

## LIVESTOCK IN RURAL PIEDMONT REGIONS OF ALGERIA

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Original scientific paper

**Abstract:** A livestock survey conducted during 2013/2015 as part of a CRSTRA project in 4 villages situated at North east Biskra and south Batna in Algeria. These regions are located at elevation ranging around 250-831m asl, experiencing arid and semi-arid Mediterranean climate. Respondents of 86 families demonstrated that livestock is an integral part of the region's mixed farming systems. Low livestock numbers per most households at present reflect the self-consumption breeding mode adapted in these regions. Currently, farmers focus on four main livestock types; goat, sheep, chicken and bee keeping in two regions, it is the case of Beni Souik and Branis , while Maafa includes beyond these types, turkey and pigeon whereas Ain Zaatout includes duck and swine beside the previous livestock types. In the same context; goat ranked first in the four regions, goat and sheep secondly then goat and poultry with goat combined to sheep and poultry in third place. Thus; most families use a combination of grazing, agriculture sub-products and industrial products for the nutrition of their livestock. Families keep livestock as source of milk, butter, wool or hair, leather and other products that are strongly used as nutritional, weaving supply or stocking covering resources for the family members or friends and in some cases for sell to seekers of animal products of indigenous territory origins. Most families use these products for family and friend consumption while a minority sell some of them on local markets.

**Key words:** Algeria, arid, breeding, family, piedmont.

### Introduction

The domestication of livestock species some ten thousand years ago was a vital step in the development of human civilisation (*FABRE, 2006*). Thus; livestock is

the second important sub sector of agriculture, it is primarily a subsistent activity to meet household food needs as well as supplement farm incomes. Almost every farm family owns some livestock .the pattern of livestock strength is mainly influenced by various factors such as farm size, cropping pattern, availability of rangelands including fodder and pasture (*Rais et al., 2013*). And even with eleven livestock production systems defined (*Séré et al., 1995a*), the traditional breeding systems are often rather difficult to identify, because they are related to existing low input production systems and are not formally institutionalized (*Steglich and Peters, 2003*). For example in South Africa; although dairy ranching is currently receiving little attention, it has the potential to form an integral part of resource poor cattle production systems. Such a system can contribute towards household food security in the form of milk consumption by the family from the cows as well as the cash obtained from the sale of milk. (*Grobler et al., 2008*). As well as in Mountain areas, Mediterranean grasslands, steppes, arid and semi-arid zones areas, animal production was traditionally one of the very few economic options, still contribute important natural values, including cultural landscapes and biodiversity (*Bernués, 2017*); in Algeria, most livestock is an extensive system, thus some of it is family type intended to self-consumption in animal products (meat, milk, egg and honey) or to furnish an income consequently in good pluvial years. In addition, these animals depending on the species and regions of breeding provide manure for cropping systems that do not use chemical fertilizers mainly gardening and arboriculture and supply the rural populations' activity system in wool, hair and leather main raw materials essential for family crafts (*Feliachi, 2003*). In this study, a sequence of survey steps was employed to assess the rural traditional livestock systems in arid and semi-arid regions of Algeria where a traditional low-input mixed crop-livestock system prevails.

## Material and methods

### *Characteristics of the study area*

The study is realised in four Aurès piedmonts villages of arid and semi-arid regions with agro-pastoral vocation; Ain Zaâtout, (altitude 831m, latitude 35°4'30.49" Nord, longitude 5°45'48.04" Est ), Beni Souik (altitude 555m, latitude 35°5'15.85" Nord, longitude 5°51'43.07" Est ), Branis (altitude 250 m, latitude 34°59'55.84" Nord, longitude 5°46'32.13" Est) these regions are mainly identified as hot arid eco region and Maafa (altitude 735.6 m, latitude 35°18'09.458" Nord, longitude 005°52'17.066" Est) which is known as a hot semi arid eco region. The Mediterranean climate with long summer drought period of these regions is characterized by a dry cold winter with rare morning freeze with low temperature registered in December and January that ranges from – 2 to + 4°C and a dry hot

summer with maximal temperature registered in July and august superior to 40°C. Thus seasonal temperature variation can reach 20°C while diurnal temperature variation can pass 22°C. Irregular insufficient and unequally spread annual rainfall ranges from 300 to 100 mm and mostly can pass 200 mm in these regions. The annual mean relative humidity is of 47 % (*Feliachi, 2003 and URBACO 2012*).

The study region has an agro-pastoral type vocation where palm dates are the dominant growing with two underlying growing fruit trees and low annual or perennial crop. Breeding occupies a predominant place; in fact the region of Biskra is famous by its livestock especially by the breed race Ouled Djellal the most spread in Algeria and known as resistant to arid zones (*URBACO, 2012*). This rain-fed farming systems in dry areas with mixed crop-livestock and pastoral systems merging into systems with very low current productivity or potential because of extreme aridity. Where each individual farm has its own specific characteristics, which arise from variations in resource endowments and family circumstances (*Dixon et al., 2001*).

The studied areas are especially traditional extensive breeding system maintained in rural areas employing self or family labour (women and children) based on free fodder offer and grazing animals on cropped land after harvest with small herd size. Animals are used as a multi-purpose breed providing milk and some of its sub-products, egg, meat, wool or hair, leather and sometimes manure.

### ***Data collection***

The study was conducted among 86 family farmers owning a livestock. The data were collected by questioning a men or women per household that accept to participate in this study. The interviewed person was inquired to generate information on breeding practices on the basis of four main questions: Types of livestock owned by the farmer family, the head number of livestock owned by the farmer family, Food source of livestock and Breeding sub-products and their consumption (whether the products are intended to be commercialised or for self-family consumption and friend consumption). Thus in our inquiry we investigate 19 women from Ain Zaatout, 19 women from Béni Souik, 20 women from Branis, and 28 women from Maafa.

Data have been processed by the Microsoft Office Excel 2007 package.

## **Results and discussion**

### **Types and head number of livestock**

The data regard types of livestock are presented in Table 1.

**Table 1. Type of livestock**

Livestock type	Ain Zaatout=19		Beni Souik=19		Branis=20		Maafa=28		Total 86
	nbr	%	nbr	%	nbr	%	nbr	%	
Goat	182	38.47	97	20.50	88	18.60	106	22.41	473
Sheep	48	21.52	43	19.28	68	30.49	64	28.69	223
Chicken	70	37.63	14	7.52	36	19.35	66	35.48	186
Beekeeping	18	48.64	15	40.54	2	5.40	2	5.405	37
Turkey	10	90.90	0	0	0	0	1	9.09	11
Pigeon	0	0	0	0	0	0	6	100	6
Duck	15	100	0	0	0	0	0	0	15
Swine	10	100	0	0	0	0	0	0	10
Total	318	34.60	169	18.38	194	21.10	238	25.89	919

Four main types of livestock are registered thus goat breeding is the most dominant one followed respectively by sheep breeding, poultry breeding and, beekeeping. Meanwhile big livestock like cattle does not exist in these regions this is related to climatic as well as socio-economic characteristics of these regions thus *Séré et al. (1995b)* revealed Africa to have vast livestock resources in semi-arid and arid regions where small ruminants play an important role while *Kwaku (2003)* reported that, under certain socio-economic conditions only small stock (e.g. sheep and goats) or micro stock (rabbits, grass cutters, etc.) may be suitable in a given agriculture-livestock system.

Families are maintaining a number of animals of different types: goat, sheep, chicken, bee hives, turkey, pigeon, duck and swine. Goat and sheep are good source of milk and meat while poultry are mostly source for eggs and bees for honey.

Data given in Table 1 show that total population of livestock raised by the respondents was 919. Total number of heads of goat, sheep, chicken, turkey, pigeon, duck and swine are 473, 223, 186, 11, 6, 15 and 10, respectively while bee hives total number is 37one. In general, these small folk sizes are intended for family consumption in contrast what is reported by *El Aich (2018)*, who mentioned that Moroccan Atlas Mountains livestock farming systems are characterized by large folk sizes.

Thus the number of each category differs from region to another these differences are attributed to characteristics of each region. Livestock number of heads maintained by a family indicates their interest in animals. Thus the mean number per family of goats (5. 50) is similar to that registered in Esera District, of Dawro Zone, Southern Ethiopia by *Beyene et al. (2018)* with 5.69 goats per household.

## Distribution of families according to livestock type

Table 2 presents data concerning the number of families per region according to the type of livestock owned.

**Table2. Number of families per type of livestock**

Livestock type	Ain Zaatout		Beni Souik		Branis		Maafa		Total	
	nbr	%	nbr	%	nbr	%	nbr	%	nbr	%
Goat	7	36.84	4	21.05	8	40	5	17.86	24	27.90
Sheep	0	0	0	0	0	0	1	3,57	1	1,16
Poultry	0	0	0	0	0	0	1	3,57	1	1,16
Goat + Sheep	1	5.26	10	52.63	5	25	3	10.71	19	22.09
Goat + Poultry	2	10.53	2	10.52	1	5	8	82.57	13	15.11
Goat +Beekeeping	0	0	0	0	1	5	1	3,57	2	2.32
Goat + Sheep +Beekeeping + Poultry	5	26.32	1	5.26	0	0	1	3.57	7	8.13
Goat + Sheep + Poultry	3	15.79	2	10.52	3	15	5	17.86	13	15.11
Beekeeping + Poultry	1	5.26	0	0	0	0	0	0	1	1.16
Sheep + Poultry	0	0	0	0	0	0	1	3.57	1	1.16
Goat + Sheep +Beekeeping	0	0	0	0	1	5	1	3.57	2	2.32
Goat +Beekeeping + Poultry	0	0	0	0	1	5	1	3.57	2	2.32

Goat livestock ranked first among the four regions (27.90%); followed by Goat and sheep livestock together (22.09) while goat with sheep with poultry and goat with poultry presents 15.11% each of the total inquired families. Thus every region has its specificity; Ain Zaatout families are mainly breeders of goats only (36.84%) or associated with sheep, poultry and bees (26.32%). Beni Souik families are mainly breeders of goats associated with sheep (52.63%) or goats lonely (21.05%). Branis families are mainly breeders of goats solely (40%) or associated with sheep (25%). Meanwhile Maafa families are mainly breeders of goats associated with poultry (82.57%) or goats only or associated with sheep and poultry (17.86%) for each category. The dominance of goat breeding is a traditional rural asset not intended for regular consumption in these regions this result is similar to what *Maass et al. (2012)* found about cattle livestock in the Rusizi plains of Congo. Meanwhile abundance of goat and sheep breeding in

combination is attributed that they are main small body perfect resources of red meat and milk for the rural population in these regions. This consolidates *Masiga (1995)* who reported that Sheep and goats account for almost 30% of the meat consumed and 16% of the total milk produced in Africa. Because of their small body size, high reproductive capacity and ability to rapidly multiply their numbers, small ruminants are ideally suited to smallholder production systems. The capital requirement for starting and keeping or expanding small ruminant production is low. They are a moving bank because they can easily be sold. Also production investment risks are low.

Generally rural population consume less animal proteins than urban population thus *Ranganathan et al. (2016)* reported that within developing countries and emerging economies, per capita consumption of animal-based foods tends to be highest in urban areas. We suppose that regular consumption of eggs, milk, or meat from small animals, such as poultry and goat would, consequently, impact on family nutritional status in these rural piedmont regions. Similarly *Maass et al. (2012)* reported about cavies.

### Food source of livestock

The source of food used in the four villages is summarised in Table 3.

**Table 3. Food type used in the four sites for animal's nutrition**

Food type	Ain Zaatout	Beni Souik	Branis	Maafa	Total
Grazing	0	1	1	0	2
Sub-product	0	1	0	0	1
Industrial	1	0	0	0	1
Grazing and sub-product	3	0	0	0	3
Grazing and industrial	3	2	3	1	9
Sub-product and industrial	1	3	3	1	8
Grazing and sub-product and industrial	11	12	13	26	62

In the four villages the combination of grazing, agriculture sub-product and industrial products for feeding animals is the most used with a total percentage of 72.09 compared to depending on grazing only 2.32%, agriculture sub-products (1.16%), industrial products (1.16%) or a combination of two of them; 3.48% for a combination of grazing and agriculture sub-products, 10.46% for the combination between grazing and industrial products and 9.30% for the combination between

agriculture sub-products and industrial products. Thus, many Mediterranean farming systems have traditionally been based on the extensive use of natural pasture (*Casasûs et al., 2014*).

### Breeding products and their consumption

Different sub-products are listed according to number of families exploiting them in Table 4.

**Table 4. Number of families per region engendering breeding sub-products**

Sub-product	Ain Zaatout	Beni Souik	Branis	Maafa	Total
Milk	18	19	20	26	83
Butter	18	18	20	26	82
<i>Klila</i>	10	10	15	8	43
Wool/hair	18	17	17	24	76
leather	14	18	17	19	68
manure	7	15	15	14	51
commercial	7	0	0	2	9
Self-family and friends consumption	12	19	20	24	75

Most families produce milk (96. 51%) thus milk is the most important product. Similarly *Steglich and Peters (2003)* reported that milk production is important in Gambia. Furthermore milk is used for the preparation of *Klila* a form of dried cheese used locally by families in traditional dishes (50%). While butter, wool or hair and leather are produced by 95.34%, 88.37% and 79.06% respectively of interviewed families. These livestock products are mainly used as nutritional, weaving supply or stocking and covering resources for the family members or friends and in some case for sell to seekers of animal products of indigenous territory origins. Most of the families (87.20%) use these products for family members or friends consumption while (10.46%) only announced that they sell some of these products on local markets. Manure is another product used as fertiliser by 59.30% of interviewed families; thus animal manure is often essential for maintaining soil fertility reported *Steinfeld et al. (2006)*. Likewise *Cox (2011)* mentioned that in the traditional mixed farming of the region, soil fertility of main fields near the homestead used to be maintained by available cattle manure.

### Conclusion

Livestock system in rural piedmont regions of Algeria is based on a variety of types with a dominance of goat followed by a combination of goat and sheep breeding, while goat combined to poultry or with sheep and poultry came in third rank. With the low numbers per household it is typically grazing, agriculture sub-

product and industrial products based-livestock system resulting in provision of healthy protein in the human diet ensures sustainability of the soil fertility. This kind of livestock system must be consolidated by programs for adequate forage grain reproduction involving smallholder farmers. It is also important that institutions work in cooperation with the farmers to provide forage and there must be focus on animal products delivered by these systems as being products of bio and healthy origin to raise farm income.

## **Stočarstvo u ruralnim pijemontskim regijama Alžira**

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### **Rezime**

Istraživanje populacija stoke sprovedeno je tokom 2013/2015. godine u okviru projekta CRSTRA u 4 sela na severoistoku Biskre i južnoj Batni u Alžiru. Ovi regioni se nalaze na nadmorskoj visini od oko 250-831m, i izloženi su sušnoj i polusušnoj mediteranskoj klimi. Ispitanici iz 86 porodica pokazali su da je stoka sastavni deo mešoviti poljoprivrednih sistema u regionu. Nizak broj stoke u većini domaćinstava trenutno odražava način uzgoja za zadovoljenje sopstvenih potreba u ovim regijama. Trenutno, poljoprivrednici se fokusiraju na četiri glavne vrste stoke; koze, ovce, živinu i pčelarstvo u dva regiona, što je slučaj u Beni Souik i Branis regijama, dok Maafa regija, pored ovih vrsta, uključuje uzgoj ćurki i golubova, dok Ain Zaatout regija uključuje i uzgoj patki i svinja pored prethodno navedenih vrsta stoke. U istom kontekstu, koze su na prvom mestu u sva četiri regiona, koze i ovce na drugom mestu, zatim koze i živina sa kozama u kombinaciji sa ovcama i živinom na trećem mestu. Tako; većina porodica koristi kombinaciju ispaše, poljoprivrednih podproizvoda i industrijskih proizvoda za ishranu svoje stoke. Porodice drže stoku kao izvor mleka, maslaca, vune ili dlake, kože i drugih proizvoda koji se koriste u ishrani, ili kao sirovina za tkanje ili skladištenje resursa za članove porodice ili prijatelje, a u nekim slučajevima za prodaju zainteresovanima za životinjske proizvode autohtonih vrsta na određenoj teritoriji. Većina porodica koristi ove proizvode za porodičnu potrošnju i prijatelje, dok manji broj prodaje neke od proizvoda na lokalnim tržištima.

**Ključne reči:** Alžir, suva klima, uzgoj, porodica, pijemont.



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