
Animal Recording in Morocco: Constraints and Possibilities for Improvement

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In Morocco, agriculture is a major component of the economy in which, livestock sector plays several functions. It represents about 25% of the agricultural gross product, contributes to population nutrition, constitutes a principal sector for employment (about two third of the rural population), offers products to the agri-industry and plays a banking role for the farmers.

The population living in rural areas represents about 50% of the total. Most of the farmers own a small size plot of land and/or herds (less than 5 ha, 1 or 2 cows and 10 to 20 sheep or goats). There are no specialized operations. A farmer may grow wheat, plant fruit trees and raise animals at the same time.

The animal population in Oct.-Nov. 1996 is as follows:

cattle	2 408 000
sheep	14 536 000
goat	4 595 000

Several systems are considered based on breed, production type, reproduction, feed and feeding management. The last one is a major constraint for livestock production (in regard to availability and quality) and is the principal parameter which determines the systems.

There are 3 principal systems based on breed (the cattle population is composed of 65% native, 25% cross-breed and 10% pure: Holstein, Friesian, Santa Gertrudis and Montbeliard), feeding (cultivated forages, wheat and barley straw or stubble, grains and agro-industry by-products: citrus pulp, molasses, beet pulp) and possibilities of milk marketing (the produced milk is either sold or self-consumed) :

- Dairy production system
- Combined system
- Beef production system

1. Presentation of livestock and animal productions. Importance of livestock

2. Livestock production systems

2.1 Cattle production systems

2.1.1 Dairy production system

This system exists in irrigated areas and is oriented mainly toward milk production even though, some farmers keep their bull calves and feed them out. The characteristics of the system are:

- forages produced on irrigated areas provide an important fraction of the animals' dietary needs for milk and meat production, if bull calves are fed out,
- pure breed or cross-breed are the most dominant animal types used,
- systematic marketing of milk through local collection centers.

2.1.2 Combined system

This system exists in favorable areas with no irrigation but, where the rainfall is sufficient to produce some forages to a certain limit, and also in some irrigated or partially irrigated areas. The breeds used are heterogeneous and with a variable production potential. The main characteristic of this system is that forages are less used for feeding than grains and by-products (including wheat or barley straw) which are extensively used.

2.1.3 Beef production system

This system is based on grazing, mainly the local breed type with the aim of producing young stock for feedlot operations. It exists in the major cereal production areas, semi-arid or arid areas and also in some irrigated areas (Tadla). Feeding is based on the utilization of wheat or barley straw and stubble (which contribute to more than 30% of animal needs). The grains and by-products are used but mainly during critical periods. In some areas forages can also be used.

2.2 Sheep production systems

The Moroccan sheep population is composed mainly, of native breeds. These breeds are generally, linked to geographical areas: *Timahdit* breed in the Middle Atlas (1 200 000 heads), *Sardi* breed in the Center (750 000 heads), *Bni Guil* breed in the East (2 300 000 heads), *D'man* breed in the Oasis (200 000 heads), *Boujaâd* breed in the Center (80 000 heads) and *Bni Hsen* breed in the North-West mainly (200 000 heads). The *D'man* is the only breed which has specific physiological characteristics (highly prolific). The other breeds have similar performances and cannot be distinguished based on this criteria except by the appearance. Therefore, excluding the oasis system, sheep production systems are not defined based on breed but based, on the feeding system. The 3 major sheep production systems are:

- Pasture system.
- Agro-pasture system.
- Oasis system.

2.2.1 Pasture system

This system is found mainly in mountain areas, the high lands in the East and in the Center, the South side of the High Atlas and some areas in arid lands. The sheep spend most of the time grazing. The pasture contributes

to meet more than 50% of animal needs. Feed supplementation is limited and the feedstuffs used are mainly straw, grains and occasionally by-products. No forages are used. Wheat or barley stubble is also grazed.

This system exists in the main cereal production regions (dry or irrigated). Again cereal by-products (mainly straw and stubble) and occasionally, cultivated forages are used to feed animals. Grains and agro-industry by products are used as supplement feeds during critical periods and in feedlot operations which are very common in this system.

2.2.2 Agro-pasture system

This system is specific to the pre-saharian regions, the Ziz and Draa Valley and between Errachidia and Ouerzazate. The characteristics of this system are:

2.2.3 Oasis system

- Intensive irrigated agriculture on small plots of land (1 to 2 ha).
- A particular breed (D'man) with exceptional reproduction characteristics: highly prolific, breeding precocity and no seasonal anoestrus. This breed is raised only in confinement in barns and hard surface pens.
- The feeding is based mainly on the use of alfalfa with supplementation with date screening, grains, cereal by-products and straw.

Goat production exists mainly in mountain areas and depends on rangeland and forests for feeding. Feed supplementation is common during critical periods with use of straw, grains and by-products. Goats are raised principally for meat with only a few specialized milking flocks.

2.3 Goat production system

Dromedary production exists in arid, pre-saharian and saharian areas. The camel number is about 55 000 head. Feeding is based on grazing shrubs and bushes and on grain and straw supplementation.

2.4 Dromedary production

Camel are mainly, used for working, transportation and, meat and milk production. Racing and touristic activities are other limited uses.

Meat and milk production from animals in 1993:

Beef	160 000 metric ton
Lamb	90 000 metric ton
Goat	45 000 metric ton
Milk (cattle only)	900 million liter
Wool	15 000 metric ton
Hides and leather	60 000 metric ton
Chicken	152 000 metric ton
Eggs	1.4 billion

3. Animal productions

Annual per capita consumption:

20 kg of meat including 5.8 of chicken

68 eggs

41 l milk

The production meets the consumption up to 100% for meat and only, 80% for dairy products. The annual increase rate of meat production is, 2.8, 3.5, 1.2, and 7%, for cattle, sheep goat and chicken respectively.

The productivity is low, the average weight of carcass is about 135, 14 and 7 kg, for cattle, sheep and goat respectively.

In Morocco, animal recording exists only for dairy cattle and sheep productions.

4. Animal recording and breeding

4.1 Description and achievements

Dairy record keeping in Morocco is a government programme controlled and fully funded by the Ministry of Agriculture. It is considered as a mean for genetic improvement. The dairy recording started in 1968 by one public management company. The extension to other public and private farms resulted in the opening of breed registries (herd book) for 4 breeds (Holstein, Friesian, Red and White, and Tarentaise) at the Ministry of Agriculture. From 1973 to 1985, the recording was limited to public and a few private farms and concerned in the average, only about 120 herds for a total of 5 000 cows (mainly Holsteins and Friesians). In 1985 the recording was extended and concerned all farms considered as "nursery units" which received subsidizes for each selected animal in order, to reduce heifer importation. Now, the number of these "nursery units" is about 390 with 11 000 cows representing only 9% of total pure breed dairy cows.

In general, the recording is used for genetic improvement only, and the farmer receives no feedback information for herd management. The Ministry of Agriculture Agent measures milk weight and take a sample for fat test once a month. Data processing is very slow and often, is done by hand with a calculator. In some cases computer is used when it is available. The generated data with a score given to qualitative traits related to body condition and appearance, are used by the National Committee of Selection and Registration in Herd Books. This committee is composed of people from the Ministry of Agriculture, a representative of the National Association of Cattle Farmers (ANEB) and a breed expert. The selection is based on the method of independent culling levels. The used traits are milk weight, fat test and the given score.

The registered cattle from 1985 to 1995 was as follows:

Year	Cattle registered in herd books
1985	1 219
1986	779
1987	1 258
1988	2 025
1989	1 419
1990	1 071
1991	1 326
1992	1 318
1993	1 868
1994	1 612
1995	925

In parallel with the intensification of artificial insemination (AI) programme, a progeny testing programme was also initiated in 1989. It started with 30 bull calves from which, in 1995, 10 bulls were selected. In 1992, 1995 and 1996, 18, 16 and 16 bulls were selected respectively, to undergo progeny testing.

1) Limited personnel, equipment and facilities

In overall, there are about 50 agents responsible for recording (390 herds, 11 000 cows). The recording is seen as a secondary activity. The agent has several other duties. Visiting farms is considered as a difficult task usually complicated with problem of transportation (car or gas not available when needed). The activity is limited simply to weighing and sampling milk, and data calculations (usually without computer). The recording agent receives no incentives and considers himself underpaid compared to AI technician who apparently, is doing an equivalent job.

2) Limited funds

The Regional Administrators of Ministry of Agriculture do not support the recording activity even though there is a small budget allocated for the purpose.

3) Farmer not involved

The farmer is not enthusiastic about recording and considers it as a burden since he receives no feedback and no short-term benefit. This and the frequent absence of the farmer during the visit complicates the task of the recording agent who receives no adequate information or help from farm workers.

4.2 Constraints

4) Lack of consistent extension work

Recording does not concern nutrition evaluation, disease data, reproduction performances and growth data. And there is no coordination between the recording agent and the AI technician who processes data on AI. In this situation, it is difficult to advise the farmer in regard to herd management.

5) Limited funds

**5.
Improvement
of dairy
recording
programme**

Recently, the Ministry of Agriculture is studying the reorganization of dairy recording and genetic evaluation of dairy herds programme. A new plan which will involve several partners is suggested. The partners are: Livestock Direction (Ministry of Agriculture), National Center of Dairy Recording (NCDR, to be created), Regional Centers of Dairy Recording (RCDR, to be created), ANEB (National Association of Cattle Farmers), Other regional dairy farmer association or cooperatives, Regional Centers of Artificial Insemination (RCAI) and Research Institutions (IAV Hassan II).

Livestock Direction has the responsibility for supervising and supporting the recording programme.

NCDR will be in charge of organizing the dairy recording programme. It will be responsible for record keeping, data processing, calculating selection index and producing reports.

RCDR will be responsible for recording data at the farm level and providing NCDR and Farmer Associations with necessary data.

ANEB created in 1990 regroups 8 regional associations, 7 cooperatives and 3 private dairy companies. ANEB is subsidized by the Government and most of its personnel is from the Ministry of Agriculture. ANEB is mainly, responsible of AI programme (100 000 AI realized in 1996 by ANEB, with an annual increase rate of 25%) and advising the dairy farmers. ANEB will be responsible of taking care of Herd Books and involved in dairy recording. It will interact with NCDR and RCDR and return analyzed data to dairy farmers in a short period of time in prospect of herd management improvement. This will encourage the farmers to cooperate and support the programme. The participation of the farmers was evident during a study conducted in several dairy farms about using a software (DairyCHAMP®) as record keeping system for herd management purpose.

RCAI will use generated data for progeny testing programme.

The faculty members of the IAV Hassan II will help by assuring scientific advising and calculating the selection index.

Funding of the recording programme will be a matter of the State and the operators in the dairy industry. Recently, partnership relations are taking place in some dairy areas between ANEB, the regional association or cooperative, the regional administration of Ministry of Agriculture and the milk processing companies in order to promote dairy industry. This may be considered as positive signal.

Recording in sheep production was initiated in 1972 in a few private and public herds composed of imported breeds for meat production. In 1982, recording was started for native breeds in private farms for a management purpose and not for selection. Unlike for dairy production, the recording in sheep production was accomplished with the involvement of National Association of Sheep and Goat (ANOC). ANOC was created in 1967. It is subsidized by the Government and most of its employees are from the Ministry of Agriculture.

Recording for genetic improvement was started in 1987. From 1987 to 1991, the recording system was not adequate because of data analysis problems. After 1991, the recording system was improved. Reproduction, growth and body condition traits are used for selection. The recording agent visits the farm every 3 weeks. He is responsible for identifying the lambs and measures body weight of male lambs during 4 visits and that of female lambs in 2 visits. Birth weight is measured if the lamb is born in the day of the visit. Data is used for herd management and selection. For this purpose, data is sent to France for index calculation as a support from the French Cooperation to ANOC. Selection indexes are used only for Timahdit breed. The selection programme of this breed includes a public farm where mothers of sires are gathered and raised .

ANOC achieved positive results. The productivity of the herds under ANOC control is 50% higher than of the others. Actually, the members of ANOC are 1 500 farmers organized in 27 groups dispatched in different areas of sheep production. There are 4 500 non member farmers who benefit from ANOC services. In over all, there are 550 000 heads under ANOC control from which about 13 000 animals per year are selected for reproduction by the National Committee. The actions of ANOC are: management improvement (health, nutrition and reproduction), genetic improvement, constitution of farmer groups and marketing. The native breeds under the control of ANOC are Timahdite, Sardi, Boujaâd, Béni Guil and D'man.

1) Problems of data collection and processing

Visiting farms at regular time is difficult to achieve because of distance, bad roads, herd movements, and some times weather conditions. Also, weighing the animals is a hard task, especially, without the farmer being

6. Recording in sheep production

6.1 Description and achievements

6.2 Constraints

present. Data is sent to the regional coordinator then to the head quarter of ANOC in Rabat. This makes data processing and report writing very slow.

2) Selection index calculation

Selection index are not calculated in Morocco and concerns only one breed (Timahdit).

3) Organization problems

Regional coordinators of ANOC do not have sufficient specialized personnel and computing equipment for an independent and flexible work.

4) Limited funds

6.3 Possibilities of improvement

Compared to dairy recording, recording in sheep production is more efficient. But, there is a need to create specialized genetic services provided with necessary qualified personnel and computing equipment in the head quarter and regional administrations of ANOC.

Significant effort must be done to improve the marketing system through ANOC which may help generating funds to support the recording system.

7. References

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