

ORIGINAL ARTICLE

Steppe paths in agro-pastoralism and pastoralism and improvement strategy case of the M'ila region

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Received: 06.05.2021. Accepted: 16.06.2021.

The high animal pressure exerted on the steppe rangelands in Algeria is reflected in a significant degradation which is manifested by the reduction of plant cover and the disappearance of pastoral species, which affects the productivity of pastoral systems. The transformation of pastoral systems based on rangelands into agro-pastoral systems based on barley feeding and barley-based fodder crops has also contributed to the scarcity of pastures. The results obtained show that farming techniques in steppe environments have a negative impact by decreasing both quantitatively and qualitatively (flora richness, overall recovery, phytomass and pastoral productivity) of pastoral routes compared to steppe routes. The study of the farming systems practiced has made it possible to point out a tendency towards the sedentarisation of the breeders on the rangelands with a high percentage. On the other hand, at the level of pastoral routes, a regressive evolution in recovery is perceptible and results in a phytomass of the order of 720 kg DM / ha and 122 UF / h.

Keywords: farming system, M'Sila, sedentary lifestyle, phytomass.

Introduction

The natural pastoral zones in Algeria are representative parties of the steppe area; the latter has always been sheep farming par excellence. According to estimates by the ministry in charge of this sector, 15 million hectares of routes support more than 9 million sheep heads (MADR 2017). Of the 15 million hectares that cover the steppe area, the steppe vegetation occupies only 6 million hectares in an advanced stage of degradation. The natural vegetation of the rangelands consists mainly of steppes based on alfa (*Stipa*), sagebrush (*Artemisia herba alba*), Chenopodiaceae, and despotic pre-Saharan steppes. Sheep farming has a significant place in the country's economy, both through the employment of labor and through its production (meat, milk, wool, leather). Sheep meat alone accounts for 55% of national red meat production and continues to be the preferred source of animal protein for the Algerian consumer. The ovine species is characterized by a short production cycle, offers a faster rotation of capital, and requires only a small investment in livestock and equipment. However, this breeding is currently experiencing many difficulties, mainly due to the often irreversible degradation of pastoral resources (high load and longer and longer stay). This situation encourages the cultivation of cereals (in particular barley) on marginal land, aggravating their degradation and was to reduce the increasing dependence on artificial food. livestock reproduction was felt through low numerical productivity of the herd (0.6 - 0.8 lamb weaned per year and breeding sheep), far from corresponding to the Algerian breeds (BOUTONNET1989). Several actions have been carried out within the framework of the development of the steppe zones by applying various projects that have not succeeded at all or have been of little interest for the livestock sector. This total or partial failure of development projects is mainly due to the ignorance of the area, and the absence of any systemic approach carried out beforehand. Therefore, highlighting the farming system practiced in the M'sila region is the first essential step to sustainable management of this activity to protect the steppe area. Characteristics of the study area Physical aspects The M'Sila region is located 250 km southeast of Algiers; it covers an area of 8,175 km², or 0.76% of the national territory. The physical structure of the area is very heterogeneous and is characterized by three distinct natural regions: a steppe zone covering most of the territory 60% and is characterized by sparse plant cover, reflecting the degree of degradation of the rangelands. The Hodna plain represent 33% of the total area where all the wilaya (province) agricultural activity is concentrated (cereals, market gardening, arboriculture). Tmountainous area is covering 7% of the area reserved for extensive mountain farming with a few forest stands (BNEDER 2011) and a sandy-stony sub-desert area with dunes.

The study area is a huge watershed that receives the rain flow thanks to the various wadis fed from the adjacent watersheds. Water capacity is estimated at 540 million m³, of which 320 million m³ is for surface water and 220 million m³ for groundwater.

Socioeconomic aspects

The population

The total population is 1,094,000 inhabitants DSA, (2011), with a nomadic population that represents only 0.37% of the population. The active population is estimated at 263,000 individuals, with an employment rate of 85.50%, the unemployment rate being 14.50%. Economic activities: the sector that occupies the most is combined between agriculture and breeding with more than 23% of the active workforce followed by that of trade with 18%. Study of the relationship between land distribution and animal

husbandry The area is agro-pastoral, and thanks to the importance of so-called rangelands, it covers the total area of 1,817,500 ha, where so-called rangelands occupy 1,646,890 ha or 56.67% of the total area (Figure 1, table 1).

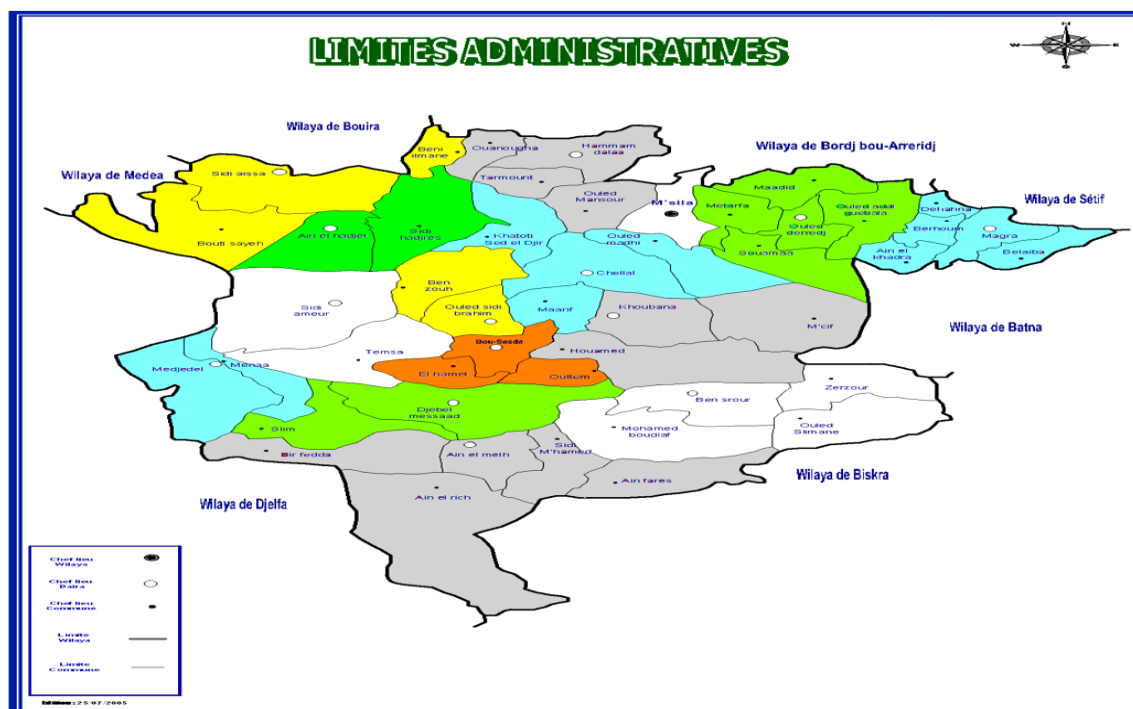


Fig. 1. Location map of the study area DSA, (2011).

Table 1. Distribution of agricultural areas in the study area.

Nature	Superficie (ha)	Taux
Superficie Totale (ST)	1.817.500	100%
Superficie agricole Totale (SAT)	1646655	90.6%
Superficie agricole Utile (SAU)	277.211	15,25 %
Superficie Irriguée	36.300	12 %
Parcours	1.646.890	56,67 %
Forets	139.734	7.68%
Alfa	200.000	11%
Terres improductives	170.610	09,39 %
Terrains salés (chotts)	110.000	0.006%

Breeding: The importance of the ovine species evaluated at 1,600,000 heads, followed by the goat species 140,000 heads, the bovine species 26,800 heads, and the camel species 1,600 heads, equivalent to 2 million - sheep inducing an average animal load on the surface which can be covered on the order of one sheep head for 0.73 ha of the journey.

Livestock is a significant constraint since the workforce is almost equal to the agricultural area with 1,600,000 heads and 1,647,000 hectares. Moreover, the pressure exerted by this activity results in a degradation of natural plant resources.

Ecological aspects

The climate

Temperatures: The highest summer temperatures are July and August; the hottest month is July (32.95°C). The lowest winter temperatures are December and January. With January (8.77°C). The average temperature of the maxima varies from 18.3°C (January) to 42.35°C (July), and that of the minima varies from -0.2°C (January) to 20.7°C (July).

Rainfall: The rainiest months are those of September, November, December, January, and May. The annual amount of rainfall ranges from 105 mm to 348 mm, and the annual average is 195.49 mm. The highest monthly average is for October (25.76 mm), and the lowest is recorded for July (4.95 mm) (ONM, 2017)

The dry season spans the entire year and is the major obstacle to the production of green biomass that can be used as food for livestock. The cause is precipitation on the order of mm on average and is experiencing a decreasing trend. Natural vegetation The land classified as course consists of low and discontinuous vegetation composed of more or less dispersed clumps of plants of equal value both in terms of their floristic composition and density. The most commonly encountered vegetation is *Stipa tenacissima*, *Artemisia herba alba*, *Lygeum spartum*, *Cynodon dactylon*, *Atriplex halimus*, *Artimisia compestris*, and *Aristida pungens*. For the plant associations that develop at the feet of tufts or bushes in the depths of depressions they are perpetually attacked by a clearing followed by a random cereal crop.

Methodology

The study approach adopted comprises the following stages:

- A bibliographic synthesis on the methodology of systemic approach.
- A pre-survey aimed at adjusting the questionnaire.
- Collection of information through the surveys carried out.
- Analysis and analysis of data from surveys

The research objective is a perfect knowledge of the dynamics of the essential sheep and goat farming systems at the level of the study area; the methodology adopted revolves around the study of the following points:

- the description of the current functioning of the farming systems;
- analysis of feedback from breeders
- carrying out surveys on a representative panel of farming activities
- description of the dynamics of farming systems and production strategies

The choice of the study area was made because of the size of its sheep and goat population, the diversity of fodder resources, and the third-place occupied by this area at the national level by the size of the sheep population. (1,600,000 head) and an area of rangeland of 1,029,945 ha.

The collection of information is based on data collected at the administrative level, on surveys, and direct interviews with breeders representative of the corporation. A pre-survey made it possible to opt for this approach in addition to our knowledge of this field. The previously established questionnaire was gradually adapted to the socio-organizational situation encountered after the pre-survey.

allowed us to develop the questionnaire with a targeted formulation of the questions using local terms and the units used to better identify the sensitive points.

• **Sampling:** The surveyed sample is located in the daïra of Ain El Hajj, which includes 2 municipalities since it is an exclusively pastoral area where the number of sheep, goats, and routes is significant respectively 125,270 sheep heads, 14,770 goat heads, and 189,783 hectares. The surveys are carried out on 51 farms representative of the identified farming systems in order to grasp the diversity and develop a typology based on the structural elements of the production units. The : the survey method used is the so-called semi-directive. During the discussion with the breeders, while leaving the interview free. The farmer can thus express his concerns.

Four classes of breeders have been defined according to the numbers owned (Table 2).

Table 2. Breeder classes.

Classes	Number of breeder	(%)	sedentary	Semi sedentary	Semi sedentary trnshumants
Classe I (<100 head)	27	52.94	17	10	0
Classe II (101-150 head)	13	25.49	7	6	0
Classe III (151-200 head)	04	7.84	0	4	0
Classe IV (200 head)	07	13.73	1	5	1
Total	51	100	25	25	1

52.94% of breeders have less than 150 heads for the first class and 25.49% for the second; 4 breeders have between 151 and 200 heads, a percentage of only 8%. The last class represents 13.73% of breeders who have a workforce of more than 200 heads. The dominant age group is 60 years and over, with a rate of 46% for class I followed by 30% for class IV. The 40 to 60 age group represents a significant rate of 58% for the first class and 41% for the second; on the other hand, breeders under 40 represent an insignificant participation with a under 40 represent an insignificant participation rate 2%. These results confirm that the breeding system currently practiced is not attractive to young people.

The direct survey of breeders made it possible to collect data relating to their use of the rangelands; which made it possible to distinguish three groups that determine three extensive farming systems:

- **Group 1:** That of the sedentary population, which includes 25 breeding units, or 49.02% of the farms surveyed; it is characterized by the use mainly of the farmland and the nearest routes at all times.

- **Group 2:** That of semi-sedentary workers, which includes 25 farms, or 49.02% of the farms surveyed; it is distinguished by the frequent movements of herds on all the routes in the area.

3: that of semi-sedentary transhumants with only one breeding unit, ie 01.96% of the farms surveyed; it is distinguished by larger displacements consisting of steppe routes throughout the territory of the wilaya and even those of the bordering regions.

Land ownership: this is a key indicator that provides information on the availability of land by livestock systems. More than 98.06% of the respondents own land, with 41.18% having areas more significant than 16 ha, 29.41% between 8 and 16 ha, 27.45% having less than 8 ha, and 1.96% (only one investigation) does not own land. For security reasons, mixed herds dominate with 84% predominantly sheep and a goat presence at the level of class I and II, with numbers varying between 100 and 150 heads (Table 3).

Table 3. Land ownership and type of herds.

Area Classes	< 8 ha	8 < S < 16 ha	> 16 ha	landless	Mixed herds	flocks of sheep
I	09	09	09	00	23	05
II	04	04	05	00	10	02
III	01	01	01	00	04	00
IV	00	01	06	01	06	01
Total	14	15	21	01	43	08
%	27.45	29.41	41.18	01.96	84.31	15.69

Structure and typology of livestock

Racial composition: Almost all breeders seem to opt for the Ouled Djellal breed; it is the most important of the Algerian sheep breeds and represents more than half of the workforce of the Algerian sheep population since it is estimated at 8,605,552 heads (Ministry of Agriculture 2017). It is an entirely white breed, with fine wool, a high waist, long legs. In addition, it has exceptional qualities in meat production.

Structure of the sheep population: The number of females is greater than that of males for all breeders classes; it is 88.95% and 11.05%, respectively.

- In class I, males older than one year represent 4.01% of the sheep population and breeding females (> 1 year) 79.48%.
- In class II, breeding ewes represent 81.49%, and males older than one year represent 4.46%.
- In class III, males older than one year represent 5.20% of the sheep population and breeding females (> 1 year) 78.13%.
- In class VI, breeding ewes represent 67.37%, and males older than one year represent 12.17%.
- The calculation of the ratio of a number of rams per 100 ewes is on the order of 8 rams on average for all farms. This ratio is higher than the standard reported for this type of breeding by (MAZZOUZ 1986) which is 5 rams per 100 ewes.
- Males and females less than one year old represent 03.34% and 14.41%, respectively.

Structure of the goat population: Males represent 11.59% and females 88.41%, of which more than half (72.27%) are breeders. Males and females less than one year old represent 5.61% and 12.65%, respectively. It should be noted that goats are reared primarily for milk production generally intended for self-consumption.

Breeding buildings. All the breeders surveyed have breeding buildings that shelter animals during bad weather and facilitate breeding practices (supplementation, fattening, sanitary treatment, etc.). More than half of the breeders surveyed (76.47%) have one building, 17.65% have two buildings, and only three breeders have more than two buildings (Table 4). There are two types of buildings; those constructed of concrete blocks and stone represent 17.65% of the buildings of the holdings and branches (Zriba) with a rate of 82.35%, as shown in the table below. Agricultural equipment: Only 33.33% of farms have agricultural equipment intended mainly for arable crops. However, it constitutes an additional source of income by its rental at the time of agricultural work.

Management of the breeding

Food aspects

Feeding behavior: Feeding is mainly based on pasture (range and stubble) and the distribution of a concentrated feed according to the year, the period, and the category of animals. It appears that fallows are not practiced in the study area. Those who use green barley represent 39.22% of the farmers surveyed; this is a specific practice for breeders who have means of irrigation (drilling, water pump). In summer, stubble is an essential food source for herds; semi-sedentary and semi-sedentary transhumant breeders move from late spring to cereal areas. For the first, their movements limit the neighboring daïra te, while the second reaches the high cereal plains wilayat of Bouira (Ain Bassam, the daïra of Sour El Ghozlane, Bordj Kheraïss These movements are disappearing due to the reduction of cereal land and agricultural practices in these regions.

Due to the succession of years of drought and the decrease in forage availability on the rangelands, supplementation with concentrated feeds has become common for most breeders. The table below shows that the food supplement used in 100% of the cases is generally composed of barley and its course. More breeders (49.02%) distribute an amount of 0.5 to 0.750 kg / head / day and (43.14) breeders distribute an amount of 0.750 to 1 kg / head / day and finally four breeders (7.84 %) distribute a quantity of 1 to 1.5 Kg / head / day. This supplement is used throughout the year by all categories of breeders. If the quantity distributed is low in a good year, it becomes significant in a bad year and affects all categories of animals. This food is distributed during more or less long periods as well as at particular physiological periods.

The reproduction

Pregnant females: Overfeeding ewes at the end of gestation "Steaming" helps prepare mothers for lambing and lactation. This feeding technique is practiced by only 60.78% of the farms were surveyed (Table 5). More than 60.79% of breeders practice supplementing sheep at the start of lactation. It is especially breeders of classes I and II who pay particular attention to this practice.

Table 4. Food supplementation.

Type of concentrated	Quantity distributed (Kg / head / day)					
	0.5 à 0.750K g		0.750 à 1 Kg		1 à 1.5 Kg	
	Number of farms	(%)	Number of farms	(%)	Number of farms	(%)
Barley + bran	25	49.02	22	43.14	04	07.84
bran	-	-	-	-	-	-

Table 5. Complementation of pregnant and lactating females.

Classes	Pregnant females		Lactating females	
	With supplementation	Without supplementation	With supplementation	Without supplementation
I	15	12	18	09
II	08	05	07	06
III	03	01	02	02
IV	05	02	04	03
Total	31	20	31	20
Pourcentage (%)	60.78	39.22	60.79	39.21

Reading the table shows that 47.06% of breeders do not distribute concentrate to lambs (Table 6). Only lambs that are destined for early sale receive the concentrated feed. However, the lambs benefit indirectly when it is distributed to the mothers when the latter benefit. 68.63% of the farmers surveyed distribute a food supplement based on barley grains to breeding rams.

Table 6. Complementation of lambs, kids, rams, and goats.

Classes	lambs and kids		rams and goats	
	With complémentation	Without complémentation	with complementation	With out complémentation
I	14	13	21	06
II	08	05	07	06
III	01	03	02	02
IV	04	03	05	02
Total	27	24	35	16
Pourcentage	52.94	47.06	68.63	31.37

Feeding sequences: Three ways of using the rangelands according to the types of breeders have been identified.

- **Sedentary:** Animal feed is based on local pastures throughout the year. Nevertheless, the animals receive straw and a food supplement based on barley and its coarse. Distribution times vary from year to year, depending on whether the year is good or bad. In a good year, the animals graze during the day and receive complimentary feeds in the evening from autumn until the end of winter. In a bad year, due to the depletion of rangelands, breeders distribute complimentary food to animals throughout the year. Hay is only distributed to feed animals.

- **Semi-sedentary:** The animals are fed on local pastures in autumn until the end of spring and on long-distance (transhumance) from the end of spring (May) until the end of summer. Nevertheless, the animals receive a food supplement during a more or less

long period according to the year. When it is good, the animals receive a complementary feeding from the autumn until the end of winter. In bad years, animals are supplemented all year round, including during periods of movement.

- **Transhumant semi-sedentary:** They make more pronounced movements than the previous ones by leading their herds to the Tellian routes (Achaba) and the Saharan routes (Azzaba). The feeding of the livestock relies on the free forage supply of the courses. However, breeders call on the complementation of their livestock for a certain period; it is identical to semi-sedentary breeders.

Protruding practice

The preparation of breeders for the fight is essential it must compensate for variations in sexual activity, and everything must be done to ensure a resumption of it both in the female and in the male (BONNES et al., 1988).

Preparation of females: According to (BONNES et al., 1988), the effects of feeding on reproductive performance have received practical application under the term of rinsing. temporarily improves the feed level of the sheep of temporarily improving the sheep's feed level before the fight and thus compensates for the effects of an average feed level, insufficient or poor body condition. This translates into additional distribution of concentrate or improved grazing conditions. For (BEURIER et al., 1975), flushing in traditional farming without grouping of heat consists of the distribution of 300 to 400 g of cereals per ewe per day, 3 weeks before and 2 weeks after the start of the fight. In our study sample, no breeder flushed.

Age of the first fertilizing projection of ewe lambs: According to (BONNES et al., 1988), the puberty of the lamb appears when the live weight corresponds to 40 - 60% of the weight of the adult. But, to ensure the success of the first reproduction and not to jeopardize the career of the female, it is recommended to only reproduce ewe lambs whose weight corresponds to 2/3 of the weight of the adult. The age of first use of ewe lambs varies between 6 and 18 months, but for 56.86% of respondents, the age is between 10 and 12 months. However, according to (GONDE and JUSSIAUX 1988), the suitable age for the first covering is 15 to 18 months.

Age of first fertile covering of deers: The age of first use of ewe lambs varies between 6 and 18 months, but for 53.49% of respondents, the age is between 10 and 12 months.

Preparation of rams: Flushing is not only for sheep, it must also be done in rams. Outside the breeding periods and to avoid excessive fattening, rams are subject to a maintenance regime. Two months before the fight, it is necessary to raise the food level of the ration by a supply of better quality fodder or by an additional distribution of 300 to 500 g of concentrate. One or two vitamin intakes are also recommended (BONNES et al. 1988). In the study area, 68.63% of the farmers practice food supplementation through the distribution of barley grain. Lambing practice: For a given herd, the duration of lambing depends on the mode of reproduction (Bonnes et al. 1988). The mode of free wrestling practiced results in lambings spread over the whole year, with two peaks of lambing (autumn and spring). Breeders prefer lambs in the fall (El Bekri lambs). They allow better lamb growth since they coincide with a relative abundance of food in the spring. Age and reasons for sale: There are two reasons for sale; the first reason for sale is commercial; in this case, the animals are generally sold very young (after weaning). The other reason for the sale is linked to the reform of certain categories of animals (old age, poor reproductive performance, diseases). For sheep, the age of sale of animals is between 3 to 7 years for 64.70% of breeders; for sheep and 94.12% of breeders for rams. The reasons for selling animals are various: (age, reduced fertility, health status). For goats it is between 3 to 7 years for 79.06% of breeders for goats and 90.68% of breeders.

Herd management Fattening: According to (Riviere 1978), fattening corresponds to the finishing period by which the animals are prepared for slaughter. It is intended for animals whose muscular development is already satisfactory but one wants to "load" a little in fat to make the meat tastier. In our study sample, 86.28% of breeders are fattening and 6.67% are lambs. The food distributed is hay and the barley + coarse bran + corn mixture. The fattening period varies from a month and a half to two months.

Watering: Self-service distribution is significant for young people consuming dry food. This water is essential for developing the rumen and the start of its fermentation (Soltner 1999). In our study sample, watering does not seem to be a problem. All breeders sources: boreholes (37.25%) and portable tanks (62.75%). Generally, the animals drink once a day in winter and twice a day in summer. However, the lack of unlimited water is a limiting factor. According to (Jarrige 1988), under the effect of heat, the need for water is doubled when we go from an ambient temperature of 15° to 30°C. In summer, animals consume a dehydrated diet that requires significant amounts of water for their digestion. Type of wrestling practiced: All the breeders surveyed practice free wrestling. In this mode of reproduction, it is common to witness fights and competitions between rams and goats. One of the consequences of this mode of reproduction is that weakly attractive sheep and goats will not be covered compared to others which will be several times. Also, it does not allow paternity checks (Bonnes et al. 1988).

Improvement and preservation strategy for steppe formations

The steppe plant formations

, The exploitation of the work of Aidoud (2006), Djelouli (1995 and 2006), Nedjimi (2006), Benabdeli (2000 and 2008), Nedjaroui (2002 and 2012), Boussaada (2008), Khaldi (2016), allow characterizing the main steppe formations of the region. These are the following training courses that should be preserved and developed:

The alfa steppe (*Stipa tenacissima*), which has a fodder value of 0.3 to 0.5 UF / KgMS, it is the inflorescences that are the most palatable (0.7UF / KgMS). The average pastoral productivity of this type of steppe varies between 60 and 150 FU / ha depending on the covering and the floristic procession.

Steppe with sagebrush (*Artemisia herba alba*) characterized by an average annual consumable production of only 500 kg DM / ha, or average pastoral productivity of 150 to 200 FU / ha. Mugwort is known to have an average feed value of 0.65 UF / kg DM, it is the best course used all year round and especially in bad seasons.

The spartan steppe (*Lygeum spartum*) it is not attractive from the point of view of pastoral interest (0.3 to 0.4 UF / kg DM), it is not very productive with only 300 to 500 kg DM/ha and constitutes on the other hand, courses remarkable for their floristic diversity and their high productivity in annual and perennial species (110 to 120 kg DM/ha).

The steppe with remt (*Arthrophytum scoparium*) forms bushy chamaephyte steppes with a fragile recovery and offers only courses of a rather weak interest on the pastoral level. The energy value of the species is around 0.25 UF/kg / DM, with an average annual production fluctuating according to forecasts between 50 and 80 kgMS / ha resulting in pastoral productivity includes between 30 and 50 UF / ha / year.

The steppe with psamophytes made up of grasses with *Aristida pungens* and *Thymellaea microphyla* or even sub-shrub steppes with *Retama raetam* with pastoral values never exceeded 200 FU / ha.

The halophyte steppe with *Atriplex Halimus*, *Suaeda fruticosa*, *Atriplex glauca*, *Salsola sieberi*, *Frankenia thymifolia* and *Salsola vermiculata*; very appreciated and sought after by breeders because of their pastoral value reaching 300 to 320 UF / ha.

Steppe space development strategy

The preservation and development of the steppe plant formations that play a decisive role in the fight against desertification with a significant socio-economic impact require implementing a strategy. The latter will be based on the following points:

- Protection of steppe formations for at least 5 years in order to increase the rate of plant cover and significantly to help natural regeneration to settle
- Organize livestock operations in solidarity cooperatives allowing them to introduce modern herd management techniques
- Possibilities of having a coach who can develop and train the shepherds in a more technical management
- Orient land development towards the production of fodder under irrigation such as barley, oats, alfalfa,

Encourage agroforestry through the introduction of species with a high production of consumable biomass such as honey locust, *Atriplex numularia*; the range of shrub species used in the Maghreb countries remains limited to a few species of the genus Cactus, Acacia, *Atriplex*, *Chamaecytisus*..., the objective of these plantations is to increase the short-term and medium-term production of fodder in order to decongest the rangelands, by providing livestock feed less dependent on rainfall fluctuations, essential during the lean season or drought. These plantations must be integrated into the pastoral rotation model and not kept as standing reserves.

Rotation, a technique allowing better development of rangelands likely to improve the management system of pastoral land, generally mobilizes very little financial investment. The rotation is gradually entering into the silvopastoral development. The technician's ambition is to do everything so that this technology gains ground by implementing a simple scheme of movement in the different terroirs, of course, which takes into account the level of forage production.

The rigid concept of the charge which imposed the downsizing rejected by the breeders is abandoned. The controlled rotation of the herds, which is based as much on the time factor as on the condition of the route and the forage balance, is gradually introduced into the breeding system and the herds' stays on the same plot are fixed as much in function numbers present only for the season.

An overall quantitative and qualitative improvement of the various agro-pastoral production systems in order to ensure a lasting improvement in the management of the forest route which requires coordinated action by all the competent services.

Improving the primary living conditions of the populations by implementing adequate support measures such as the opening and maintenance of tracks, the creation of water points and hill lakes close to homes and different rangelands, firewood supply, community reforestation, and distribution of subsidized forest and fruit plants.

In conclusion, the culmination of sustainable development of resources through the organization and improvement of the conditions of production of extensive livestock farming in the forest requires the adoption of a participatory and partnership approach based on negotiation and consultation with the producers directly concerned (breeders) in order to arrive at a favorable resolution of the traditional conflicts posed by grazing in the forest.

Conclusion

The processing and analysis of data in the study area reveal vital information enabling proposals to be made to develop this strategic sector from a socioeconomic and ecological point of view. The number of animals is relatively large, with an average of 100 heads per operator, making it possible to group in a cooperative. This option is encouraged by more than 99% sedentary and semi-sedentary breeding, another characteristic trait enabling implementing a common strategy. All the farms have livestock buildings (82.35%) which need improvement since they are mostly traditional. The majority of herds are mixed sheep-goats with 84.31% with 74.54% of breeding ewes giving the breeding its reproduction option common to all the holdings. The goat farm is intended produce milk with the El Arbia breed and represents almost 10%. This option is favored by the presence of only one race, that of Ouled Djellal. In terms of health, all breeders practice vaccinations and treatments against the main diseases. Herd feeding is exclusively based on natural resources which are seriously endangered and require sustainable preservation. The lack of fodder availability means that more than 60% of farms practice complementary feeding based on coarse bran and barley during the whole year with the exception of the summer period. The sale of sheep is generally done in the spring and during the holiday season have regularly tended to each spring; the age of sale of the animals is between 3 to 7 years for 64.70% of breeders. Additional resources come from wool estimated at between 1.5 and 2 kg per head. All these indicators stemming from the typology of the farming systems practiced militate in favor of the strategy proposed in the main objective is to safeguard the steppe and the breeding in a co-responsible integration.

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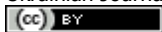
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Citation:

Boussaada, D., Benabdelli, k (2021). Steppe paths between agro-pastoralism and pastoralism and improvement strategy case of the Msila region. *Ukrainian Journal of Ecology*, 11 (4), 48-56.



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