

INVENTORY AND DEVELOPMENT PERSPECTIVE OF MILK PRODUCTION IN SAHARAN AREA: THE CASE OF THE GHARDAÏA REGION (ALGERIA)

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ABSTRACT: *The National Fund for the Development of Agricultural Investments (FNDIA) supports various actions, including the dairy industry (mini-dairy, production and birth bonuses, milk collection, processing and artificial insemination). At the level of the Ghardaïa region, like the other Saharan regions, FNDIA helped initiate the development of livestock and thereby contributed to the increase in the number of head of cattle. The establishments of nurseries and of specialized dairy barns have created a dynamic in the dairy cattle farming and have positive impacts on the local market, namely an increase in the production of milk. According to the Directorate of Agricultural Services (DSA) of the Wilaya of Ghardaïa (2010), the number of imported dairy cattle between 1995 and 2010 rose from 177 to 1688 dairy cows owned by the private sector. 13 400 liters of milk are collected daily by dairies and milk collection points. In this context, the objective of this research is to develop an inventory of the dairy industry in Ghardaïa and identify its strengths and weaknesses in order to propose solutions to ensure its sustainability and thus provide guidance to the strong investment by government.*

ORIGINAL ARTICLE

Key words: *Agricultural Development, Dairy Cattle, Ghardaïa, Milk Production, Saharan Region*

INTRODUCTION

Development of milk production is among the priorities of the Algerian state, to meet a growing demand for milk and its derivatives and, in particular, to cover the deficit in animal protein, facing a spiraling population growth. The overall need for milk of Algeria in 2007 was estimated at 5 billion liters, with an average consumption of about 130 liters per capita per year (I.T.E.L.V. 2007).

Various national programs have been initiated since the 90s and are to encourage and induce a series of policies to upgrade the local milk production, to promote self sufficiency (Mamine et al., 2010). This one will improve the protein intake of the local populations concerned (Bensaha, 2008) and will develop an economic sector that can be prominent in the development of the Saharan areas. The development of this sector creates jobs and wealth (Ouakli et al., 2003).

All state aid and interventions planned under the plan slag quickly created a craze for cattle including dairy cattle became part of the socio-economic landscape of the Saharan territories. These measures have largely contributed to the establishment of stable performance in these areas.

Of the 1.56 million which heads up the national herd, found traditionally in the regions north of the country about 80% of the cattle scattered irregularly, with 59% in the east, west 14% and center 22%. Only 5% are located in the Saharan regions, the equivalent of 77 000 head of cattle (Senoussi et al., 2010).

In this context two questions arise:

- What is the current position of dairy farming in the region of Ghardaïa?
- What are the dynamics into play?

This study aims to answer these key questions, addressing aspects of production, livestock management, packaging, distribution, consumption and marketing, to begin thinking about the potential of improvement of this sector in this region.

Crop production and the feed balance current

In Algeria, the land involved in forage production is nearly 40 million hectares (Mammeri, 2003). They represent barely 7% of the useful agricultural area (SAU). One of the most striking consequences of this lack of



fodder SAU, is the weakness of milk production. Indeed, it depends, in large part, forage production (Abdelguerfi et al., 2003). It seems obvious at this stage, taking into account the importance of the actual availability of food resources in the projection of development activities (Sraïri 2004).

Therefore, the state has established grants to encourage the farmer to produce himself necessary food for his animals, such as forage and grain. These grants were provided for the purchase of irrigation equipment and bonuses 5000 DA / ha have been granted for the installation of high forage yields and feed value optimal. Emphasis was placed on the development of forage seed production quality, adaptable to our climate, focusing on ways to produce ensilage and build silos.

In the region of Ghardaia, the total agricultural area only 16% of the total area of the Prefecture, due to the dominance of unfavorable geomorphological. Thus, 84% of the area consists mostly of unusable surfaces, they include not only unproductive land not used for agriculture, but also areas that cannot be grown or processed in background and, more definitive, surfaces covered by urban areas, various buildings and communications channels (Bensaha 2008). This is combined with factors such as drought, water shortages, inadequate control of operating techniques, the high cost of cattle feed and fodder lack perimeters, which are factors that limit the development of dairy farming.

This stems from that culture and forage production in Ghardaïa remains, in many respects, a marginal farms. Indeed, the proportion of land reserved for forage crops, used extensively moreover, remains low. (Table 1)

Cultures	Areas carried out (ha)	Quantities harvested (qx)	Average yield (qx / ha)
Cereals	1 150	47 384	41,20
Industrial Crops	476	9 520	20
Fodder	1 900	366 700	193
Market Gardening	2 666	400 000	150
Potato	130	26 800	206,15
Arboriculture	3 237	117 600	36,33

The incentive for the production of fodder by the breeder, rehabilitation and diversification of the forage crops, especially those consumed fresh, through a careful selection of forage species adapted to local conditions, the use of 'adequate fertilization to improve forage production in quantity and quality, are needed (Mayouf 2008).

Workforce data Dairy

Cattle breeding have an important economic and social role in Algerian society. Indeed, the dairy sector is strategic in view of its impact on food security and its place in the socio-economic. Furthermore this importance, the dairy sector supports the maintenance of livestock on their farms by providing a regular income. It thus contributes to the intensification and integration of agriculture in national economy.

This speculation has risen in 20 years, from a casual family breeding to an interest preeding, by the orientation and awareness of supported dairy producers by grading the health of their business and their introduction into the sector « milk ». The activity of dairy cattle in the region of Ghardaia plays, in fact, a much larger role that cannot lead one to believe the simple statistical reading of the part that plays in the overall development of the region. We notice that the number of breeders is continually evolving, and this is due, no doubt, supports and subsidies from the state to place different types of farms including dairy cattle (Figure 1).

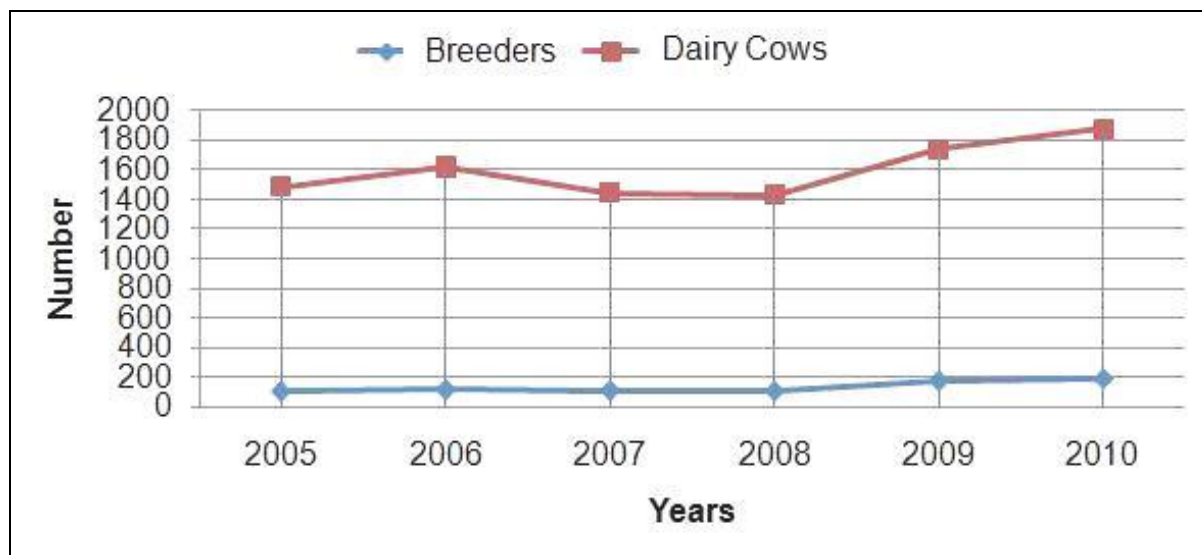


Figure 1. Evolution of cattle farms and the number of dairy cows (DSA Ghardaïa 2010)

In the Wilaya of Ghardaia, livestock-oriented dairy is based mainly on cattle and goat. Indeed, it was counted a total number of dairy cows of about 1,688 heads, for a number of dairy goats, which is 132 heads. About 80% of farmers are moving towards cattle and 20% associate the farm to that of goats (Ouled hadj youcef et al., 2007), while ensuring strict compliance with health standards (particularly regarding the prevention of brucellosis). We should know that the rise in recent years is the direct result of increased enrollment by importing heifers, the strict application of preventive health plans, and the gradual improvement of production techniques. It is in this perspective that the National Agricultural Development Plan (NADP) initiated in 2000 through the dairy cattle section, has impacted positively on the Saharan space (Senoussi et al., 2010).

This type of farming livestock intensively conducted exclusively for milk production. The main livestock bred are those imported such as Holstein, the Montbeliarde the Flekvy and Brune des Alpes. The latter require a good command of livestock (buildings, balanced diet and health monitoring, ...). With a reasoned and rational conduct, dairy cattle, on both numbers of staff, is an asset capable of generating a dairy capable of ensuring self-sufficiency in consumption

Availability of labor

The need for labor is important to the cattle breeders, goats, camels or institutions related to the sector (Table 2). In the availability of the workforce, we record that over half of cattle farms face difficulties in its timely availability, because it consists of a young workforce, with no experience and with low qualifications, young non-degree holders training orienting default to livestock.

Table 2 - Labor generated in the dairy industry (DSA Ghardaïa 2010)

Dairies	71
Collectors	12
Cattle breeders	221
Goat breeders	35
Camel herders	06
Workers in institutions breeding	371
Total	716

Ability of milk collection

The wilaya of Ghardaia is a large pool that has a dairy herd assessed in 2009 to 2,630 head of cattle including dairy cows 1560 against 1320 in 2008. The assessment of management of agricultural services (DSA) reported a production of 18 million liters of milk during 2009 against 17.3 million liters in 2008. This growth is related to the advent of the policy of agricultural and rural renewal in 2008, which led the agriculture sector to focus on strengthening local production, including those of wide consumption.

Within this framework, a process incentive for all stakeholders in the sector is being implemented, including grants and aid programs consistent. This new strategy was soon proved to be successful. Thus, production levels in raw milk only increases year by year. The products of the milk collection grew significantly thanks to state support, which increased from 7 dinars to 12 dinars per liter. In 2009, the collection capacity has exceeded the 13,400 liters / day.

o bring this production to the industrial units, a small network of collectors has been created and approved the health plan. They collect milk on farms with small vehicles and refrigerated transport unit level packaging. These are solicited based on their packaging capabilities.

The increasing number of collectors and the quantities of milk machined displays a remarkable parallelism which confirms that the efforts in the formal collection were the major component of the dynamics of supply to industrial units (Figure 2).

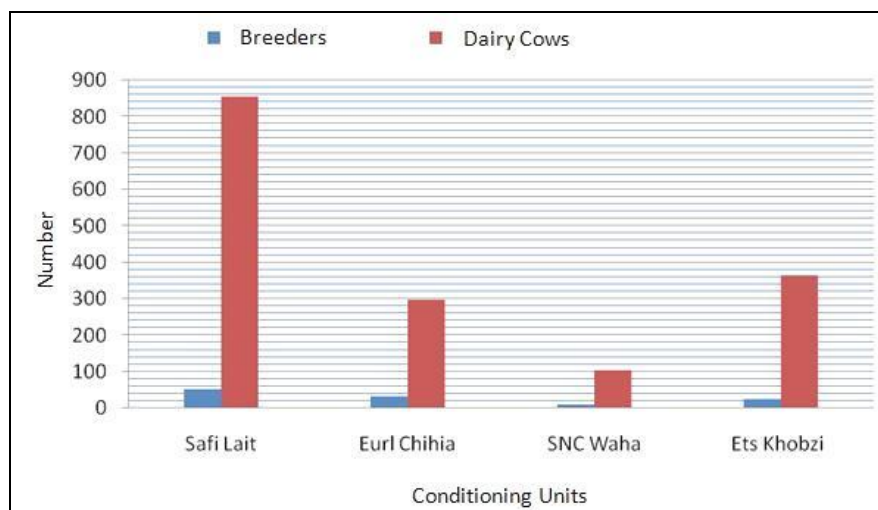


Figure 2. Relation breeders / Conditioning units (DSA Ghardaïa 2010)

The goal of regulators was to allow these farms located throughout the wilaya of their daily flow perishable product to the packing units. But the needs remain great, and efforts must continue to be absolutely oriented collection, particularly in terms of reducing mobilization costs of raw milk in the industrial process, because, currently, processors admit that the cost of raw milk is unusually high, by between 40 and 45 DA / liter, which is why they resort to import milk powder.

It should be noted that the collection of milk is only a sideline and the breeder cannot count on to live with his family's income it generates.

Marketing and dairy industry

The nutritional status of a population is closely linked with the quality of its diet (Araba et al., 2001). The objectives of the plan in terms of milk consumption could be considered "excessively high" since they are 130 liters per capita per year, against 70 liters per capita per year in the Netherlands. They could not be reached, because consumption levels are closely linked to socio-economic household as well as culinary traditions.

The major objective through different types of milk marketing channels is to regulate the milk market to meet this issue, and ensure the smooth operation between the various links in the chain (Diagram 1):

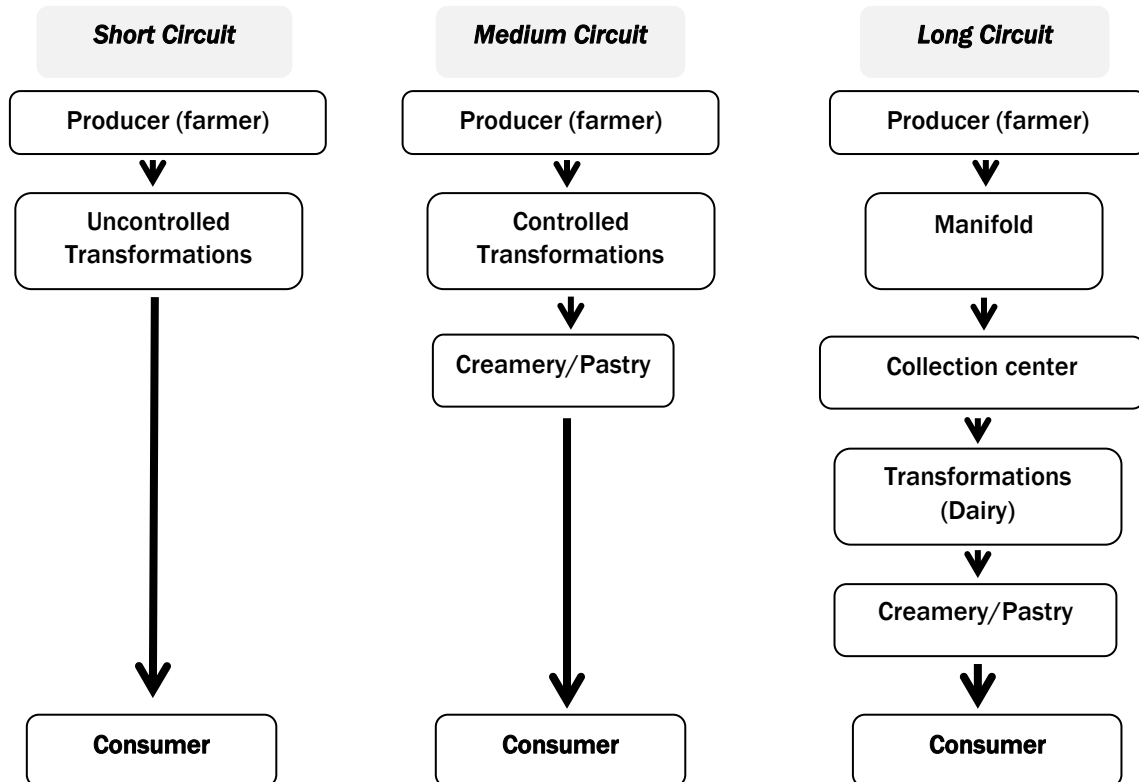


Diagram 1. Main marketing channels for milk in the region of Ghardaia. (Ouled youcef and al 2007)

The distribution of milk in bags, including through the mobilization of refrigerated transport and approved the health point of view, is gradually improving in boosting the regular circuit compared to the informal to the great satisfaction of households. In fact, it is much more quality than quantity, which now seems compelling (Sraïri, 2010).

In the region of Ghardaia, most consumers appreciate fresh products (fresh milk, Lben, kémaria ...). Among the strengths of the dairy industry include local expertise inherited over many generations of cheese-making tradition (Kémaria). This tradition has grown over the years by advances in technology, but consumers remain committed to the regional product. During the holy month of Ramadan, there is an increase in consumption resulting in higher demand from dairies. This situation causes the depletion of stocks of dairies in the wilaya. Also, the supply of milk powder should be strengthened.

Health monitoring of herds
The State, in order to guarantee public health entrusted inspection dairy veterinary services located in wilayas. These services have continued to implement measures to monitor the health of dairy cattle and especially in the fight against tuberculosis and brucellosis, two diseases that also threaten consumer health (Benkirane 2001).

It should be noted the positive impact of health action, which takes place every six months and is associated with periodic epidemiological investigations to maintain all health indices at thresholds satisfactory.

A screening program was implemented by the veterinary inspection of the wilaya of Ghardaia to limit the rise of zoonotic diseases mainly due to the consumption of milk that could escape the circuit imperative pasteurization unit level packaging.

Development institutions concerned have strengthened supervision and support for farmers by 40% of veterinary officials, 30% of private veterinarians and 12% in pre-employment (Table 3), in order to undertake

extension activities in an area where, precisely, professionalism is required because of the complexity of the activity (Amellal 2000)

Table 3 - Veterinary medical coverage of wilaya (DSA Ghardaïa 2010)

Officials veterinarians	16
Pre-employment contract	05
Para-veterinary officers	07
Private veterinary medical	12

Milk Sector Weaknesses

The dairy industry in the region of Ghardaia, reveals a number of advantages but also shortcomings surmountable. Among the constraints, it turns out that some breeders do not take into enough account of the quality of food and resort to a rudimentary form of rationing. They use as main pastoral resources, including drinn (*Stipagrostis pungens*), the Diss (*Imperata cylindrica*), the Agga (*Zygophyllum album*) and quackgrass (*Synapsis arvensis*). This, equally, without considering the nutritional value of these respective foods.

In fact, breeder are almost always forced to use dry food, because of the lack of land used for forage crops, on the one hand, and lack of irrigation water on the other. But the high cost of this type of food, bran, VL15, maize, and the scarcity of green fodder in winter, leading farmers to use more highly concentrated food, including date rubbish, bran and VL15, (representing almost 74% of cases considered during the investigation). Indeed, the forage system based on dry forages (hay and straw), and concentrated food, lead cow fattening and, therefore, a significant drop in milk production.

Forage production in the region of Ghardaia, is very low compared to the needs of livestock, which requires appropriate actions for the development of the dairy herd. Food that is the most important parameter in operating costs of milk production is also one of the most effective tools for controlling this production, both in quantitative, qualitative and economic. Thus, the food forage remains the main limiting factor, nearly 97% of the farms studied are not self-sufficient in fodder.

Regarding the actual Dairy and its adaptation to the Sahara, we find that climatic factors generally act negatively on the performance of imported breeds of cattle, which was already known. Cattle performance decrease, since much of their metabolism provides the energy consumed by the need to adapt to environmental factors (Nedjraoui, 2003). Breeds recently imported, introduced to improve production, are faced with ecological conditions quite different to those of their country of origin. Indeed, the Saharan climate is unfavorable for these animals, and deprives them of abundant food because of the lack of grazing suburban. Summer heat that exceeds the average of 34 ° C also affects milk production, because over the thermal interval [27 ° C - 30 ° C], animal productivity drops significantly (Senoussi, 2008).

As for the ability of milk collection, the main link between production and the dairy industry, it exceeded 13,400 liters / day in 2009. This volume, a marked increase, is a response to the encouragement of the State, but the collection capacity has not been able to progress from one way and it undergoes significant and important annual variations. It is estimated, therefore, that the major problem of production of milk by producers in the wilaya of Ghardaia, lies in the inadequacy of the collection of raw milk.

In terms of sanitation, modern dairy cows are both sensitive and demanding. Susceptibility to certain diseases, and requirements vis-à-vis farming conditions, maintenance of the animal and livestock buildings. Indeed, in the absence of an adequate plan prophylactic measures and hygienic routine, we found, in most farms, cases of abortions during the sixth or seventh month of gestation.

In terms of health monitoring, it is necessary to predict biannual and annual screening against major zoonotic bovine. And not forgetting the various vaccinations, for cattle, sheep and goats. The various pathologies induce loss of production and marketing of milk because of the legal prohibition of delivery, straight to drug treatment, and the farmer bears additional expenses entailed by the reinstatement of dairy cows.

Finally, the difficulty of recruiting the necessary labor, wage conditions because of discouraging and lack of interest of people for careers in farming, are among the factors hindering the development of the dairy industry in the region. Finally, the industrial production capacity of milk and dairy products have seen notable expansion in the region of Ghardaia, but the dairy industry is still not able to respond adequately to rising demand.

Recommendations and proposals

Development institutions shall, while implementing a strategy urgent deployment (scale wilaya), continue their efforts in various fields, such as genetic improvement and control of cattle feed to objective to make proposals to the government in charge of livestock, ranchers and development workers.

From this perspective, the ITELV the CNIAAG, the ONDEEC, might be called upon to construct, together with veterinary services at the wilaya, a strategic approach to sustainable development challenges at the various links the sector and ensure its sustainable development. For this, the state must invest in the crenel "Recruitment of veterinarians and animal scientists, engineers' real capital so called the cornerstone of development policy.

Also, better knowledge about the composition of herds, the comparative performance of different races in the Sahara and on forage production, are also needed. This is possible only by the experimental trials involving research centers and universities specializing in this area to: improve feeding by balanced basal rations (legumes and grasses), to optimize yields and methods of conservation and distribution of different forage species acclimated.



CONCLUSION

In our country where the promotion of specialized dairy farming is relatively new, the Animal Research adapted to dairy farming Sahara still have several challenges. Quantity of raw milk, Dairy farming could not keep up with demand: it is still relatively low yield, probably due to the lack of logic of intensification and integration of this local production. Species of sheep and camel, thanks to their hardiness and their good adaptation to environmental conditions, may represent a crenel research to significantly improve milk production. A debate on the model of dairy farming in Algeria in the Sahara, and the place to be taken by the selection of local breeds in such environments would be an important contribution.

The definition of the different pathways that the dairy industry can guard against any dogmatism and simplification. Every decision at each level and each situation must result from arbitration must take into account all the technical and socio-economic actors.

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