



## **Current Status of Dairy Cattle Breeding And Understanding of the Technical Operating Logic of Farms in the Saharan Regions of Algeria**

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### **Abstract.**

The objective of this study was to evaluate the balance of the milk sector over the last three decades. Based on an analysis of the diversity and dynamics of livestock systems, in their past and current context, it raises the problem of the development of cattle farming. The analysis then going back upstream of this sector presents the current situation of the dairy cattle in the Saharan regions and its geographical distribution, then the production and the local milk availability in the various communes. Current dynamics reflect a real livestock revolution in the Saharan regions, recognized as the main regional dairy basin.

Indeed, according to Direction of Agricultural Services (DAS) in the Ghardaia wilaya (2019) between 1 995 and 2018, the number of imported dairy cattle increased from 177 dairy cows to 4 189 dairy cows, owned by the private sector. The production of 28 560 liters of milk of which 11 800 liters is collected daily by the dairies and collection center. The purpose of this institution was to respond to the concerns of stakeholders in the sector: How to improve herd reproduction? How to solve the problem of the forage deficit? The finding has shown that despite thirty years of support measures, very expensive at the state coffers, the livestock sector has still not passed the embryonic stage and remains far from achieving the goal that it is assigned, in this case self-sufficiency. Algeria sees oil resources dwindle as world price of milk and dairy products rise.



**Keywords:** Agricultural development, Dairy cattle, Ghardaïa, Milk Production, Saharan area.

## Introduction

During the last decade, Ghardaia region, like other Saharan regions, witnessed a remarkable growth in terms of milk production, and, thanks to the improvement of livestock, enhancement of the genetic potential of dairy cattle and goat as well as the increase in number (**Bensaha & Arbouche, 2014a**). The feeding of dairy cattle is subject to many questions on the part of farmers and consumers. First, for concerns regarding product quality, but also the relationship between feeding practices and wider environment and land use (**Bensaha & Arbouche, 2014b**). Among these constraints, the technical aspects to which very few authors have attached importance.

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 were estimated at 5 billion liters, with an average consumption of about 130 liters per capita per year. (**I.T.E.L.V. 2007**).

The animal welfare issue is more and more central both within the debates between the agricultural world and the global society, and in the regulations. Some of the main issues are to build relevant tools to assess the level of animal welfare on farms, to know whether it is more relevant to improve animal welfare on every farm, or to develop quality schemes with welfare specifications (**Dockes et al., 2007**). At the same time, ruminant farming is increasingly questioned by society about its contribution to sustainable development (**Guillaumin et al., 2009**). To tackle these issues several research projects are being carried out. They study the points of view of farmers, consumers and scientists.

The notion of sustainability is multidimensional since it includes ecological, social and economic objectives. It is in this general context that several methods of assessing the sustainability of agricultural holdings have been proposed by several authors. Among these, the method of indicators of the sustainability of agricultural holdings (IDEA) (**Vilain, 2000**).

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

The private practice of the veterinary profession has grown, including in the Saharan areas where it has been able to rely on networks of animal health auxiliaries (**Bensaha and Arbouche, 2017**). Vaccinations are partially and gradually provided by private individuals in Algeria (**MADR, 2018**).

According to **Bensaha et al., (2015)** in cattle farms the use of foreign labor, the low level of technology and lack of knowledge of workers exacerbate serious problems. Rural areas are today, namely the Saharan areas are at the heart of the concerns of governments seeking to respond to a growing social and economic necessity (**Kanoun-Meguellati & Yakhlef, 2008**).

The purpose of this study is to assess the situation of the actors: producer breeders, wholesalers, state agents, private veterinarians and traders; identify the constraints and suggest improvements of this sector in this region.



## 2. Material and methods

### Study Design and Sampling

Our study focuses on the conduct of the dairy farming practices in the Saharan regions namely the region of Ghardaia. It is based on socio-economic surveys previously carry out by Bensaha et al for their many works. Research was conducted with farmers and producers, agricultural and local government institutions.

These interviews were carried out with stakeholders in the municipalities of the province of Ghardaia (Algeria Sahara region). Each farm was visited for sampling and for data collection.

With the breeders, the semi-closed questionnaires focused on their assessment of the animal health status, the behavior of the animals, reproduction, the level of dependence of the veterinary services, their opinions on the efficiency of state actors and suggestions for improvement. The type of training among breeders was also questioned and their level of training is reported in the results as well as the activities of breeders.

## 3. Results and discussions

### Fodder potential in the study area

The agricultural activity recorded a great boom its last years in the region of Ghardaïa thanks to the dynamics instilled by the various programs implemented by the public authorities, to promote this vital sector.

The Saharan zone is one of the difficult areas in which to maintain farms despite all the constraints they face. The state, through public policy has played an important role in the dynamics of this region. In semi-arid forage are traditionally grown as intercrop with cereal (**Bensaha et al., 2017**).

The results of ten years (2008-2018) of agricultural development of the Saharan zones (Table 1) today are generally positive, in terms of area and production. Some Saharan wilayas have become leaders in some agricultural products, including vegetable crops. Dynamics of production of these farms systems reveals their ability to adapt to the different constraints.

**Bensaha et al (2015)** notes that these shortcomings in forage resources are an obstacle to livestock development, which leads to deficiencies in animal production. Algerian farming suffers food constraints which limit not only fodder production at farm level but also the production of concentrated feed for dairy cattle.

The intensification of fodder production (Alfalfa, Sorghum, Corn) essential food for the dairy cattle herd currently estimated at 41,200 heads is planned in order to support the development of the milk sector in the region which produces 13,000,000 liters / year of which a large part in the region of Guerrara nicknamed "**Dairy Basin**" as well as the production of red and white meat.

La luzerne constitue la culture fourragère dominante avec une superficie de 1.175 ha, soit plus de 41,81% de la superficie fourragère totale, suivie du maïs ensilage avec une superficie de 1.160 ha (41%), puis l'orge avec 320 ha (11%) et l'avoine avec 150 ha.



Well adapted to the climatic conditions and the arid environment of the region, these fodder crops have proven to be essential to significantly strengthen the development of the milk sector upstream and to improve the quality of the product and the yield downstream.

Table 1. Main crops harvested and implanted in the wilaya of Ghardaia (DSA Ghardaia. 2018)

Species	Areas in Ha	Areas harvested in Ha	Quantities harvested in Qx	Average yield In Qx / Ha
Oat	549	549	43371	79
Alfalfa	1294	1294	165630	128
Grain-maize	189	189	56700	300
	1880	1880	564000	300
Barley	1351	1351	162120	120
<b>Total</b>	<b>5540</b>	<b>5540</b>	<b>1605221</b>	<b>192</b>

The incentive for the production of fodder by the breeder, rehabilitation and diversification of the forage crops, especially those consumed green, 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 (MADR, 2018).

### General workforce data Dairy

Livestock represents one of the main components of the oasis economy of the Ghardaia region. This sector constitutes an important source of income for the local population and contributes to the maintenance of the ecological balance of the region.

Cattle units surveyed operate imported breeds such as the Holstein breed, the MONTBELIARDE the FLEKVI and BROWN ALPS and cross breeds such as COMTOISE. The racial makeup of farms leaves appears dominance of improved breeds (Belhadia et al., 2009). The predominant race is MONTBELIARDE 74%, followed by Holstein and the very small proportion FLEKVI, the BRUNETTE ALPS and COMTOISE. According to (Belhadia et al., 2009), (Belhadia & Yakhlef, 2013), animals from the local renewal would MONTBELIARDE race, enjoyed by farmers in the region. However, this potential remains poorly expressed especially in the absence of control. The main high goat breed is the result of a cross between the red race oases and Saanen breed, whose number is 153 000 head.



The boom in the milk sector in the region of Ghardaïa is favored by several factors, notably the increase in the dairy herd currently estimated at around 4,000 dairy cows, the Improvement of the calving rate and the increase in areas for the production of fodder and silage corn for the manufacture of animal feed (**Table. 2**).

In this perspective, many investors plan to create in the region of Ghardaïa new integrated farms combining dairy cattle breeding, fodder production and production of milk and its derivatives. The development of the sector in the wilaya aims to perpetuate and increase production while guaranteeing the quality of pasteurization processes, by encouraging the creation of new processing and pasteurization units in order to promote conservation without affecting the taste properties of milk. Currently, more than 1.2 million liters of fresh milk are produced monthly in the region of Ghardaïa.

*Table 2. Number of livestock in the study region.*

Livestock	Number of head
Sheep	363 000
Cattle	4 189
Goats	159 000
Camels	11 450

According to **Bensaha et al., (2014 b)** the general structure of cattle size of the study area shows that dairy cows, heifers and calves are 78.1% of the total workforce. This denotes an orientation of farms to one dominated by dairy production versatile production with animals and meat renewal.

### **Milk collection data**

An agricultural region par excellence, the region of Ghardaïa has become a benchmark region in terms of food self-sufficiency and the (Bio) taste quality of its products. It is currently positioning itself as a leader in the milk sector in the south of the country with 13 million liters of raw milk in 2017, say local officials in the sector, despite the multiple challenges hindering its development, in particular the problem of land fragmentation, low attractiveness for young workers, a dry climate and low rainfall.

In most cases, the breeder does not deliver the milk himself to industrial units. We observe that collectors are approved by the collection center, which collect milk from a business group and take it to the collection center. But in general, they are collectors, owners of refrigerated vehicles which collect milk at the farm level and route directly to the processing unit. In our study area, there are two collectors who ensure collect milk daily even on holidays. M'zab Valley is classified as dairy basin of the Sahara region, with its great potential in milk production and collection of 67% of the quantities of raw milk produced (**Bensaha & Arbouche, 2014a**) .



Collection should have a key role in the policy development of national milk production and it is the main link between the production and the dairy industry (Sofi et al., 2011).

The collection equipment used by both collectors is a tanker truck and a car tank. The total capacity of the first collector is 5000 L/day; they really collect only 4800 L/day with 25 farmers. The second collector, served by 12 breeders, ensures a collection of 2400 l/day in two stages (Table 3f).

Table 3 Milk collectors in the valley of M'Zab and Metlili

	Manifold 1	Manifold 2
Collection equipment	Tanker	Tank car
Collection capacity	5 000 l/day	1 700 l/day
Volulme collected/day	4 800 l/day	2 400 l/day
Number of farmers	25	12

Source: Bensaha et Arbouche, 2014a

The milk sector in the region of Ghardaïa is a benchmark for the remarkable boom recorded in recent years, following a set of incentive measures taken by the public authorities affecting all links in the sector. This dynamic was favored by, in addition to the various support systems and incentives, the importation of heifers of dairy breeds, the modernization of the breeding system by equipping the stables with technical equipment suitable for dairy production, food self-sufficiency livestock by encouraging fodder production in large agricultural areas south of the wilaya rich in water and favorable to irrigated agriculture under pivot, as well as the establishment of a raw milk collection system. The incentives put in place by the State have encouraged many breeders in the region to integrate into the milk production process and have also encouraged industrialists and other private farmers to invest in the milk and livestock feed.

The goal of regulators was to allow these farms located throughout the Prefecture 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  $28,560.75 \times 10^3$  liters, of which milk collected  $11,800 \times 10^3$ . The breeder cannot count on to live with his family's income it generates.



### Herd health assessment

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 surveys 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. It has to be noted that reported outbreaks of contagious diseases are recorded in the table below (Table. 4).

Table 4. Reported outbreaks of contagious diseases

Disease	Number		Total workforce screened
	Fireplaces	Case	
Bovine tuberculosis	01	01	1412
Bovine brucéllose	11	29	4852
Goat brucéllose	12	59	1237
The plague of small ruminants	04	52 sheeps+12 goats	21 sheeps+12 goats
Bovine foot and mouth disease	02	87	17
Foot and mouth disease small ruminants	05	62 sheeps+12 goats	0
<b>Total</b>	<b>41</b>	<b>134</b>	<b>9486</b>

### 4. Conclusion

The constraints weighing on the milk sector in the Saharan regions are many and varied. 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. A participatory approach associating all the actors in the design of policies in terms of animal behavior would increase milk production.



The training of group agents and breeders can be envisaged to improve their diagnostic and care capacities. Every decision at each level and each situation must result from an arbitration must take into account all the technical and socio-economic actors.

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