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The Breeding, Pastoralism, the Sedentary and the Sustainable Development of the Steppe in the Region of El-Bayadh (Algeria)

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ABSTRACT

The pressure imposed by the livestock and the sedentary to the steppe cannot be supported by an understanding of the functioning of the systems of rearing practices. The results obtained in a study of 52 farms surveyed between 2010 and 2015 show that the systems of rearing are caracterized by:

- Dominance of sedentary farming and semi-transhumant imposing a permanent pressure to the steppe
- A strong regression of the nomadism is a loss of the know-how of the pastor
- An identification of three types of livestock (type 1: system of sedentary farming with a fattening has short duration; type 2: system semi transhumant /semi sedentary with fattening to medium term; type 3: transhumant system and nomadic with fattening to long duration.
- A diversity of actions in the management of the risk that threatens the livestock.

KEY WORDS: Sustainability, Fattening, Farms, Management of Rangeland, Pastoral System

INTRODUCTION

On the 20 million hectares, that occupies the steppe; a herd of more than 20 million head operates this space and weakens in the absence of management strategy. This herd is dominated with more than 85% by sheep, which provided "the main export item of the country, at the same time as the meat most estimated and usually consumed by the native people, and the raw material for almost all of their clothing"**[1].** Overloaded by a Livestock increased strongly, surpâturés discontinuous without in the decline of the transhumance, the golf courses have finally been degraded and their ability to forage production strongly reduced more and more dependent on food concentrates and other imported fodder, the sheep-goat farming is now at the mercy of the shortages and explosions of prices which affect periodically the national and international market of the latter. **[2]**. the breeding was then an integral part of the system of values and relationship of each company with its environment, system that it maintained beyond the human generations **[3]**. Cultural landscapes are thus the result of thousands of years of the interactions between man and the nature **[4]**. The question of the development of the farming of pastoral does not arise as in Algeria and in the Maghreb, but in many developing countries. According to the **[5]**,"the pastors and the agro-pastoralists from the south are part of highly vulnerable populations of the planet. They are regularly subjected to modifications of a more or less fast of their environment primarily related to drought, conflict on the pastoral resources, health crises; compete with imports at low prices, armed conflicts".

MATERIALS AND METHODS

The methodology used is based on the following approach, which revolves around eight points:

- Choice of the geographical area of study **(Figure n° 1)**
- Preparation of a questionnaire
- Random selection of 52 breeders
- Collection of Information and Analysis
- Identification of systems of rearing
- Typology of systems of rearing
- Exploitation of Results
- Strategy for the development

The principle of the analysis to the rearing system allows you to understand how to develop animal production in a given situation by establishing relationships between explanatory the techniques of analysis, the state of the resources put into play, on the one hand, and the performance achieved by the animals on the other hand **[6].**

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Figure n° 1: Localization of the zone of study el bayadh

The data collected during the in-depth investigation of 52 units of livestock were used in the development of a diagnostic on the livestock, which is of an importance since it is the main characteristic of the Systemic Approach **Table n° 1.** This diagnostic aims to reflect the diversity and complexity of the operation of the systems of rearing. It has for purpose, through the practices of farmers to identify the objectives, to judge their level of technical mastery, identify limiting factors and to formulate the questions to resolve the constraints and the situation to change in the desired direction **[7].** The data of surveys collected have been analyzed using the multivariate methods (AFC).

Table 1. Data on the Investigation

Type of Operation	Location	Composition
Group 1	The high plains	23%
Group 2	The Atlas Saharian	63.5%
Group 3	The Pre Saharian	13.5%

RESULTS AND DISCUSSION

The cluster analysis was used to identify five systems of rearing in the study sample, two modes of conduct of herds are identified, the sedentary mode and the migratory mode that is to say, Nomad, transhumant or semi transhumant. The group of actors respondents brings together more of sedentary breeders that of breeders mobile. It is rather the sedentary system, which is the more dominant, it represents 44.2%, compared to the whole of the respondents **Table n° 2.** With the growth in population and the degradation of course, a large number of mobile breeders is settled gradually to depend entirely on their fields, which has strongly contributed to aggravate the degradation of course.

A linear model of base (under software SPSS 21) has been created on the basis of a typology, which includes more than 280 variables; the study has supported the aspect decision maker (Breeder) as the main target in function of the possession of the herd. The main indicators of sustainable development identified and established in this model have allowed by the result of better understand how the cattle producers of the area adapt to changes in socio-economic and environmental.

Typology of farms

The typology of farms is an important goal to refine the diagnosis to the rearing system and suggest directions for sustainable development through its integration in its environment. According **[8]**, it is trite to meet side by side in the same village of sedentary breeders, transhumant and semi-nomads, having right of a same territory, but the using each according to its possibilities of travel.

Table 2. Type of respondents in the study area.

Type of breeder	Staff	Percentages	Valid Percentage	Cumulative percentage
Sedentary	23	44.2	44.2	44.2
Semi transhumant	11	21.2	21.2	65.4
Transhumant	6	11.5	11.5	76.9
Nomad	4	7.7	7.7	84.6
Sedentary Semi	8	15.4	15.4	100.0
Total	52	100.0	100.0	

The results obtained show a regression of the nomadism, which does that in an irregular manner, since movements of large amplitude concern only 7.7 per cent of the livestock against 9 per cent in 2015. **Table n° 3**. The proportion of sedentary in the population of breeders is increased from 38% to 59.6% between 2010 and 2015; the pastors have changed their system of production by combining cereal crop and livestock. Currently the staff transhumant represent only 11.5 per cent instead of 28 per cent in 2010. In terms of number of livestock, 69.2% of farmers have a herd exceeding the 150 head. The transhumance and the nomad respectively have experienced a regression of 16.5 and 1.3 per cent, while the strength of the sedentary herds has experienced an increase of 21.6%, justifying the strong pressure on the steppe formations.

Table 3. Evolution of staff by type of farming 2010-2015 of the study area (El Bayadh)

Dynamic Workforce Percentage Type of farming	Percentage	
	2010	2015
Sedentary/semi-sedentary	38%	59.6
Transhumants	28%	11.5
Semi transhumants	25%	21.2
Nomads	9%	7.7

Typology of systems of rearing

The main types of livestock are three in number, namely:

1. The system of sedentary farming with a fattening has short duration (type I): It's characterized by the fattening and breeding. It is general in the entire area. This type of breeder has a diversified activity as the production and marketing of the food, the corn and the agricultural production. The area of pasture of their animals extends on a radius of 10 kilometers around the place of residence. The caretaking is done by a member of the family or an employee. The development of this type of farming is mainly due to the income from the various activities, the cattle herd by owner remains low, with a small herd of 10 to 20 head. Their key strategy of fattening resides in the purchase of lambs already Rodés and sold quickly after a fattening of two months to declare the ranchers respondents.

2. The system semi transhumant /semi sedentary with fattening to medium duration (type II): this type of system is led by pastors of the region with as main activity is the production of lamb intended to butchers. The average distance of their movements is 10 to 30 kilometers to see more. These farmers use a family labor for the guarding of herds with a seasonal resort to a salaried labor associated. They buy the power supply for their animals with in the weekly markets or points of sale the closest. The animals are subjected to diet for six to seven months through a break-in period, this method is used by farmers to feed their livestock in a progressive manner until reaching the diet based on the weight of the animal, Locally it is referred to as "E The rach".

3.The system transhumant and nomadic with fattening to long duration (type III): This is a s ystem of extensive breeding and semi extensive, user to route, thus dependent of natural resources without adjustment. This type is threatened by the droughts obliging the herd to make long distances in search of green herbs or dry and water points. Two types of travel between the pastures of the rainy season and the pastures of the dry season can be made according to an amplitude very variable. The long fall movements are due to the search for pastoral resources on many routes often distant from the location of the camp of the flock. These movements involve the expenditure of additional energy, reflected by the Expenditure enough nutritional binding; the average distance of their travel fluctuates between 30 and 90 km and Departures ranged from October to December. **(Figure n° 2).**

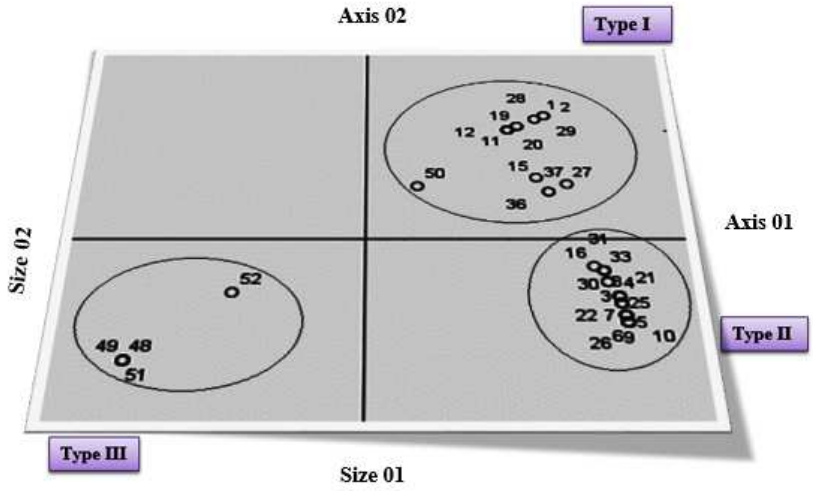

Figure 2. Projections of individuals (52 farms) on the factorial plane (1, 2).

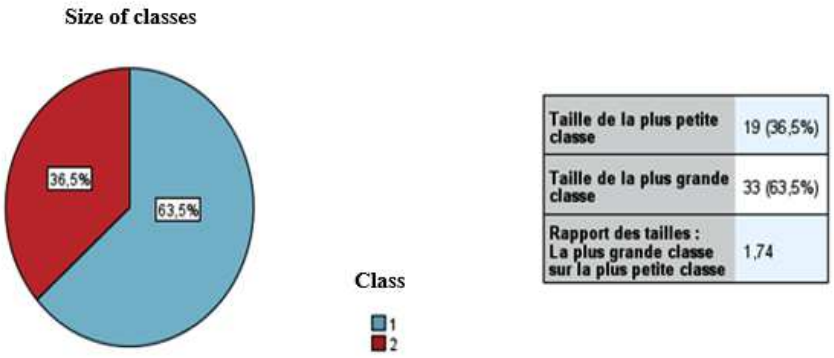

Figure 3. Size of classes of livestock farmers in the function of acquisition of livestock

Analysis of the functioning of the systems of rearing

The system of farming is often depicted from the triptych man-flock-resources**[9,10]**, dynamic models of herds develop from a particular point of view on the system of livestock, centered on the pilotage and renewal by the breeder of the collective entity herd, the latter being composed of females in production, young products and of adults reformed. To refine the understanding of the functioning of the systems of rearing, the results of studies are based on two main: a classification called two-step focuses on the study of the means of production available, the techniques and practices used, the roles of the herds and the objectives of the ranchers. This type of node allows to classify the data in separate groups and generate forecasts; it also allows you to identify trends within the input fields.

The overall results of monitoring the investigation are distributed on two classes, a small and a large according to their acquisition of livestock (Figure 3). The models are distinguished from those which give more attention to the management of forage resources and to the development of the production of grass **[11,12].** The adaptation of the systems of rearing to the issues of channels must be able to integrate the whole of production activities such as travel, watering, the use of the land, the follow-up of the reproduction….etc) and account for the diversity of the lines implemented (or question) among the vas deferens type of systems currently practiced by our farmers.

The constraints of the farms in zone steppe

The analysis of these systems of rearing has allowed collecting the diversity of practices of conduct of herds imposed by various constraints; these are structural in origin and functional and impede the proper functioning of these farms. According to **[13]**, facing a drought become structural in the arid and semi-arid regions, the system is organized accordingly and is proving to be particularly resistant.

Historically, the ranchers had always a great fear of droughts especially those who persisted. The low demand for meat combined with high food prices of livestock imposed to the farmer to get rid of low costs of its sheep. These periods of drought are marked more by mortalities very high, resulting in an economic situation of farmers very critical. In these conditions, the breeder had little choice but to proceed with the decapitalization of his flock **[14].**

Analysis of the strategies of farmers

The results summarized in the table below show that the strategies of the cattlemen have evolved considerably during the last nine years, a total evolution estimated at 27% for the strategy in the short term and only 7% for the long term. This explains the relationship that exists between the economic conditions of the herders and their initiatives. The financial capacity of farmers and their social rank allow you to better maintain the herd, in particular as regards the access to opportunities various forage, the extension of the duration of the complementation and choice in the purchase of the Food concentrated an increase of 31.5 per cent (Table n° 4).

Table 4. The different options in the coping strategies of farmers.

The strategies	Short-term strategies		Long-term strategies		Evolution of strategy on 9 years
	GEGT	GEPT	GEGT	GEPT	
Year	**2015**		**2006**		
Concentrated purchase	100	89.5	63		31.5
Sale	78.8	52.6	56		09.7
Moving	100	21	66		60.5
Purchase of a nimaux	51.5	42.1	47		00
Caretaking s	84.8	47.4	63		03.1
Fodder Rental	100	89.5	9		85.8
Vaginal sponge e	78.8	94.7	34		52.8
Year	**2006**		**2015**		
Animal production B sheep	31		84.8	84.2	53.5
Cereals	22		81.8	52.6	45.2
Ready	-		54.5	78.9	66.7
Arboriculture Fruiti ers	28		10	89.5	66.8
Means T ransport	69		81.8	89.5	16.7
Small c Trade	15		100	10	40
Climate accidents s	-		66.7	63.2	65

-Legends: GEGT: group of breeders of large size, GEPT: group of breeders of small size.

The results obtained show that our area of study offers a diversity very important in direct connection with the edaphic factors climatic and anthropogenic. However, adoption and combination of certain strategies such as dry plowing, the use of irrigation and breeding techniques, complementing the starting transhumance, extra farm income ...) have revolutionized the operation of path causing a degradation and a scarcity of fodder resources and threatening the sustainability of farming activities.

The study reveals that the majority of producers have at their charge a family of large size where the number of children is high, the actors respondents are from families of farmers where the activity of farming is inherited from father to son. The slice of average age of farmers is located around 60 years to 70 years. The proportion of young farmers under 60 years of age does not exceed the 36.8%. By against 54.5 per cent of farmers who exceeds the 60years who hold the large number of heads on the surface studied.

The formula for change in space and time the quantification of the number of animals in the steppe and virtually impossible. The breeder does not declare almost never the actual strength of his flock to uncertain number of reasons among which: the follow-up of the state (tax and taxation, the aid for the supply of these herds, the location of the route …etc.).

The most common category and attient for the two poles of sheep and goat farming is 58%. In the area of study of the important variations of the staff of the surveyed sample have been registered and which varies between (40 to 580 heads).

The analysis of the composition of herds of the sample survey of two groups show that the mixed herds (sheep goats) are represented by 25% of farms surveyed. The Goat, whose strength varies from 15 to 30 heads

A significant variability in the number of staff is observed at the level of the area. It depends of the pastoral year that is conditioned by the rainfall. In the case of good pastoral year, there has been an increase in the workforce, while in the case of bad pastoral year, an average reduction of two categories of the order of 35 per cent of staff will take place, it is mainly due to the mortality and the massive sales of breeding cows.
The maintains with the ranchers during the period of study shows that our investigated based on the experimental observation is essentially during the purchase of the categories available in the souk. It represents 100% of the Races Rembi and djalel Oueld for ranchers and 94.7% for the small category, this choice of base essentially reflects the reputation and the Faculty of races to adapt to the socio-economic variation as well as the climate change in the area. According to the importance of their flocks and their means and their various occupations, the cattlemen have recourse to gardiennages modes different who print a "social status "well defined to each unit of production.

The results show that is 78.8% for the breeders of large size and 73.7% the breeders of small size questioned manage their herds in assert direct. The caretaking is assured by themselves, one of their children or a member of their family (brothers). The breeder owner is the master of all decisions. The individuals who manage their herds in assert indirect are shepherds responsible for the surveillance and the conduct (total or partial) of the cattle of the owners.

Respondents report several periods of struggle in the year depending on the sexual activity of the Ewe a better reproductive efficiency by the fact of having constantly a battering ram to protrude the ewe with aborted or not protrusions; a sale more spread of lambs and an income more regularly in all the farms respondents, the struggles are free. Where the rams are maintained permanently with the sheep. A Aries is able to protrude 25 to 30 ewes during the period of spring beginning was against 50 to 60 sheep in autumn early winter

According to the respondents of the region the main obstacle to the improvement of the zootechnical performance of herds remains the food problem. In the pastoral systems of animal feed is exclusively provided by the course, whose resources are both reduced quantitatively and with fluctuations in time and space.
According to our results the primary key can be summed up in two gestions to learn, the use of the land and the mode of irrigation which seems to two terms very important in the sustainability of operations.

Conclusion

The ecological importance and socio-economic development of steppe ecosystems and présahariens on the one hand, the degradation of these environments and the need for a sustainable development on the other hand, are all elements, which justify the understanding of the functioning of the systems of rearing. At the end of the analysis of the conduct of the herd and the strategies implemented by farmers in a medium to pastoral component, it spring a diversity of systems of rearing practiced by the rural society, it relates essentially to the operation, to the structure and the strategies adopted.
On the basis of the results obtained, it seems that the majority of farmers would prefer strategies Coulter term, then it will be difficult in the long term, to conduct an effective policy of the sustainable conservation of natural resources in the areas steppe without solving the problem of the rights of property (the use of the land by farmers) and use of way to empower the owners and/or users of course. Also, it will be difficult to sustainably manage routes and the space-steppe in general without having a cadastre. There is in effect today no statistics indicating the way a little bit specifies the distribution of land according to their legal nature, nor as regards the property, nor as regards the rights of use **[15].**

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