Project DAIRY

AIRD Young Teams 2012-2014

Project DAIRY (AIRD Young Team program):
"Understanding the Traditional Milk Supply Chain Functioning in Cairo- Egypt"

with the support of AIRD and CIRAD

Training workshop:
Interdisciplinary Approach of Urban and Per-urban Traditional Dairy Chain

Organized by Ain Shams University and CIRAD
in collaboration with Desert Research Centre (DRC),
Animal Production Research Institute (ARC) and ICARDA

10-14 June, 2012, Cairo

PROCEEDING REPORT

15 January 2013

Editors: Véronique Alary (CIRAD/ICARDA), Salah galal (Ain Shams University), Jean-François Tourrand (CIRAD)

TABLE OF CONTENTS

INTRODUCTION

BACKGROUND:

This Workshop on **"**Interdisciplinary Approach of Urban and Peri-urban Traditional Dairy Chain" has been organized within the project DAIRY entitled: "Interdisciplinary Approach of Urban and Peri-urban Traditional Dairy Chain", funded by the AIRD (Agence inter-institutionnelles de recherche pour le développement) in the program "AIRD Young team" (2012-2014). The main objective of this project is to develop an interdisciplinary team and to build expertise on the diagnostic of traditional milk supply chain in the periurban area of Cairo city using systemic approach at the farm and family level and dairy chain analysis. This workshop was considered as a major activity of the project to create North-South research network and to facilitate transfer of knowledge.

The workshop has been organized in partnership between Ain Shams University (Cairo, Egypt), Animal Production Research Institute (APRI) (Cairo, Egypt), CIRAD (Centre de cooperation International de recherche agronomique pour le Développement) in collaboration with the Desert research centre (DRC, Cairo, Egypt) and ICARDA (International centre for Agricultural research in Dry Areas). This workshop benefited from the support of AIRD Young Team and CIRAD and we thank in particularly the president of DRC, Dr. R.E. Khidr, and his staff to welcome the workshop and participate in its organization.

CONTEXT AND OBJECTIVES:

Agriculture is a key sector in the Egyptian economy, providing livelihood for 55% of the population and directly employing about 30% of the labor force. Dairy is considered as the main livestock sector with a production of about 5.7 billion liters of liquid milk (FAO, 2010). But Egypt's milk sector is still largely traditional with a majority of the population consuming unpasteurized milk often delivered straight to the home or through vendors. This traditional sector is estimated to represent nearly 80% of Egyptian milk consumers (around 74 liter/capita/year in 2008). This figure indicates a large potential for growth and a quality gap that producers will have to fill. Besides, it is difficult to find research or development studies on the technical-economic performances of the small dairy producers and the traditional dairy chains.

The overall objective of the Workshop was to develop common knowledge on global dairy value chain and exchange knowledge on different methodological approaches at different scales.

The scientific objectives of this Workshop are:

- to develop an interdisciplinary team on dairy sector; and
- to build expertise on the diagnostic of traditional milk supply chain in the peri-urban area of Cairo city using systemic approach at the farm and family level and dairy chain analysis.

The main expected outputs were:

- develop methodological competencies on the analysis of functioning of small dairy farms and traditional milk chain in Egypt;
- produce scientific knowledge and expertise about the traditional dairy sector in Egypt: report of expertise;
- develop knowledge and expertise about informal dairy sector in some relevant parts of the world: sharing experience and bibliography; and
- develop an international Research-Enterprise-Development partnerships

This part of the proceedings gives a synthesis of each presentation and discussion during the plenary sessions and some feedbacks on which the next actions in the research project DAIRY will be based.

PART 1: SHARING OF EXPERTISE AND METHODOLOGIES ON MILK SECTOR AROUND THE WORLD

The scientific papers are in Annex-A and the presentations of other presentations in Annex-B.

SESSION 1: TRADITIONAL MILK CHAIN IN THE MEDITERRANEAN BASIN- BIBLIOGRAPHY (CHAIRMAN: DR. H. MANSOUR, REPORTER: CH. CORNIAUX)

This session 1 aimed at giving an overview of the milk sector in Egypt (S. Galal) and in the Maghreb (M. Srairi). A first exploratory of data collected among 105 dairy farmers in Greater Cairo has been presented (L. Elsorougi; V. Alary).

This session was organized around three presentations:

- Dairy Sector in Egypt: Past and Present Development. S. Galal: (20 minutes)
- Dairy farming systems in Cairo: Exploratory of first data collected in 2011-2012. M. Elsorougi/ V. Alary (20 Minutes)
- Milk Chain in Maghreb- A Review. T. Srairi (IAV, Morocco) (20 minutes)

PRESENTATIONS

S. Galal : Dairy sector in Egypt – Past and present development (20 minutes)

Main conclusions:

- Very old tradition in Egypt.
- Production of milk from both buffaloes and cows and their productivity are increasing (1 500 kg/year), the latter at a rate higher than the increase rate of the human population, hence leading to increased per capita share of milk.

- The increase in productivity is mainly coming from the higher production of exotic cattle and their crosses.
- Among all milk products including liquid milk, soft white cheese is the most prominent milk product Egyptians consume.
- The composition of the cattle population is tilting towards exotic genes at the expense of Baladi cattle. This should be a matter of concern in order to regulate the generation and use of crossbreds and limit the indiscriminate crossing.

M. Elsorougi – V. Alary : Dairy farming systems in Greater Cairo : Exploratory of first data collected in 2011-12 (20 mn)

Land and livestock:

- Most of the farmers : 3-5 dairy animals (cow and buffalo)
- Important agricultural diversification: Livestock system with sheep and sometimes camel or goat, fattening activities, and sometimes sale of dairy animals for meat….
- Complementarities between the activities: (i) Cattle fattening for large investment or to pay land rent, (ii) Sheep fattening for the period of feast … cash security and (iii) Milk for daily cash flow and family consumption

Feeding systems

- No easy link between feeding ration (and then the cost) and milk productivity
- Feed equilibrium and quality? Margin of improvement of efficiency…
- Low milk yield regarding the feed (concentrate and irrigated fodder) investment? Problem of environment?

Positive margin only for buffalo, hence explaining the interest of farmers in Buffalo
Dairy marketing strategies: the price of the fat
Animal conditions: health problems
Perception of farmers

- The farmers want to develop their own private business of milk, mainly buffalo milk (high level for fat content), and want to develop more add value products from milk to respond to an increasing demand (especially buffalo milk with high fat content)
- The farmers want more public support for milk collection and milk prices.
- But different situations regarding the districts.

M.T. Sraïri : The dairy chains in the Maghreb countries (20 mn)

This presentation was focused on the three countries of Maghreb (Morocco, Algeria and Tunisia) with fast growing population and urbanization.

Consumption: 112, 60 and 105 kg/p/year, respectively in Algeria, Morocco and Tunisia.
Different policies among Morocco, Tunisia and Algeria with market consequences on the supply: local production for Morocco and Tunisia, importation for Algeria.
A limited add-value: drink-milk represents almost 80 % of total milk processed.
Diversification of the industries.
Many challenges ahead:

- Soaring prices of inputs and dairy products;
- Growing demand and changes in consumer awareness.

Efforts to be made throughout the chains for an upgrading according to international standards:

- Fair income distribution for the operators;
- Rethinking of ways to improve water productivity through cattle farming;
- Establishment of traceability and milk quality remuneration.

DISCUSSIONS

Characterization of the genetic situation is a priority because Baladi cattle, although less performer, are well adapted to climatic conditions and the microorganisms in the rumen increase milk productivity. In Egypt: high quality goat cheese (ewe/doe cheese) with a high price (2 times cattle cheese). Changes in market demand: stimulated changes from the Government or from international indications?

Nutrition remarks: In Egypt, it is possible to increase the dairy performances only with technical adaptations (firstly by the feeding system). But there is a need for an organization to build around feeding program and crossbreed.

Is there seasonality of dairy chain in Egypt / in Maghreb? For production and consumption?
There is seasonality: First seasonality on production linked to rainfall season (main production from October to May) and second seasonality on consumption (lunar calendar). The summer period suffers from low fertility and heat resulting in lower production. To meet the demand, two solutions: use of milk powder or processing milk into cheese.

Why better productivity for crossbreeds compared to buffaloes? Which method is used to access the annual productivity at the farm level? Declarations of farmers are insufficient to estimate annual productivity. Two options can be established to have a better estimation: 1) monitoring at the farm; 2) use notebooks of collection centers.

Understanding “What are the young farmers looking for ?” is important to determine the future of this traditional milk sector.

SESSION 2: DAIRY FARMING SYSTEMS (CHAIRMAN: DR. B. FAYE, REPORTER: DR. M. WARDANI)

This session aimed at introducing systemic and pluri-disciplinary methods to understand the functioning of dairy farms. Moreover the session pointed out the necessity to consider the farm as part of the global level to understand farm functioning and their actual and potential strategies.

This session included two subjects:

- Dairy Farming Systems: Systemic Approach. *C. Corniaux/ JF Tourrand* (30 minutes)
- Identifying and Valorization of the Complementarities between Farming Systems within Milk Processing Units. *M. Napoleone*: (15minutes)

PRESENTATIONS

C. Corniaux, J.F. Tourrand: Dairy Farming Systems: Systemic Approach:

First speaker in this subject talked about:

1) From analytic approach to systemic approaches to study dairy farms:

- C. Corniaux explained what does traditional mean and how do you evaluate dairy farming systems.
- Usefulness of systemic approach for small holder and characteristics of small holder by taking into account "self consumption and non-marketing exchanges" (including donation, sales, self consumption).
- Multi-purpose of animals: donation, rules, self consumption…Milk can be a product, a co-product or by product.
- To produce milk vs to sell milk- who decides. This questions the place of the milk at the farm level.
- Interaction between entities: complexity and interaction between different scales".

2) Methods of study dairy farming systems:

- Survey with an example of traditional dairy systems around Bamako, milk collection around Bamako, Mali, herders group. In intensified milk producers' pastoral herds.
- Long terms studies, could be follow-up longitudinal surveys from 2-5 years or retrospective surveys over several decades.
- Modeling; illustration from Brazil, Vietnam and West Africa.

M. Napoléone: Identify and Valorization of the Complementarities between Farming Systems within Milk Processing Units:

The speaker talked about: Identify farming system diversity as an asset to manage the seasonal nature of milk in the south France. The seasonality of milk production poses a problem for marketing firms. A signal technical response (out-of season kidding) does not solve the problem, but it shifts it.

A way to combine a diversity of farming systems is to:

- to consider the diversity of farming systems as an asset.
- identify complementarities for the different production systems.
- help organize adjustments between individual projects and collective stakes.

DISCUSSIONS

General discussion was done around small-holder, traditional dairy production, milk chain, seasonal production and performance. Dr. H. Mansour introduced some pictures about how people produce milk in the north and south of Egypt, especially from sheep and goats.

More discussions on:

1) Who are 'small' holders?

- low income/cash flow?
- Land constraint in urban/peri-urban context?
- No generic group: depend on the context
- In Uruguay: small farmers means family work only

2) Contrasted contexts in Egypt, for example between Nile valley' societies and Bedouin society where milk/ cheese is mainly for family consumption

3) About the technical efficiency of the system: environment issues need to be addressed, mainly to estimate the green house gas emission.

4) Need to combine production and economics for the questions of seasonality. Apparently two cycling periods in Egypt, mainly in the Nile valley.

5) Many traditional cheeses in Egypt with added-value:

- Hard cheese (Roomy), Ras cheese or Kevlotiri type.
- White cheese made from natural milk of cows or buffalo or a mixture of these, and there are different names depending on the original region or salt content e.g. Damietta (belongs to Damietta governorate), Tallaga, Double cream, Baramilli, and Khazeen.
- Feta cheese, which is entirely different from the Greek cheese and is manufactured by different ways, but often depends on the replacement of milk fat by vegetable oils.
- Karish cheese, made from skim milk, the cheese is made using the acid coagulation method and can be manufactured by more than one way.

SESSION 3: TRADITIONAL MILK CHAIN (CHAIRMAN: DR. S. GALAL, REPORTER: M. NAPOLEONE)

This session aimed at introducing different methods to approach and evaluate the performances, efficiencies of the dairy chains (Duteurtre) by asking the questions "how do we see the informal dairy sector". This session aimed also at introducing why and how to approach milk quality (Faye, Mansour).

This session was organized around three presentations:

- How Do We "See" And How Do We "Evaluate" The Informal Dairy Sector: Multi-Criteria Evaluation of the Informal Dairy Sector. G. Duteurtre (30 min)
- Hygienic Aspects of Milk Chain in Egypt from Producer to Consumer. H. Mansour (20 min)
- How to Approach Milk Quality? B. Faye (20 min)

PRESENTATIONS

G. Duteurtre: How Do We "See" And How Do We "Evaluate" The Informal Dairy Sector: Multi-Criteria Evaluation of the Informal Dairy Sector.

1) Why 'traditional" vs "informal"

- Traditional (as opposed to modern) means "cultural heritage" vs informal (as opposed to formal) means bad, illegal, unhygienic
- Traditional would be in our mind?
- Tradition is: ritual, belief, origin in the past… proverbs, songs, literature…

2) Value chain: historical value

- Knowledge on production and processing
- Knowledge on consumption

3) "Filière" approach

- Complex system including products, actors, performance and institutions (markets, rules, norms)
- Principles: exploratory field research
- Description of products and techniques, norms

4) Paradigm of sustainability

H. Mansour: Hygienic Aspects of Milk Chain in Egypt from Producer to Consumer. H. Mansour (20 min)

1) Traditional milk means

- domestic use in Egypt,
- small farmers (representing 88% of dairy farmers),
- no chilled transportation

2) The required hygienic prerequisite at dairy farm

- applying prerequisites program (PRP) and food safety standards
- Creating basic requirements based on Codex general requirements of Good Hygienic Practices (GHP), the Good Manufacturing Practices (GMP), and other related regulations

3) Concept of *Milk Hub* to enable the implementation of good dairy farming at this sector aiming:

- improving milk productivity and safety based on Good Farming Practices (GFP)
- raising the standard of living for the small producer

B. Faye/G. Konuspayeva: How to Approach Milk Quality?

1) Main questions related to quality:

- Development of fast and reliable methods for the evaluation of the hygienic and technological quality
- Characterization of the technological and nutritional quality of traditional milk
- Economic assessment of the non-quality of the dairy products at various levels
- Development of standards and rules of production and marketing in local contexts

2) A necessary adaptation of the tools and methods of quality control of the dairy products with the participation of all the stakeholders,

- An internationally certified standard, mainly adapted to the local context or base on a better knowledge of the characteristics of the products,
- The characterization of the products resulting from particular contexts of production, specific methods of processing or nonconventional species
- The differentiation of the quality of the dairy products according to their position on international, regional and local markets,
- The development of an adapted management for which the public authority and the market may work in partnership."

DISCUSSION

The debate of this session focused mainly on local quality vs international quality. And what can mean minimum standards in connection with food safety?

There is an ambiguity in international standards due to interference of measures of protection. For example, freedom from Brucellosis is a condition to export although there is no change in meat taste and quality.

There is a need of an authority to control milk quality on the market and to determine criteria of quality. The main dangers in Egypt are: pesticide, heavy metals (very costly to detect).

There is a need for a consensus on the minimum standards for quality and differentiate nutritional (social construction) and technological quality (texture, protein contents, etc.). This consensus among stakeholders must be based on history of standards and regulation in the country. Quality is a social construction?

For example:

- In Columbia: stop stale of unpasteurized milk in 2007 and new decree to authorize the sale of fresh milk in 2010
- Europe: approach HACCP to avoid risk
- US: sterilization

SESSION 4: HISTORICAL AND GEOGRAPHICAL PERSPECTIVE OF DAIRY FARMING CHAIN (CHAIRMAN: DR. P. LECOMTE, REPORTER: S. ALSHEIKH)

This session aimed at replacing the development of milk sector in its social and geographical context through theoretical approach of the concept of territory (R. Poccard-Chapuis) and case studies in India (S. Ranade) and Uruguay (V. Porcile).

The session was organized around three presentations:

- Territorial Approaches to analyze dairy sector. R. Poccard-Chapuis (20 min)
- Milk Procurement Supply Chain Historic Perview . S. Ranade (15 min)
- How to Develop Dairy Farmers' Association? Family operated dairy farming in the North of Uruguay (Tacuarembó). (Ex: Cooperative New Zealand/Uruguay). V. Porcile (15 min)

PRESENTATIONS

R. Poccard-Chapuis- Territorial Approaches to analyze dairy sector

1) Why a territorial approach?
   - Dairy dynamics" are linked not only to farms but to "chains" too. From inputs to consumers, succession of "steps", kinds of actors, functions, etc.
   - So, dairy dynamics depends on conditionality's, synergies / interactions among all of these elements.
   - For each of them, the proper functioning depends on insertion in a larger system, that we call territory.
   - Territory = Local approach; Area, with social construction during the time (spatial and temporal dimension); System composed by actors, networks, environment in interaction
2) Methods:
   - Typological analysis and representations
   - Spatial dynamics modeling
   - Combining farm typologies and trajectories, retrospective analysis, territorial and marketing chain analyzes

S. Ranade : Milk Procurement Supply Chain Historic Preview

'Operation flood' was the name given to the white revolution in India to organize and improve the milk sector in order to satisfy the milk demand during the seventies.

Historical steps of the development of milk sector in India:

- Pre Operation Flood Milk Supply Chain Model : unorganized sector represents 70% of milk supply
- Operation Flood period : Milk Procurement Model based on broader social and economic dimensions and integrated development (including training on feeding system/ dairy practices, veterinary and AI service, balanced feed manufacturing,
- Post Operation Flood Milk Supply Chain Model
    - Milk Procurement System from dairy producers to chilling centers or dairy plants
    - BMC / CC Procurement System based on quality test (SNF, FAT)

V. Porcile: How to develop dairy farming association? Family operated dairy farming in the North of Uruguay (Tacuarembó).

In Uruguay: the consumption of milk: 242 liter/cap/year and meat: 63 kg /cap/year; production: 2400-3000 liters/animal/lactation; price: price at farm gate: 0.31 US$/liter and consumer price: 0.62 US$/liter.

Main achievements of the association:

- Forestry land for dry and young stock.
- Participation in monthly meetings with local organizations.
- Recognized locally and nationally (used as example by MGAP)
- Exhibition and sales of products in Annual Rural Association Exhibition & Sales.
- Training : Best practice for dairy farming, Leadership and motivation workshop, Dairy farm operator course, Cheese making course
- Technical assistance: social (identify needs, strengths and weaknesses), agronomic (to develop production)
- Recently, 2 weeks ago, we´ve got 550 ha for farming together!

Needs:

- Identification of common needs and goals "something to pull for"
- Search for available resources and networks

DISCUSSIONS

The debate was on the particular context of the last two case studies. Attention has been given to social context that explain the main success of dairy development. Discussion was also on the gradient of public intervention in the sector.

PART 2: TRAINING IN THE FIELD - 3 DAYS 11, 12&13/6/2012

Objective: learning in doing: learning interdisciplinary approaches through collective field work and develop a common expertise on the informal dairy sector in Cairo

3 Teams were constituted:

- Team 1: Ch. Corniaux, M. Napoleone, M. Wardani, T. Srairi, Ph. Lecomte, A. Elnahas, C. Delgado, V. Alary
- Team 2: G. Duteurtre, B. Faye, P. Bonnet, M. Elsorougui, I. Daoud, Abd El-Rahim A. Sahar
- Team 3: H. Mansour, S. Galal, JF. Tourrand, R. Poccard-Chappuis, Dr. Ranade, S. Alsheikh, V. Porcile, H. Hamdon

Program

Day	1st team	2nd team	3rd team
Monday 11 June 2012	Departure Maadi: 8:00 Menoufeya (Shanshour) 2 farmers 1 cooperative	Departure Maadi: 8:00 Giza: 2 farmers Dokki (at 2 pm.) :- Animal wealth Cooperative	Departure Maadi: 8:00 Shubra: 2 farmers 2 milk shops cheese processing unit cheese storing
Tuesday 12 June 2012	Departure Maadi: 8:00 Menoufeya (Shanshour): 1 collection point 1 collection centre 1 cheese processing unit	Departure Maadi: 8:00 Giza: 1 collection point 1 collection centre 1 cheese processing unit	Departure Maadi: 7:45 Ain Sham Univ.: 8:30 Kafr El-Sheikh (Delta) Experience of coop. (Dr. Hussein Mansour)
Wednesday 13 June 2012	Departure Maadi: 8:30 am 9:30-10:00 am: Juhayna 1:00 pm: CFI (Chamber of Food Industries)		

TEAM 1: MENOUFEYA (SHANSHOUR)

Reporters: C. Corniaux and M.T. Sraïri.

Team 1 went to the north of Greater Cairo, in the village of Shanshour, Al Menoufeya Governorate (June, the 11 and 12th). This report is not an analysis but a description of the situation that Team 1 (T1) saw during its field training.

1) Dairy farmers

Shanshour is located in the South Delta that is absorbed into the suburban area of Greater Cairo. The farming systems –visited- are mainly based on irrigated crops and forage (berseem and maize), with livestock: fattening animals and dairy buffaloes and cows. At this time, in summer, main crops are maize and berseem, cultivated on very small plots (less than half a ha). During the winter, wheat and horticulture are also cultivated.

We visited 3 farms in the village. They are quite big compared to the average, with more than 15 cattle heads. We saw buffalo, cattle, Baladi cattle and crossbreds, with imported breeds (Holstein). All are reared in the barn. It is mainly a zero-grazing system. Farmers transport all the feeds to their animals, forage as well as concentrate feedstuffs. In the barn, the atmosphere is not always welfare and we notice health (and hygienic) problems. The situation seems even more difficult because of the recent outbreak of the Food and Mouth Disease (FMD) which had resulted in a significant rate of mortality in herds.

Most of the farms rear dual purpose (milk and meat) herds. Sometimes, fattening animals seems to constitute the main livestock production activity in these farms. Most of calves are suckling calves, fed on the milk of their mother until weaning. As a consequence, at least half of the milk production is consumed by the calves.

Fattening may be considered as a priority at farm level, representing a significant source of income, mainly to face important expenses, whereas milk production is rather seasonal (a steep decrease in summer due to lack of protein feed sources in We notice two significant innovations for the feeding system. First, farmers grind wheat straw, whether on-farm produced or purchased from neighboring farms, for a better digestibility and they store it near the barn. Secondly, farmers use maize silage for the quality of this forage (storage possibility too).

Main conclusions:

Numerous dairy farmers in the village (Shanshour? El-Menoufeya?), several hundred at least (perhaps thousands?) (need to be confirmed).

The irrigated farming system seems to be efficient for milk and fattening animals. But what is the water cost (economical and environmental point of view)?

Further investigation may be thus needed to clarify the exact contribution of milk and fattening in the strategy of the small scale farmers, with regard to the feed resources used for each activity and the income they generate.

Evident drawbacks in milk yield due to unbalanced rations throughout the year and the absence of support programs to assist farmers

A non secure land situation for the future (not very clear).

2) Milk collection points

At this step, we don't make a difference between collection points and collection centers. In the village, it seems there are more than 40 milk collection points. We visited 3 of them.

The first collection point visited collects more than 1000 l/day in summer and around 2 000 l/day in winter. They collect every day from 90 farmers in summer and 170 in winter. 4 people work in the collection point : the boss who receives and assesses milk quality and pays for the milk weekly, his wife who assists him, his brother who delivers daily the milk by pick-up to 7 shops in Cairo (Maadi, Shubra), and his mother who processes on-farm some of the milk collected (butter, cream and cheese).
The milk is paid for based on a fat level basis (around half an Egyptian pound per one fat point). Therefore, buffalo and cow milk are separated. In this dairy unit, main collection is buffalo milk (90 %). The building and the equipments are quite basic: a balance to weight the milk and a Gerber centrifugation to assess the fat content. They are basic, and not very clean, but it works: 1 000 to 2 000 l/day and 170 farmers are involved! The milk can be refused according to its odor and fat %. The payment to producers is done every week on Thursday with an advance on Sunday (to go to the souk).

They manage the annual and daily evolution of supplies and sales by:

- Trend of sales to cheese processing units,
- self processing units (mother): buffalo butter, ghee, cream and cheese, if surplus
- 1 cooler tank.

The price is fixed for each season. For example, for buffaloes:

	Purchasing price from producers	Selling price to milk shop in Cairo
In summer	2.50	3.25
In winter	2.25	3

The fat content varies with the season. The fat % reduces in summer due to the forage. So in summer 100 liters of milk give 20 kg of cheese, compared to 70 liters in winter. 50 liters of milk give 6 kg of cream for family consumption and sale (30 LE/kg cream in winter and 40 LE/kg in summer) according to the responsible of the milk center. With 45 collection points in the village there is a high competition on the price. Buffalo milk is mainly sold in Cairo, while cow milk is sold at house gate in the village (sale price arounn2.5 LE/liter).

The second collection point we visited shows a clean building with 2 tanks: one for cow's milk (the largest one) and one for buffalo milk. Cow milk is the main collection. Their capacity is around 1 000 l (each). But in summer, they collect less than 1 000 l/day from 70 farmers (150 in winter). They buy the milk from the farmer at 3.5-4 LE/liter and sell the milk to 10-12 chops in Cairo at the price: 4-4.5 LE/kg. The surplus is sold to a cheese processing unit (at the price 1LE/liter). This collection center comprises 3 persons: a collector at the centre, one assistant and one driver. It seems there is a bigger capacity and a cleaner situation, but modest results in comparison to the first milk center we saw, according to the sales flows.

The third collection center we saw belongs to a cooperative, with a linked State status. 3 tanks provide an important collection capacity: 3 000 l/day. But, at this time, the volume collected does not exceed 400 l/day (150 l sold in one shop in Cairo; the rest sold in the village). The members of the board said the administrative constraints and controls make them less reactive compared to the private units. The co-ops try to innovate with cheese and yoghurt (in winter). Imported milk powder is used to improve the collected milk, in order to allow the production of dairy derivatives. But their market remains limited. Each day, they only process few liters of buffalo milk. Anyway, the dairy unit, created in 2007, is not the first activity of the co-ops. Since 1981, they produced concentrate feeds for animal with 3 formulas: dairy (30 %), fattening (50 %), starter (20 %), relying on imported feedstuffs: soya bean, maize, wheat bran, beet pulp,… But the activity is also decreasing: 30 tons/day compared to 250 T/month now.

Main conclusions:

- Tight collection network in this village. 40 – 45 collection points. High density of the network (to be checked).
- Small collection radius: less than 2 km (TO BE CONFIRM). It means proximity, rapidity, and short chains (to be checked).
- High production level in winter, but no real possibilities to manage the supply at long term: No long conservative cheese. Quotas? Milk kept for the calves? Others chains?
- Exchanges based on confidence, no contracts.

3) Conclusion

The first impressions:

- A very impressive dynamic, especially with private units.
- 2 separated chains: cow milk and buffalo milk to be taken into account for next studies.
- A very interesting area to observe and to describe at the village scale.

Many questions for further research, which necessitate systemic approaches in the field:

- Functioning of farms: which resources (agricultural land, labor, feedstuffs, etc.) for which animals (not only with regard to growing animals and cows, but also according to cattle and buffalos)? Seasonal variability of feed resources? Milk yield? Weight of milk and live weight gain in the incomes of farms? Milk quality and its relationship to rearing practices?
- Milk chain: milk price throughout the year, milk effective sales (moments of surplus), volumes of on-farm processing and relative weights of butter, yogurts, cheese, etc., milk quality of processed derivatives, milk flows to Cairo and their seasonal variations, impact of imported milk powder on the dynamics of the dairy development (level of taxation, who imports the powder? Which volumes? Etc.).

TEAM 2: GIZA (GREATER CAIRO)

Reported: G. Duteurtre, P. Bonnet

1) Farms visits

Two farms have been visited.

Farm 1: SAID
Land: 1 feddan (0.42 ha) in rent since 10 years. Irrigated Cropping system based on:
Winter: berseem (50% of the area) + wheat (50%)
Summer: Maize (Dora) + vegetables (eggplant, courget, potatoes, salad)

Livestock: currently, the farmer had only 1 buffaloes (*Gamour*); in January 2012, he had 2 buffaloes and one cattle for fattening. This animal has been sold to pay the rent of land. For fattening, he buys one animal at 4 months and sells it after 6 months; At 4 months, the animal is bought at 4 000 to 5 000 pounds. At 10 months, its weight is around 300 kg and it is sold at 26 LE/kg, which is equivalent to 8000 pounds. The gross margin is around 4 000 pounds. The feeding is based on fodder crops (berseem in winter and maize in summer) and concentrates. The cost of the concentrates is around 600 pounds (1 bag of concentrates per month during 6 months). The cost of vet treatments : around 150 pounds. With the outreach of FMD, ha has recorded his animal near the GOVS. This recording must be asked by the farmer.
The milk production is mainly for calves or family consumption. The milk is transformed at home in Kareich and butter (*Zibda*).
The main cash flow comes from vegetable and manure from animals.

Farm 2: WALID
Family: Walid is member of a big family with more than 60 members. The house is situated at 10-15 min from the plot.
Land: 10 feddans cultivated:

- In winter: berseem, wheta and vegetables
- In summer: maize and vegetables

Livestock: he has 1 buffaloe and 3 cows that are milked (he gets 8 kg/day from the buffaloe, and 5-6 kg/day from the cows, i.e. around 20 (?) per day). The rest of the herd is kept at home for fattening: 4 calves and 4 camels. The fattening is based on maize, residuals and bran wheat. Animals are sold for Ramadan or on weddings. The milk is mainly transformed and consumed at home (5 litres of milk for 1 kg of butter). The surplus is sold to consumer or in the street at the price: 5 LE/kg of milk, 10-15 LE/kg for cheese and 50 LE/kg for butter. He sells also the manure at 300 LE/1.8 Ton for the New reclaimed land along the desert road.
He also leases 6 feddans and gets the corresponding income (5000 LE/m2) in the zone. 15 families will live in the area.

In the area, the urban pressure is so high. A lot of farmers have sold their land. But Walid has always wanted to keep his way of life and he does not want to sell his land.

2) **Visit of the General Cooperative for development of Animal wealth production (GCDAWP)**

This federation –created in 1977- has 400 local cooperatives in all Egypt focused on medium and large farms with more than 50 heads. Each cooperative includes more than 20 members. . 25% of its members are very big farmers (more than 20 cows, up to 1000 cows..). One of them (mega-farm) produces more than 35 tons/day.

The activities of the federation (50 staff including technicians) are:

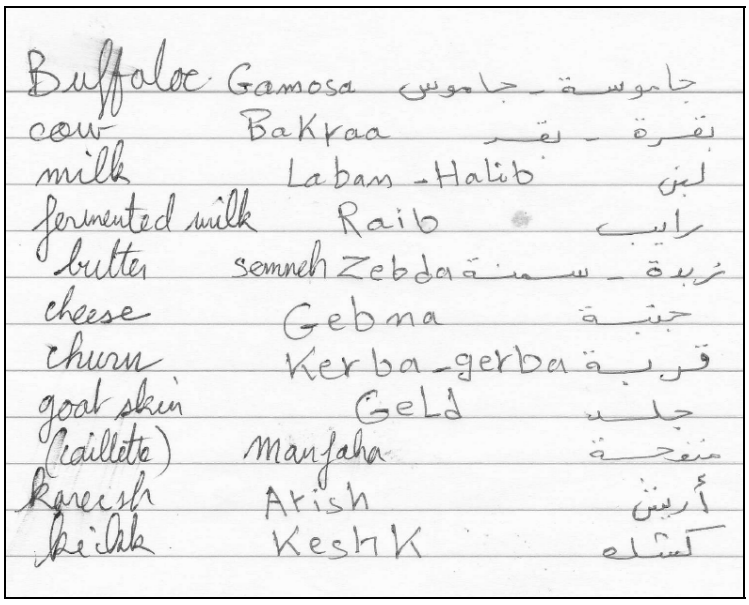
- Import heifer and AI Frozen (pure Holstein, Friesian) from Germany, Holland
- Import frozen semen of buffaloes from Italy (20 US$/semen) sold to member
- Import vaccines and vet products
- Extension services
- Milk equipment: Alfa Laval, GLAS
- Quality test based on % fat and microbial content
- Make contact with big companies to sell milk (Juhayna, Dompti, malaï…)
- Credit: 40% capital (payment over 3 years)
- Develop 3 feed companies in cooperation with Germany and Hungary: 2 in Tanta and 1 in About City (Ismaleo Road Desert)
- Participation in elaboration of dairy policy (representative role)

This federation negotiates also the price of milk (producer price) with the MARL (Ministry of Agriculture and reclaimed land) and the private companies. For 2012 the price was established at 3 LE/liter in winter and 3.2 LE/liter in summer. This price is negotiated every 6 month. The cooperative will have around 20-25% of milk supply of the big companies?
Main problem: mastitis.
This cooperative is only for dairy cattle producers no buffalo's producers.

3) **Visit of a milk shop and a family milk processing unit**

Cheese processing unit (household level)
Fresh cheese (*Kareish*) is processed from fresh buffalo milk (*laban*), only during winter. The milk is churned in a goat skin (*shakoua, or Kherba*) hang on a door frame. A gaz fire is put underneath for heating the milk. After 15 mn, 2 products are separated from each other: solid butter (*semneh = zibda*) and liquid buttermilk (that will give cheese, *Gibnah*[1]). Butter from buffaloe milk has different colors, depending on the season. Rennet (*Manafaha*) is then added to the liquid "*Gibnah"* for curdling and cheese making. The rennet is a home-made one taken from the abomasums of calves. *Gibnah* might also be mixed with wheat to process *Kichk*.

[1] *Gibnah* was used by the family for "buttermilk". In marocan Arabic, Gebna means cheese. Is Gibnha the right word for buttermilk? Is there another specific word for "churned milk" or "buttermilk" in Egyptian arabic?



Glossary of Arabic terms (Moroccan Arabic) (source : M. T. Sraïri)

Milk retailing shop

The “Mahal aya” supermarket is a middle-size supermarket, or retailing kiosk. The shop sells buffalo milk in bulk, stored in a tank (150 l). The retailing price is 5,5 EL/kg. The buffalo milk is sold for drinking.

It also sells Rayeb, solid butter (Zebda) and cheese. The different types of cheese that are sold are Beremmili, Aricha (*kareish type of cheese)*, Tallaga, Dompti (commercial), Roumi + other industrial cheeses (cheddar President, Bore cheese President , La Vache qui rit, Danish Blue Cheese Renstorg, etc.). The cheese is produced in Kafresheikh Governorate. The butter is mostly sold in winter.

Supermarket

The supermarket sells *Zebda* (solid butter) and *Samna* (butteroil or ghee). 2 types of *Samna* are sold :

- Vegetable Ghee (Arma brand) : 12 EL/kg
- Real Ghee (pure milk fat, various brands): 35 to 50 EL/kg

4) Conclusion

- Animal products: meat, milk and manure
- Use of a wide range of feeds and foragesin the feeding system (berseem and wheat during winter, Maize (Dora) + various vegetables (eggplant, courget, potatoes, salad) during summer.
- Importance of urban milk production, with huge environmental constraints
- Importance of the “informal” outlets : liquid milk marketing + home processing into butter and cheese sold through direct sales and small kiosks;
- Technological specificities of traditional products (kaleish, butter, buffalo milk) need to be more precisely detailed (literature review and field observations).

- Huge cultural gap between industries and small holders, including in terms of defining “what is good quality of milk”.
- Loose milk and industrial milks are not the same products
- Industry does not take advantage of the dairy tradition in Egypt. It is mostly based on standardized processes and products. Any challenge for the future?

TEAM 3: SHUBRA AND DELTA

Reporter: J.F. Tourrand

1) Dairy, Shubra 11 June 2012

Salah Galal, Hussein Mansour, Samir Alsheikh, Hatem Hamdon, S. Ranadé, Virginia Porcile, René Poccard-Chapuis, JFT

Visit of a dairy farm

No grazing, all time in the barns.

Two barns, 1st at 1st floor of a hall building (where the famer family lives) with 28 dairy cows (24BF + 4BV= and 5 young calves (BF), 2nd at the 1st floor of a new building with 20 dairy cows (BF) and 20 young calves at the 3rd floor. The two barn are located at 50m and the dairy shop is between.

The farmer just buys pregnant females (from 4th to 6th milking period … for the top of dairy production) before the calving period, milks the cows, raises the calves (4 months just with milk and 3-5 months with ration) and fattens the cows to sell to butcher or to other farmers. The milking period is from 6 to 14 months.

The nutrition is 15kg/d berseem during the period (winter), rice straw and all the left-overs from human food, especially bread which is subsided. Water drinking system (bathtub) exists in each barn for cows and calves.

The average of dairy production is 15kg/day, twice-a–day milking, 6 kg for the calves and 9kg for sales.

There is no more agriculture or livestock in the area. It is very difficult to find a bull for sevicing the females. Farmer is planning to move to another place, in the delta at 15km (or 50) to continue his activity. His father and his grandfather had the same activity … he began when he was young, as his grandchild (8-9 years old) who is helping him. There were only farms in Shubra 10 years ago. But today there are only 10-12 floor buildings. Urbanization process is very strong and advancing very rapidly.

15 people are working in the farm and the shop. He gets EP 3/kg (#U$0.5) giving a daily income = E$1200/day … as the same as the sales of calves and cows. The labor is for milking, feed the herd, cleaning the barns, dairy processes and dairy and cheeses sales.

In the shop there are some equipment for small dairy factory and freezer to conserve the milk and cheeses.

Another shop sells milk, cheeses, rice pudding, fresh cream … 5kg milk => 1kg fresh cream and 4kg no-fat milk which adding 1kg vegetal oil => 5kg milk. Fresh cream is sale at the high price. Rice and milk is sale EP2.5 and production cost is EP1 (0.5 for milk and rice and 0.5 for process and equipment).

2) Dairy, Elgharbeya Governorate (Middle Delta) 12 June 2012

Hussein Mansour, Samir Alsheikh, Hatem Hamdon, S. Ranadé, Virginia Porcile, Ahmed (Cairo Univ.), JFT

Visit of the Qotour cooperative and dairy farms. Around 10-12 members of the Qotour directorate participated to the interview: president, vice-presidents, secretary, budget responsible … a great part are young men. The directorate is elected for 3 years.

There are approximately 800 members in the Qotour cooperative, but just 300-400 of them use the services of the cooperative: milk trading, inputs for milk production (feed, medicines), some trainings and technical assistance (?) …

The milk production of the Qotour cooperative is between 25000 to 35000 liters a day according to the season for a global production of 60000 liters per day. The cooperative sells the milk to different dairy factories according to the "best" price. The quantity is sufficient to negotiate the price. The dairy factory sends a dairy truck to transport the milk.

Qotour cooperative has a specific building with cooling system tanks to store the milk waiting for the truck. Some analysis of milk can be done, especially density. Added water is not a problem in Qotour cooperative due to the awareness of the members.

There are more and less 60-80 dairy farms just around the Qotour building, one beside the other. We visited seven farms.

Herd size depends on the farm: 7, 9, 11, 15, 18 dairy cows, no more 20, and every time some buffalo cows, 2 or 3. Cows are in small corrals beside the houses. Calves are in separated barns near the cows. Some farms have bulls, others no, at least during the visit. In some farms, other species are grown as sheep, goats and chicken. Each farm has one or two donkeys.

Some farms have milking machines. The cow production is around 8 and 15 liters a day according to the season and the stage in dairy period.

The feed of the dairy cattle is based on berseem (*Triflolium of Alexandrinum*) ad libidum cultivated on the farm, or some time bought from neighboring farms. In all the farms, there is a great quantity of rice straw used as bedding in the corral, but also as feed for the dairy cattle. Dairy cows receive concentrates bought from the cooperative or the market. The daily quantity is more and less according to the milk production.

The main health problems are mastitis, failure reproduction and parasites.

There is a strong crop-dairy-cattle integration in all the visited farms. The land is is cultivated with cereals (rice, corn, barley, …) cotton, berseem for feed, horticulture …

The dairy family has one, two or three households with one or two members working in the dairy production and the crops: father and sons, or brothers, or …

The common future scenarios are to continue in dairy production with perspective of technical advances, especially in milking machine, artificial insemination and genetics.

TEAM 1, 2 AND 3: VISIT OF THE MODERN SECTOR

Visit of Juhayna

Started since 28 years
Capacities of milk processing unit:

- Milk: 800 tons/day (expectation: 1 million liter at the end 2012)
- Yogurt: 20 tons/day and
- Milk in plastic bag: 300 T/day
- Milk in pack: 250 To/day
- Storage 5 days for bacterial and chemical tests

Water: 1 million liter/day
Labor: 350 employees
European certificate
Milk suppliers: 50% from farmers (around 35 farmers) and 50%powder milk. One farm on desert road with 14000 cows, one near Alexandria with 1800 cows…
Export (around 10% of products) to Jordan, Lebanon, and Mauritania
Project of big farm: a milk production from 100 ton to 650 Tons/day.

Visit to CFI

Project of AFD:

- Quality system for traders
- Cheese processing/making branding
- Laboratories and equipment for certification

Milk supply of Cairo: 2 sectors: Traditional sector and Modern sector. The vision of supply by the modern sector answers to the domestic demand.

Future of small farmers?

1) Before 1990:

- 20 years ago: only small farmers. Only one business man with 100 cows and cooling system and a production of 12 kg/cow for Holstein.
- Less than 1% used in pack→ consumers were afraid from milk packs
- The market increased by 3-4%/year
- Qualities required: white and fat content

2) After 1990:

- Now: 85 farms with more than 1000 dairy cows with productivity: 30 kg/day.
- 23% in milk pack
- The market increases by 3-4%/year

- The market increases by 20%/year (the consumption increase from 0.7 to 1.5 kg/hab./year with a demographic increase of 2% compared to a consumption of 12 kg/hab./year in morocco)

Problems:

- Very bad feed supply
- Lack of collecting centers
- 5 companies have their own collection points

Price:

- Winter: reduced by 12% compared to summer period
- Average price: 3 LE/l (2012 : 2.14 in winter and 3.25 in summer)

PART 3- PLANNING ACTIVITIES FOR DAIRY PROJECT

The objective of this day was to capitalize on the 3 field-day visits and use this common knowledge to develop the main research activities for each WP in the project DAIRY.

SESSION 1: RESTITUTION OF THE FIELD VISITS

Firstly each team of the field visit has organized a slideshow in order to share their understanding of the milk chain with all the groups; these slideshows were mainly based on pictures (See **Annex-B**).

In summary:

These field visits allowed identifying several sub sectors which are also connected to different types of farming systems in the Greater Cairo.

- Small scale production (and processing), cohabitating with
- Large scale industrial sector
- +- SME's: processors & milk collection

From the different interviews, it is not clear, even ambiguous, the link between the large scale industrial sector and the small and medium scale production and processing systems. What is the share of each sub chain in terms of volume produced and consumed? From the production of the large scale industrial sector and medium scale and the average consumption in Egypt, around 70-80% of production would come from the small scale dairy sector. Due to the high demographic and economic growth in Egypt, the large and medium/small scale sector can be complementary to satisfy the demand or to cover all the geographical zones or in competition if Egypt knows a change of habit in the consumption pattern.

These «dichotomous » chains can be regarded as different as well as regarding quality standards:

- International standard are adopted in the industrial sector (capacity to export worldwide)
- « Local » standards (though not well documented) to be could be converted into national standards by improving practices (hygiene, technology..)

To understand this stake of complementarities or competition between the different subsectors, research works must be developed to understand the social and economic contribution of the various subsectors in terms of:

- What is the social and economic role of each farming system / chain in terms of employment, food security (self consumption, direct sales entry into the chains), add value?
- Need to better describe and characterize the traditional technologies for making cheese and other dairy products
- Study the dairy sector in its territorial environment
- Land cover/land use and interface urban agriculture for understand the future for small scale farms
- Response to change in land cover / land tenure: prevention, Adaptation, resilience of systems.

Main methodology and scientific question: At what scale to study the agricultural territory and dairy chain functioning in a per-intra urban context?

SESSION 2: DEFINE RESEARCH ACTIONS FOR THE PROJECT DAIRY

SESSION GROUP WP1: HISTORICAL AND SOCIAL CONTEXT OF THE TRADITIONAL DAIRY CHAINS

The main objective of this WP is to characterize the historical context of the traditional dairy chain around Cairo

Action 1: Spatial analysis of long term transformations

- Understanding rules on land access
- Interviews with farmers,
- Interviews with land planning authorities
- Characterizing long-term spatial transformations
- Satellite image mapping,
- other mappings,
- Interviews with stakeholders
- Characterization of milk collection and “milk sheds” spatial transformation
- milk collection flows and mapping,
- Flows of feeds and manure, spatial complementarities

Action 2: Trajectories of individual enterprises

- Characterizing farms trajectories
- Interviews with farmers,
- Surveys (Cf questionnaires of Mohammed Elsorougi)
- Characterizing collectors and processing units trajectories
- Interviews with collectors
- Interviews with processors
- Interview with key stakeholders

Action 3: Geo-political and social history

- Characterizing land policies and local planning strategies
- Interviews with farmers,
- Interviews with local stakeholders
- Interviews with local authorities
- Characterizing networks of actors and their historical evolution
- Interviews with farmers,
- Interviews with local stakeholders
- Interviews with stakeholders

Action 4 : Modeling the future of dairy chains

- Spatial modeling of dairy chains
- Based on other activities 1, 2 and 3
- Mapping the future of dairying in the survey areas
- Economic modeling of dairy chains
- Based on other activities 1, 2 and 3
- Use of Toolkit Alive

SESSION GROUP WP2- ASSESSMENT OF SMALL DAIRY PRODUCTION SYSTEM

The objective of this WP is to have a clear representation of the small dairy farms providing milk in the population and in the market with Greater Cairo

3 steps:

- Typology
- Performances monitoring
- Economic assessment

Actions 1: Typology of farming systems in Greater Cairo: To identify the types of farming systems by a wide crossing survey based on a rational sampling procedure → Preparation of a conceptual pre-model for analysis (see Box 1)

A long discussion has concerned the identification of small scale dairy farms unit. Different criteria are proposed: land tenure and herd size?, market oriented farms?, or % of milk self-consumption?, family dairy units?

When considering the livestock system, the group agreed to consider all the functioning of the whole livestock system: herd (size, structure, species, age, …), practices (calving, duration of lactation, culling, milking and transformation, veterinary practices –vaccination, treatments-, practice of slaughtering, AI, …), feeding resources: origin, concentrates part, cost, some feed analysis,
Questions for each parameters: when, time (/week, /month), place, who.

Action 2: Performances monitoring: To select farms representative of the types identified in step 1 for monitoring performances→ Using specific software (LASER, 12 MO) for monitoring

Sampling procedure:

- Spatial sampling or
- According to land size
- According to herd size
- According to market oriented objectives

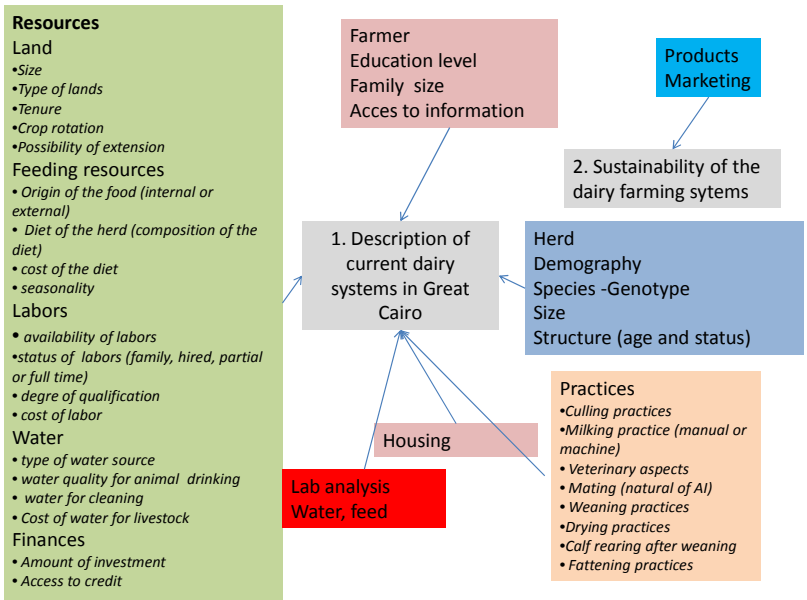
Duration of the monitoring:

- Measurement during 2 years→ for prospective study
- Retrospective during 12 months: cross sectional survey (12MO)

Action 3: Assessment of the household viability
Based on the types identified in action 1 and based on the performances identified in 2

- Monitoring of economic assets by elaborating convenient indicators of household viability (land pressure, feed accessibility, credit access, quality management, etc.).

Box 1: Example of conceptual pre model:



SESSION GROUP WP3- THE TRADITIONAL DAIRY MARKETS IN EGYPT

The objective of WP3 is to understand market access for smallholder dairy producers around Cairo

Action 1:

- To identify the competitive advantages of products from small farmers on the market
- To identify the competitive advantages of traditional products on the market [*Products*]
  - Modes of consumption and consumers preferences [interviews with consumers, traders, restaurants + consumption survey]
  - Analysis of "Safe" practices at consumers levels and risks analysis
  - Products characterization [technical, hygienic, organoleptic, cultural analysis]

Action 2: To better describe the different channels and their economic importance
To better describe the different channels and their economic importance *[Actors and Performances]*
Actors strategies and roles in the Chain

- Typology of actors
- Price and margins analysis
- "Safe" practices at marketing levels and risks analysis

Action 3: To better understand the policy context for market organization
To better understand the policy context and organization of the market *[Institutions]*

- Farmers organizations (Co-ops, associations…)
- Regulation on imports of dairy products (taxes..)
- Rules and standards on processing and hygiene..
- Branding, labeling, quality signs, norms and standards…

Conclusion: Finalize planning activities for DAIRY Project and evaluation of this workshop

CONCLUSION

(i) Develop methodological competencies on the analysis of functioning of small dairy farms and traditional milk chain in Egypt;

The workshop allowed combining theoretical and empirical approaches by the alternance of room meetings and fields visit.
But it was difficult to implement real methodologies in the field due to the discovery of the Egyptian case study for the majority of participants and the time of moving that has limited brainstorming at the end of the day.

Despite this inconvenient common to all mega poles, the field visits have raised different theoretical or methodological issues:

- the geographical scale for the DAIRY project: two options have been proposed:
    - 1 option: limited the project to one well defined village (such as the 15 dairy farmers that occupy a restricted area in Giza) and develop deep analysis;
    - 2nd option: to encompass the geography of Greater Cairo and limit farm studies to a small sample in each place.
- The approach of animal performances: some types of protocol have been explored based on the material available in the dairy centers.
- How to develop a conceptual model? method

(ii) Produce scientific knowledge and expertise about the traditional dairy sector in Egypt: report of expertise;

The two presentations on Egypt, plus the expertise of the group, plus the 3 field visits allowed us to have a first approach of the traditional but also modern dairy sector in Egypt.

Actually we can distinguish at least three sub-sectors:

1) Very small dairy farms with 1-2 dairy buffalos for milk consumption of the family. The groups don't interact with the market
2) Small and medium scale dairy sector: this system is dominated by the majority of farmers with less than 20 dairy animals (in average between 1-5 animals). These farmers raise dairy animals not only for milk but also meat and manure that are sold. The milk is both self consumed or sold.
    a. In urban zone (like Giza): milk is mainly sold in the closer "milk shop" or in the street or at home. It can be sold fresh or transformed in cheese or butter.
    b. In peri-urban zone (like Shanshour), milk is mainly sold to dairy centre. These dairy centers have direct contact with "milk shop" in Cairo that they supply every day.

3) Large and modern sector: this sector is dominated by very large farm (with more than 1000 dairy animals). They have their own cooling system and deliver directly to big companies at a negotiated price.

Different indicators have been collected on the functioning of dairy farms or processing units. These indicators or at contrary the lack of indicators allowed to fix some priorities for the project DAIRY.

ANNEX A- LIST OF PARTICIPANTS

(Alphabetaically arranged**)**

Family, First name	Institution	Country	Specialization	Email
Abd El-Rahim, Sahar	APRI	Egypt	Economist	sahar_2007@hotmail.com
Abdelzaher, Mona	APPI	Egypt	Animal breeding	monaabdelzaher@yahoo.com
Aboul-Naga, Adel	APRI	Egypt	Genetics	adelmaboulnaga@hotmail.com
Acloque, Guillaume	Institut Français d'Égypte	Egypt	Attaché de coopération scientifique	gacloque@institutfrancais-egypte.com
Ahmed, Mohamed	Cairo University	Egypt	Graduate Student, Animal Production	m.radwan883@gmail.com
Alary, Véronique	CIRAD / ICARDA	Egypt	Economist	Veronique.alary@cirad.fr
Ali, Safwat	Ain Shams U.	Egypt	Dean of the Faculty of Agriculture	safwatali@windowslive.com
Alsheikh, Samir	DRC	Egypt	Zootechnician	s_alsheikh@hotmail.com
Bakry, Essmat	Ain Shams U.	Egypt	Deputy Dean for the Graduate Studies and Research	Esmat54@hotmail.com
Balata, Mohamed	DRC	Egypt	President of Animal production Division	maebalata@yahoo.com
Bonnet, Pascal	CIRAD	France	Veto-geographer	pascal.bonnet@cirad.fr
Corniaux, Christian	CIRAD	Mali	Zootechnician	Christian.corniaux@cirad.fr
Daoud, Ibrahim	Matroh	Egypt	PhD student	ibrahim_hawaty@yahoo.com
Delgado, Juan	Cordoba U	Spain	Professor, Genetics	juanviagr218@gmail.comb
Duteurtre, Guillaume	CIRAD	Vietnam	Economist	guillaume.duteurtre@cirad.fr
El-Gendy, Marwa	DRC	Egypt	Dairy Scientist	Mero_hm6@yahoo.com
ElNahas , Ahmed	Sohag University	Egypt	Graduate Student, Animal Production	elnahas_2002@yahoo.com

El-Nawawy, Mohamed	Ain Shams U.	Egypt	Professor, Dairy Microbiology	Elnawawy2009@yahoo.de
Elsayed, Manal	Ain Shams U.	Egypt	Associate Professor, Animal Breeding	2005.manal@gmail.com
Elsorougi, Mohammed	APRI/ Ain Shams U.	Egypt	PhD student	m_a_elsrogi@hotmail.com
Faye, Bernard	CIRAD	Saudi Arabia	Veterinarian	Bernard.faye@cirad.fr
Gado, Hani	Ain Shams U.	Egypt	Chair, Animal Production Dept.	Gado@link.net
Galal, Salah	Ain Shams U.	Egypt	Professor, Animal Breeding	sgalal@tedata.net.eg
Ghonim, Elham	Menoufeya University	Egypt	Assistant Professor, Animal Breeding	Elhamghoneim1963@yahoo.com
Hamdon , Hatem	Sohag University	Egypt	Assistant Professor, Animal production	hamdon9@yahoo.com
Hassan, Ahmed	DRC	Egypt	Vice-president of DRC	Ahmedibrahim1958@hotmail.com
Jabbouri, Said	IRD	Egypt	Représentant IRD	said.jabbouri@ird.fr
Karajeh, Fawzi	ICARDA	Egypt	Regional Coordinator of ICARDA (Cairo office)	ICARDA-Cairo@cgiar.org
Khidr, Raafat	DRC	Egypt	President of DRC	raafatkhidr@yahoo.com
Konuspayeva, Gaukhar	Université Al Farabi, Faculté de Biologie,	Kazakhstan	Biologist	konuspayevags@hotmail.fr
Lecomte, Philippe	CIRAD	France	Agronomist	Philippe.lecomte@cirad.fr
Mansour, Hussein	Ain Shams U.	Egypt	Professor, Animal Breeding	hussein.mansour@gmail.com
Martine, Napoléone	INRA	France	Zootechnie	martine.napoleone@supagro.inra.fr
Moslhy, Naiim	DRC	Egypt	Vice-president of DRC	Naem20042001@yahoo.com
Poccard-Chappuis, R	CIRAD	Brazil	Geographer	poccard @cirad.fr
Porcile, Virginia	Consultant	Uruguay	Agronomist	virginiaporcile@hotmail.com
Ranade, S.	Indian Society of Agribusiness	India	Manager	arpitar@sify.com

	Professionals			
Srairi , T.	IAV	Maroc	Zootechnician	tsrairi@yahoo.fr
Tawfik, Khalid	APPI	Egypt	Director of APRI	kt_osman@yahoo.com
Tourrand, J.François	CIRAD	France	Veterinarian	tourrand@cirad.fr
Wardani, Mohammed	APRI	Egypt	Zootechnician	mohdwardani@yahoo.com
Youssef Ahmed	DRC	Egypt	Head of RS & GIS unit	ahmedyoussef100@yahoo.com

ANNEX B- PROGRAM OF THE WORKSHOP

Venue : Desert Research Center (DRC)

Partners :

- University of Ain Shams,
- CIRAD
- Animal Production Research Institute (APRI)/Agricultural Research Centre (ARC)
- Desert Research centre (DRC)
- ICARDA

Funded by AIRD and CIRAD

Context and Objective:

Agriculture is a key sector in the Egyptian economy, providing livelihood for 55% of the population and directly employing about 30% of the labor force. Dairy is considered as the main livestock sector with a production of about 5.7 billion liters of liquid milk (FAO, 2010). But Egypt's milk sector is still largely traditional with a majority of the population consuming unpasteurized milk often delivered straight to the home or through vendors. This traditional sector is estimated to represent nearly 80% of Egyptian milk consumers (around 74 liter/capita/year in 2008). This figure indicates a large potential for growth and a quality gap that producers will have to fill. Besides, it is difficult to find research or development studies on the technical-economic performances of the small dairy producers and the traditional dairy chains.

The scientific objective of this Workshop is:

- to develop an interdisciplinary team on dairy sector; and
- to build expertise on the diagnostic of traditional milk supply chain in the peri-urban area of Cairo city using systemic approach at the farm and family level and dairy chain analysis.

The main expected outputs will be to:

i. develop methodological competencies on the analysis of functioning of small dairy farms and traditional milk chain in Egypt;
ii. produce scientific knowledge and expertise about the traditional dairy sector in Egypt: report of expertise;
iii. develop knowledge and expertise about informal dairy sector in some relevant parts of the world: sharing experience and bibliography; and
iv. develop an international Research-Enterprise-Development partnerships

Program:

1st. Day, Sunday 10/06/2012:

Objective: develop common knowledge on global dairy value chain and exchange knowledge on different methodological approaches at different scales

9:00 - Welcome from DRC President, **R.E. Khidr**

9:10 - Welcome from **S. Galal**

9:20 - Brief presentation of the research project DAIRY **(V. Alary)**

9:30-10:00- Break

10:00-11:30 - Session 1:

Traditional milk chain in the Mediterranean basin- Bibliography

Chairman: Dr. H. Mansour, Reporter: Ch. Corniaux

- Dairy Sector in Egypt: Past and Present Development. S. Galal: (20 min)
- Dairy farming systems in Cairo: Exploratory of first data collected in 2011-2012. M. Elsorougi/ V. Alary (20 Min)
- Milk Chain in Maghreb- A Review. T. Srairi (IAV, Morocco) (20 min)
- Discussion (20 min)

11:30-13:00 - Session 2:

Dairy Farming Systems

Chairman: Dr. B. Faye, Reporter: Dr. M. Wardani

- Dairy Farming Systems: Systemic Approach. C. Corniaux/ JF Tourrand (30 min)
- Identify and Valorization of the Complementarities between Farming Systems within Milk Processing Units. M. Napoleone: (15min)
- Discussion (20 min)

13:00- 14:00- Lunch

14:00-15:30- Session 3:

Traditional Milk Chain

Chairman: Dr. S. Galal, Reporter: M. Napoleone

- How Do We "See" And How Do We "Evaluate" The Informal Dairy Sector: Multi-Criteria Evaluation of the Informal Dairy Sector. G. Duteurtre (30 min)
- Hygienic Aspects of Milk Chain in Egypt from Producer to Consumer. H. Mansour (20 min)
- How to Approach Milk Quality? B. Faye (20 min)
- Discussion (20 min)

15:30-15:45- Break

15:45-17:00 - Session 4:

Historical and geographical perspective of dairy farming chain

Chairman: Dr. P. Lecomte, Reporter: S. Alsheikh

- Industrialization and Territorial Insertion of Dairy Producers-Territorial Approach of Dairy Chain. R. Poccard-Chapuis (20 min)
- Example of the History of Dairy Cooperatives in India (From Governmental Cooperative To NDDB and From NDDB To Present). S. Ranade (15 min)
- How to Develop Dairy Farmers' Association? (Ex: Cooperative New Zealand/Uruguay). V. Porcile (15 min)
- Discussion (20 min)

3 days 11, 12&13/6/2012): Training in the Field

Objective: learning in doing: learning interdisciplinary approaches through collective field work and develop a common expertise on the informal dairy sector in Cairo

3 Teams:

- Team 1: Ch. Corniaux, M. Napoleone, M. Wardani, T. Srairi, Ph. Lecomte, A. Elnahas
- Team 2: G. Duteurtre, B. Faye, P. Bonnet, Dr. Hussein Mansour, M. Elsorougui, I. Daoud, Abd El-Rahim A. Sahar
- Team 3: J-F. Tourrand, R. Poccard-Chappuis, Dr. Ranade, S. Alsheikh, V. Porcile, Hatem Hamdon
- Coordination team: V. Alary , S. Galal

Provisional program

Day	1st team	2nd team	3rd team
Monday 11 June 2012	Departure Maadi: 8:00 Menoufeya (Shanshour) - 2 farmers - 1 cooperative	Departure Maadi: 8:00 Giza: 2 farmers Dokki (at 2 pm.) Animal wealth Cooperative	Departure Maadi: 8:00 Shubra: 2 farmers 2 milk shops cheese processing unit cheese storing
Tuesday 12 June 2012	Departure Maadi: 8:00 Menoufeya (Shanshour): 1 collection point 1 collection centre 1 cheese processing unit	Departure Maadi: 8:00 Giza: 1 collection point 1 collection centre 1 cheese processing unit	Departure Maadi: 7:45 Ain Sham Univ.: 8:30 Kafr El-Sheikh (Delta): Experience of coop. (Dr. Hussein Mansour)
Wednesday 13 June 2012	Departure Maadi: 8:30 am 9:30-10:00 am: Juhayna 1:00 pm: CFI (Chamber of Food Industries)		

5th Day: Thursday 14 June: Planning Activities for DAIRY Project

9:00-11:00 – session group
Objective: development of research activities for each WP:

Three groups:
WP1- Historical and social context of the traditional dairy chains
WP2- Assessment of small dairy production system
WP3- The traditional dairy markets in Egypt

11:00-11:30- Break

11:30-13:00 – Restitution group 1 and 2

13:00-14:00- Lunch

14:00 - 15:00- Group WP3

15:00 - 16:30 – Finalize p**lanning activities for DAIRY Project and evaluation of this workshop**

ANNEX C- SCIENTIFIC PAPERS

DAIRY SECTOR IN EGYPT: PAST AND PRESENT DEVELOPMENT[1]

S. Galal

Faculty of Agriculture, Ain Shams University
sgalal@tedata.net.eg

SUMMARY

This paper presents trends of milk production and consumption in Egypt and of milking herd composition during the last half century or so. According to 2010 data, total raw milk production from buffalo and cattle was 5.6 million ton, 55% of which goes to commercial use while 45% to farm use. Number of milking animals, productivity of animals, and per capita consumption of milk and milk products have all been increasing during the study period. The latter increased by 34% during 1998-2007 period. While the contribution of buffalo to national milk production has been hovering around 50%, that of Baladi cows has been decreasing and that of exotics and their crosses has been on the increase. Ghee had had the highest share (in terms of liquid milk equivalent) among milk and milk products produced until 1991/92 where soft white cheese took over with an average share of 37% during 2001-2005.

***Keywords*: Species/genotypic composition, per capita share, Baladi, exotic, crosdsbred, trends**

INTRODUCTION

Egypt has had a long history of dairy culture that extends more than 4000 years ago. The cow was the most sacred of all Goddesses (Hathor) to ancient Egyptians. They used milk as fresh and processed into cheese, fat and fermented products which they used for nourishment as well as for medicines and toiletries. The word for ghee in Ancient Egypt is *Smy*, possibly the origin of the current word in Arabic '*samna*' (Khattab, 1986). The earth ware vessel used to settle milk and separate the cream from the curd in Ancient Egypt was very common in the recent past and is still in use in some parts in the country. Buffaloes were introduced by Arabs only in the 9th century.

Total annual milk production from cattle and buffaloes in 2010 was 2.9 million ton and 2.7 million ton, respectively. Total milk production from buffaloes and cattle in 2010 of 5.6 million ton (FAO, 2012) is nearly five times that in 1961 of 1.1 ton. Human population was 80 million in 2010 up from 29 million in 1961 (UNdata, 2012), i.e. production increased at a higher rate than the human population leading to increase per capita share from 55 kg in 1998 to 74 kg in 2007 (Central Agency for Public Mobilization and Statistics (CAMPAS) : Book of Statistics, 2008**)** .

The objective of this presentation is to give historical and present perspectives on milk production and products from buffalo and cattle and analyze the species composition of the national dairy herd.

Historical:
Road marks:

Significant development took place in the last 50-60 years that transformed the dairy industry from essentially cottage and small-scale industry to one that is a mix of that and large modern commercial outfits based mainly on Holstein and its crosses. The following is a sketch of the most significant of these developments (Eldemeiry, 2006):

9th century: introduction of the buffalo

1930's: importation of exotic dairy cattle breeds by the Ministry of Agriculture

1945: Establishment of Astra Company for the production of pasteurized milk

1952: Establishment of Sikklam Company for Dairy processing and Trade

1956: Establishment of Misr Dairy Company. This company played a pivotal role in the national dairy industry and the modern history of its history is quite linked to this company as will become clear later.

1961: Establishment of Elnasr for Dairy and Food Products

1968: Liquidation of Elnasr for Dairy and Food Products and its amalgamation with Misr Dairy which became the only public sector firm in the dairy industry. This took place during period the socialization of the national economy with the nationalization of most of major industries.

Last quarter of the 20th century: Liberalizing the economy, thus undoing the nationalization. This led the establishment of many private firms and the introduction of modern technology to the dairy industry , e.g. ultrafilteration, UHT, modern packing etc. , producing liquid milk, cheeses, fermented products, ice cream etc. This was accompanied by issuing regulations to cope with this trend and by mass importation of foreign dairy breeds.

Currently, Misr Dairy the once flagship of the industry is defunct and there are efforts to revive it.

At present there are some 300 firms in the dairy industry, the great majority of them belong to the private sector.

National lactating herd:

Number of lactating buffaloes and cows increased from 670,000 and 580,000, respectively in 1961 to 1,893,500 and 1,735,600, respectively in 2010 (FAO, 2012). Fig 1 shows the development of number of females over time and Fig 2 shows percentage of each species /genotype to the national 'lactating' herd (> 2 yr of age) based on sources of Ministry of Agriculture and Agrarian Reform (MoALR) statistics. The potentially lactating females (> 2yr of age) of buffalo , Baladi[1], exotic and crossbred changed by 10%, -6%, 40% and 210%, respectively. The increase in the exotics and crossbreds is understandable as they contribute to the increase of milk production at least in the short and medium run. However, the decrease in number the Baladi females and their proportional contribution to the national herd (Fig 2) could be alarming from the point of view of maintaining biodiversity and sustaining a valuable genetic resource. The word Baladi refers to all native cattle population making no distinction among different populations (breeds). There is no reason to think that cattle population belongs to one breed. There has been no serious effort to characterize the Baladi into different breeds (Galal, 2007) as has been with other species of livestock. Change in numbers of bulls (1993-2010) was 61% for buffalo, 35% for Baladi, 29% for exotic and 180% for crossbreds. Figures for the exotic and crossbred may not be accurate due to the use of AI.

Milk produced from different species/genotypes followed the same pattern as animal numbers (Fig 3). The following table shows that mean contribution of buffalos to the total buffalo-plus-cow milk reduced from 56% in 1995-2000 to 51% in 2000-2006 periods another significant changes is the doubling of the contribution of the exotics from the first to second period.

Period	Buffalo	Baladi	Exotic	Crossbred
1995-2000	0.56	0.18	0.06	0.19
2000-2006	0.51	0.17	0.12	0.21

Productivity:

FAO data (FAO, 2012) show that productivity has been increasing during the period 1961-2010 in both species (Fig 4). Average annual production per buffalo cow increased from 1136 kg to 1439 kg during that period, i.e. 27%. Corresponding figures for bovine cows are 674 kg, 1672 kg and 148%. The dramatic increase for bovine cows is due to the wider use of exotics and crossbreds beside improvements in the environment including vet care. The change for the buffaloes is mainly due to the latter. There is almost total lack of performance recording in the two species except in institutional herds and the pilot work carried out by the Egyptian Dairy Herd Improvement Unit (EDHIU) on a very limited number of animals (3681 buffaloes in 2010-2011, EDIHU, 2011).

Dairy products:

In a study covering fifteen years from 1985/86 to 1999/2000 (Food Science Department, Ain Shams University, 2003), the average per annual capita consumption of white cheese, hard plus processed cheese, ghee plus butter, ice cream, and liquid milk plus yoghourt in terms of kg milk equivalent was estimated at 30.8, 12.7, 29, 5 and 27, respectively. In that study the relative importance of ghee and butter was higher than that of white cheese until 1991/92 after that the latter became the more important throughout. Liquid milk and yoghurt consumption has more or less stable hovering around 27 kg per capita per annum. Table 1 shows similar trend in terms of product values (Egypt. pound).

CONCLUSION

Production of milk from both buffaloes and cows and their productivity are increasing, the latter at a rate higher than that increase rate of the human population, hence leading to increased per capita share of milk. The increase in productivity is mainly coming from the higher production of exotic cattle and

[1] Baladi literally means 'native'.

their crosses. The composition of the cattle population is tilting towards exotic genes at the expense of Baladi cattle. This should be a matter of concern in order to regulate the generation and use of crossbreds and limit the indiscriminate crossing.

REFERENCES

Central Agency for Public Mobilization and Statistics (CAMPAS) : Book of Statistics, 2008.

Egyptian Dairy Herd Improvement Unit (EDIHU), 2011. Egyptian Buffalo Herdbook. pp 247.

Eldemery, Fawzia I.M., 2003. Dairy Industry in Egypt in the Light of Some Current Economic Variables (in Arabic with English Summary). MSc. Thesis, Faculty of Agriculture, Ain Shams University. pp168.

Food Science Department, Ain Shams University, 2003. Sectoral Status for Food Industries in Egypt. pp 383.

FAOSTAT. 2012. http://faostat.fao.org/site/569/DesktopDefault.aspx?PageID=569#ancor. Accessed in May 2012.

Galal, Salah. 2007. Farm animal genetic resources in Egypt: Factsheet. Egypt. J. Anim. Prod.:44:1-23.

General Organization for Industry. (2001-2005)

Khattab, A.H., 1985.Livestock in Ancient Egypt (in Arabic). General Administration for Agri Culture. pp 224.

Ministry of Agriculture and Agrarian Reform, (1991 -2010). Livestock, Poultry and Fish Statistics, various issues. UNdata. http://data.un.org/Data.aspx?q=Egypt+population+&d= PopDiv&f=variableID%3a12%3bcrID%3a8 18 April 2012.

Table 1. Relative importance (value-wise) of dairy products processed by firms during 2001-2005

Product	Relative importance %
Pasteurization	16
Packaging	1
Ghee (samna)	5
White cheese (soft)	37
Cooling	negligible
Ice cream	12
Yogurt	11
Processed cheese	10
Hard cheese	8

Source: General Organization for Industry – Information Section (2001-2005)

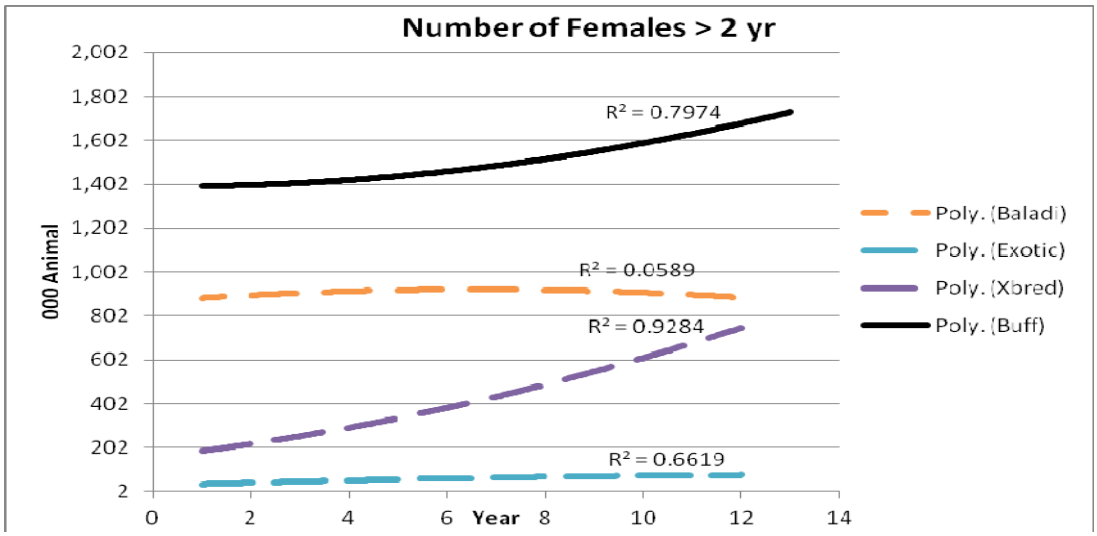


Fig 1. Number of females of different species/genotype (Source Ministry of Agriculture and Agrarian Reform (1991 -2010).

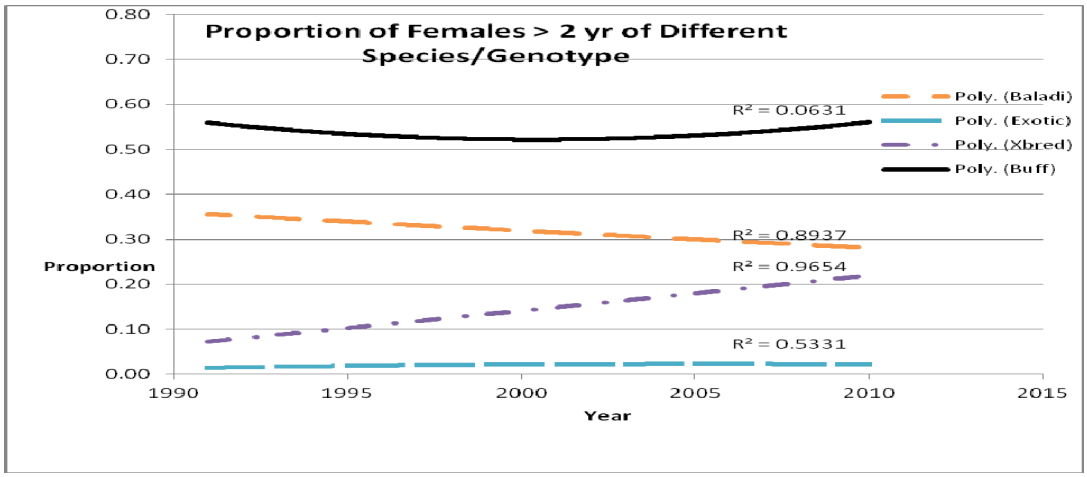


Fig 2. Proportion of Females > 2 yr of Different Species/Genotype

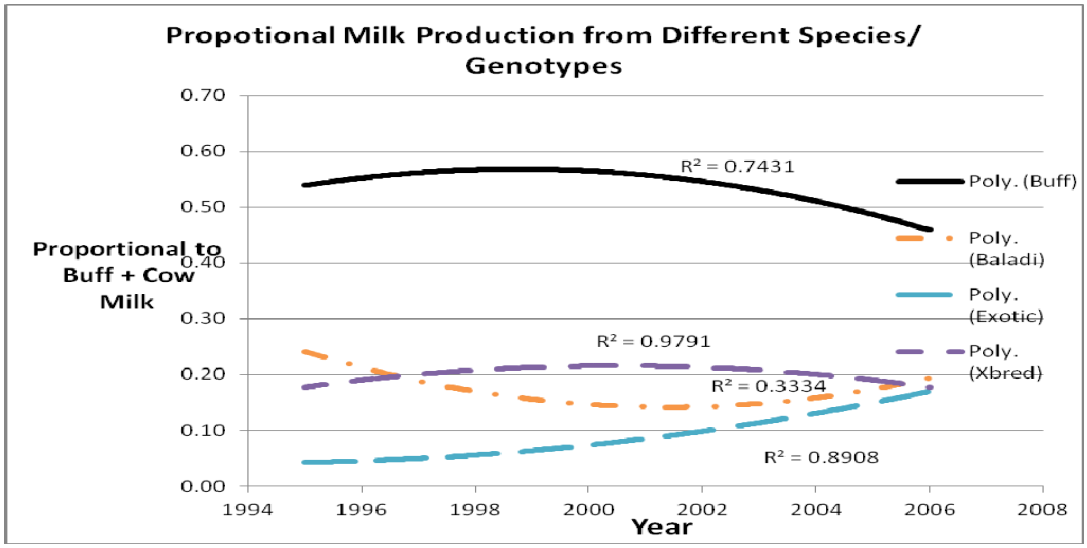


Fig 3. Proportion of Milk Production from Different Species/Genotype (Source: MALR) Livestock, Poultry and Fish Statistics)

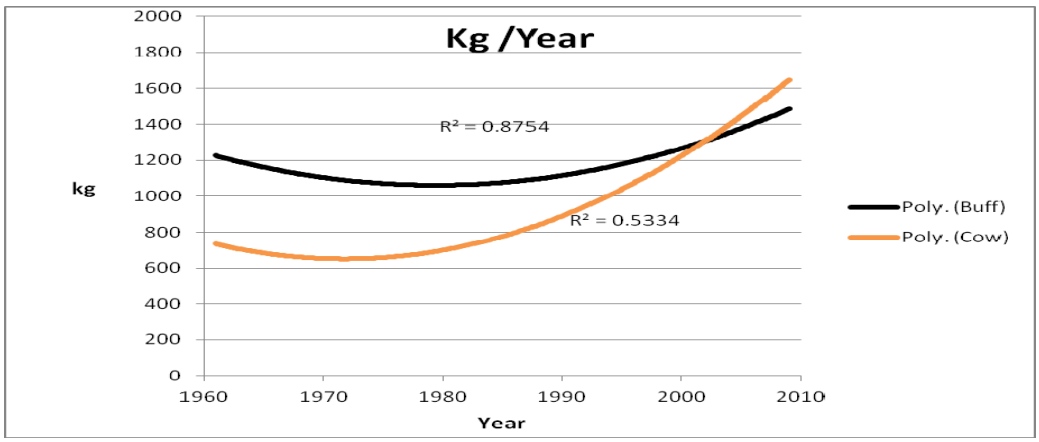


Fig 4. Kg milk per animal per annum (Source: FAO, 2012)

THE DAIRY CHAINS IN THE MAGHREB (ALGERIA, MOROCCO AND TUNISIA) COUNTRIES

M. T. Sraïri

Hassan II Agronomy and Veterinary Medicine Institute, Rabat, 10101, MOROCCO
Email: mt.srairi@iav.ac.ma

SUMMARY

The Maghreb countries (Algeria, Morocco and Tunisia) have experienced since the early 1950s a rapid demographic growth coupled to a significant increase in their rhythms of urbanization. This has led to a marked increase in the demand of animal products. In order to secure the supply, adapted policies have been implemented. They mainly consisted in the establishment of a dairy industry, based on the processing of either raw milk produced locally (in Morocco and Tunisia) or imported milk powder (in Algeria). These divergent options have had significant consequences on the whole organization of the dairy chains in these countries, from cattle rearing practices, to milk collection and processing. They have also implied differences in milk and its derivatives' prices and levels of consumption. The paper tries to draw a comparative analysis of milk chains within the three countries and emphasizes on the future challenges that will have to be addressed: a rising volatility of milk and other strategic inputs' prices (feed, machinery, cattle, etc.) in global markets, an improvement in consumers' awareness about milk quality, a further pressure on natural resources (mainly soils and water) to get more raw milk. The article also draws recommendations about specific issues related to dairy cattle production in the context of North Africa. These are mainly linked to the fragmented offer induced by numerous smallholder farms, which implies obvious difficulties to assess the hygienic and the chemical quality of milk batches delivered daily. Moreover, this fragmented offer also induces that specific support programs will have to be designed, as the vast majority of farms are not dairy specialized, expecting both milk and calf crop from their herds.

Keywords: Cattle, Fragmented offer, North Africa, Quality, Water productivity.

INTRODUCTION

Located in the Southern part of the Mediterranean, the Maghreb countries (Algeria, Morocco and Tunisia) face important challenges to supply food for their fast growing population. Though this region used to be recognized for its high potential of cereal grain production during the Roman Empire, it has become net importer of food and feed. Therefore, since the Independence of the three countries, policies have been implemented to secure the supply of food. In the particular field of animal products, measures have been undertaken to establish dairy chains to fulfill the needs. The aim of this paper is to draw a comparative analysis of the dairy policies that have been adopted in the three countries and to evaluate their effects on both cattle rearing performances, milk collection tools, dairy products' processing and the levels of consumption achieved in the region.

CONTEXT OF MILK PRODUCTION IN THE MAGHREB COUNTRIES

A rapid demographic expansion was expected in the region, since the early 1900's and therefore, the colonial authorities launched at that time a reflection on the necessary means to secure the supply of food. With the Independence era, the governments of the three countries had to implement sound policies to avoid food shortages. These policies had to deal with the critical point of critical water availability in the region, as it does not exceed an annual value of 1,000 cubic meters *per capita* (Table 1). In fact, the climate in the region is characterized by an important annual variability and with structural drought from May to October. Therefore, any dairy herd development plan has to ensure adapted feed production, particularly through irrigated fodder or imported concentrates. Another important development of the regional context of dairying is the moderate but steady increase in the Gross Domestic Product (GDP) *per capita*, which has risen respectively to 7,000, 4,600 and 8,000 US$ in Algeria, Morocco and Tunisia. This is leading to continuous changes in food consumption patterns, as dairy products' demand is increasing and consumers are looking for high value derivatives (i.e. yogurts, cheese, light products, etc.), particularly for urban classes with high incomes (Sraïri and Karbab, 2010).

DAIRY PERFORMANCES IN THE MAGHREB COUNTRIES

The domestic annual cattle milk output is increasing in the three countries, due to State

policies dedicated to support local production. Data related to the recent evolution (from year 2004 to 2008) in the Maghreb region of the milk output and the numbers of cows are reported in Figures 1 and 2. The total milk output of Morocco and Algeria are quite similar (1.7 million tons) whereas in Tunisia the milk output is around 1 million tons.

Data related to cattle number show that Morocco has the largest herd (some 1.5 million cows of different genetic merits) followed by Algeria (800,000 cows) and Tunisia (some 500,000 cows).

The previous data show that efforts have been made to increase dairy cattle productivity, particularly in the most favourable areas of the Maghreb countries: irrigated schemes and regions with sufficient annual rainfall (more than 400 mm). The agricultural authorities are trying to boost cattle milk yield through imports of specialised breeds from Europe and the US and the promotion of forage and feed additives.

The dairy farming sector is also characterized in the Maghreb countries by the heterogeneity of its genetic structure. In the three countries, three distinct groups of lactating cows may be identified:

1. cows of local breeds, with very limited lactation abilities (less than 600 kg of milk per year), but representing more than 50% of total numbers of cattle;
2. crossbred cows (local x imported strains) with a variable contribution to total numbers and with a diverse lactation genetic potential (from 2,000 to 4,000 kg per cow per year). In Morocco, this genetic group represents up to 35% of total cattle, whereas in Tunisia it represents less than 20%, as in Algeria it might represent some 40% of total animals;
3. purebred imported cows of specialized dairy strains, such as the Holstein, the Montbéliarde, the Tarentaise (France), etc. These are cows found in dairy specialized farms and even in smallholder units. This genetic group may represent 30% (Tunisia) to less than 10 to 15% (Algeria and Morocco) of total numbers. Their contribution to the overall milk output is however much higher, because of their better milk yield.

There are also marked interventions to assist farmers selling their milk output, by the promotion of milk collection centres. This is obvious in Morocco and Tunisia, where some 60% of total cattle milk amounts are collected through formal channels destined to industrial processors.

The question of raw milk prices and value chain is of primary importance to analyse milk production trends in the Maghreb countries. This issue is certainly the most difficult to address in Algeria, as domestic liquid milk output is in an unfair competition with massive imports of milk powder. Therefore, two different raw milk prices have to be considered: farm gate milk price and milk price from imported powder. The differential between these prices is a key element to take in account for the analysis of the Algerian dairy market. In fact, until the food crisis of 2007, farm gate cows' milk price was around 30 to 35 Dinars (almost 0.33 US $) whereas the price of milk from imported powder was around 25 Dinars (0.27 US $).

In Morocco, farm gate milk prices have not changed significantly during the last decade (Table 2). A complete liberalization of milk prices at farm level has occurred in 1992. This has created a situation in which dairy farmers feel that raw milk price has been quite unchanged, whereas milk price at consumption has steadily increased. As a consequence, there is an acute debate within the dairy chain on the value repartition.

In Tunisia, farm gate milk price has been steadily increasing since mid nineties after the government launched measures to improve milk collection. The latest milk price increase took place in February 2010, as it reached 0.58 Tunisian Dinar (DT) per liter (0.38 US $). Pasteurized milk price has also been increased at the same date, and it now averages 1.03 DT per liter (0.67 US $).

The issue of milk quality and its remuneration is also crucial whenever analyzing the dairy chains in the Maghreb. In fact, the official figures reveal that more than 80% of farms considered as dairy have only five cows or less. Hence, production systems are dominated by smallholders' farms, leading to a fragmented offer. Relatively small volumes of milk are delivered daily from numerous farms to intermediate co-operatives, which gather them before supplying the industrial process units. Therefore, the quality of individual batches can hardly be analyzed due to technical, economic and logistic limitations (Sraïri *et al*, 2009). In the vast majority of situations, milk payment to farmers is only based on quantities delivered. This implies that for the majority of smallholder farms who supply milk processors, there is no direct incentive to improve milk quality, as it won't be paid consequently.

DAIRY PROCESSING, IMPORTS AND CONSUMPTION LEVELS

To deal with the fragmented offer, an adapted milk collection policy had to be adopted. It is one of the success stories of the dairy chain in both Morocco and Tunisia, where more than 67% of the total milk output is transferred to dairy processors. In Algeria, due to the huge imports of dairy products, the collection of raw milk represents less than 15% of the output.

The milk processing sector in the Maghreb countries is heterogeneous. Many companies of different sizes are active and they deal with different raw matters (domestic raw milk or imported powder) to get different products. The existing data show that milk processing activity is largely dominated by a single product: drink milk, which is the most common form of dairy products in consumption habits (some 75% of total milk processed). This means that high value derivatives such as yogurts, cheeses and butter occupy narrow spaces in the total milk volumes processed, as they are considered too expensive by the majority of consumers.

The structure of the milk processing sector is different in the Maghreb countries. In Algeria, the milk processing sector gathers some 128 operators, of which 15 are State societies. Milk processors in Algeria mainly work with imported dehydrated milk. Though in minority, the State societies have the leadership in milk volumes

In Morocco, dairy processors mainly work with locally produced raw milk. It gathers 44 societies, classified in four main categories: *i*) private industrial sector (60% of total milk), *ii*) a structured co-operative (-20%), *iii*) 27 small co-operatives (15%), and *iv*) the informal sector, locally known as *mahlabate* (5%). The processing capacity exceeds 2 million tons, but only 1 million tons are effectively treated.

In Tunisia, milk processing activities are practiced by 37 societies: 10 which produce mainly drink milk (pasteurized and Ultra High Temperature), 7 which are specialized in yogurts and 20 which manufacture cheese. Drink milk represents more than 75% of total milk processed, whereas yogurts and cheeses only represent 13 and 8% of total volumes. The 4% remaining are converted to dried milk, particularly in periods of high production, used in case of milk shortage.Moreover, the processing sector has been supported by significant State incentives, through subsidies for milk refrigeration (0.03 US $ per litre), and through price controls (minimum producer price: 0.03 US $). In fact, as in Morocco, there are regularly periods of surplus milk production in comparison to demand. Therefore, many processors have to stop milk collection from farms, which create obvious difficulties for the industry. The Tunisian dairy processing market is experiencing a period of troubles, as many societies have financial problems. In fact the sector has evolved from self sufficiency to surplus.

The Maghreb region is one of the leading area in dairy products' imports worldwide. This is mainly due to Algeria, which imported as much as 859 million US $ of dairy products in 2010. During the same year, Morocco and Tunisia imported respectively 186.6 and 34.3 million US $ of dairy goods. The structure of the dairy imports shows that milk powder accounted in Algeria, during year 2010, for some 103,000 tons, whereas cheese and butter imports reached respectively 10,500 and 3,870 tons. In Morocco, imports are equally dominated by milk powder (30,300 tons) and butter (29,700 tons), whereas cheese only represents 11,200 tons. In Tunisia, imports mainly consist in milk powder (10,300 tons) followed by cheese (1,900 tons) and butter (1,400 tons). All together, the annual level of milk consumption in the Maghreb region varies from 112 kg of milk equivalent per capita in Algeria, to 105 in Tunisia and 60 in Morocco. This figure reveals an important variability according to the level of income and the social status of the households.

CONCLUSIONS

Because of the ongoing volatility in the prices of the main agricultural commodities (Thornton, 2010), it is expected that the supply of growing urban populations may represent serious problems for the Maghreb region. Dairy chains in these countries still face important challenges to be upgraded. They will have to deal in priority with a higher milk yield per cow coupled to sound water productivity (as dairy herds rely heavily on irrigated forage) to ensure the sustainability of the activity. Challenges also await the collection sector, as solutions will have to found to remunerate farmers according to milk quality. Finally, the dairy processing sector will have to adjust its milk payment to farmers, if it wants to guarantee the resilience of the dairy farms, in a context of soaring inputs' prices. Above all, the evolution of dairy products' demand will be a key factor which will pull the whole chains. Whenever it increases to reach international standards, it will certainly pull the dairy chains towards more performances: producing more with fewer inputs by the implementation of original support programs, from farmers to milk collection operators and dairy processors.

REFERENCES

Sraïri M.T., **A.** Karbab, 2010. Consommation de lait et produits laitiers dans la ville de Rabat (Maroc) : effets des facteurs socio-économiques. Tropicultura. 28: 211-216.

Sraïri M.T., H. Benhouda, M. Kuper, P.-Y. Le Gal, 2009. Effect of cattle management practices on raw milk quality on farms operating in a two stage dairy chain. Tropical Animal Health and Production. 41: 259-272.

Thornton P.K. 2010. Livestock production: recent trends future. Philosophical Transactions of the Royal Society (B), 365: 2853-2867.

Table 1. Key figures of the Maghreb countries

	Algeria	**Morocco**	**Tunisia**
Country area (10^3 ha)	238,174	71,085	16,215
Agricultural area (10^3 ha)	8,459	9,232	5,045
Irrigated area (10^3 ha)	907	1,454	345
Water availability (cubic meter/year *per capita*)	478	971	482
Population 2010 (‘000)	34,895	31,993	10,323
Urban population (%)	63	55	65
Life expectancy (years)	72	73	75
GDP *per capita* PPP (2011)	7,000	4,600	8,000

Source: The World Bank, 2012

Table 2. Farm gate and consumption milk prices’ evolution in Morocco

Year	**Farm gate milk price (1)**	**Milk price at consumption (2)**	**(1) / (2)**
	(In Moroccan Dirhams) / (US $)		**(%)**
1995	2.94 (0.33)	5.00 (0.55)	58.8
2000	2.94 (0.33)	5.40 (0.60)	54.4
2005	2.94 (0.33)	6.20 (0.69)	47.4
2010	3.00 (0.33)	6.40 (0.71)	46.9

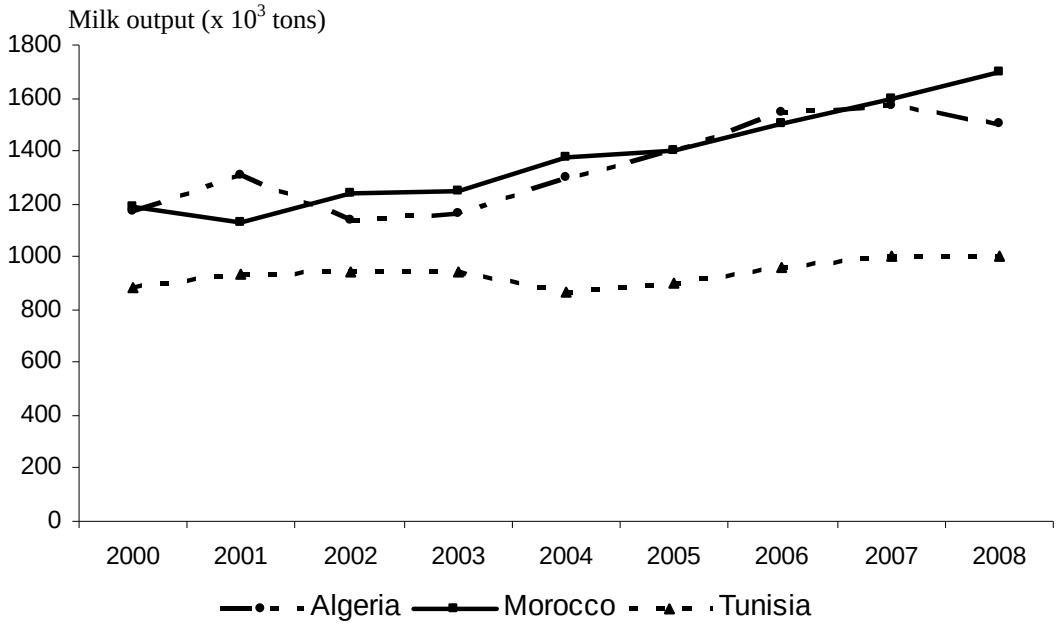


Figure 1. Raw cattle milk output in the Maghreb countries (from FAO STAT)

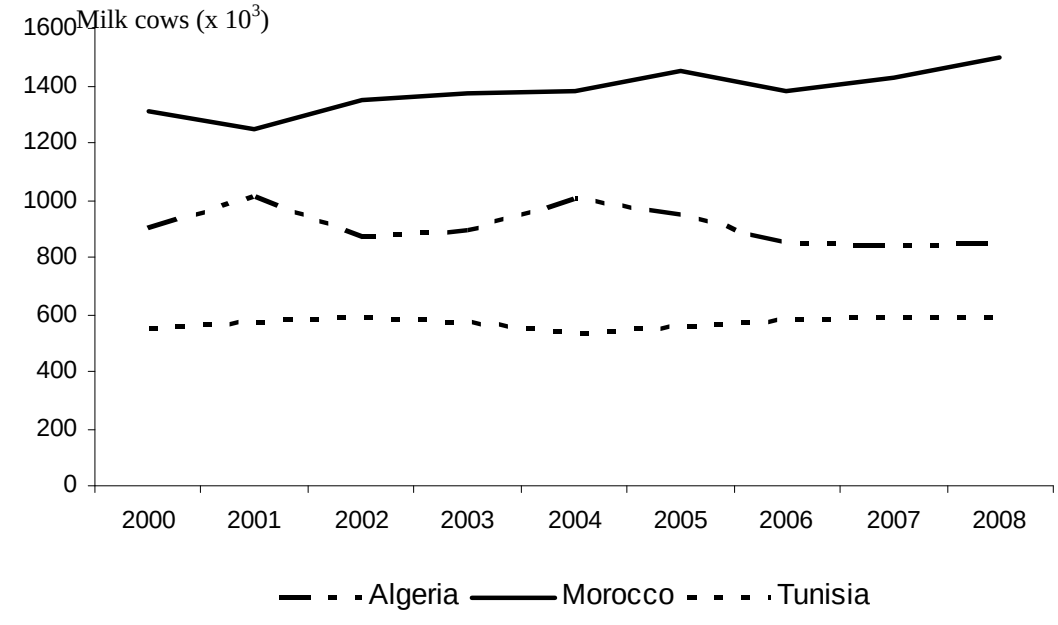


Figure 2. Dairy cows numbers in the Maghreb countries

INTEREST OF LIVESTOCK FARMING SYSTEM DIVERSITY IN MANAGING THE SEASONAL NATURE OF MILKCOLLECTION: CASE OF A GOAT DAIRY COOPERATIVE IN THE SOUTH EAST OF FRANCE

M. Napoleone

INRA SAD- UMR SELMET – SUPAGRO – 2 place Viala – 34060 Montpellier Cédex 1- France
Mail : martine.napoleone@supagro.inra.fr

SUMMARY

The purpose of this paper is to deal with adjustment between deliveries and sales concerning a seasonal product. The example concernsa cooperativeprocessing goat's milk. We show that diversity concerning production systems is positive. Complementary solutions adapted to each system can enforce the adjustment between deliveries and sales. Organising this complementarity suggests continuous compromisebetween collective and individual levels.

Keywords: Goat production, deliveries, seasonal product, collective and individual learning

INTRODUCTION

Managing the distribution of the volume collected during the year is an important issue for dairies, for the best possible adjustment of supplies and sales. Milkdelivery is seasonal, whereas sales of milk or cheese are not very seasonal. Managing upstream-downstream adjustmentspresents dairies with great difficulties, in particular for dairies which sell fresh milk or young cheeses made with raw milk.

In this article we explore the interest of developing production system diversity, for the better management of the seasonal variation of milk deliveries.

Basing our studies on work by agronomists and livestock system scientists (Landais, 1987; Girard, 1999, Bellon *et al.*, 1999, Hubert *et al.*, 1993, Napoléone, 1994, Aubry, 2000, Le Gal *et al.*, 2010), we show that there is a diversity of practices and operating methods in the collection area, and that the practices of livestock farmers can be placed in relation with the distribution of their herd production.

We will then show that these various livestock systems can contribute to different deliveries segments, and that complementarities can be identified. In this, weconcur with management science work relating to the planning of supply via the assembly of various production systems (Le Bail, 2002, Lorino P, 1991; Soler *et al.*, 1995).

The approach presented hereshould be adaptable to other situations. Work by the Dairy workshop will make it possible to see whether this kind of approach is relevant to the Egyptian context, andthe adaptations which would have to be made to respond to the challenges specific to milk collection in Egypt, and more particularly in the intra and peri-urban areasaround Cairo.

METHOD

Characterising the milk collection:

- Characterising the distribution of deliveries, from information filed by the cooperative.
- Comprehensive interviews with the people in charge of the cooperative.

Understanding the diversity of livestock systems.

- Characterisation of the *distribution of milk production* from the farmer's notes (milk collected every two days). The whole of the milk produced is delivered to the dairy. *Delivered milk thus corresponds to herd milk.*
- Characterisation of the *management of the herd of each farmer in the cooperative*[1] *surveyed by expert opinion* with technicians (feed: the way the farmer mobilizes his resources throughout the year to manage feed (grazing and feed in the goat house); management of reproduction (periods, batching…)
- Characterisation of the *diversity of management methods* by comparing the diversity of milk productionprofiles and the organisation of herd management, and *production of situated knowledge*, on links between the management of herd

[1]In the case of dairies withnot many members, the surveys are carried out directly with the farmers

management and the distribution of production.

- Comprehensive discussions with a sample of livestock farmers on the one hand to validate the types and understand the logic underlying the described organisation methods, and on the other hand to look further into the situated knowledge by comparingit with the knowledge and observations of the livestock farmers.

Analysis of the complementarities between livestock farms with respect to collection:

- Characterisation of the *contribution to thedeliveries* of each type of livestock farm.
- Identification with the players of the *complementarities and paths of action* to be considered from both the individual andcollective points of view

SITUATION STUDIED

This work was carried out with several dairy cooperatives in the South of France. All of this work gives the same types of results, whatever the size of the cooperative.

Here we will take the example of a goat dairy cooperative collecting milk from 110 goat farmers. Various types of cheeses are made and sold in the mass distribution networks. Part of the production is processed into a local'terroir'productunder a sign of quality (AOP Picodon). This AOP cheese is made from raw milk andhas a short maturing time (13 days). *To produce AOP cheeses, the dairy must therefore****manage in almost real time the adjustment between the deliverie and the supply***.

However, the milk deliverie is 4 times greater in autumn than in spring. In France, the births of kids are seasonal. The natural season is at the end of winter. So in autumn the herds are at the end of lactation or dried off. In an attempt to increase the autumn deliveries, since the 1990s, dairies have encouraged producers to modify their practices to produce milk in winter:

- Setting up a price grid in favour of winter milk (by thedairy inter-profession)
- Advice to livestock farmers directed towards the diffusion of a model enabling off-season production to take place (hormonal treatment to trigger off-season oestrus, support of feed in the goat house), selection of animals to increase productivity, and thus make feed distributions in the goat houseprofitable.

RESULTS

The deliveries:

A considerably extended slack period:

The impact of the incentive measures resulted in: (figure 1).

-Annual supplies which increased.

- The ratio of volumes delivered between the lowest month and the highest month did not vary.
- The period of under supply shifted towards the summer and widened considerably. It went from November-December to a period extending from August to December.

The question to be askedfor the management of the seasonal variation of collection must be reformulated:

The widening of the slack period modifies the way of reasoning the question to be answered and the types of technical actions. In 10 years, the question has gone from "how to increase the deliveries in November - December", to "how to increase the deliveries between August and December". Off-season breeding can no longer constitute the principal path of technical action. To increase the deliveries between August and December, it is necessary to combine the contributions of herdsusing in-season kidding (traditional model) with that of herds using off-season kidding (figure 2).

15 % of herds delivering to the cooperative have off-season kiddings for the entire herd. 40% of the herds have just a few goats kidding in autumn and the rest of the herd in the spring. 45% of the herds have kiddings in the natural season.

Understanding diversity to specify the means of actions:

Five types of delivery profiles (therefore of herd production) were identified (figure 3), then placed in relation withfeed and reproduction practices, from a calendar base (Napoléone, 1994).

It can be noted that only a low minority of production profiles corresponds to the zootechnical benchmark model, in which the production peak ranges between 30 and 45 days and persistence is 92%. Model which was developed in contexts of livestock farming far removed from the studied situation.

For each type of delivery profiles, links can be established between profiles of herd production - or of delivery - and the design of

the feed system (grazed and distributed), (table 1).

Complementarities with regard to the deliveries:

By compiling the milk production of farmers using the same type of reproduction (in season or off-season), and if we carry over the volume collected onto the collection of the dairy, we note that:

- At the beginning of the slack period (August-September) the collection relies primarily on deliveries from traditional farms,
- But in autumn, the collection relies on the off-season herds (figure 4).

Both types of livestock farming systems are indispensable to manage the collection between August and December.

Specific paths of action:

In each situation the means of action to be considered will be specific.

In the case of farms with seasonal kidding, to reinforce their deliveries in summer, the persistence of lactation must be maintained until the end of lactation. For this, the most important issue will be to maintain the quality of the grassland during the summer (dry period in France). The paths of action therefore rely on the management of the grazed resource, on theway of organising over time this diversity of grazing to sustain the milk.

In the case of off-season livestock systems, to reinforce their deliveries in autumn, the issue relates to triggering lactation. In the winter period during which the animals remain in the goat house, the technical paths of action will relate to the quality of zero-grazing to make a success of the start of lactation, and the control of off-seasonreproduction.

DISCUSSION

Evolution in the way of qualifying diversity, of assessing the production systems :

Extending the critical period has changed the way of qualifying farms, within the cooperative.

When it was a question of producing in November December, the essential technical solution was off-season breeding, since it is a period when herds using spring kiddings do not deliver any more milk. The autumn kiddings, a sign of modernity, were placed in opposition to spring births, carrying the weight of the traditional image, even the image of the past. This vision of the world puts systems in opposition with each other, qualifying them on performance and thus reduces the possibilities of co-operation between them and within a collection area. In this logic, technical advice is mainly directed towards an evolution of the so-called traditionalsystems towards systems perceived as being modern, more especially as the price grid can allow it to be thought that it is economically interesting to make milk in autumn.

At the present time, it is a question of making milk between August and December. Off-season breeding can no longer represent the only technical solution. Developing complementarities between systems is becoming a means of regulating seasonal variation. Other criteria for the appreciation of technical systems are appearing. These new criteria change the collective perception of farmer practices, of farms, as well as the relationships between the types of farm. Spring kiddings, perceived as backward-looking in a logic directed towards the productivity of individuals in the herd, is once again becoming socially acceptable, since they can be legitimised in relation to a “higher” interest, i.e. that of supply for the cooperative. This evolution in the meaning of practices renews exchanges between the producers and the technical methods ofadvice to farms.

From compromise towards the emergence of collective action:

Managing coordination over time … to facilitate the collective action:

We consider that we are dealing with processes in progress, individual and collective, which evolve in a context of relative uncertainty. If we regard the cooperative as a collective player, then managing the seasonal variation of production amounts to setting up a structure facilitating coordination, i.e. of the identification of the possibilities of arrangement between various activities with a given aim. Identification of the complementarities faced with a collective question, leads to identifying the assets and the roles of each one. To stabilise the collection, a true strategy of assembly, based on the characteristics and complementarities of the production systems is in question.We are close here to theorganisation strategies of collection areas described by M. Le Bail on the production of durum wheat (M. Le Bail, 2001). Various types of agreement can be imagined according to the methods of organising production, making it possible tothink carefully about the herd management system to be adapted. We are thus seeing new compositions and mutual recognition between the various production methods.

Such a dynamic of change will probably not come about spontaneously. The livestock

farmer must be able to place himself within the collective, identify his own assets, have a clear vision of collective concerns, think that he has a role to play, at his own level, and that this role has a recognized status. It is a question here of creating a context of work, comprehension and co-operation between people with objectives, therefore different daily concerns. The people responsible for the collective structure who must do their best tomanage global assets, taking the markets into account, the livestock farmers who must do their best to manage the organisation of their farmactivities, and the adviser who does his best to identify technical messages, taking into account his perceptions of individual and collective concerns. The group must therefore be able to manage the interaction between global supplies and individual deliveries.This involves the design of a mechanism of coordination between individual and collective and a process of dual training. However, several authors have shown that to encourage initiative, the intelligibility by all concerned of the situation has to be increased, and so the representations that the various partners concerned have with each other have to be extended (March 1981, Albaladéjo and Casabiance 1995; Capilon and Valceschini 1998). Various means are probably possible for the foundation oflegibility and collaboration between the individual and the collective. We can think that the representation of the evolution of the collection, confronted with the representations of the delivery dynamics of the farms, is one of these means and a tool of analysis and negotiation between the collective and the individual.

The solutions to create this context of co-operation and organisational training belong to the structure. The research work does not aim at producing turn-key solutions whose appropriation we all know is hypothetical. It only claims to contribute to bringing methods and means to makea situationmore easily legibleenabling the partners to invent their own solutions.

REFERENCES

Aubry, C., 2000. La modélisation de la gestion de production dans l'exploitation agricole, Revue Française de Gestion, pages 32-46

Albaladejo C., et F. Casabianca, 1995. Une condition préalable à la participation : modifier les représentations des agriculteurs, Cahier de la Recherche-Développement, N° 41.

Bellon S., N. Girard and G. Guérin, 1999. Caractériser les saisons pratiques pour comprendre l'organisation d'une campagne de pâturage, Fourrage 158, 115-132.

Capillon A. and E. Valceschini, 1998. La coordination entre exploitations agricoles et entreprises agro-alimentaires, Etudes et Recherches sur les Systèmes Agraires, N°31 : 259-275.

Girard N., 1999 Formalising categories of farms in learning situations.An experience in building a typology of land use in sheep farming.In Com up e tree.Science Update inraédition.pages 253-270.

Hubert B., N. Girard, J. Lasseur and S. Bellon, 1993.Les systèmes d'élevage ovins préalpins – Derrière les pratiques, des conceptions modélisables.Pratiques d'élevages extensifs- Etude et recherche N°27 Ed. Landais et Balent, INRA pages 351- 385.

Landais E., 1987 Recherche sur les systèmes d'élevage Questions et perspectives. INRA 73 pages

Le Bail M.2002.Le bassin d'approvisionnement : territoire de la gestion agronomique de la qualité des productions végétales in : Agronomes et territoires. EdL'Harmattan, pages 211-227.

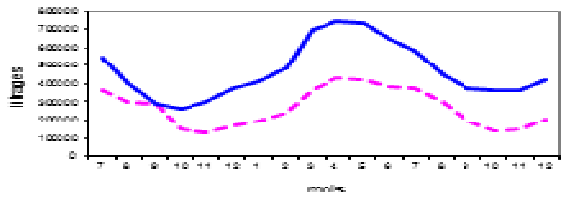
Le Gal P.-Y., A. Merot, C.-H. Moulin, M. Navarrete and J. Wery, 2010. A modelling framework to support farmers in designing agricultural production systems. Environmental Modelling & Software, 25 (2): 258–268.

Lorino P., 1991. Le contrôle de gestion stratégique. La gestion par les activités. Ed Dumod , Paris, 213 pages

March J.G., 1981. Réflexion sur le changement dans les organisations. Administrative Science Quaterly N°26

Napoléone M., 1994. Functioning of pastoral goat farms. Méthodological contribution of a reseach and development group. In: Brossier J., de Bonneval L., Landais E., (eds) Systems studies in agricultural and rural development, pp. 191- 196.

Soler L.G, H. Tanguy and E. Valceschini, 1995.Problèmes de planification, systèmes de gestion et organisation interne de la firme. Cahier d'économie et sociologie rurale N° 37 Pages 202-225



Evolution of the slack period for the delivery from November-December towards August to December

Figure 1: Evolution of the milk delivery at an interval of 10 years

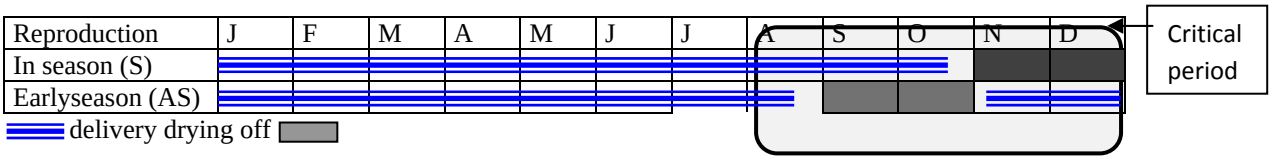
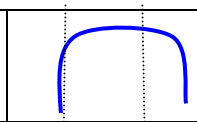
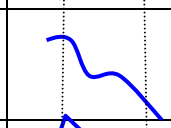
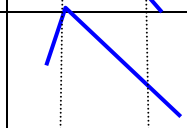
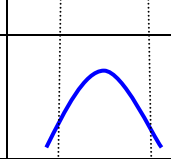
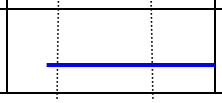


Figure 2: Delivery periods according to kidding periods.

Types ofproduction – deliveryprofiles identified
Case of herds with seasonal kidding
N = 79 herds

«Plateau » n = 19		1 plateau lasting more than 5 months. Rapid drop at end of plateau
« Sequences » n = 17		Succession of contrastingsequences
« Peak-drop » n=12		Production peak at 1month Peak maintained for 1 to 2 months Drop accentuated until drying off (+ 13%/month)
"Bell" *n=6*		Spread start of lactation Maintenance of production 3 to 4 months Spread end of lactation
"Flat" n = 25		Flat profile – verylowlevel

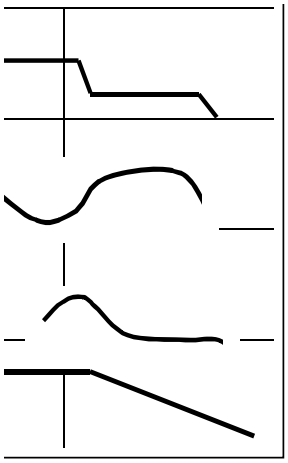


Figure 3.

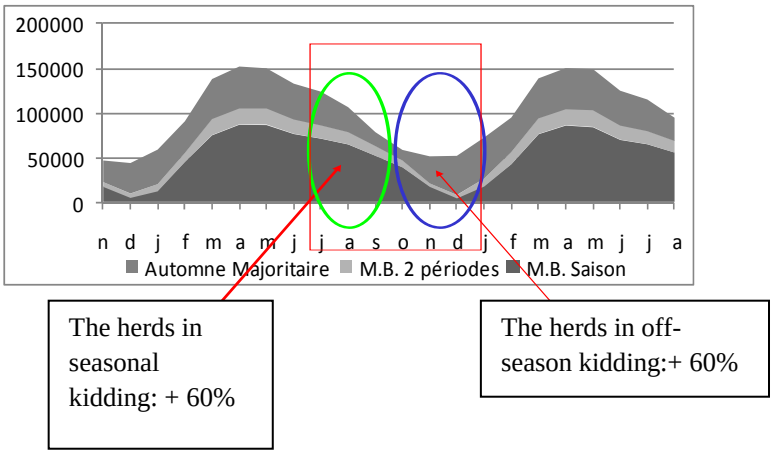
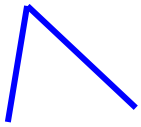


Figure 4: contribution to the collection of types of livestock farms

Table 1. Links between forms of delivery and feeding practices.

Distribution of the herd milk production		Link with the feeding calendar (grazing and goat house)
Plateau		*Regular feeding*:grazing on forage areas and rangelands combined in time so as to maintain regularity in the grazed ration. Good interaction with feed distributed in the goathouse. The end of plateau date marks a change in the feed or the end of lactation if it is the end of the summer.
Sequences		*Feeding and grazing calendar* seasonal or presenting abrupt feed changes in quantity and quality, at certain times of the year. The production curve marks these moments of feeding change. The analysis of production sequences informs about the feeding sequences.
Peak-drop		*"Extensive" management of the herd on rangelands*. The herd grazes freely on wooded areas and rangelands. The production presents a lactation peak in the middle of spring when natural grasses are produced, but decreases very quickly with the advance of the dry period. The persistence of herd lactation is about 80%.
Regular slope		*Management of feed adjusted on the evolution of the nutritional needs of the animals* ,taking the physiological stage into account.

HOW DO WE "SEE" AND HOW DO WE "EVALUATE" THE "TRADITIONAL" DAIRY SECTOR? A SYSTEMIC APPROACH OF DAIRY CHAIN

G. Duteurtre

CIRAD, UMR "Selmet", Vietnam, On secondment to RUDEC/IPSARD, Hanoi (duteurtre@cirad.fr)

SUMMARY

In Africa and Mediterranean countries, dairy chains are undergoing a very rapid structural transformation. Because of the important role of "traditional milk chains" in providing employment to poor households and products of specific quality to consumers, it is important to analyze those chains in a comprehensive manner. The "PAPI" framework proposes a systemic approach to those dairy chains based on various multi-disciplinary experiences. The PAPI acronym stands for "Products", "Actors", Performances" and "Institutions" that constitute the 4 dimensions of the framework. Various tools are proposed to conduct local studies including each of those dimensions.

Keywords: Value chains, dairy development, tradition, institutions

INTRODUCTION

The dairy sector is changing very rapidly in most developing and emerging countries, in response to a fast-growing demand in the urban centers. New processing industries and industrial farms, in particular, are set up in many places by private entrepreneurs, international firms or government bodies in order to take advantage of this expanding market. This global structural transformation creates many opportunities for modernizing agriculture and for boosting the industrialization of the agro-food sector. However, it raises serious concerns about the social and environmental sustainability of the future dairy chains. In many countries, the small-holder enterprises involved in the traditional (or "informal") dairy sector, which play a major role in providing income to poor households as well as cheap dairy products to consumers, might progressively lose their market shares to the benefit of the new industrial corporations. And the intensive production techniques culminating in the "mega-farms" model is not yet proven to be able to manage simultaneously economic, social and environmental challenges of the local territories (Grain, 2011).

This structural transformation of dairy value chains is particularly accurate in the whole Mediterranean region. In this area, the dairy chains are characterized by a significant economic and cultural importance of traditional dairy products, in particular fermented milks, cheeses and butter. But those chains are changing very rapidly: smallholder dairy farms become more and more intensified; new specialized production structures are emerging; processing and marketing enterprises are blooming, importations of standardized dairy products are increasing; and the modes of consumption are undergoing deep transformations (Hassainya *et al*., 2006). In Egypt, for example the dairy chain has entered a historical "turning point" (Soliman, 2006).

This requires renewed approaches focused on understanding more deeply how marketing chains are evolving. In particular, we suggest that we need to better understand the "traditional" dairy chains, and their evolutions in the context of the rapid industrialization and liberalization of the dairy sector (Duteurtre, 2007). This brings to raising the following questions: "In what extend do the enterprises of the "traditional sector" compete with the industries?" or "do they benefit, alongside with the industrialization, from the current development process?

The paper focuses on elements brought by a set of approaches focusing on analyzing the "dairy chains" in a systemic manner. This refers in particular to several works conducted in the framework of the "filière" approach (Duteurtre, *et al*., 2000), but also to some other tools provided by the "commodity chains", "marketing chains", "supply chains", and "value chains" approaches (Moustier, 2011). In addition, reference will be made to specific contributions provided by various works on the quality of traditional dairy products (Duteurtre, 2003, 2004) and on institutions, history and sociology of the African milk sector (Hassainya *et al*., 2006; Duteurtre, 2007; Duteurtre et Koussou, 2007; Koussou *et al*., 2007).

DEFINING THE "TRADITIONAL" DAIRY CHAINS

Analyzing the "traditional" dairy chains requires primarily to defining what we mean by "traditional". In the literature, the concept is

not very often used, and the authors rather refer to “informal” (by opposition to “formal”). We must be aware, however, that the concept of “informal” refers to a negative evaluation of the associate economic system. “*The "informal sector" is treated with disdain by the elites. Produce is called "unhygienic" or of "poor quality", and the system is labelled "inefficient". Some decry it for not contributing taxes. But the truth is that people's milk thrives in many countries. Small farmers, pastoralists and landless peasants are showing that they can produce enough milk to satisfy people's needs, and small vendors and processors have little trouble getting the milk and other dairy products safely to markets. The "unorganised sector" can do things just fine without the big players when they are not undercut by dumped surplus milk from elsewhere or persecuted by unfair regulations*” (Grain, 2011). To avoid this, some South-American authors propose to use the concept of “popular milk” (*leche popular*) to qualify those value chains that involve a lot of poor families (producers, collectors, processors and even consumers).

We propose to rather refer to the concept of “traditional chains” as proposed in the DAIRY Project. But how shall we define a “traditional chain”? First of all, the “traditional” sector is defined by “what it is not”! By opposition to the “modern” sector, the “traditional” chain involves all the “non-modern” enterprises. In that sense, all enterprises or actors that are not “modern” will be qualified as “traditional”: smallholder dairy farmers, rural housewives processing and selling their products, bicycle or motorbike collectors, small-scale processors, street venders, etc. are the major actors of those “traditional” chains.

But tradition has a more specific meaning. It might be viewed as a transfer of a cultural content throughout time. As stated in Wikipedia, “Tradition is a ritual, a belief, an object passed down within a society, still maintained in the present, with origins in the past”. The word comes from the Latin roots *trans* (through) and *dare* (to give). The tradition must thus be viewed as a cultural heritage that constitutes a part of the identity of a given community.

In we consider the dairy traditions in African or Mediterranean countries, we might identify as part of a cultural heritage at least the 4 following features (Duteurtre, 2009):

- **Knowledge on production, handling, and processing of milk products**. Those include knowledge on local breeds and genetics, knowledge on pastoral resources, on herd management, on animal care, on processing different types of fermented milks, concentrated milks, cheeses, butter or clarified butter, etc.
- **Knowledge on consumption of milk and milk products**. This knowledge is mainly domestic, and refers to different cooking recipes, dangers and benefits for health, uses for special feasts, non-food use (cosmetic butter, butter-fat for unguent, etc.).
- **Proverbs, songs and literature** on milk and dairy products
- **Celebrations and festivals** related to dairy products, or in which dairy products play a particular role, such as the oromo festival of Irreechaa in Ethiopia were butter offertings are presented at the basis of sacred trees;
- **Economic organisations and institutions** related to the exchanges of dairy products:

Those cultural heritages are wide in most of the Mediterranean and African countries. They refer mainly to “pastoral and agro-pastoral” societies, to particular ethnic groups that may be mobile herders or sedentary populations: Fulani, Arabs, Touareg, Bambara, Wolof, Serer, etc. Among those groups, the cow might have a particular role but it might be also the camel, the goat, or even the sheep.

In that perspective, the “traditional dairy chains” involve actors, products and rules that come from a heritage of different communities (Duteurtre, 2009). Those communities developed through time specific culture, knowledge, and know-how, as well as social and economic organisation about milk and dairy products that shape the current “traditional dairy chains”.

To understand the transformation of those chains embodied in the social and cultural rules, we propose the following approach, which is to address one by one:

- Products (P) and techniques,
- Actors (A) and their strategies,
- Performances (P) of the actors and of the whole chain;
- Institutions (I), which define the *collective rules* of the value chain.

THE “PAPI” FRAMEWORK: SYSTEMS APPROACH TO DAIRY CHAINS

A large set of methods and tools have been used to address informal value chains in a systemic manner. We propose to integrate some of them into the following framework (Table 1).

Describing the products and techniques

This first dimension refers to understanding the diversity of products and techniques used in the chain. Local nomenclatures, know-how, practices, objects used for milking, processing,

transportation, selling and consumption, might be described carefully. We might in particular identify locally specific products, specific resources used to produce them (pastures, breeds, natural yeasts, etc.), and identify scientific knowledge on those specific products. The expressions of "Farm products" "typical products", "local products", "ethnic products" or "small-scale processing products" may be used to differentiate them from "modern" and standardized" products. Attention may be given to official standards and regulations that often omit to describe or to name those products very carefully. Cheating practices (watering milk, adding powder, adding other additives, etc.) might also be studied carefully.

Technical processes and chains might be described through diagrams (see annex 1 as an example)

We might classify those products into 4 groups (or products families) (FAO, 1990):

- Fresh milks
- Fermented milks
- Butter and butteroils
- Cheeses
- Other milk-based products (sweets, ice-creams, soap, etc.)

Those groups of products are quite important in their diversity. Regarding for exemple the group of "non-fermented" liquid milks, shall we talk about "fresh" milk? Or "raw" milk? Or "pure" milk? The English (or French) vocabulary is often much more limited than local languages to qualify "milk". In Chad, there are at least two different words to talk about fresh milk: *Laban* refers to the « freshly milked » milk, and *halib* refers to the milk that will be sold. In South Burkina-Faso, according to the Fulani language spoken in this area, the freshly milked milk (*biraddam*) (from the Fulani radical *bir*, to milk) is gathered into the *birdugal*, an appropriate container made from calabash. It is then poured into a bigger calabash (*jaandé*) that gathers milk from several different cows, and is the heated. After filtration, the milk to be drunk (*t'obbam*) is separated from the milk to be sold (*sippété*) and from the milk to be left for fermentation (*hittuddam*). The milk to be fermented (*hittuddam*) in then poured into the fermentation calabash (*hitturdé*) until the day after. Over the night, the milk becomes soft fermented milk (*lèl d'an*) and later on acid fermented milk (*t'anidda*). This milk will then be creamed to obtain a skimmed fermented milk (*Kossam*).

What are the actors, their identities and their strategies?

The high diversity of actors involved in the traditional value chains requires particular attention. Different types of producers include those who process their dairy products themselves, and those who sell collection milk. This difference has strong consequences on their strategies. The traditional chains also involve actors specialized in dairying, and other who tackle a more diversified set of activities. In order to understand this diversity, it is important to listen to individual backgrounds, knowledges and individual trajectories. It is also important to refer to the capital endowment, and to the objectives of each individual enterprise in order to understand their logics and their rationales. This dimension might be tackled by individual monographs and quantitative surveys leading to comprehensive typologies.

What are the performances of those actors?

The broad literature on marketing chains and value chains focuses on the economic dimension of the chains performances. Even if this dimension might be considered as the main important dimension for the value chains, we have also to recognize that in the context of the "sustainable development" corpus, evaluation of dairy chains need to be conducted in regards to other indicators of "sustainability"[1]. This means to be able to take into account the social and environmental components of the sustainability, at different scales (Sraïri, 2011).

In that respect, in addition to accountability evaluation, and added value calculation, it might be useful to evaluate the different actors and the whole traditional chain in respect to their contribution to social equity, to environment conservation, and to sanitary risks management.

Institutions in the traditional milk chains

The last dimension we propose to tackle is the "institutional" dimension of the value chains. We understand economic life as "social process", and institutions as "a collective action in control, liberation and expansion of individual action" (Commons, 1931, cit. in Duteurtre, 2011)

This dimension refers to identifying and understanding rules for accessing resources (such as pastures) and capital, professional organizations, vertical contracts, price mechanisms and market organization, beliefs, common knowledge and conventions, public regulations on trade, quality or taxation, and public-private relationships.

[1] As stated in the CIRAD 2012 Strategic vision (p. 10), « *La notion de performance appliquée à l'activité agricole est à reformuler pour tenir compte des services et des nuisances, écologiques et sociaux, induits par l'activité à différentes échelles*.»

To study those, the following tools might be usefull: Interviews with actors, private and public stakeholders; historical diagnosis of individuals, institutions and of the whole chain; analysis of the modes of governance (legislative, executive and judiciary), and modelling of the whole chain.

CONCLUSION

What is the reality behind the diversity of traditional dairy chains? Why do we see some of them as “traditional”, or “informal” dairy sector? Why do we want to “improve” or “upgrade” those value chains? Those questions need careful attention, because they refer to the way we “see” the reality and to the way we “evaluate” it.

Cultures and dairy traditions appear today to be fast moving, changing. The milk is thus part of a new vision of modernity. But local dairy cultures are not apart of this movement. Better, they enrich and integrate it. We are thus witnessing the reinvention of a "local modernity" (Duteurtre, 2009).

Far from being forgotten, the market of traditional products is still very active, and recomposed. Sales of fresh milk or fermented milk on the road, home deliveries, "milk bars" are very dynamic. Sales of liquid butter, of typical cheeses also develop very rapidly. Many dairy industries are strongly influenced by the traditional dairy cultures and use it in its marketing and strategy management, inventing a new modernity. However, in these reconstructions, the position of local producers is not always clear. The local political games and economic relationships, relations of powers, are often in favor of large industries, and might result in increased uncertainty on poor households (Corniaux *et al*., 2012).

The visions we have of those “traditional” dairy value chains might affect the role we want them to play in the future (futurity). This might be approached through the analysis of the “models” we have about techniques marketing structure, and through their scientific evaluation. The evaluation of informal dairy chains have to be multi-scale, from “local” to “global”, and inspired by the “sustainable development” corpus.

REFERENCES

Corniaux C., Dia D., Diao-Camara A., Duteurtre G., 2012. Les importations laitières : vraie question ou faux problème ? Le lait comme révélateur des enjeux du développement agricole au Sénégal, dans un contexte de mondialisation, Pillon P. (Dir.), 2012: *La faim par le marché : aspects sénégalais de la mondialisation*, Paris, l'Harmattan, pp. 219 à 238.

Duteurtre G., 2003. La typicité du beurre de vache en Ethiopie. Études et Recherches Sahéliennes, n°8-9, janvier-juin 2003, pp. 59-66

Duteurtre G., 2004. Normes exogènes et tradition locale : la problématique de la qualité dans les filières laitières africaines. *Cahiers Agriculture*, 13 (1), pp. 91-98.

Duteurtre G., 2007. Commerce et développement de l’élevage laitier en Afrique de l’Ouest : une synthèse, *in Rev. élev. méd. vét. pays trop*., 60 (1-4), pp. 209-223.

Duteurtre G., 2009. La tradition laitière africaine : un héritage menacé ?. Contribution à la conférence « Le lait, produit moderne ou traditionnel ? » organisée dans le cadre de l’Exposition « Mon Lait, je l’aime local », le jeudi 9 avril 2009 à l’Institut Leopold Sédar Senghor (CCF) de Dakar, ISRA-CIRAD-GRET, 7 p.

Duteurtre G., 2011. State withdrawal and institutional changes in the West-African dairy sector: what prospects for new policy instruments?” Communication to the International Seminar “Transformation of the role of State and new instruments of public action”, May 5-6, 2011, Pretoria, 9 p.

Duteurtre G., M.O. Koussou, 2007. Économie pastorale et marchés laitiers au Sahel : L’âge d’or du commerce de beurre clarifié au Tchad de 1930 à 1970. *Revue d’élevage et de médecine vétérinaire des pays tropicaux*, 60 (1-4), numéro spécial « filières laitières », pp. 29-38.

Duteurtre G., M.O. Koussou and H. Leteuil, 2000. Une méthode d’analyse des filières : synthèse de l’atelier de formation du 10 au 14 avril 2000. Rport PRASAC / LRVZ / DPPASA, N’Djamena, 46 p.

FAO, 1990. “The technology of traditional milk products in developing countries”, Fao Animal Production and Health Paper 85, FAO, Rome, available on line on : http://www.fao.org/docrep/003/t0251e/T0251E00.htm#TOC

Gizachew Sisay, 2011. Women Economic Leadership through Honey Value chain Development in Ethiopia. Oxfam GB, CASH-E Program, Powerpoint Presented at the Gender and Market Oriented Agriculture Workshop (AgriGender 2011), Addis Ababa, Ethiopia , 31st January-2nd February 2011, 16 slides.

Grain, 2011. The great milk robbery: How corporations are stealing livelihoods and a vital source of nutrition from the poor. Report, Dec. 2011, Grain, Madrid, 33 p.

Available on http://www.grain.org/article/categories/14-reports (in English, French and Spanish).

Hassainya J., M. Padilla, S. Tozanli (Dir), 2006. *Lait et produits laitiers en Méditerranée*, Paris, Editions Karthala, 377 p.

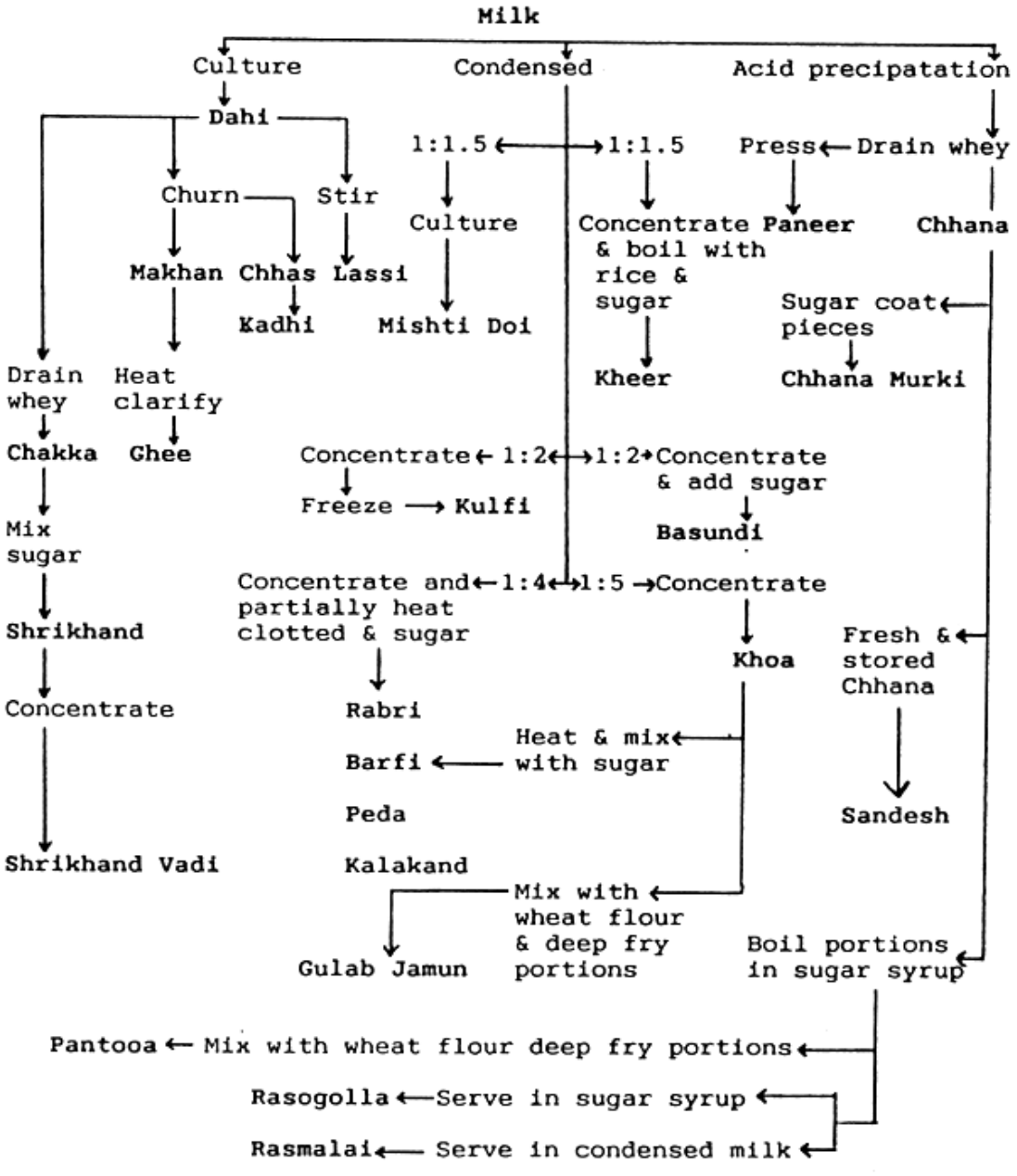
Koussou M.O., G. Duteurtre, and L.Y. Mopaté, 2007. La consommation de lait dans les bars laitiers de N'Djamena (Tchad). *Revue d'élevage et de médecine vétérinaire des pays tropicaux*, 60 (1-4), numéro spécial « filières laitières », pp. 39-44.

Moustier P., 2010. "Commodity chains, supply chains and value chains: basic definitions and concepts", Malica training, 4/06/2010, Hanoi, powerpoint 21 views, www.malica-asia.org

Sraïri M.T., 2011. An assessment of livestock production sustainability in the Maghreb irrigated schemes. *Options Méditerranéennes*, n°. 100, pp. 45-49

Annex 1

Flow chart of conversion of milk into traditional Indian dairy products



Source: FAO, 1990

Annex 2

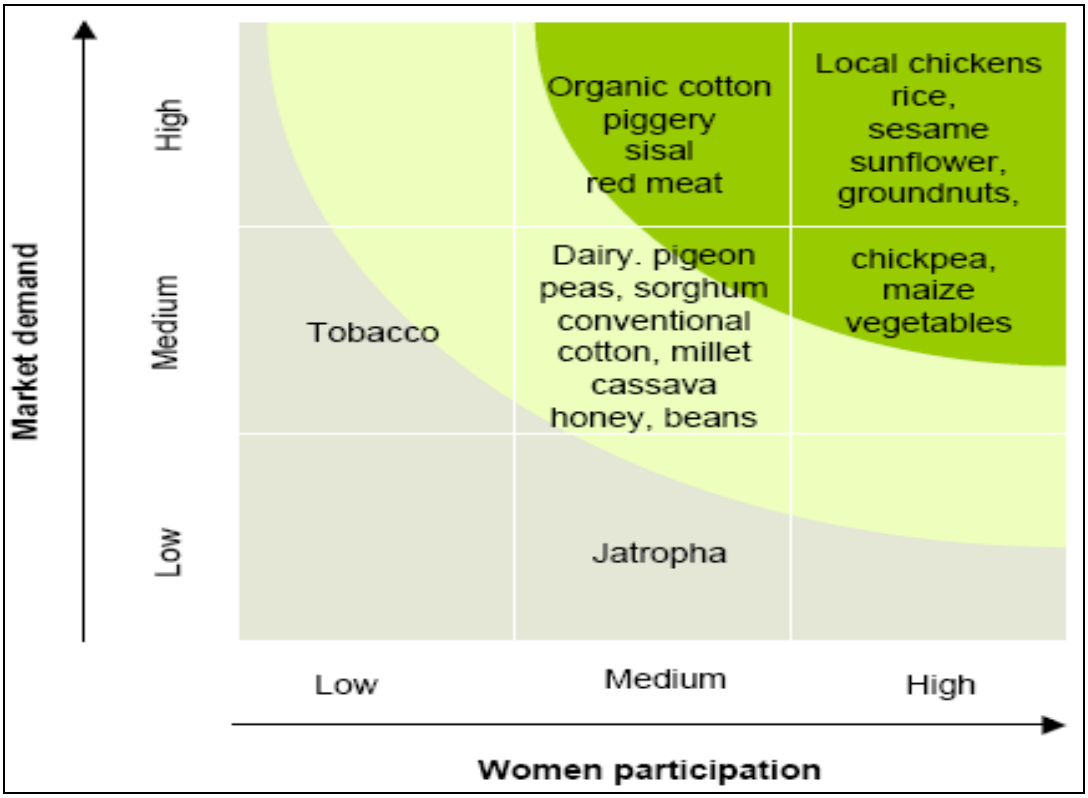
Technical performances of irrigated cattle farms in Tadla (Morocco) in relation to water efficiency

Farms	1	2	3	4	5	6
Milk output (kg)	14,820	11,900	13,310	6,800	3,800	4,950
Total water used (m3)	31,170	25,950	22,200	7,750	5,740	8,970
Water productivity through milk (m3/kg of milk)	2.1	2.2	1.7	1.1	1.5	1.8

Source : Sraïri, 2011

Annex 3

Value chain classification in Ethiopia in relation to women participation



Source: Gizachew Sisay, 2011

MILK QUALITY ASSESSMENT: HOW TO APPROACH MILK QUALITY IN SOUTHERN COUNTRIES?

FAYE B.[1,2], KONUSPAYEVA G.S [2,3]

1- UMR SELMET, Campus International Baillarguet, CIRAD-ES, 34398 Montpellier, France, 2- FAO, Camel and range Research Center, P.O.Box 322 Sakaka , KSA 3. Chair of biotechnology, biochemistry and plant physiology, Biology faculty, University Al-Farabi, Av. Al-Farabi, 71, 050073 Almaty, Kazakhstan

SUMMARY

The requirements for quality concern the same rights for the consumers in the South than in the North. However, the context of the southern countries as well in terms of climatic conditions as sociological or economic background could induce a difference in the approach of the quality management. The contexts of the South return to the need for setting up sometimes specific systems of control and for thinking of the obligation to establish standards according to the markets concerned. The characterization of the dairy products specific to the tropical countries (for example camel milk in the Middle-East and Central Asia) is a step to precisely tackle the question of the applicable standards in the southern countries of the South. Consequently, the quality becomes a social building effectively able to be based on a participative approach implying all the stakeholders of the dairy sector. Lastly, it is advisable to distinguish the involved market niches, international, local or regional, the southern countries knowing to adapt according to those although the milk market in the South is mainly local or regional.

Keywords: Milk, Southern countries, dairy market, quality control

INTRODUCTION

The topic of the quality and of the food safety became a concern in many Southern countries following the crises widely mediatized in the northern countries and in China which sensitized the consumers of all the countries, following also the constraints to export met by the developing countries and which sensitized national authorities. The promotion of quality thus answers stakes of public health and economic stakes. It also contributes to the safeguarding of the environment and to the sustainability of the systems. While being focused on the milk ,sector, emergent or under development in the southern countries, the questions returned to research turn around: (1) of the development of fast and reliable methods for the evaluation of the hygienic quality and possibly for the traceability of the milk and dairy products intended for marketing in a context of atomization of the producers, weak equipment and infrastructures far away from the international standards, (2) the characterization of the technological and nutritional quality of traditional milk in particular those coming from other species that the cow, (3) of the economic assessment of the non-quality of the dairy products at various levels from the dairy farm to the market then to consumers, (4) the development of standards and rules of production and marketing in local contexts.

Milk being not a specifically tropical product, the questions of research must thus be interested more precisely in the conditions of production and the modes of transformation leading to products characterized by a certain typicity in the tropical contexts. Lastly, the approach has to integrate all dimensions (technical, economical, social) being able to lead to a state of non-quality.

THE QUALITY IN SOUTHERN COUNTRIES: CHALLENGES AND QUESTIONS

In consequence, what could be the positioning of the southern countries on topic of quality, in particular for livestock products as milk if their priority is to improve their productivity to meet the increasing needs for the population (Delgado *et al*., 1999, Faye and Alary, 2001)? And thus, how it is possible to give the advantage to the quantity, contrary to northern countries policy aiming to take a reverse way to “productivisme”, if the quality becomes the main objective of the consumers? It is probable that the mediatization of the recent food crises had a direct impact on the real or supposed concerns consumers of the southern countries which largely implemented for example policy of embargo on the milk from China after the scandal of melamine in cow milk. In addition, the pressures on the environment are the object today of a world sensibilization which lead all States to be conscious of the challenges for the future generations in spite of the urgencies for the present generations (Steinfeld *et al*., 1999). Actually, the debate on the quality of the livestock products in the developing countries proceeds of the same logic as to North, but in a context of fast urbanization, of increase in the standard of living, changes in the food practices and in the regulation and distribution systems, finally difficult to implement (Duteurtre, 2005).

Quality can be defined according to the standard ISO 8042 as being “the whole of the properties and characteristic of a product, a process or a service which confer its aptitude to satisfy explicit or implicit needs”. It is thus attached to a need, essentially variable, various, according to the users and consumers, according to the places, the moments or situations'. For example, the quality of a yoghourt can be evaluated on the basis of very different criterion: taste or the mark for a consumer, shelf life for a manager of supermarket, the respect of the expired date for an industrial director, or conformity to the medical standards for an agent of the ministry of Health. It is thus a concept whose subjective dimension is obvious and which results finally to a compromise between actors having preferences, even divergent interests. One speaks about “social construction of quality” to give an account of this social process of definition of the quality standards. Two principal forms of quality are defined (Allaire and Boyer, 1995):“generic” quality (based on standard and regulations controlled by the States) and “specific” quality (based on intrinsic or extrinsic characteristics allowing the differentiation of the products, as labels, AOC or private trade mark).

However, the challenges are not the same according to market level. Indeed, it is necessary to distinguish the local market and the products intended for export. Concerning the livestock products, the countries having made the choice of export often succeeded in implementing the means to satisfy the sanitary requirements of the importing countries of North, particularly the European Union. One can quote for example, the drastic measures of fight against the PPCB (including stamping out) engaged by Botswana to maintain its exporting activity of beef and veal towards the EU. In other cases, the weakness of the structures of national control could lead to temporary restrictions prejudicial to export. However, regarding milk market, the international exchanges are not in favor of southern countries as most of them cannot satisfy their local demand. So, the milk market in the South is mainly concerned by local or sometimes regional market.

Regarding the products on the domestic markets, it is advisable to locate how the various attributes of the quality are recognized by the consumers, and are defined by local rules, contracts or particular conventions. Consequently, it appears that the technical criteria of quality in the South can be very distant from those of North. The quality of the local products is yet depending of the use of these products. In Ethiopia, for example, the level of rancidity of butter constitutes sometimes positive attribute, sometimes negative, according to the use of the butter for making sauce, pastry or for cosmetic (Duteurtre, 2005).

THE CONSEQUENCES FOR RESEARCH AND DEVELOPMENT

In this context, what are the consequences for the research and development to answer these challenges of quality regarding milk and milk products which have as major characteristics to be products largely widespread in the southern countries and primarily dedicated to the satisfaction of the national markets? The milk sector is under important development in these countries, even in the areas traditionally with low consumption (for example in the Far East and Southeast Asia). The milk sector is particularly sensitive to the question of quality, due to the perishable character of the product, its role in the major transmission of zoonoses (tuberculosis, brucellosis) and to the requirements in its composition to ensure the industrial processing.

The concern of quality in the milk sector is finally rather recent because related to the emergence of a marketed production and to the entry of populations beforehand primarily self-consumers in marketing strategies. For the period post-independence in Africa, the dairy development had been especially based on the massive powder milk importation at competitive prices, transformed within the framework of “ready-made” dairy plant most of the time under public management. In this context, the preoccupation on quality was not posed or little, the raw material used being controlled in theory at its origin. The policy of quotas for the production imposed by the storage costs of the dairy products, the stagnation of consumption per capita in the northern countries arrived at the possible optimum, have in fact changed the context and allowed a new development of the dairy production in the southern countries at the time of high demographic growth and changes in the food practices of the increasingly urbanized populations stimulated consumption. Consequently, the national market became the place of an increased quantity of milk coming from local producers for whom the problems of quality was posed in a different way that during the previous time. Four complementary approaches on milk quality regarding research and development could be proposed:

(1) ***Development of fast and reliable methods for the evaluation of hygienic quality*** *and* possibly of the traceability of the milk and dairy products intended for marketing.

Indeed, one of the characteristics of the dairy production in the southern countries is the "atomization" of the production units often in a context of important milk self-consumption, which leads to the low volumes marketed per family unit, and thus to a strong variability from the quality point of view of the milk delivered to the dairy processing plants. In fact, the large scale dairy plants prefer to work with an international product standardized rather than with products of multiple sources with very variable quality. Moreover, in the tropical contexts, the dairy equipments in farm are not often operational and the infrastructures remain far away from the international standards, adding to the risks of milk and dairy products degradation because lengthened transport without effective cold chain. In general the quality controls are reduced to some basic tests to evaluate the hygienic quality of milk delivered (alcohol or methylene blue test for example), to the analysis of fat rate at nutritional level and sometimes to the density (with a lacto-densitometer) to detect the frauds due to water adding. These techniques are simple but not very precise and in particular do not allow to detect more specific contaminations (coliforms, *listeria*…). Various innovating techniques were tested (bioluminescence, near infra-red spectrometry for example), but remain not easy to use by the southern stakeholders. Thus, it seems useful for research to work for providing at all the stakeholders of the milk sector, reliable techniques and at reduced prices. The technique based on the addition of lactoperoxydase to improve milk conservation, popularized by FAO seems a very interesting system in certain tropical contexts, guaranteeing to final acceptable quality of the product, but its application does not discard the necessity for carrying out quality controls of the delivered product.

(2) ***Characterization of the technological and nutritional quality of traditional milk*** in particular those coming from other species that the cow. In the world, 85% of consumed milk comes from the dairy cow. Ewe's and goat's milk are not very available on the markets of the South. Some "non-cow milk" (Faye and Konuspayeva, 2012) are specifically from tropical countries (camel milk, buffalo milk) or are associated to strong cultural identities (mare milk in Central Asia, yak milk in highlands from Asia). In addition, these "non-conventional" milk undergo often artisanal processing, providing on the market, very specific products, such as curdled milk or fermented milk (for example *shubat*, *kurut* and *koumis* in Central Asia, respectively made from camel, yak and mare milk. These products require to be better characterized more especially as far as the consumers drink them for their true or supposed therapeutic or medicinal virtues (Yagil and Van Creveld, 2000; Konuspayeva *et al*., 2004) or at least for probiotic qualities of the fermented forms (Serikbaeva *et al*., 2005), being able to promote their nutritional quality to a population increasingly sensitive to the "health" factors of the dairy products. These traditional products mark an identity to which certain populations are much attached. Indeed, Camembert cheese for example is associated to France, like rancid butter to Ethiopian culture as well for the kitchen or cosmetic use (Duteurtre, 1998) or like fermented mare milk to Central Asia culture. Technological quality is essential for processing these products and researches must be undertaken to reduce the cost of non-quality in the tropical context. For example, the problems of lipolysis and proteolysis, or the problems of the inhibitors, or the heat behavior of certain milk as camel milk, are some ways for technological studies. The identification and characterization of lactic bacteria strains, especially from non-cow milk for the dairy and pharmaceutical industry, is also particularly promising for controlling specific fermentation process in order to obtain products better adapted to the taste of the new consumers (in particular urban) less inclined to use traditional products in their food.

(3) ***Economic evaluation of the non-quality of the dairy products*** at various levels from the dairy farm to the consumers by including the stakeholders of the whole sector. Such evaluation represents essential information for the decision makers and the actors of the commodity channel. It is an element of decision-making to the measures to be implemented. This evaluation can be considered first of all at the level of the dairy farm. In much country, there is not differentiated payment according to the quality of the milk product. As long as such system is not set up, there is no incentive with quality. That implies, from the processors, an effort to propose a "schedule of conditions" and an effective quality control. Such procedures were set up for example at the dairy plant in Nouakchott (Tiviski factory) which

markets pasteurized milk and yoghourts with the cow's, camel's and goat's milk. The pastoralists providing milk are organized in an association profiting from the technical supports of the dairy plant and, in return, have to respect a certain number of hygiene practices adapted to the local context. The economic evaluation must take account of becoming the milk discarded and rejected by the dairy factory. It appears indeed that there is a risk to find this milk in the informal networks where the dairy products is submitted to artisanal changes within the framework of very short commodity channel. These products can be dangerous for the public health as well by their level of bacteriological contamination as by the presence possible of xénobiotiques. The most frequent case is indeed the presence of antibiotic residues, the milk of the treated animals not being discarded from the market. There are in fact few cost/benefit studies regarding the impact of disease prevention on the quality of milk. It is notorious for example that the control of the transmission of human tuberculosis by milk can pass simply by the change of modes of consumption (boiled milk) rather than by an expensive eradication campaign. Lastly, it is necessary to introduce the concept of out-price competitiveness (Duteurtre, 1998). Indeed, the traditional dairy products can be required for their hedonic, organoleptic quality specific rather than for their price. It is the case of the local butter in Ethiopia, however more expensive than the soft butter imported or manufactured from imported products, but which corresponds better to the taste of the consumers (Duteurtre, 1998).

(4) ***Development of standards and rules for production and marketing*** in the local contexts. Two preliminary comments: milk is not a tropical product (except some specific milk mentioned above) and it is as much a cultural product as zoo technical. Two consequences: the existing standards and rules are often imposed by the northern countries of North, but it is difficult to impose these rules without taking account the social, cultural, economic dimensions of the countries and the involved populations. Such debate already exists within the European Union regarding the French raw milk cheeses. Quality is a "social construction". It is the result of a negotiated consensus, and research must be interested by the methods of social construction of the quality, this one being able to be associated to a given territory with proper characteristics (particular breed, specific resources, singular practices).

TWO EXAMPLES OF THE MILK QUALITY MANAGEMENT IN SOUTHERN COUNTRIES

Participative management of the hygienic quality of the dairy products in Africa

In Africa, contrary to Europe, raw milk remains dominating, whereas the maintenance of the cold chain remains problematic. So, the main researches on dairy products quality in Africa consisted in evaluating the importance of the hygienic risk, while trying to quantify the rates of pathogenic germs present in the sampled local dairy products at the farm level or at sale points (Grillet *et al*., 2005). If the majority of the authors are intended to recognize the high level of the bacterial loads of the dairy products marketed as well in the formal sector as informal, they always do not agree on the way for regulating this problem (Bonfoh *et al*., 2007; Faye and Loiseau, 2002; Grace *et al*., 2007; Koussou *et al.*, 2007).

Indeed, the majority of the policies led up to now in Africa are based on coercive approach with constraining regulations intended to protect the consumer, and according to criteria's often imposed by the legislations of the industrialized countries. However, this approach is limited by the weakness of the control and supervising authorities. Several development projects suggested to promote approach "of incentive for self-checking quality by the companies or professional organizations themselves" (Broutin *et al*, 2007). These programs, named policies "of participative evaluation" of quality with the involved stakeholders (Bonfoh *et al*, 2007; Grace *et al*., 2007), aim to propose improvements of the "practices" for milk production, processing and marketing by the development of collective diagnoses, of "good practices" to be promoted among professionals, and of information campaigns. The participation of the consumers, processors, and milk producers to such collective approach, as well as the active presence of research and of the involved authorities, make it possible such solutions (Bonfoh *et al*., 2007). A particular effort has to be done on training of the stakeholders and decision makers. Indeed, it falls on those to sensitize the producers and the processors with the techniques and methods making it possible to satisfy the requirements of quality. Approaches such as the HACCP, the analysis of risk, the ecopathology of quality (Faye *et al*., 1999), the actions such as the edition of handbook for good practices of hygiene or good practices of

processing (Broutin *et al*., 2007) represent assets that could be appropriated by all the stakeholders of the milk sector. In Kenya, the implication of Smallholder Dairy Project in favor of the small stockbreeders made it possible to counter the denigration campaigns on the quality of the non-industrial dairy products and have encouraged the authorities to limit the "repressive" policies (Grace *et al*., 2007).

These participative steps also make it possible to limit the risks of social exclusion of some stakholders of the dairy sector. The women working in the informal sector, in particular, appear very vulnerable vis-a-vis coercive policies. The promotion of policies in favor of the poor seems thus compatible with such steps based on the training, sensitizing and promotion of good practices (Schneider *et al*., 2007). Lastly, the diversity of the reference frames for quality explains partly why the promoting programme for the lactoperoxydase system met so many obstacles in African countries, whereas this innovation appeared so promising (Lhoste, 2007).

Standard and rules for non-characterized milk

Regarding technological quality, the non-conventional milks are suffering of a lack of standard. It is the case of camel milk, a typical product of the desert zones. Camel milk is not processed spontaneously into cheese and the mode of conservation remains the fermentation process leading to very varied products according to the initial composition of the raw milk and to the starter used. It is a product dedicated to the local markets, just recently recognized at the international level (inscription to the *codex alimentarius*), but for which standard for the international exchanges does not exist yet (Faye and Konuspayeva 2008). Several studies have been undertaken to characterize the product. In Central Asia or in Sudan, where the camel milk consumption is culturally important, the characterization of this product consisted of (i) the analysis of the physicochemical composition of raw milk (and its variability) being used for fermentation process (Konuspayeva *et al*., 2009), (ii) identification of the lactic bacteria strains entering in the fermentation process (Ashmaig *et al.* 2009) (iii) the piloting of fermentation process on the basis of strain identified in the preliminary stage, to direct sensory qualities of the end product in adequacy with the demands of the consumers (Hassaine *et al*. 2007). Finally, these elements of characterization make it possible to provide the foundations for a recognizable standard by all (Merin *et al.*,2004). This characterization is an important step for qualifying the non-hygienic quality of such non-conventional milks.

CONCLUSION

The quality is a complex construction involving technical (quality standards), economic (cost of the non-quality), social (perception of the quality) administrative (insurance-quality) dimensions. The way of the southern countries towards quality must integrate the following parameters: (i) The conditions of production, processing and marketing in the context of the southern countries induce a necessary adaptation of the tools and methods of quality control of the dairy products with the participation of all the stakeholders, (ii) The quality fulfills the requirement to respect standards of which some are internationally certified, but others must be adapted to the local context (food practices for example) or base on a better knowledge of the characteristics of the products, (iii) The characterization of the products resulting from particular contexts of production, specific methods of processing or nonconventional species is an essential stage to evaluate their adequacy to the local and international markets, and to satisfy the request of the consumers, (iv) The quality of the dairy products is differentiated according to their position on international, regional and local markets, less in "generic" term of requirement than in term of adequacy to the various sectors of the market, (v) The quality depends of an adapted management for which the public authority and the market may work in partnership.

REFERENCES

Allaire, G. and R. Boyer. 1995. La grande transformation de l'agriculture. Inra Publ., Economica, Versailles (France), 390p

Ashmaig, A., A. Hasan, and E. El Gaali. 2009. Identification of lactic acid bacteria isolated from traditional Sudanese fermented camel's milk (Gariss). African J. microbial. Res., 3: 451-457

Bonfoh, B., G. Fokou, M. Ould Taleb, A. Fane, D. Woirin, N. Laimaibao and J. Zinsstag. 2007. Dynamiques des systèmes de production, risques et transformations socio-économiques au Mali. Rev. Elev. Méd. Vét. Pays Trop., 60 : 67-76.

Broutin, B., M. François, and N. La Noë Niculescu, 2007. Gestion de la qualité dans la transformation laitière : expérimentation d'une démarche d'élaboration concertée de guides de bonnes pratiques d'hygiène au Sénégal et au Burkina Faso. Rev. Elev. Méd. Vét. Pays Trop., 60 : 163-169

Delgado, C., M. Rosegrant, H. Steinfeld, S. Ehui and C. Courbois. 1999. Livestock to 2020. The next food revolution. Publ. IFPRI, Washington, USA, 17 p.

Duteurtre, G., 1998. Compétitivité prix et hors-prix sur le marché des produits laitiers d'Addis-Abeba-Ethiopie. Thèse d'agro-économie, ENSAM, Montpellier, 353 p.

Duteurtre, G., 2004. Normes exogènes et tradition locale : la problématique de la qualité dans les filières laitières africaines . Cahiers Agriculture, Numéro spécial « L'Alimentation des villes », 13 (1):91-98.

Faye, B., D. Waltner-Toews, and J. Mc Dermott., 1999. *From "ecopathology" to "agroecosystem health"*. Prev. Vet. Med., 39 : 111-128

Faye, B. and G. Loiseau, 2002. Sources de contamination dans les filières laitières et exemples de démarche qualité. Gestion de la sécurité des aliments dans les pays en développement. Actes de l'atelier international CIRAD-FAO (E.Hanak, E. Boutrif, P. Fabre, M. Pineiro), (Eds). CIRAD, Montpellier (France), 11-13 Dec. 2000

Faye, B. and V. Alary. 2001. Les enjeux des productions animales dans les pays du Sud. INRA Prod. Anim., 14(1): 3-13.

Faye, B. and G. Konuspayeva, 2012. The sustainability challenge of the dairy sector-The growing importance of the non-cattle milk production worldwide. Int. Dairy J., 24 : 50-56

Faye, B. and G. Konuspayeva. 2008. Improvement of the technology and development of the rules for national products from the camel milk according to FAO and FIL/IDF requirements. Veterinariya, 4: 16-25.

Hassaine, O., H. Zadi-Karam and N.E. Karam. 2007. Technologically important properties of lactic acid bacteria isolated from raw milk of three breeds of Algerian dromedary (*Camelus dromedarius*), African J. Biotechnol., 6: 1720-1727.

Grace, D., T. Randolph, A. Omore, E. Schelling and B. Bonfoh. 2007. Place of Food Safety in Evolving Pro-Poor Dairy Policy in East and West Africa. Rev. Elev. Méd. Vét. Pays Trop., 60 : 153-162.

Grillet, N., P. Grimaud, G. Loiseau, M. Wesuta M. and B. Faye. 2005. Qualité sanitaire du lait cru tout au long de la filière dans le district de Mbarara et la ville de Kampala (Ouganda). Rev. Elev. Med. Vét. Pays Trop., 58: 245-255

Konuspayeva, G., G. Loiseau, and B. Faye. 2004. La plus-value «santé » du lait de chamelle cru et fermenté : l'expérience du Kazakhstan. Renc. Rech. Ruminants, 11: 47-50.

Konuspayeva, G., B. Faye, and G. Loiseau . 2008. The composition of camel milk : A meta-analysis of the literature data. J. Food Compos. Anal., 22: 95-101.

Koussou, M.O., L.Y. Mopate, M. Béchir, P. Grimaud P. and B. Bonfoh. 2007. Evaluation de la qualité physico-chimique et hygiénique du lait de brousse et des produits laitiers locaux commercialisés dans les bars laitiers de N'Djamena (Tchad). Rev. Elev. Méd. Vét. Pays Trop., 60 : 45-49

Lhoste, F., 2007. Limites de l'application de la méthode de conservation du lait cru par le système lactoperoxydase en Afrique de l'Ouest. Rev. Elev. Med. Vét. Pays Trop., 60(1) : 171-176.

Merin ,U., S. Sela, B. Rosen, R. Pinto and G. Leitner. 2004. Standards for camel milk. Proc. of Intern. Workshop, « Desertification combat and food safety : the added value of camel producers". Ashkabad (Turkménistan), 19-22 April 2004. In "Vol. 362 NATO Sciences Series, Life and Behavioural Sciences". B. Faye and P. Esenov (Eds), IOS press Publ., Amsterdam (The Netherlands), 152-158

Schneider, M., H. Kouyaté, G. Fokou, J. Zinsstag , A. Traoré, M. Amadou and B. Bonfoh. 2007. Dynamiques d'adaptation des femmes face aux transformations des systèmes laitiers péri-urbains en Afrique de l'Ouest. Rev. Elev. Méd. Vét. Pays Trop., 60 : 121-131

Serikbayeva, A., G. Konuspayeva, B. Faye B., G. Loiseau, and M. Narmuratova. 2005. *Probiotic properties of a sour-milk product shubat from the camel milk.* Proc. of . Intern. Workshop, « Desertification combat and food safety : the added value of camel producers". Ashkabad (Turkménistan), 19-22 april 2004. In "Vol. 362 NATO Sciences Series, Life and Behavioural Sciences". B. Faye and P. Esenov (Eds), IOS press Publ., Amsterdam (The Netherlands), 187-191.

Steinfeld, H., C. De Haan and H. Blackburn. 1999. Interactions entre l'élevage et l'environnement. Problématique et propositions. Ed. CIRAD , Montpellier, France, 52 p.

Yagil, R., and R. Van Creveld. 2000. Medicinal use of camel milk. Fact or fancy? In "2nd Camelid Conf. Agroeconomics of camelid farming", AgroMerkur Publ., Almaty (Kazakhstan), 8-12th september 2000, 100.

ANNEX D- OTHER PRESENTATIONS

Interdisciplinary Approach of Urban and Peri-urban Traditional Dairy Chain

Dairy Farming Systems (DFS) :
Systemic, Multi-Scale and Long Term Approach

C. Corniaux, J.F. Tourrand

Proceedings of Workshop: Interdisciplinary Approach of Urban and Peri-urban Traditional Dairy Chain

Project DAIRY (JEAI-AIRD), Cairo, 10-14th June, 2012

INTRODUCTION

Q : How to evaluate traditional dairy farming systems ?

First part : Usefulness of systemic approach for small holders
Second part : Methods

Discussion : Case study (Cairo)

I. Usefulness of systemic approach for small holders

1. Analytic approach

* Usual approach at the farm level
  - well adapted for specialized dairy farmers
  - dairy performances evaluation

→ To understand how it works (practices and strategies)

But inadequate to understand the functioning of traditional /small « dairy farms »

I. Usefulness of systemic approach for small holders

2. Characteristics of small holders (1/3)

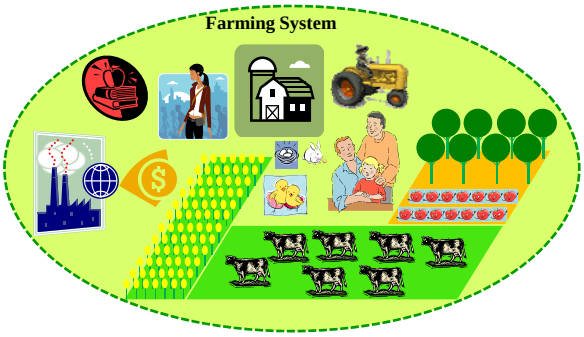
Size of the family group

Not necessarily only one person to decide / milk

I. Usefulness of systemic approach for small holders

2. Characteristics of small holders(2/3)

Diversification of activities : livestock, agriculture, non agriculture and out farm jobs.

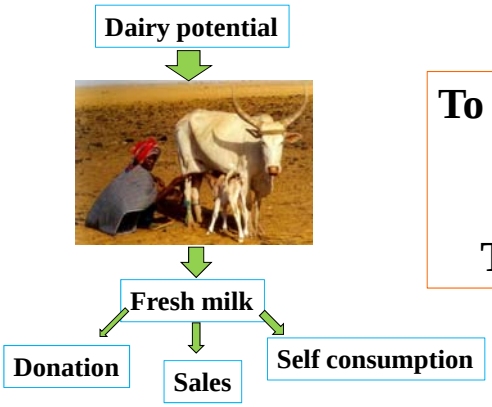


Interactions between dairy and other productions / activities ?

I. Usefulness of systemic approach for small holders

2. Characteristics of small holders (3/3)

Self consumption and non marketing exchanges



To product milk

≠

To sell milk

I. Usefulness of systemic approach for family agriculture

3. Place of the milk at the farm level ?

*** Product, co-product or by-product? (i) in relation to animal products, agricultural products, in the activities of the farm; (ii) in terms of monetary and economic weight.**

*** Destination of milk : self consumption, donation, sales (channels ?) ?**

*** Who decides ?**

I. Usefulness of systemic approach for small holders

4. Conclusion

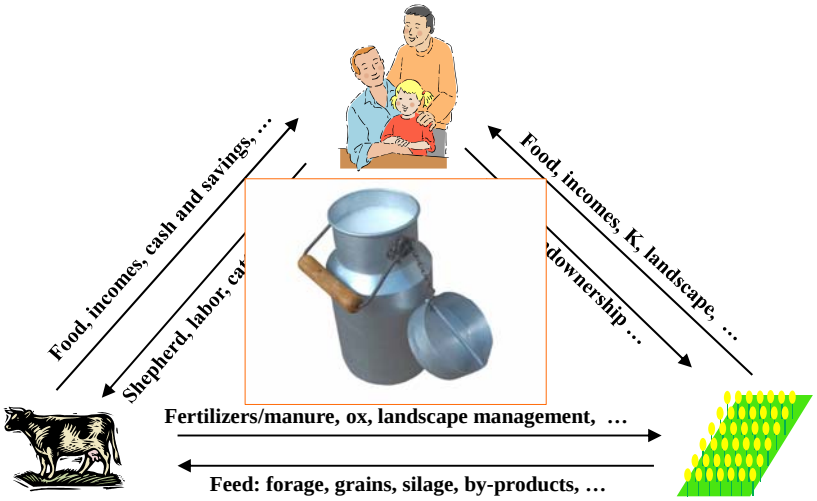
→ To understand the fonctioning of small / traditional dairy farm : Systemic approach.

• Multidisciplinary approach

• Multi scale approach

• Process analysis

Interactions between entities : complexity



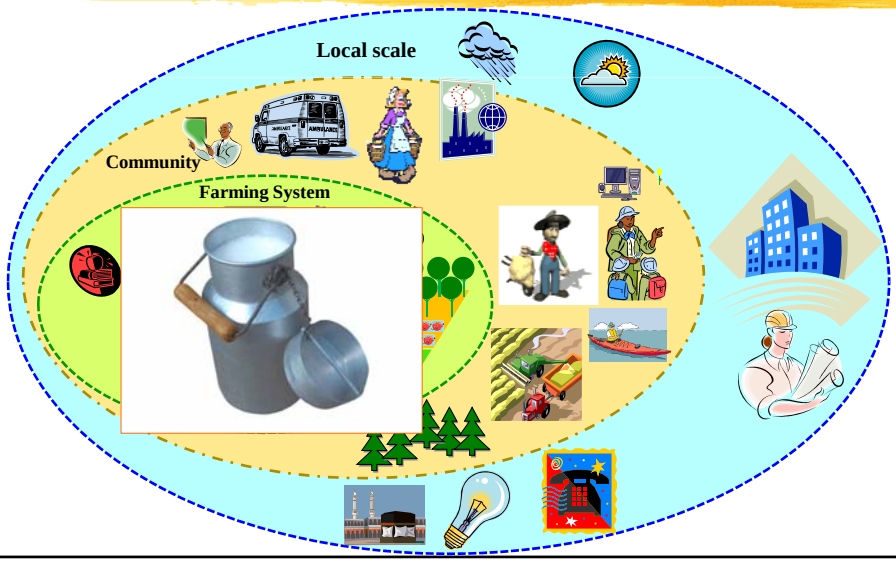
I. Usefulness of systemic approach for small holders

4. Conclusion

- Multidisciplinary approach
- **Multi scale approach**
- Process analysis

Livestock Farming System => …. Global System …

Interactions at different scales:
family, farm, community, local, national, global



I. Usefulness of systemic approach for small holders

4. Conclusion

- Multidisciplinary approach
- Multi scale approach
- **Process analysis**

Farms trajectories, retrospective and prospective.

Add-Value of Farming System Approach

- Check and better understand the objectives and strategies of the farmer family
- Identify the main drivers and constraints
- Evaluate potential and the performances
- Describe and modeling the system (DFS)
- Suggest improvement pathways in different POV (technical, economics, social, policy, …)

II. METHODS

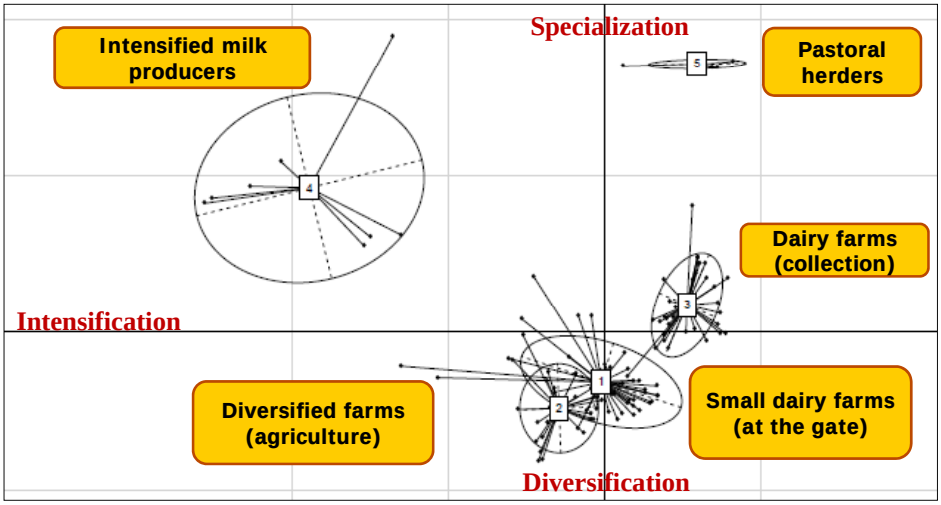
1. Surveys

* To give a ponctual picture of the overall functioning of the dairy farms.

* Disciplines : Animal science, agronomy, economy, sociology

* Results : indicators, typologies

Traditional dairy systems around Bamako (Mali)
Herders groups



II. METHODS

2. Long terms studies

→ Farms sampling from typologies

* Follow-up, longitudinal surveys
  - 2-5 years (target = dairy cattle and milk)
  - visits on the field : every months

* Retrospective surveys
  - over several decades (target = family and milk)
  - visits on the field : only 2 / farm (in the same week)

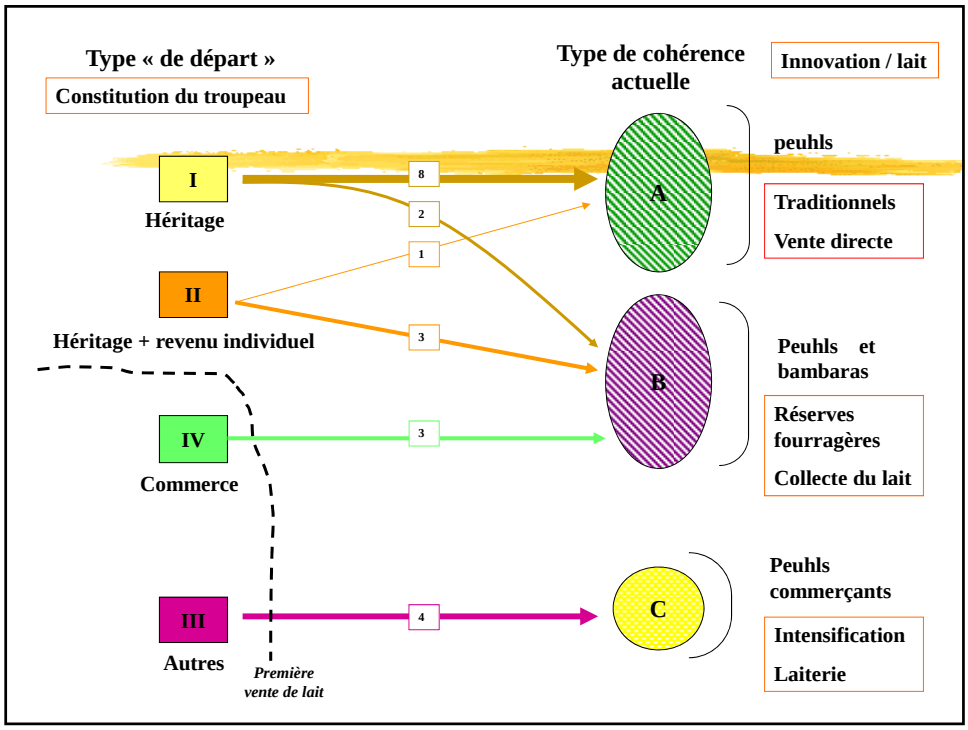
Disciplines : idem + geography and history
→ Dynamics and processes (space and time)

II. METHODS

2. Long terms studies

*** Results :**

- **indicators : performances, social organization, production costs and incomes, …**
- **farms trajectories**
- **mapping : dynamics of the dairy collection basin**
- **modeling : the long term – retrospective and prospective**



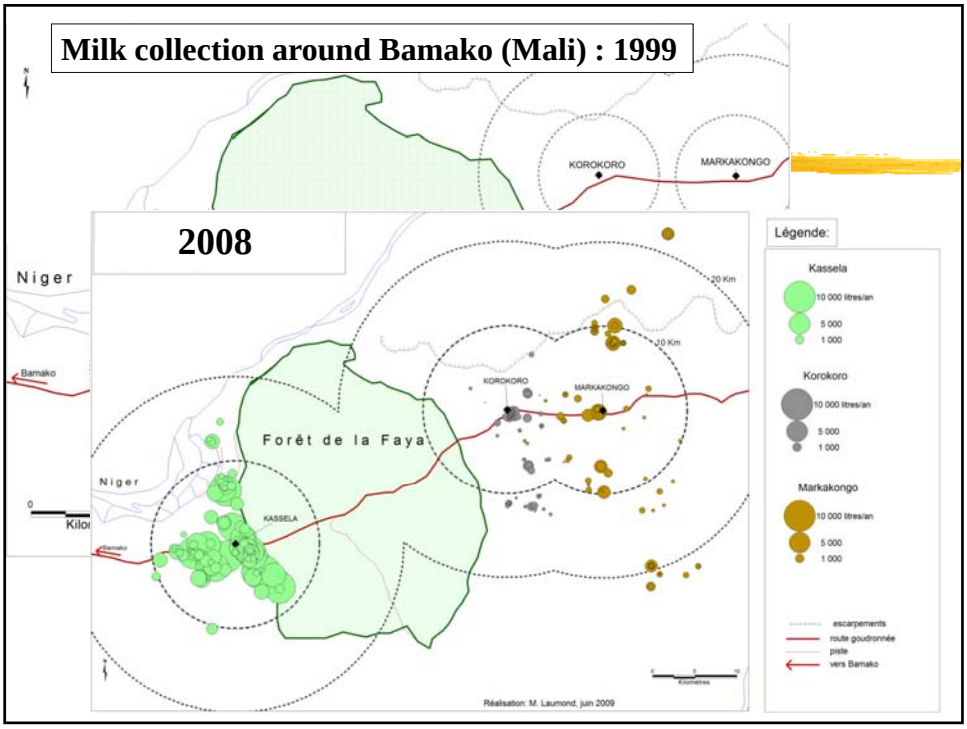
II. METHODS

2. Long terms studies

*** Results :**

- indicators : performances, social organization, …
- farms trajectories
- **mapping : dynamics of the dairy collection basin**
- modeling : the long term – retrospective and prospective

Milk collection around Bamako (Mali) : 1999



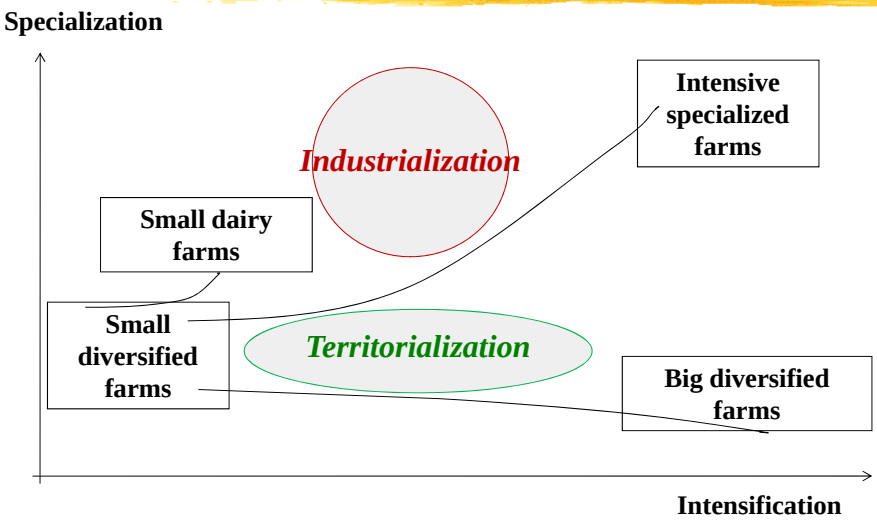
II. METHODS

2. Long terms studies

*** Results :**

- indicators : performances, social organization, …
- farms trajectories
- mapping : dynamics of the dairy collection basin
- **modeling : the long term – retrospective and prospective**

Illustration from Brazil, Vietnam and West Africa



III. CASE STUDY IN CAIRO

→ **Dairy farming systems in Cairo :**
Exploratory of first data collected in 2011-2012.
M. Elsorougi/ V. Alary

III. CASE STUDY IN CAIRO

MILK HUB CAN COMBAT THE DRAWBACKS OF POOR HYGENIC PRACTICES AND LOW PRODUCTIVITY OF SMALL DAIRY HOLDERS IN EGYPT

Hussein Mansour

Faculty of Agriculture, Ain Shams University

Hussein.Mansour@gmail.com

Proceedings of Workshop: Interdisciplinary Approach of Urban and Peri-urban Traditional Dairy Chain

Project DAIRY (JEAI-AIRD), Cairo, 10-14th June, 2012

INTRODUCTION

- **A research by the International Food Policy Institute (IFPRI) in May 1999, predicted[1] that the next revolution in the developing countries will focus on increasing animal production**
- **Low milk productivity and safety quality masked IFPRI prediction at small holder level in last decade**

[1] **"Animal Production until 2020"**

OBJECTIVES

The objective of this paper is of two folds:

- **to discuss the required hygienic prerequisite at dairy farm**
- **to discuss the establishing of Milk HUB (a cluster of small holders) to enabling the implementation of good dairy farming at this sector aiming:**
  - **improving milk productivity and safety**
  - **raising the standard of living for the small producer**

CURRENT STATUS OF LIVESTOCK IN EGYPT

- **The livestock sector in Egypt represents about 30% of the agricultural national product and 5% of the national GDP**
- **About 57% of the Egyptian live in rural areas and have connection to farming in a way or another**
- **Women plays a significance role in small holder livestock activity**
- **The sector is short of providing the average Egyptian with the safe animal component required for the health (security and safety) of the consumer**
- **The average per capita consumption of animal protein in Egypt is about 18 g/day from various sources of animal products (meet, dairy, egg, fish)**

THE PREVAILING LIVESTOCK PRODUCTION SYSTEM INCLUDES:

- The commercial dairy sector that uses modern technology (5% of animal population)
- The medium-size production system (7% of animal population) and have the potential to contribute positively to the national economy
- The small-holder mixed farming system (88% of total animal production) represents the majority of animal population
- Small-holder plays an important socioeconomic role providing farmers with financial security and liquidity
- Most of these holdings are local and crossbred cows, and buffalos

CHALLENGES ARE FACING THE DEVELOPMENT OF SMALL HOLDER SECTOR

Production

- Mainly in primitive farms
- Animals are not identified
- Manual milking
- No hygiene measurements
- Lack of producer's understandings of the production technology
- Low productivity

The loose dairy market is heavily anchored in society

CHALLENGES ARE FACING THE DEVELOPMENT OF SMALL HOLDER SECTOR

Transportation

- No chilled transportation
- Aluminum containers
- Preservatives often added

Marketing

- Difficulty in accessing good markets Mainly low bulk dairy products as a result of low production and quality of the dairy products
- Hand packing in plastic bags of ½ and 1 liters
- Selling places: homes, cheap markets and Laban shops

MORE CHALLENGES ARE FACING THE DEVELOPMENT OF SMALL HOLDER SECTOR

- Small size of animal holdings limits having animal production services and participation in national improvements program

- Greater production waste due to high calf mortality, low cow fertility and inefficient veterinarian care services in general

SAFTEY OF ANIMAL PRODUCTS

- Animals and their products are potential causing of food borne illness, their products are good media for growth pathogenic microorganisms
- Residues of veterinary drugs, pesticides and other chemical contaminants are potential sources for animal products contamination
- Equipment's carry risks of further contamination from man or the environment or growth of inherent pathogens
- Animal drinking water of poor quality are a major source of hazards

Cont. SAFTEY OF ANIMAL PRODUCTS

Continuation of the problem has been well illustrated in recent years by human surveillance studies of specific meat-borne pathogens such as Escherichia coli O157:H7, Salmonella spp., Campylobacter spp. and Yersinia enterocolitica, the emergence of new hazards, such as the agent of bovine spongiform encephalopathy (BSE); and recurring disease outbreaks that have led to wholesale destruction of livestock (e.g. the 2001 food-and-mouth disease [FMD] outbreak in the United Kingdom and Northern Ireland and FMD in Egypt 2005-2006 and 2011

SAFTEY OF MILK

The dairy system is a complex, concentrated and dynamic chain of activities that begins with production of raw milk on farm and move to value added chain through processing and then to retail food stores and foodservices establishments

SAFTEY OF MILK

- **At each point of the chain applying prerequisites program (PRP) and food safety standards is a must to secure the suitability of animal products to the intended use throughout the food chain to producing safe food to the consumer**

- **PRP is an activity that can be used to: prevent, eliminate food hazard or reduce it to an acceptable level**

Cont. PRE-REQUISITE PROGRAM

- Require every specific and documented activity or facility that is implemented corresponding to the codex general requirements of Good Hygienic Practices (GHP), the Good Manufacturing Practices (GMP), and other related legislation, to create basic requirements that are necessary for the production and processing of safe foods in all stages of the food chain
- PRP : transform these hygiene measures in a practically manageable, effective and farm specific surveillance system

PRE-REQUISITE PROGRAM

- PRP is More than a working instruction, a plan or a regulation of general control measures, it includes verification of the effectiveness of the system , on a regular base
- Applying PRP on the dairy farm activity would result in healthy animals and high quality milk (economically and hygienically)
- The final result is increased profitability for the dairy producer and a safe product for the consumer

THE MOST IMPORTANT GMP's

- Cleaning and disinfection
- Water/air
- Personnel
- Pest control
- Temperature control
- Structure/infrastructure
- Technical maintenance
- Waste management
- Control of raw material
- Traceability, recall, goods returned, rejections/non-conform products

MORE ACTIONS ARE NEEDED TO SECURE ANIMAL PRODUCTS

APPLYING GOOD FARMING PRACTICES (GFP)

There are eight areas of primary production in which preventive actions can usefully be implemented as follows:

1. **Animal Health Conditions**
2. **Animal Feeding and Water**
3. **Animal Welfare**
4. **Environmental control, Buildings and other facilities: surroundings**
5. **Personal hygiene**
6. **Maintenance on the Farm of Specified Records**
7. **Knowledge of Good Farming Practice**
8. **Others**
   - **Veterinary Drugs**
   - **Preparation of animals for slaughter**
   - **Milking Hygiene**
   - **Common measures for record keeping and traceability**

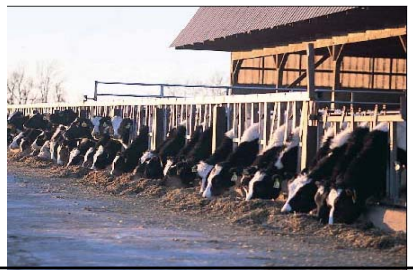
If we failed to apply PRP and GFP with an individual farmer

We can make it through MILK HUBs

GET THE POWER of BEING TOGETHER

A HUB
has
1000 members
with
1000 cows

One farm
has
one owner
with
1000 cows



ACTIONS TO BE TAKEN BY THE HUBS

- The Milk HUB would set some basic guidelines for the application of PRP & GFP at primary production level and GMP at the milk collection units
- The guidelines are based on the recommended international code of practice, general principles of food hygiene (FAO/WHO) and the Codex Milk Code, 2004) and the Good Farming Practices as stated in the two EU regulations (EC) No 882/2004 and 853/2004

ACTIONS TO BE TAKEN BY THR HUBS

- The milk HUB should apply complete PRP and GFP for ensuring food safety and suitability of the produced milk
- The dairy holder can be guided to implement these Guidelines

MILK HUB

Primary Production

- Secure animal products throughout the food chain is essential to ensure its safety and suitability for their intended use and depends on implementing proper hygienic control measure on farm
- Offer veterinary services
- Feed services
- Animal Identification, record keeping, enabling genetic improvement and tractability
- AI services

22

MILK HUB

Milk Collection and Transportation

- Hubs would be supplied with milk cooling Storage and transport tanks
- Labs to do primer milk receiving test
- Applying GMP Practices
- Milk marketing

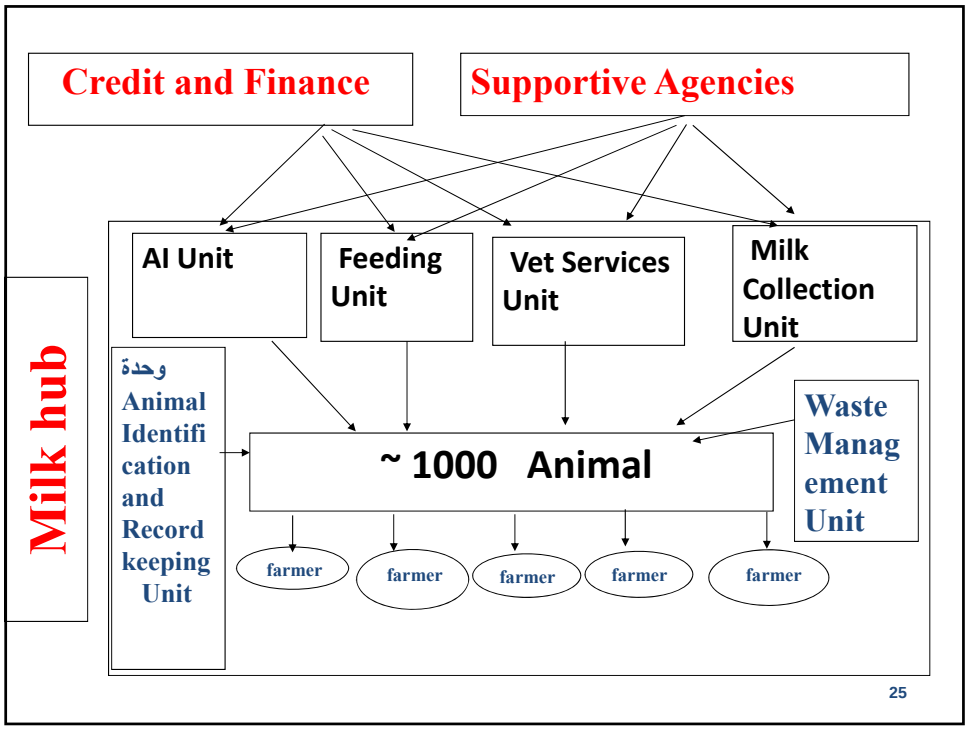
23

MILK HUB

Milk Distribution and Marketing

- Training and educating the farmer on good Farming practices
- Possible direct sale to retailers and out lets

24



MORE OUTCOMES

- The genetic improvement of local cows depends, on a crossbreeding program that utilizes exotic semen could double the production of the first generation of the crossbred heifers compared to their dams
- These genetic improvements should be accompanied by adopting updated modern integrated managerial system for husbandry, feeding, and marketing, which would be tailored for the small holder circumstances,

MORE OUTCOMES

- Satisfying the human nutritional needs from animal products
- Securing a safe and healthy food production for the Egyptian citizen
- Raising the standard of living for the farmer, especially the small producer
- Creating a national strategic reserve of animals producing milk and beef as a safeguard against the ban of animal products due to disease outbreaks in exporting countries
- Contributing to a potential increase of export products
- Contributing to solving the unemployment problem
- Enhancing the role of and strengthening the private sector's role.

Territorial approaches to analyze dairy dynamics

René Poccard

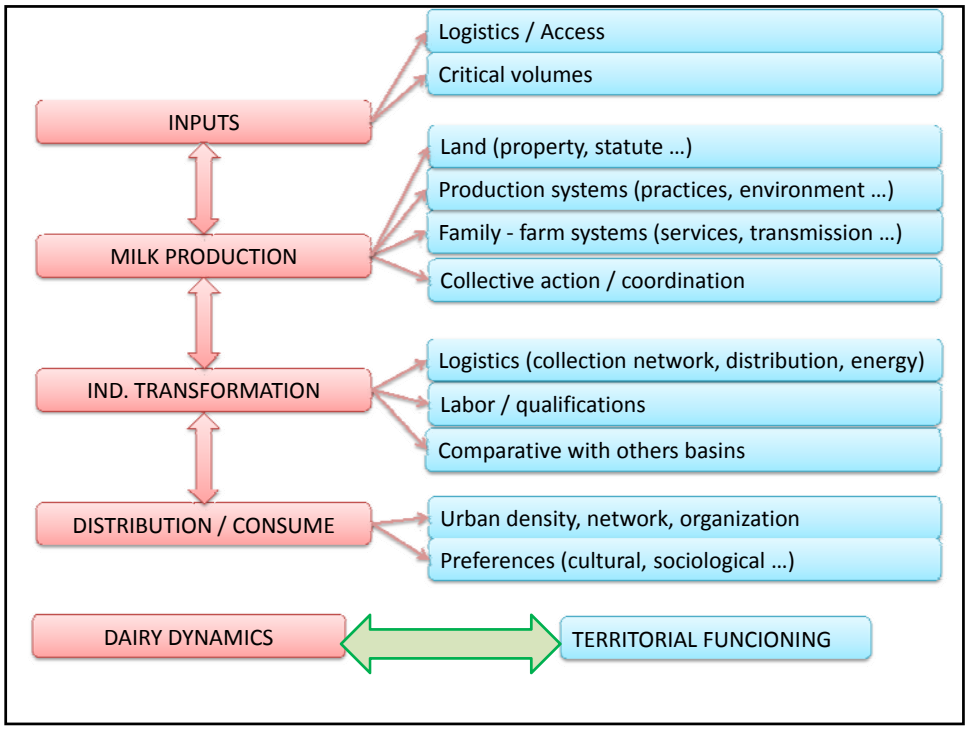
Cirad – Embrapa – UFPa (Brasil)

Proceedings of Workshop: Interdisciplinary Approach of Urban and Peri-urban Traditional Dairy Chain

Project DAIRY (JEAI-AIRD), Cairo, 10-14th June, 2012

Why "territorial approaches" ?

- "Dairy dynamics" are linked not only to farms but to "chains" too. From inputs to consumers, succession of "steps", kinds of actors, functions etc. ...
- So, dairy dynamics depends of conditionality's, synergies / interactions between all of these elements.
- For each of them, the proper functioning depends of insertion in a larger system, that we call territory.
- Territory =
  - Local approach
  - Area, with social construction during the time (spatial and temporal dimension)
  - System composed by actors, networks, environment in interaction



How should we do it ?

- Territorial approach is to look far from farms, to better understand an agricultural problematic (“dairy dynamics”
- Objective = Understanding the territorial functioning and the dairy chain organization.
- Data :
  - Survey approaches with all kinds of actors in territory / dairy sector. Open survey to understand the local knowledge's.
  - Secondary (or primary if possible) data to represent the flows, and the territorial and dairy systems , especially in the space (cartography): land, localizations, logistics, networks, demography ...

- The most important is the systemic comprehension (> than quantify, or mapping)
- Useful =
  - build a team that will combine several points of views : scientific disciplines, kind of formation (searchers, technical, teachers …)
  - Plan surveys to meet all kinds of actors and key informants (some of them are identified during the surveys: methodology needs to be adaptive)
  - Looking for historical comprehension, origin of the actual processes to understand drivers
  - build with the actors, during surveys, some analyzes about the research question (participative analysis).
  - Have a time every day to analyze the surveys, in collective sessions (all the team). Building a common responses about the research question, based on local knowledge.

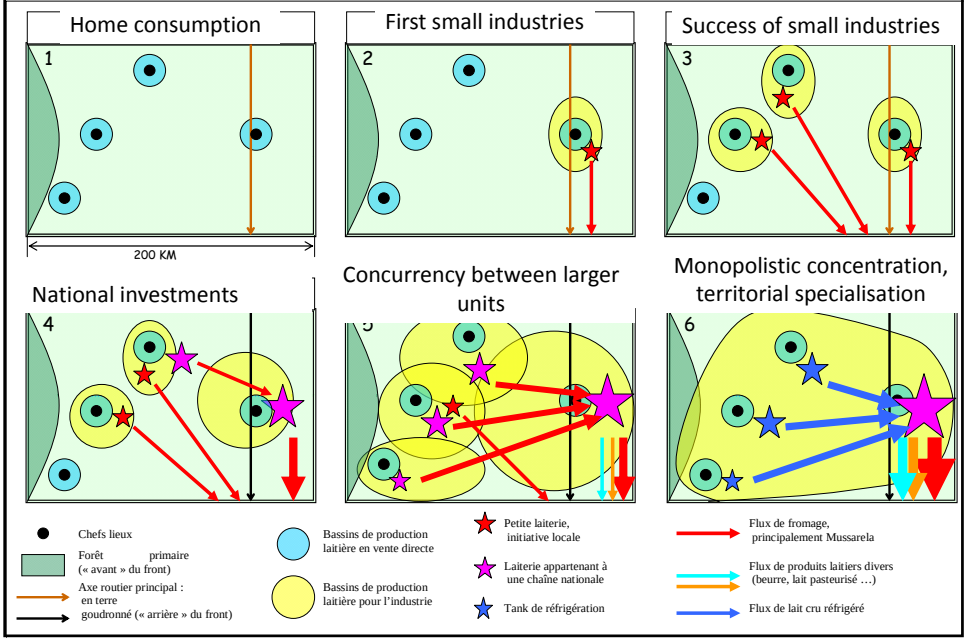
Kinds of analysis /results

- Typological analysis and representations
- Spatial dynamics modeling
- Combining farm typologies and trajectories, retrospective analysis, territorial and marketing chain analyzes

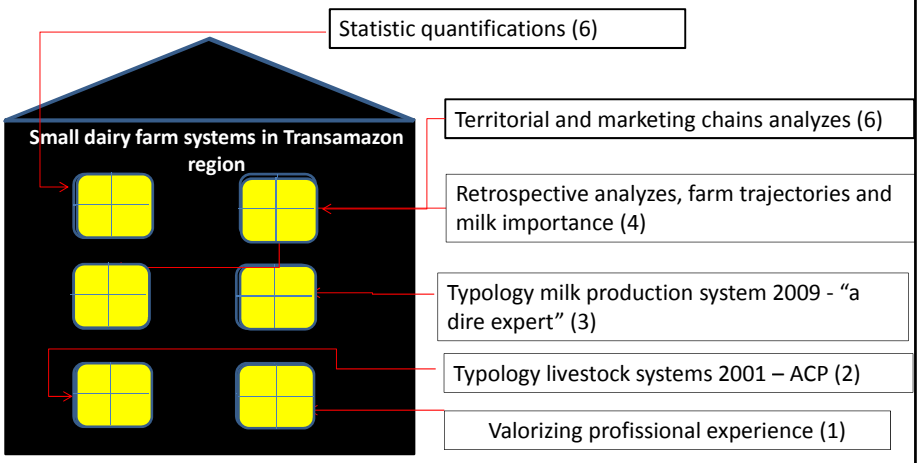
Typologies of dairy dynamics based on territorial approach

	Isolated basins	Indutrialized basins	Periurban basins
Dairy chain organization	- Marché : local (quelques milliers de litres/jour) - Mode de mise en marché[1] : vente directe au consommateur, porte à porte - Produits : lait cru	- Marché : national (absorbe toutes productions) - Mode de mise en marché : ramassage du lait quotidien par des transporteurs - Produits : fromages simples à pâte cuite	- Marché : régional, ample mais très concurrentiel - Mode de mis en marché : ramassage du lait quotidien par des transporteurs - Produits : fromages fins, yaourts, lait pasteurisé
Kind of industries	Aucune industrie	Petites unités industrielles (1000 – 5000 litres / jour) appartenant à une réseau régional (80 – 100 000 litres / jour)	- Petites unités industrielles, de type familiales ou PME (<2000 litres / jour)
Impacts on small farmers	- Perte de temps et risque pour la commercialisation - Difficile accès aux intrants et au crédit, peu d'augmentation de la production / productivité - Revenus suffisants pour justifier une spécialisation sur le lait - Prix au litre : R$ 0,5 / litre	- Revenus faibles mais réguliers et sûrs - Moindre isolement des familles - Accès facilité aux services, intrants et crédit - Facilités pour augmenter la production et la productivité - Valorisation du foncier - Reproduction de la famille - Prix au producteur inférieur	- Prix élevé - Exigences de qualité élevées - Faible capacité d'appui de la laiterie envers le producteur - Revenus du lait inférieurs à ceux d'autres activités agricoles
Impacts on territory	- Limité à quelques dizaines de producteurs, aux abords des centres urbains - Pas de création d'emplois dans le tertiaire ni le secondaire, et peu dans le primaire - Activité marginale pour la région	- Grand nombre de producteurs impliqués, impact local très fort. - Entretien des routes - Maintien d'une densité démographique rurale - Développement des commerces et services de base dans les villages - Génère des revenus et des emplois urbains et ruraux	- Limité à un petit nombre de producteurs, dont seuls quelques-uns sont de structure familiale - Difficultés pour mettre en place des processus d'adoption de technologies - Importations massives de produits laitiers
Limits of dairy dynamics	- Accès au marché - Capital pour investir dans une petite industrie, ou union de producteurs pour monter une structure de type coopérative	- Basse qualité de la matière première - Possible évolution vers des situations de monopole industriels, ou de cartels. - Dépendance croissante des producteurs envers les laiteries.	- Coûts élevés de la terre et de la main d'œuvre - Le niveau d'infrastructures, d'assistance technique, d'accès aux marchés, et de coûts de production favorisent d'autres activités agricoles pour l'agriculture familiale. - Exigences de prix et de qualité au niveau de la distribution
Possible public policies	- Améliorer les voies d'accès aux marchés distants (ex : Transamazonienne). - Appuis logistiques et financiers pour l'émergence de coopératives, ou autres structures collectives. - Aides fiscales pour l'installation d'industries. - Formation de ressources humaines locales (fromagers notamment). - Formation de producteurs et initiatives pour améliorer la qualité de la matière première (vaccinations, certifications locales …).	- Formation de producteurs et initiatives locales pour inciter à améliorer la qualité - Législation sur un prix au producteur garanti - Législation pour éviter la formation de cartels, la concentration horizontale ou les abus de position de monopole ; mise en place d'accord de filière pou réguler les rémunérations de chaque partie - Recherche – développement pour améliorer la productivité des systèmes d'élevage	- Législation du travail plus adéquate pour favoriser la création d'emplois dans des structures familiales - Recherche-développement et assistance technique pour mieux profiter des disponibilités en aliments issus de l'agro-industrie régionale. - Formation de producteurs et initiatives locales pour améliorer la qualité (accords de filière, appellations …) - Appuis fiscaux aux petites industries locales

Spatial and temporal dynamics modeling : linking industrial dynamic and specialization levels in the dairy basin



Combining approaches (Carvalho S., 2010)



What is the weight of the dynamic in the territory ?

Conclusion

- A good approach for policies proposals (public, private, collective …)
- Methodology has to be flexible, adapted at every case. Many other proposals in the literature ("SYAL" C. Cerdan, "Participative zoning" P. Caron …)
- It is a collective approach, needs a collective preparation (workshops …)

Thank you

HOW TO DEVELOP DAIRY FARMING ASSOCIATION?

Case study:

Family operated dairy farming in the North of Uruguay (Tacuarembó).

Virginia Porcile

(Agronomist-Uruguay)

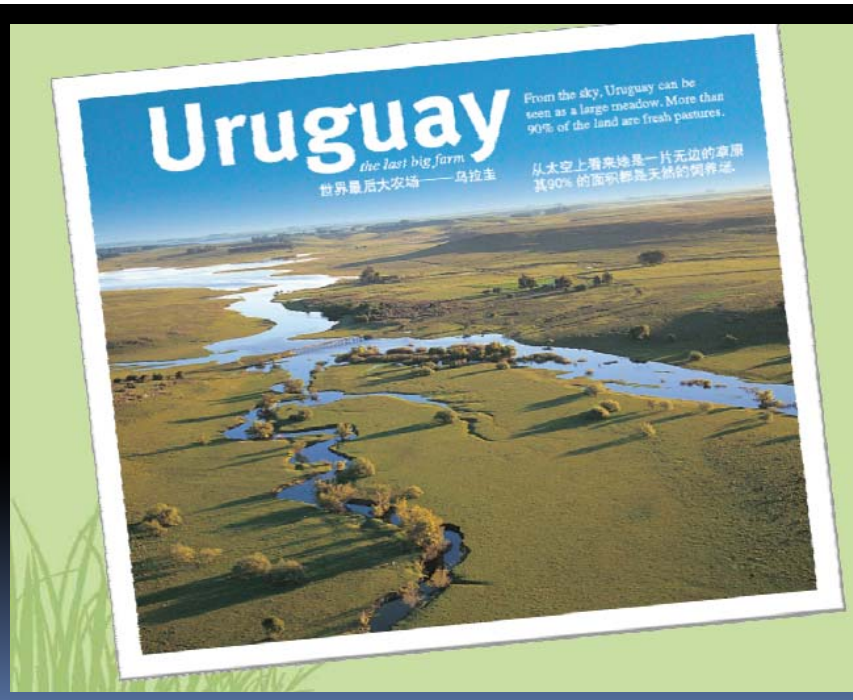
Proceedings of Workshop: Interdisciplinary Approach of Urban and Peri-urban Traditional Dairy Chain

Project DAIRY (JEAI-AIRD), Cairo, 10-14th June, 2012

- INTRODUCTION : Uruguay
- FAMILY OPERATED DAIRY FARMING in the NORTH (production, commercialization and industry)
- THE EXPERIENCE OF ASSOCIATION
  Processes, evolution, actual situation)
  Strengths and weaknesses.
- OPPORTUNITIES AND CHALLENGES

URUGUAY-SOUTH AMERICA

URUGUAY



URUGUAY

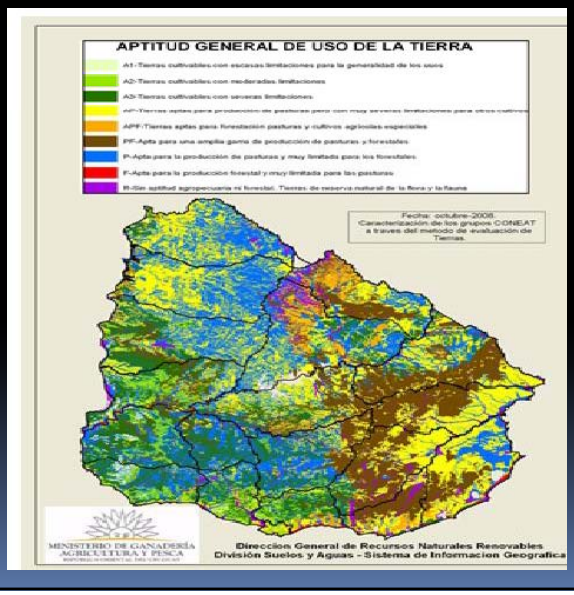
- LOCATION: 30 – 35º South Latitude
- AREA: 17 million has (15 millions has Agriculture)
- CLIMATE: template (4 seasons)
- TEMPERATURE: 30-40º (summer), -5 -10º(winter)
- RAINFALL: 1250 mm per year

- POPULATION: 3.3 million (40% -Montevideo)

- BEEF CATTLE: 11.1 million (meat breeds) = 4 cattle heads/person
- SHEEP: 7.7 million (meat & wool)
- Meat consumption: 60 kg/p/yr

- DAIRY CATTLE: 764 thousand heads (300 thousand milking cows)
- Milk consumption: 242 lt/ person/yr (includes all dairy prodts)
- 84% milk captured by industry (CONAPROLE and other small companies)

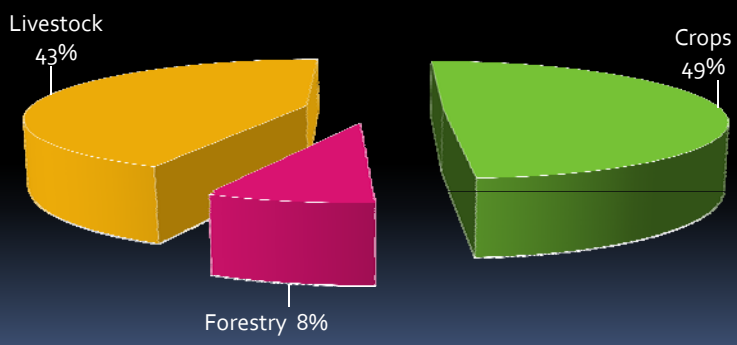
URUGUAY: land use aptitude



URUGUAY

(30-35% GDP from AGRI-industries-70% exports)

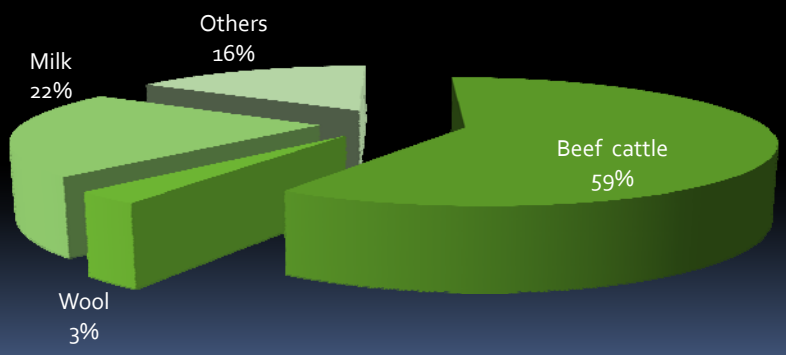
- **Gross income from agriculture (millon USD)- 2010-**



Source: Ministry of Livestock, Agriculture and Fisheries (Uruguay, 2011)

URUGUAY

Gross Income from livestock (millonUSD)
- año 2010-



Source: Ministry of Livestock, Agriculture and Fisheries (Uruguay, 2011)

FAMILY DAIRY OPERATIONS IN THE NORTH OF URUGUAY

PRODUCTION SYSTEMS IN THE NORTH OF URUGUAY

FAMILY OPERATED DAIRY UNITS IN THE NORTH OF URUGUAY (TACUAREMBÓ)

SOCIAL ASPECTS	
Land ownership (90%)	25-50 years on the land (3-4 generations)
Labour (all activities: milking, feeding, calf rearing, delivering, sales)	Wife & husband (sometimes children) Women farmers (1%).
Education (parents)	Primary school (not finished)
Education (children)	Secondary School +
Farmers age (average)	54 years old
Decision makers:	Man (& woman)

MAIN ACTIVITIES per FARM	
Dairy production	89%
Beef cattle (meat)	10%
Cheese	0-3%
Others (pigs, chicken, sheep)	1%

PRODUCTION SYSTEMS

FAMILY OPERATED DAIRY UNITS IN THE NORTH OF URUGUAY (TACUAREMBÓ)

PRODUCTION SYSTEMS	
Location	Peri-urban areas and city suburbs.
Area/farm:	1 -45 has
Number of farms:	50-60
Number of cows/farm:	1-30 (Holsteins, Jerseys & crossbreeds)
Milk production(lt /cow/year):	2400-3000 (4, 5 – 12lt/cow/day)
Pastures (10-15% diet)	-Native (low quality and DM production) -Autumn/winter (1-3 ha oats + ryegrass, Lotus subbiflorus, Trifolium repens) -Summer crops (1 ha sorghum, maize)
Supplements (85-90% diet):	By products rice, wheat, sunflower, barley industries (8 -10 kg/animal/day)
Lactation length (days):	300
Mating:	Artificial insemination (90%) , Bulls (10%)
Age at first mating:	2.5-3 years
Calving	All year (spring)

Milking system (am/pm milking)	**24% manually 76% 2, 3 organs milking machine.**
Milk cooling system:	Freeze water bottles and put in a freezer at cooling temperature

Delivering system	After AM milking --directly to clients: door to door (aluminium tanks, 1lt /2lt plastic bottles) in carros or utes.
	AM: daily to local industry in carros or utes.

MILK COMERCIALIZATION	2500 lt/day
57 % milk sold directly to clients (unpasteurized)	70% ($13 = USD 0.62/lt)
43% milk sold to local industry	30% ($ 6.5=USD 0.31 /lt)

MILK PROCESSING		
Cheese,(dulce de leche)	1%	

MAIN PROBLEMS seen by them:

PRODUCTIVE SYSTEM MAIN PROBLEMS:	
1. LOW MILK PRICE	100%
2. HIGH FARM WORKING EXPENSES	100%
3.SERVICES AND GOODS AVAILABILITY	83%
4. TECHNOLOGY ADOPTION	78%
5. LAND (not enough area to grow)	67%
6. CAPITAL TO INVEST ON FARM	56
6.LABOUR (lack of people to help/work)	39%
7. ACCESS to CRÈDIT	33%

Source: Faculty of Agronomy survey (2012)

FARMERS ASSOCIATION

Family dairy farmers in the North

STRENGHTS

- Productive capacity installed (land, cattle, infrastructure, knowledge).
- Government support (grouping promoting policies)
- Motivated and respected leaders.
- Conviction of the need to grow (out of the farm).
- Technical Assistance (Social & Productive)

WEAKNESSES

- Productive issues (production, milk quality, pastures sustainability, water quality, infrastructure, hygiene)
- Many failed attempts of grouping
- Unsuccessful experiences in the past.
- No confidence in government agencies & others (e.g. research institutions and extension organisations)
- No support from local industry (monopoly)

THE PROCESS OF ASSOCIATION

DROUGHT (2008/09) ! .....! Regulations	Project to rent land to Forestry company	TACUAREMBÓ DAIRY FARMERS ASSOCIATION
Tacuarembo DFAPROJECT (government organizations & private companies)	Share land for young stock and dry cows (1st experience)	Break up myths Knowledge 1st Team working experience
Land use instability + more farmers to join ..	Social – Productive Project…	550 has land for common use….

ACHIEVEMENTS

What have we achieved after becoming an Association?

- Forestry land for dry and young stock.
- Participation in monthly meetings with local organizations.
- Recognised locally and nationally (used as example by MGAP)
- Exhibition and sales of products in Annual Rural Asociation Exhibition & Sales.
- Training :

Best practice for dairy farming

Leadership and motivation workshop

Dairy farm operator course

Cheese making course

- Technical assistance: social (identify needs, strenghts and weaknesses), agronomic (to develop production)
- Recently, 2 weeks ago, we´ve got …550 has for farming together!!!.

THE PROCESS OF ASSOCIATION

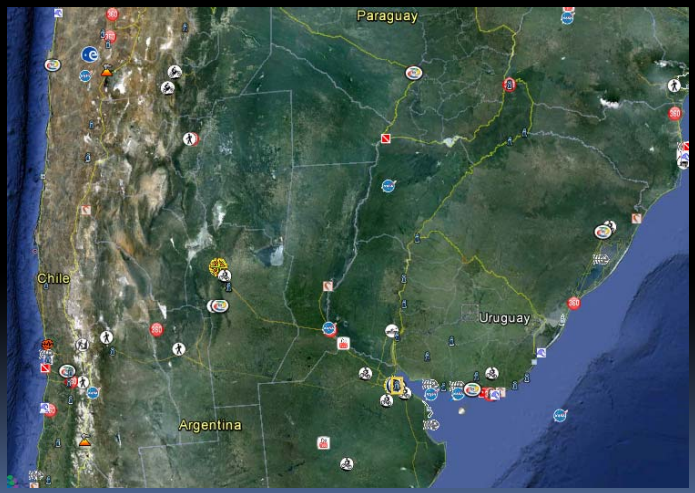
OPPORTUNITIES AND CHALLENGES

- SUSTAINABILITY (individual farmers, group of farmers, natural resources-soil& water quality)
- GROUP STRENGTH
- KEEP TRAINING
- MOTIVATION AND LEADERS SUCESSION
- YOUNG PEOPLE (?)

- DEVELOP COMMON SYSTEM (milking and milk processing)
- SALLE OF EXTRA MILK PRODUCED

MAIN CHALLENGE:…KEEP DAIRY FARMERS SMILE

URUGUAY



Milk Procurement Supply Chain Historic Perview in India

Dr. S. Ranade

Three different time stages

1. Pre Operation Flood
2. Operation Flood Period
3. Post Operation Flood Period

Proceedings of Workshop: Interdisciplinary Approach of Urban and Peri-urban Traditional Dairy Chain

Project DAIRY (JEAI-AIRD), Cairo, 10-14th June, 2012

Pre Operation Flood Milk Supply Chain Model

Introduction of Milk Schemes in the Four Metro cities

Establishments of cattle Colonies

Similarly major District HQ , Dairy Plants were established

Raw Milk Supply inadequate due to Population growth of the Cities

Heavy dependance on Imported Skimmed Milk Powder and Butter Oil

Operation Flood period
Milk Procurement Model

Indian Dairy Sector

Dairying in India is more than a business; it has broader social and economic dimensions

Feeding practices
Animals fed largely on agricultural byproducts, crop residues and green fodder
Supplemented with Compound cattle feed and mineral mixture

Resource ownership
Predominantly Small farms with < 2 ha of land and 1 to 2 animals
About 70 million producers

Use of Labour
Women contribute significantly

Domestic milk production – 2009-10
112 million tonnes - 310 million kg/day*

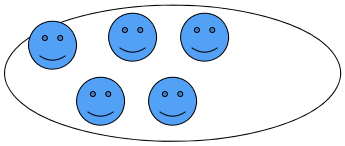
Milk consumed/used in production areas itself	Surplus milk sold from production areas
150 million kg/day ~ 48%	160 million kg/day ~ 52%

Surplus handled by:

Unorganized Sector	Organised Sector (Coop+ Private)
110 million kg/ day	50 (26 +24*) million kg/ day
~ 70% of surplus	~ 30% (16+14)of surplus

***Estimate surplus handled by organized private sector**

The unorganized sector which handles the balance milk not collected by the organized sector, includes a large number of milk vendors who collect milk from producers and sell directly to consumers



Milk Producers

Testing , Weighing & Grading of the each Producers Sample

Village Level DCS

Milk Transportation by Open Truck

Complaints of Shortages,Spillage, Sourage etc

Recieving Milk in Cans

Grading , Weighing & Testing

Processing , Standardisation & Packing

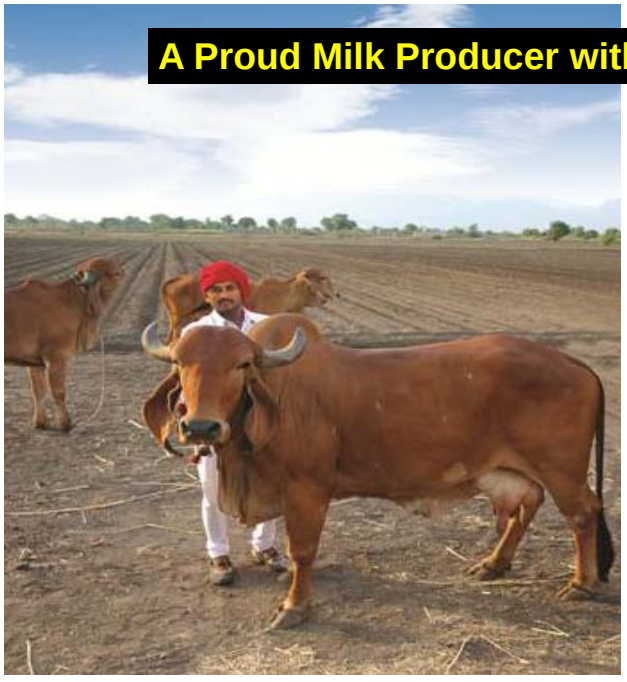
Product Manufacturing

Supply to Consumers

Reciept of Payment

Payment to Village DCS

Payment to farmers



A Proud Milk Producer with his Cow

Areas where Milk Coops are providing Backward & Forward linkages

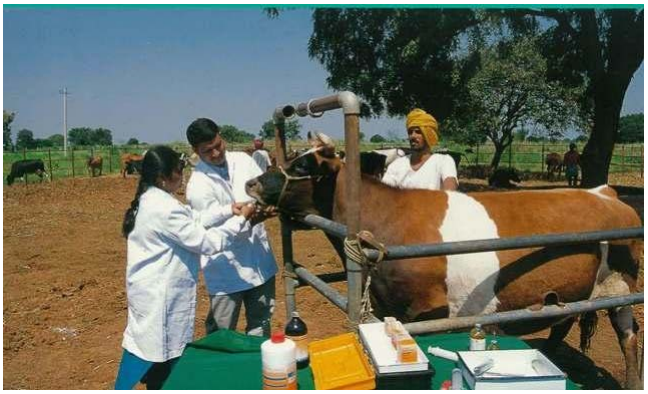
- Increased coverage of producers by cooperatives
- Quality improvement – cold chain – Bulk Milk Coolers
- Artificial Insemination & Breeding Services.
- Veterinary Services & Vaccination Programme.
- Nutrition : ration balancing
- Nutrition : feed manufacturing
- Nutrition : fodder development
- Human Resource development
- Processing and marketing network

Nutrition : Ration balancing

Nutrition : Balanced Feed Manufacturing


Nutrition : Fodder Development

Veterinary Services & Vaccination Programme.



Training on Dairying Practices & Human Resource developme

Quality improvement – cold chain – Bulk Milk Coolers

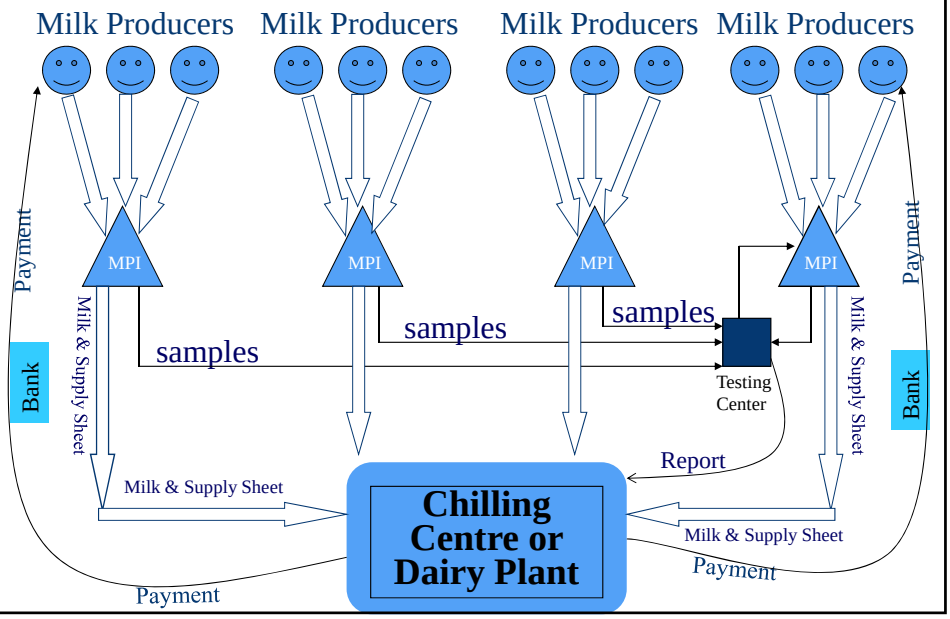
Post Operation Flood Milk Supply Chain Model

Era of Globalisation and Competition

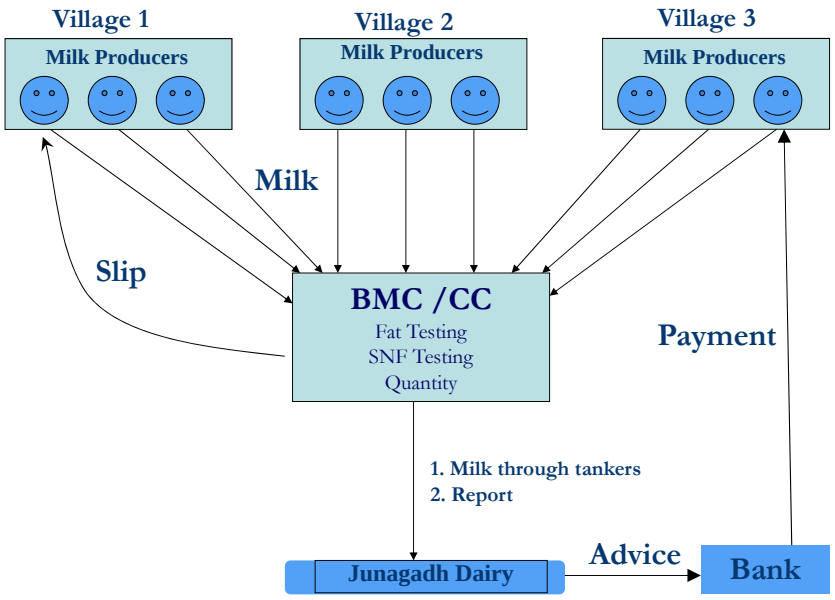
Milk Surplus and Opening of Export of Milk Products

Major thrust on Quality of Milk

Milk Procurement System



BMC / CC Procurement System



While starting the Dairying operation simultaneously Pasteurised Milk Marketing should be initiated .
High Volume – Low Profit Business model will render the operations uneconomical for the Small Milk Vendors , who supplies unpaserised milk Directly To the city consumers.