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Dairy production: technical and economic results of lowland farms in the Chlef region of northern Algeria

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Abstract

This paper aims to characterize milk production: it highlights the management methods of these farms. Our work was based both on the collection of information from the agricultural services, regional fund of agricultural mutuality, chamber of agriculture which allowed us to have a global overview of the situation of livestock in the area . This information was enriched and deepened by surveys of dairy farms using a questionnaire previously adapted to the field by a pre-survey which enabled us to choose the farms to be studied. The sample studied comprises 34 farms, 6 of which are landless farms. The area varies from 1 to 10 hectares, the cattle population varies from 1 to 20 head of cattle. Cereals and fodder occupy an important place, more than half of the herd is made up of dairy cows. In the majority of farms the animal load is low because of the small agricultural areas used. The marketing of milk to the collection center represents 92%, the rest is intended for self-consumption. The distribution of farms according to milk production per cow milked and per lactation was carried out in three groups: leading, middle and trailing; thus, the milk yield is higher during the winter and spring seasons due to the availability of fodder and the concentration of calvings. In the majority of farms the loads remain low due to the extensive system; as well as for the margins which are low due to the reduced number of producing cows. The results obtained reveal differences in average production resulting in a diversity of the level of milk production between the farms studied. Food remains the limiting factor due to unfavorable climatic conditions which force breeders to resort to buying food from outside; similarly, herd management has a direct influence on production

Key words: *Dairy production, Agricultural services, Bovine, Algiria*

1. Introduction

Considered an important source of animal protein and playing a vital role in human nutrition, milk plays a highly strategic role in Algeria (MADR, 2010). It is essential to the Algerian consumption model. Its share of total food imports is approximately 20%.

National production, which does not exceed 2 billion liters, does not cover all of the population's needs, estimated at approximately 3 billion liters. This type of production faces the productivity problems of current production systems.

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2. Materials and methods

Our work is based both on the collection of information from the agricultural services, regional fund of agricultural mutuality, which allowed us to have an overview of the situation of livestock in the area. This information was enriched and deepened by surveys of dairy farms using a questionnaire previously adapted to the field by a pre-survey which enabled us to choose the farms to be studied. The sample studied comprises 34 farms, 6 of which are landless farms. These farms were selected based on the farmers' willingness to respond to the questionnaire and according to a number of criteria, the most important of which are: geographical location, herd size, farm area, share of fodder crops and the destiny of dairy production: self-consumption, private sale or collection center.

3. Results

3.1. Breakdown of farms according to land capital

The surface areas of the farms surveyed vary from one farm to another. The extreme values for farms are zero (0) hectare for 6 of them practicing off-land farming; there is a predominance of those whose areas vary from 1 to 10 hectares. On the other hand, those whose area is greater than 30 hectares represent only 6% of all farms (Table 1).

Table 1: Breakdown of farms surveyed according to land capital

Class	Area (hectare)	Holdings	
		Number	Rate
01	0	06	17
02	01-10	19	56
03	11-20	04	12
04	21-30	03	09
05	>30	02	06
Grand total		**34**	**100**

3.2. Distribution of farms according to the size of the cattle herd

There is a predominance of farms whose numbers vary from 1 to 20 heads grouped in classes 1 and 2 with a rate of 82%. Those whose workforce varies from 21 to 40 heads represent only 18%. This shows that the herd is small to medium in size (Table 2).

Table 2: Breakdown of farms according to herd size

Class	Area (hectare)	Farms		Number of bovine head	
		Number	Rate	Average	Total
01	01-10	13	38	7	91
02	11-20	15	44	14	211
03	21-30	05	15	12.8	05
04	31-40	01	03	11	32
Total		**34**	**100**	**16**	**339**

3.3. Socio-economic characteristics of farms

3.3.1. Housing

According to the survey carried out, the majority of breeders live in douars (it's true, common) where they are gathered in groups of 3 to 4 families, resulting in permanent mutual assistance for equipment, labor and even the loan of bulls. Mention is also made of the remoteness of some farms in certain communes from the milk collection centre, veterinary services and food sales units.

3.3.2. Electricity and water

Electricity is not a problem for the farms because some practice manual milking. On the other hand, for water, with the exception of 1/3 of the farms which have wells, for the rest of the farms the problem of water arises acutely, especially in summer, hence the reduction in the areas irrigated by a large number of breeders.

3.3.3. Sources of income

The farms' sources of income are quite diversified. In fact, 80% of them whose agricultural area is significant, their sources of income come from livestock farming and agriculture such as the sale of cereal products, milk and young bulls; 17% of them comes from animal husbandry alone and the rest, 3%, comes from animal husbandry and other activities.

3.3.4. Labor

In all the farms surveyed, the workforce is predominantly family. Indeed, for those where the agricultural area is reduced or nil (farming above ground) the breeder only uses family labor, the children take care of the guarding of the animals on the pasture while the women take care of the milking and barn cleaning; the owner generally deals with the purchase and distribution of food as well as the watering of the animals. As for farms with a large agricultural area, they call on seasonal labor during peak periods when family labor is insufficient.

3.4. Breakdown of farms according to usable agricultural area

For all the farms, the useful agricultural area represents on average 90% of the total area of the farms, the rest is occupied by livestock buildings or converted into tracks (Table 3).

Table 3: Breakdown of farms according of usable agricultural area

Class	Area (hectare)	Number of farms	Usable agricultural area	Total usable agricultural area
01	0	6	–	–
02	01-10	15	04	62
03	11-20	09	17	150.5
04	21-30	01	25	25
05	>30	03	104	168
Total		**34**	**150**	**405.5**

3.5. Breakdown of farms by crop

In almost all farms cereals and fodder occupy the first, which explains the importance of livestock which is linked to the practice of crops; Pulses are essentially represented by broad beans that breeders use for fattening calves.

3.6. Structure of the cattle herd on farms

More than half of the farms studied, that is 52%, their herd is represented by dairy cows; then come calves and calves with 34% of farms. Indeed, the majority sell the calves at an early age and only keep the day before for the renewal of the herd and one or two calves intended to replace the bull after its culling.

The culling rate of dairy cows is quite low on almost the majority of farms. The age at culling is on average 8 to 10 years, the causes are due to the reduction of milk production, serious illnesses and fertility disorders.

Table 4: Breakdown of farms according to the structure of the cattle herd						
Class	**Number of farms**	**Breeding bulls**	**Dairy cows**	**Heifers**	**Calves velles**	**Total**
01-05	03	0	02	0	1.6	**13**
06-10	10	0.1	4	0.8	0.3	**71**
11-15	12	0.3	6.5	1.2	4.5	**155**
16-20	03	0.3	9.5	02	6.6	**56**
21-30	05	0.2	12.5	3.8	8.6	**128**
31-35	01	01	17	03	10	**32**
Total	**34**	**1.9**	**51.9**	**10.8**	**34.3**	**455**

3.7. Animal load per hectare

It should be noted that due to the difficulty of measuring the actual stocking. The number of dairy cows per hectare of forage areas, and in the absence of precise knowledge of the areas actually devoted to dairy cows in exploitation. We used the concept of number of livestock unit per hectare of usable agricultural area.

By comparing the results of the farms surveyed with those observed by Low and Hamilton (1987) which are of the order of one hectare for 4 livestock unit and one hectare for 7 livestock unit, and with the exception of the last two classes; in the rest of the classes the animal load per hectare is low, due to the small agricultural areas used by the farms (Table 5).

Table 5: Breakdown of farms according to animal load per hectare				
Class	**Area (hectare)**	**Fréquency**	**Relative frequency**	**livestock unit /hectare**
01	0-1	19	55.9	0.56
02	1-2.4	09	26.47	1.6
03	2.4-7.5	02	5.88	6.64
04	7.5-9.5	02	5.88	8.75
05	9.5-11.5	01	2.95	11.5
06	11.15.5	01	2.94	15.15
Total		**34**	**100**	**7.33**

3.8. Number of dairy cows present per worker

The present dairy cow report (DCR), human work unit (HWU), informs us about the technical mastery of the management of dairy cows. According to the Table 6, it appears that 44% of the farms surveyed are grouped in the first class; thus the number of dairy cows per worker is almost comparable from one farm to another.

Table 6: Breakdown of holdings according to the DCR/HWU ratio				
Class	**Area (hectare)**	**Fréquency**	**Relative frequency**	**livestock unit/hectare**
01	0-1.5	15	44.1	01
02	1.5-2.5	12	35.3	1.8
03	2.5-3.5	04	11.7	03
04	3.5-4.5	03	8.8	04
Total		**34**	**100**	**2.5**

3.9. Farm milk production analysis

From the Table 7, we have noted that the distribution of farms according to milk production per cow milked and per lactation was in three groups: a leading, middle and tail group (Cordonnier, 1986). Also the milk yield is higher during the winter and spring seasons, this is explained by the fodder availability during this season on the one hand and the concentration of calvings for most farms on the other hand. On the other hand, the differences in milk yield which exist between these groups result from the mode of management of each farm and more precisely from the food management (fodder supply and supplementation) and the management of reproduction (number of dry cows, distribution of calvings in the course of the seasons).

Table 7: Farm milk production analysis

	Average	Farms		
		Head	Average	Tail
Average Prod. (lact./Cow)	3311	4900	4897	1847
Number of breeding	34	16	12	6
Aver. Cow number	8	9	6	5
Dry cow/present cow (%)	67	73	64	48
Dry dairy cow product/day	8	5	7	4
Sept.- Oct. – Nov.	9	29	22	4
Dec.-Jan.-Feb.	10	10	9	6
Mar.- Ar.-May	10	13	8	4
Jun.-Jul.-Agust	2.3	3	2.3	0..5

3.10. Analysis of farm costs

According to (Table 8), it can be seen that the loads remain low in the first three classes due to the production system adopted by the breeders (extensive) on the one hand and the reduced number of producing cows. On the other hand, these charges reach their maximum levels in the last three classes following the purchase of food from outside the breeders of these classes as well as the costs of water and electricity which are significant due to the number of cows owned by them.

Table 8: Breakdown of farm costs U: AD (Algerian Dinars) (1$= 142 AD)

Class	Charges	Number
01	1000-10000	14
02	10000-20000	06
03	20000-30000	07
04	30000-54000	04
05	40000-50000	01
06	50000-60000	01
07	100000-150000	01

3.11. Farm Margin Analysis

Through (Figure 1) we notice that the gross margins are low in the first and second class due to the reduced number of producing cows. On the other hand, they remain high in the last class represented by five farms, due on the one hand to the number of producing cows which varies between 12 and 16 cows and on the other hand to the good management of the herd with the maximization of products and the minimization charges.

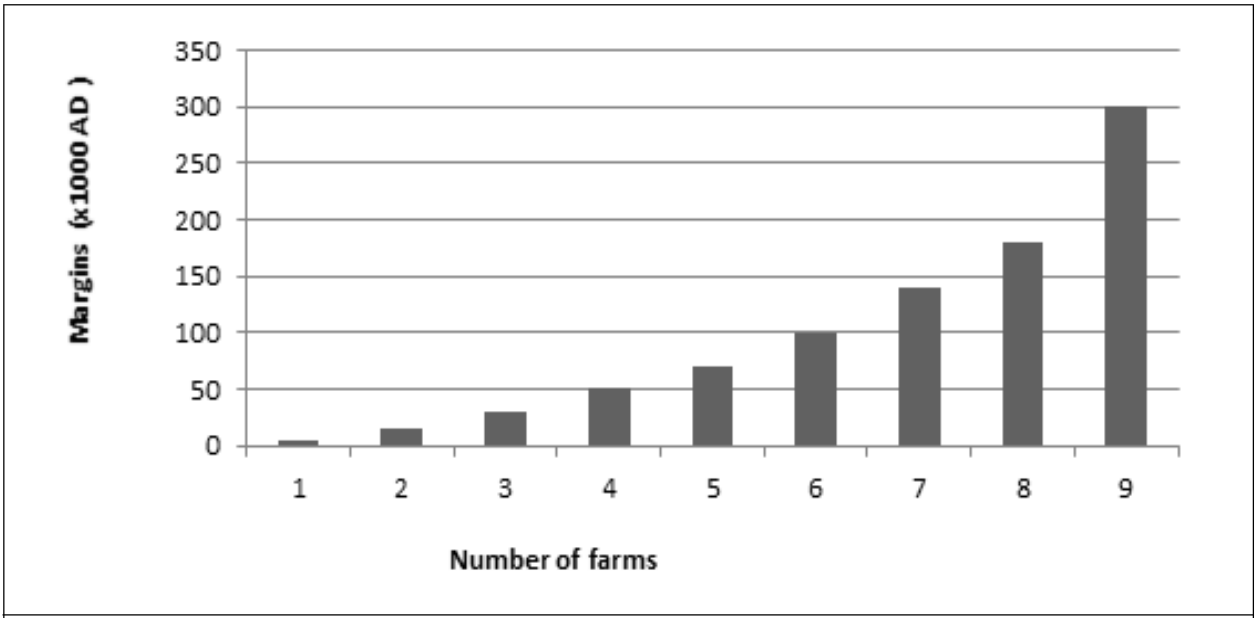

Figure 1: Breakdown of gross margins of farms surveyed

4. Discussion

4.1. The predominance of extensive logic within the dairy farms

The driving mode of livestock in the majority of farms is extensive dominant, with the exception of a few state farms practicing semi-intensive system. Seeded forages are dependent on weather conditions and ensure the needs of 5 months of the year (Sadoud, 2008). For the rest of the diet consists of oats and vetch concentrates (10 kg / cow / day), which penalizes milk production quantitatively and qualitatively. This is compounded by the random and seasonality of production, due to low rainfall and frequent droughts (Serairi *et al*., 2007).

4.2. Constraints related to breeding and milk production systems

Among the constraints of low production, according to the table below, it is the dominance of the husbandry system in family and traditional character, with herds of small sizes, hindering the introduction of innovation technique. Thus, the practice of a family-type farming (86%), with two cows per farm on average 57% in the number of breeding, a constraint of increased milk production. Weak technical among farmers in controlling the herd and food rationing, the use of reproductive technology, gene carrying Progress (Kherzat, 2006).

4.3 The little incentive price for milk production

The raw milk prices paid by producers is considered Giplait little incentive for them; 22 DA / l, practiced for 10 years and the substantial increase in feed prices following the drought. Hence their orientation towards those that offer a more remunerative price (private collectors) and to more profitable activities such as the fattening of young cattle, arboriculture and market gardening (Amellal, 2000). In general, raw milk is sold for direct consumption and small artisans at a price varying between 35 and 40 AD liter.

5. Conclusion

This study led us to determine a heterogeneity of the farms studied which are distinguished by the size of the farm, the workforce, the crop production, the size of the herd and the milk production.

The results obtained reveal differences in average production resulting in a diversity of the level of milk production between the farms studied.

Food remains the limiting factor due to unfavorable climatic conditions which force breeders to resort to buying food from outside; similarly, herd management has a direct influence on production. This difference in practice between breeders also reveals differences in income obtained from one farm to another, due to the production system adopted by each farm.

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