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Steppic ecosystem in the area of M'Sila, Algeria: state and perspective of rehabilitation

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Abstract. In the present study, we are interested in the management of the rangelands of the area of M'Sila; one of the principal wilayas (departments) of the Algerian steppe (rainfall between 100 and 400 mm/ year). We conducted interviews with thirty sheep breeders, representing the different existing breeding systems in the area. The exploitation systems of rangelands are the pastoral system (13.3%) in regression, and the agro-pastoral system (86.7%) which is in expansion. Livestock numbers keep increasing. Consequently, pastures (rangelands) are chronically overloaded, sometimes all year around. This practice induces a rapid degradation of the rangelands (64.5% of soils are degraded). So, to maintain livestock alive, breeders use food supplementation. Given this worrisome situation, new strategies to be considered should be based on both rehabilitation (natural regeneration and/or sowing forage plants) and on alternative systems of associations of breeding-farming, and through a better technical management of sheep livestock.

Key words. Algerian steppe – M'Sila – Ovine breeding – Degradation – Rehabilitation.

L'écosystème steppique dans la région de M'Sila, Algérie : Etat et perspectives de réhabilitation

Résumé. *Dans la présente étude, on s'intéresse à la gestion des parcours de la région de M'Sila, l'une des principales wilayas (départements) de la steppe algérienne (pluviométrie entre 100 et 400 mm/an). Nous avons mené des entretiens auprès de trente éleveurs, ce qui représente les différents systèmes d'élevage ovin existant dans la région. Les systèmes d'exploitation des parcours sont le système pastoral (13,3%), en régression, et le système agro-pastoral (86,7%) en expansion. Les cheptels continuent à augmenter. En conséquence, les pâturages (parcours naturels) se trouvent chroniquement en état de surcharge, parfois toute l'année. Cette situation induit une rapide dégradation des parcours (64,5 % des sols sont très dégradés pour seulement 17,6% intacts), ce qui pousse les éleveurs à faire appel à une complémentation alimentaire pour le maintien en vie de leur cheptel. Devant cette situation préoccupante, de nouvelles stratégies à envisager devraient s'appuyer à la fois sur des réhabilitations (régénération naturelle et/ou plantation pastorale) et sur des systèmes alternatifs d'associations élevage-agriculture, et par une meilleure gestion technique des troupeaux ovins.*

Mots-clés. *Steppe algérienne – M'Sila – Élevage ovin – Dégradation – Réhabilitation.*

I – Introduction

Algerian steppe is known as "the country of the sheep"; where 80% of the national livestock sheep exist. Extensively exploited, this species is best adapted for valuing the natural fodder resources of the area.

The changes in the agro-socio-economic systems led to an imbalance in the exploitation of the natural resources, in particular the rangelands. Today, we witness exhaustion and serious degradation of rangelands. The conservation and the restoration of the steppe, as well as the development of other feed resources for livestock to make up the existing food deficit are national order priorities of intervention (Bensouiah, 2003.).

II – Material and methods

To reach our objectives, we chose the area of M'Sila (Fig.1). This choice is based on animal

and pastoral potentialities that the area conceals (1.6 million sheep per 1 million hectares of rangelands). Field interviews to thirty sheep breeders representing various breeding systems were realized.

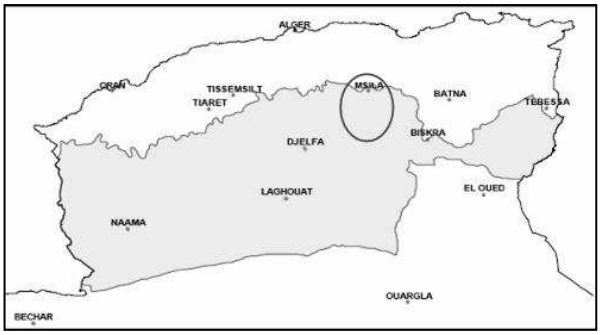

Fig.1. Location of the study area (Nedjraoui, 2004) (adapted).

III – Results and discussion

1. Production systems in the steppe rangelands

Two breeding systems were revealed: a pastoral system (in decline) and an agro-pastoral system (an increase, 86.66% of the investigated cases). The current systems of sheep breeding are characterized generally by a passage of a pastoral to an agro-pastoral mode. As well as a generalization of the food complementation on rangeland "passage of grass to the concentrate".

2. Inventory of fixtures of the rangelands of the area of M'Sila

Data collection on the potentialities of the rangelands for pastoral use emphasizes that the rangelands covering an area of 839,212 ha are in a degraded state (73.45%of the total) (Table1).

Table 1. State of the rangelands of the wilaya of M'Sila

State	Surface (ha)	%
Very good	/	/
Good	201,265	17.62%
Mediocre	102,020	8.93%
Degraded	102,799	9.00%
Very degraded	736,413	64.46%

Source: *HCDS, 2010*..

The field investigations reveal that the leading causes which contributed to the degradation of the rangelands of the area of study summarize primarily in the following points:

(i) Overgrazing. An effective charge nine times higher than what the rangelands can support.

(ii) Clearings of the rangelands. The eradication of perennial plants, expose the already thin soils to wind and water erosion.

(iii) The drought. The effect of drought on the spontaneous vegetation can be multiplied if it is combined with the effect of overgrazing.

(iv) Poor policies of management of the steppe. Overexploitation and expansion of cereal crops on areas of rangelands are the result of ill policies applied in steppe region.

3. The fodder balance-sheet

The coefficients of conversion into UF selected are the following: Stubble: 300 UF/ha, Straw: 0.33 UF/kg, Barley in grains: 100 UF/Qx, Fodder crops: 1500 UF/ha (Boutonnet, 1989), and rangelands: 64.92 UF/ha on average (HCDS, 2010).

It should be noted that the production of the rangelands represents practically half of the total production of the area (49.57%) (Table2).

Table 2. Fodder availabilities in M'Sila region during 2011

Food sources	Surface (ha)	Production (Qx)	Production/ha	Fodder units (UF)	%
Fodder crops	19,600	-	1 500 UF/ha	29,400,000	19.65%
Rangelands	1,142,497	-	64.92 UF/ha	74,167,040	49.57%
Barley grains	-	240,000	100 UF/Qx	24,000,000	16.04%
Stubble	39,600	-	300 UF/ha	11,880,000	7.94%
Straw	-	308,000	33 UF/Qx	10,164,000	6.79%
Total	-	-	-	149,611,040	100%

In accordance to the steppe being regarded as "the country of the sheep", we note that 81.73% requirements are expressed by the ovine species (Table 3). The rest are divided among the other existing domestic herbivore.

Table 3. Livestock numbers and evaluation of their annual requirements in M'Sila region (DSA, 2011)

Animals category	Numbers (heads)	Requirements (UF)	Requirements in UF/ species (%)
Sheep	1,600,000	427,920,000	81.73%
Goat	140,000	26,352,000	5.03%
Cattle	26,800	64,665,120	12.35%
Camel	1,600	4,650,000	0.89%
Total	1,768,400	523,587,120	100%

The food availabilities of the study area cover only 28.57% of the requirements for the livestock of the wilaya (Table 4). The deficit, which rises to 373,976,080 UF or 71.43% of the requirements, needs to be filled by imported feeds. The insufficiency is partly due to the reduction in the fodder productivity of the rangelands as a result of overexploitation.

Table 4. Fodder balance-sheet (UF)

Animal requirements	Fodder availabilities	Deficit	Coverage rate
523,587,120	149,611,040	-373,976,080	28.57%

4- Strategy of exploitation and management of the steppe rangelands

Indeed, a practical and feasible step proves to be essential for similar study. It is in this direction that we recommend the strategy which follows and which takes account of three principal scenarios of management and planning and which are summarized mainly in:

A. Scenario one: Symbiosis between pastoral areas and agricultural middles

The axes of development in this direction can be drawn according to two concerns:

intensification of the fodder production and the valorisation of agricultural by-products. The improvement of the fodder production can be made through the associations "grass-leguminous species" (tare-oats, alfalfa-barley, etc). Also, a multitude of adapted fodder species to soil and climatic conditions of the area can be introduced. In addition, and to avoid the insufficiency and the irregularity of precipitations which experience the area, a rational and optimal use of existing water resources is very necessary. Furthermore, the valorisation of the straw proves to be paramount. The technique of straw treatment with urea proved a notable improvement on the food value of the straw: increase in UF and nitrogenous substances supplementation.

B. Scenario two: Natural regeneration of the rangelands

The technique of assisted natural regeneration in rangelands can be employed for a faster reconstitution of the vegetation. In other words, it is about the acceleration of the process of regeneration, by plowing in contour lines, which will increase the ground roughness and consequently effects in trapping the seeds, the organic residues and the rain waters. The combination of assisted natural regeneration and the prohibition of grazing is the best method to induce the increase of the natural vegetation of these degraded rangelands.

C. Scenario three: Rehabilitation of the rangelands by the pastoral species plantation

This technique is the recommended technique for the highly degraded areas, where vegetation cover cannot be regenerated by the previous described methods. Several indigenous and exotic species can be used, among which we can quote those having already given encouraging results, like the Atriplex genus (*Atriplex canescens, Atriplex halimus, Atriplex nummilaria*) and the *Medicago arbor*ea. However, trials of other pastoral species are also necessary.

IV – Conclusions

In front of this situation which endured the rangelands in the area of M'Sila, the projects of protection and management of the rangelands are essential. However, these measures alone are not enough; they must be accompanied by expansion and intensification of fodder crops and valorisation of agricultural by-products.

All in all, the success of the projects of management implies the implication of all the intervening actors in pastoral sector. The agro-pastoral management will not be durable, if it is not registered within a framework of development which touches the whole of the economic activities of the area.

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