaged in small amounts.

This new dairy system organization has brought transformations on the production side. Milk has become a commodity and a source of revenues for the farmers and the price they get for their milk often depends upon a few milk quality thresholds, which not all farmers achieve to meet. According to the economic actors, the growing demands does not allow raising prices; therefore they rather concentrate on the intensification of the milk recollection and a costly extension of the milk basins. Large private firms and cooperatives endeavour to raise the milk yields, yet with limited success.

The development of large dairy firms has not erased the long-standing "milkmen system" which continues to play a crucial role, most of all in the rural areas and smaller towns. Here other socio-economic adjustments regarding milk quality and prices, or additional services (loan and payment facilities for instance) seem to take place.

Symmetrically, in the cities, cows still supply part of the population. The Anand dairy organisation has erased the city milk colonies, which the Mumbai Milk Aarey colony is surely the most well known one. Such colonies, once planned to feed the city demand, consisted in huge city farms, which offered the immense advantage of avoiding transportation and therefore preservation practices drawbacks and costs. This organized, government supported solution slowly went down; but the urban cattle remains. Its production, market and consumption are fairly unknown as well as its sanitary quality. A master student is about to start a study on this particular dairy system, as far as we know, unique to India.

Next to the milkmen, the city cows and the large firms and cooperatives, a new operating dairy system is emerging, which rests upon an enlarged list of the milk qualities (A1-A2, Desi cow, unprocessed, raw, natural, organic, farm milk...) and increased milk value.

## **2. A new unexpected “unprocessed milk” dairy system in emergence**

This emerging dairy system is still rather small. Yet, as for all innovative systems, the size is not a good measure of the changes it could induce. One of them is of utmost importance for all the economic actors and mostly the largest firms and cooperatives: the new operators raise the customer awareness towards milk quality and accept to pay much higher prices for what they see as a higher quality, which is also often “unprocessed” quality. Such a change in the demand could pave the way of a larger quality differentiation process bringing higher added value, or higher prices paid to the farmers accepting to raise the quality of their milk. Yet, this new organisation also raises crucial questions regarding sanitary quality, although of limited range due to the common habit of the Indian customer to boil the milk, even UHT or pasteurized milk, before using it.

This first major result needs to be further investigated starting with an exhaustive description of the variety of the actors involved in this new dairy system, their complex and diverse understandings of milk quality, their socio-technico-economic organisation, their impact on local farmers habits, practices, revenues...

This change is occurring in big cities. We did not notice such a demand trend for unprocessed, natural, A2, raw milk in Pondicherry, and the field study will be pursued in the large Chennai area.

## **3. The quality challenge of the large dairies**

Quality is a daily challenge for all large milk producers, buyers or retailers, which assessment generates high costs. Since a long time large dairies have tied the milk payment price to a few criteria. They generate frustration among farmers whose cattle do not meet the firms’ quality requirements and stimulate the creativity of some providers who try to adjust at best their products to the required quality thresholds.

Milk quality criteria do not only specify the quality of the milk; they are also expected to encourage the production of the best quality. Then where slightly detailed analysis can be done on a routine basis, the crossings of the different criteria help in fraud detection. However, a reliable diagnostic requires taking into account the specificities of the breeds and the diversity of the individual animals.

A limited exploratory study on this topic is starting. The first results suggest unexpected performances of the local and Indian breeds, which need to be confirmed.

#### **4. Internship project: City cows**

Please see document « Internship project: City cows » in Annexe B

#### **5. A rising demand for new dairy products and cheese**

Among the high valued added dairy products, cheese is at the head, although, unlike ice cream or milk shakes, cheese is definitely not a customary Indian food. The cheese production puts a considerable emphasis on milk quality, as low quality milk generates considerable losses and costs.

The development of the cheese production is studied through two different empiric situations: a small city with a high foreign population rate, mostly French, Pondicherry, and a large city, Chennai, with on the contrary strong Tamil food habits and culture.

In the first case, the production is pulled by the foreign demand and part of it keeps close to international production standards (“Camembert”, “goat cheese”, “Parmesan”, “Cheddar”...). Small artisans try to adapt the cheese production to the climatic conditions prevailing in Tamil Nadu, which requires first a good know how and second important investments for small producers.

In the second it is not or much less the case. Cheese production is not totally new. Since a few decades, large cooperatives and firms propose some cheese specialties mostly designed for cooking. However, the production can also show much more innovative. A few farmers or cheese makers are inventing Tamil cheeses in accord with the local demand. Playing in concert with the gastronomic trend currently developing in Chennai, they achieve to raise awareness towards new products and tastes.

As a result cheese is no more an exotic food for happy few dinners, or a cheddar copy for foreign recipes. Depending on the success of these “early entrepreneurs”, cheese could well appear as a new economic potentiality, which would also increase the pressure on production and farmers to increase the quality and quantities of the milk production.

A first inventory of the cheese producers in the two areas under study is almost finished. A second phase can now start with a focus on the customers, their changing minds and taste about cheese, its new place in Indian consumption schemes.

#### **A seminar on milk and dairy production**

After decades under the footlights, milk and dairy systems have slowly give up the stage, living the recent changes, as well as their potential consequences, fairly unnoticed.

In order put these results back in a larger range of available knowledge and raise awareness regarding the on-going evolutions, Dr Vijayabaskar from the Madras Institute for Development Studies and I plan to organize a seminar on milk and dairy production in 2018. Funds gathering campaign is in progress and a tentative program is attached to this file.

The seminar will last 3 days including field visits and be open to academics, scholars as well as practioners and members of the public services.

## Annexe A: Field work progress

This table presents the visits/interviews realized from November 2015 to April 2017.

Field in progress: visits and interviews	Milk		Cheese	
	Chennai	Pondi.	Chennai	Pondi.
On April 29th, 2017				
Large cooperative or firm	2			
Small producer and or bulk milk gatherer providing raw milk in bags or bottles	3			
Small producer and or bulk milk gatherer selling raw milk online	3			
Small farm selling raw milk (among other productions)			2	1
Medium specialized milk farm	2	1		
Milk producers village	1	4		
Small producer bottling and selling its pasteurised or boiled milk production	1			
medium production unit selling its milk	1	1		
Small shop selling raw milk in bags or bottles	10			
Cheese-makers			3	4
Cheese production unit making raw and pasteurized milk cheese			2	
Cheese production unit making pasteurized milk cheese				4

## Annexe B: Field work progress

### Internship project: City cows

Supervisor Geneviève Teil (FIP Pondichéry) genevieve.teil@ifpindia.org

Duration 2 months

#### Description

The Indian white revolution “Operation Floods” has insisted on the necessity to develop the milk production in order to feed increasingly milk-thirsty cities and has tried to spread the successful Anand System from Gujarat.

Urban dairies, like the famous Aarey Milk colony in Mumbai, have alternatively been proposed so as to avoid the competition between human and animal feeding agriculture on one side and the transportation issues raised by rural milk gathering due to the lack of cold chain. City cows milk was both seen as a street corner fresh production and alleviating the pressure over rural land.

The development of the cold chain and the steep rise in urban property prices have contributed to a certain decrease in the interest for urban dairies. Yet city cows still provide milk in the cities. This production might be seen as marginal, but it contributes to the religious as well as dietary needs and incomes of a definite urban population.

This internship project purpose is to provide some light on a not so well known<sup>1</sup> aspect of urban economy with a close link to poverty issues, nutrition and food safety namely.

Its aims first at providing

- a description of herd maintenance and ownership of city cows
- an estimate of the production, (milk, dung, urine, skin...), their market, the sale prices, the incomes generated, the amounts bought,
- a first sight on some issues related to health aspects.

Then it will focus on what makes this production long lasting, most of the time away from state allowances, regulations or veterinary guidance. Often denounced as “fraud”, the blending of the milk with various products, water, sugar, powders and liquids, will not be seen as a threat upon markets and in line with S. George<sup>2</sup>, as an adjustment to the purchase power of poorer citizens<sup>3</sup>. These adjustments will be examined in detail, as well as possible concomitant suspicions of the clients towards the ‘quality’ of the milk and their strategies for unhealthy milk or ‘fraud’ avoidance, or the compromises between prices and quality involved in city cows milk selling and buying.

The investigation will be conducted through participant observation, that is, getting in touch with city cows owners who sell their milk, accompanying them or the milk buyers, understanding how these cows are fed or feed themselves on various urban wastes so as to provide for a global account of the city milk production, market and consumption.

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<sup>1</sup> See Nightingale, R.W., 1968. "The modernisation decision in Indian urban fluid milk markets", *New York State College of Agriculture*. Cornell University, Ithaca, New York.;

<sup>2</sup> George, S., 1985. *Operation Flood -- An Appraisal of Current Indian Dairy Policy*. Oxford University Press.

<sup>3</sup> As well as the retail of very small quantities.

## Annexe C: “India’s Milk: Operation flood, 20 years after” Tentative program

Seminar to be held in Pondicherry, at FIP Pondicherry

Public: scientists and professionals, actors of research and development, NGOs, public administration...

Date: 2018

### **Organisational committee:**

- Dr Vijayabaskar MIDS Chennai
- Geneviève Teil IFP Pondichéry
- Shashanka Bhide (MIDS) (knows politicians and institutional actors)
- Yvane Marblé (CIRAD)
- Vanita (IFP)

### **Scientific committee: tentative composition**

- H S Shylendra, Professor, Institute of Rural Management, Anand
- Sumit N. Saha
- XXX, National Dairy Research Institute, Karnal
- Frédéric Landy IFP, Director
- Elumalai, NDRI, Bangalore
- Bruno Dorin, CSH, Delhi
- Dr Kalpana, NAF, Chennai

### **General aim of the seminar**

Despite the Indian cattle herd being the largest of the world, the Indian milk market has kept for a long time relatively undersized. In the rural productive areas, milk was used for religious and social purposes, given, distributed, exchanged, not so often sold (National Commission on Agriculture, 1976) : 68. In the cities however, a demand for milk developed a steady increase since the 1950’s.

After India’s independence, the dairy herd started to be seen as a source of potential wealth. Milk had therefore to be “economised”, that is transformed into a commercial good fit for economical transactions. The Indian state enabled this process through a series of initiatives and strategies, Operation Flood being the most dramatic and well known in post colonial India. The transformation of milk into a good aiming at creating economic wealth rested upon profitable sourcing of milk, which in turn rested on livestock yield optimisation strategies because the Indian livestock herd was seen as mostly composed of dry animals (Kurien, 2000). Milk being a highly perishable product, its collection was also structured and organized so as to limit the losses. Another important attribute of milk was its variable quality and scope for adulteration, which in turn required a new set of regulatory apparatus (Mohan et Madan, 1989). The second half of the 20<sup>th</sup> century saw the implementation of urban stables in Mumbai, Calcutta or Madras for instance to reduce the distance between the increasing urban demand and the dairy units. They partly replaced the milking of urban cows at the consumers’ doorstep (George, 1985). Elsewhere cooperatives were initiated with an aim to supplement or even substitute the local collecting and retailing practices by a number of “petty” retailers. Milk quantity and quality heterogeneity was constantly pointed out as a source of market malfunctioning. Besides fraud, the problems raised by the discrepancy between production and consumption peaks were also continually underlined. Quality was progressively state-regulated. Large dairy units therefore opted for capital-



intensive standardization technologies and the production of milk powder, which allowed homogenizing both quality and quantities over the year.

The final phase of Operation Flood, the major Indian program aiming at transforming milk into a wealth source ended some 20 years ago. More liberal dairy market policies took over. The debates, which once fired researchers (Kurien, 1983; Baviskar et George, 1985; Doornbos et al., 1990; Doornbos et Nair, 1990; Franco et Vijaya Cherry Chand, 1991; Achaya and Huria, 1986; Attwood and Baviskar, 1987; Baviskar and George, 1985), politicians and economical actors around its benefits and negative fallout, have cooled down. Milk production organization is no more a hot topic in public magazines or in the scientific press though there are recent discussions on sustainability and revival of the dairy sector (some refs again- I can do it). Yet this considerable and long lasting effort to organize dairy production has driven drastic changes (Kurien, 2000), giving birth to a variety of milk production and marketing regimes, which are relatively under studied. Importantly, there are several initiatives at the micro-level that focus on various aspects of the Indian bovine and milk economy in the domain of all production, distribution and marketing, particularly through a range of differentiation techniques. Further, given the weak links between the cattle economy and the agricultural economy unlike in the past, the organisational dimensions of sustaining the economy is unclear. The context has also been made complex with recent efforts by some regional governments to provide free cattle and rise of civil society movements seeking to protect 'native' species of cattle.

It is in this context that we propose to conduct a seminar taking stock of and analysing what changes have taken place in dairy economy in terms of production, distribution and policy regimes in the last fifty years. It would also seek to understand the presence and viability of alternate regimes that coexist in this highly competitive market? What are the old and new problems regarding dairy production, especially in the context of changing agrarian and consumption regimes? These questions will be examined by sourcing research papers and insights from key stakeholders based on a plurality of approaches, experiences and field cases. We propose to organise sessions under the following broad and tentative themes.

## **A. Tentative Program**

### **1. Transforming milk into a optimized source of wealth: a historical retrospective**

#### **1.1. From the independence to Operation flood**

- A customary husbandry and a traditional production to be improved
- Aarey milk colony in Bombay, milk colonies in Kolkata and Madras.
- First cooperatives: Mother dairy in Delhi, Anand in Gujarat and other...

#### **1.2. Operation flood: achievements, debates and proposed alternatives**

- {Attwood, 1987 #90}
- Chittor {Erraiah, 2005 #603}
- {Rao, 2003 #604}{George, 1985 #199}{Achaya, 1986 #59}

#### **1.3. A new phase**

- {Elumalai, 2010 #1088}{Rajarajan, 2007 #634}

- {Erraiah, 2005 #603}

#### 1.4. Evolution of NDDB action

- Created in 1964 for the diffusion of the Anand model in India
- Example from Karnataka {Mascarenhas, 1988 #646}

## 2. A new variety of dairy units, dairy products and milk qualities

### 2.1. Indian milk production in an international context

- {Ohlan, 2014 #608}{Gupta, 2007 #630} General view on the evolution of the Indian milk production as compared to the other milk producing countries
- competitive advantages of the indian dairy trade, {Rakotoarisoa, 2006 #635}
- {Ohlan, 2016 #629} : consumption evolution
- {Vandeplass, 2013 #633} : multinationals vs cooperatives

### 2.2. The professional actors experiences

- Tirumala, Hatsun, Creamline, The Right Moo, Astra dairy, paskey... in Tamil Nadu)
- Processed or unprocessed milk? New emerging milk qualities of small scale artisan high quality milk production
- The recent break through of cheese production and consumption, and the diversification of the dairy products consumption

### 2.3. The small farmers condition and recent evolution

- Women {Rao, 2003 #604}{Rao, 2012 #607}
- Tribal people {Singh, 2006 #606}
- Poors {Erraiah, 2005 #603}
- Villages studies in TN, karnataka, AP, Kerala...
  - **The diversification of “farming ways”**
- The commodification of Milk.
- Cherished manure or livestock effluent? The changing dung status as an index for changing synergies between agriculture and husbandry. IndiaMilk
- Anjaly Teresa John. A still persisting urban milk production? From urban milk colonies to city cows milk retail.
- Narayanam Nair : New and old consumption habits

### 2.4. The diversification of “consumption ways”

- The recent break through of ice cream cheese production and consumption, and the diversification of the dairy products consumption
- An increased urban demand for dairy products

### 2.5. Quality and qualities

- Technological and organisational difficulties encountered while raising milk quality: structuring the milk basins (milk-sheds), organising and maintaining the cool chain, transportation, milk blending
- Milk health- and nutritional quality.
  - A1-A2 milk controversy
- Microbes assets and enemies: pros and cons regarding milk pasteurization and dairy products quality. Boiling milk: a not so safe Indian habit (namely with pasteurized milk)
- Quality regulations: vigilance and control of adulterations, safety risks...

### 3. New issues and aims for milk production

#### 3.1. Environmental issues in milk production and sale

##### 3.1.1. Greenhouse gases production

- {Mishra, 2005 #605} and multifunctionality of agriculture

##### 3.1.2. Water issues

##### 3.1.3. Milk wastes and whey

- Whey: the potentialities of a by product of dairy production

#### 3.2. Feeding men or animals? The increased pressure on real estate

- Food for men or animals
- {Ohlan, 2014 #608} Paradoxical feeding strategies of the farmers

#### 3.3. Technical issues on milk yields

- The generalisation of artificial insemination. An achievement?
- Project M&BGF
- {Vincent Ducrocq} Indian Breeds
- Animal fodder
- Feed and health care
- {Prévost, 2017 #675} Tensions on dairy product markets

#### 3.4. Quality issues in milk production and sale

- Watering, adulteration...: a loss for all ?
  - Price schemes and win-win schemes
  - Large dairies and small collectors relationships with their providers: quality and price issues
  - Traceability and individual responsibility
- Cows and buffaloes : the smart knowledge of the farmers' blends and their economic adjustments of quality
- Indian inversion in Cold chain development {Prévost, 2017 #675}

#### 3.5. An international politics point of view

- India a new actor on the international dairy market place? The evolution of the Indian dairy balance of trade in the last 50 years
- The New Deals in Indian and European dairy relationships
- Imports and exports of milk powder, dairy products and fodder
- European private investments in the Indian dairy sector

### 4. Conclusion : A changing milk geography?

- Milch animals and breeds
- catchment areas
- national and NGO projects
- prices, quantities, dairy markets

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