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**PASTORAL DYNAMICS IN THE REGION OF DIFFA (NIGER): A DESCRIPTIVE ANALYSIS OF LIVESTOCK CAPITAL**

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**Abstract**

Located between the desert zone in the North and the Sahelian zone in the South, the Region of Diffa is a pastoral area par excellence in Niger. Breeding, with a highly diversified livestock, is the dominant economic activity in the region. It occupied 95% of the population and contributes annually to 55% in the formation of the region gross domestic production (1). For understanding the pastoral dynamic a survey of 300 households (150 households with herd sedentary and 150 with herd mobile) was conducted during the first semester of 2012. The data analysis is performed from a herd of 15,618 animal heads consisting mainly of small ruminants for both sedentary (72%) and mobile (52%). The herd structure (sedentary and mobile) by age and sex shows on the one hand, the males are early and systematically exploited, all species including, and the reproduction is carried out by a core of female spawners more less stable and dominated by young females, on the other hand. Comparative analysis of compositions and structures of the livestock by agro-ecological zone (Pastoral bowls zone; Komadougou River and Lake Chad zones) reveals zonal disparities particularly in the sedentary livestock system.

**Keywords:** Livestock, Pastoral economy, livestock system, Diffa, Niger

**Introduction**

Animal husbandry is practiced throughout Niger territory according of agro-climatic parameters. This activity contributes significantly to household budgets and to meeting the food needs of Nigerien populations (Republic of Niger, 2003; Save the Children, 2009).

Livestock sector represents 70% of export agricultural products, 11% of the country's GDP. It is the second export heading (22% of export revenues) of the country after 'uranium (Republic of Niger, 2003). However, various natural constraints (rainfall, silting up of ranges, etc.) and anthropogenic (demographic pressure) seriously affect all pastoral production systems in Niger, especially in the Region of Diffa, an essentially pastoral zone with 10% of the national livestock (Republic of Niger, 2008b). In this Region, 95% of population practices animal husbandry as their primary or secondary economic activity after farming.

To understand livestock dynamics in the Region in the face of constraints which have become more and more structural over the years, 300 households were surveyed during the first semester of 2012. This article provides a descriptive analysis of the livestock surveyed with a sample of 15,618 head of animals. After a look into natural environment of the region, the composition and structure of livestock surveyed in general were analysed. In second hand, an

analysis by rearing system (sedentary or nomadic) and agro-ecological areas will be conducted in order to identify the major trends and potential variances that may exist.

### Natural environment

With a surface area of 156,906 Km<sup>2</sup>, the Region of Diffa is located in the far Eastern part of Niger between 10° 30' and 15°35' east longitude, 13°04' and 18°00' north latitude (Figure 1).

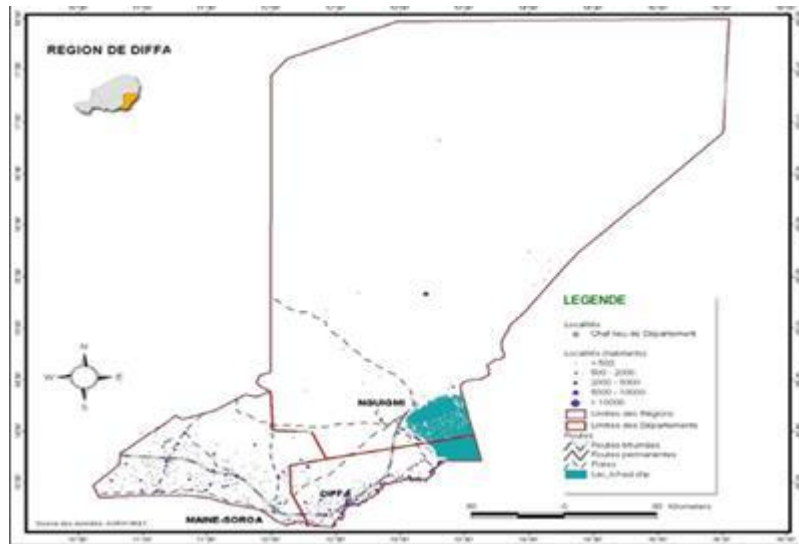


Figure 1: Spatial distribution of communities in the Region of Diffa (source : Republic of Niger, 2006).

The climate is Saharan-Sahelian. This makes the Region of Diffa one of the pastoral zones per excellence in Niger.

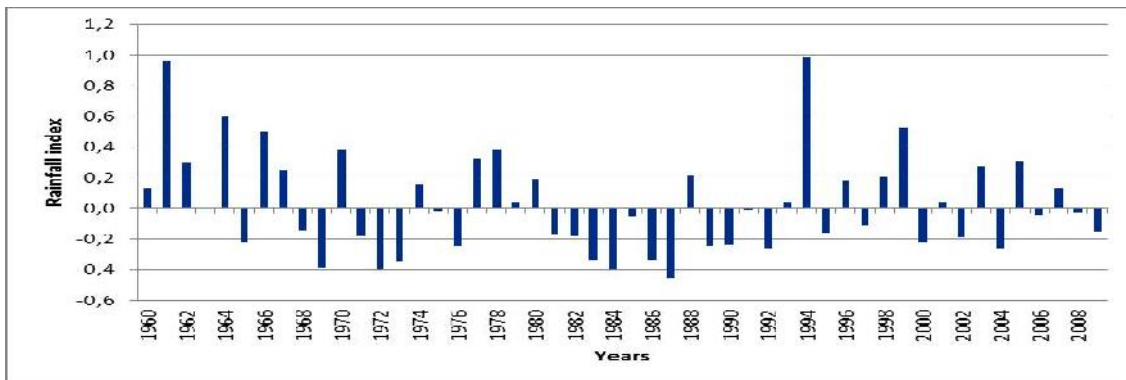


Figure 2. Rainfall variations in the Region of Diffa from 1960 to 2009  
Source : INS data (2010).

Figure 2 shows the evolution of rain index in the Region of Diffa from 1960 to 2009 characterized by a succession of more or less constant dry periods. Only two years out of 11 recorded excess rainfalls over the period 2000 - 2011. This climate variability generates

recurrent shocks and important fodder deficits for an extensive rearing system. Such deficits are becoming more and more structural (figure 3).

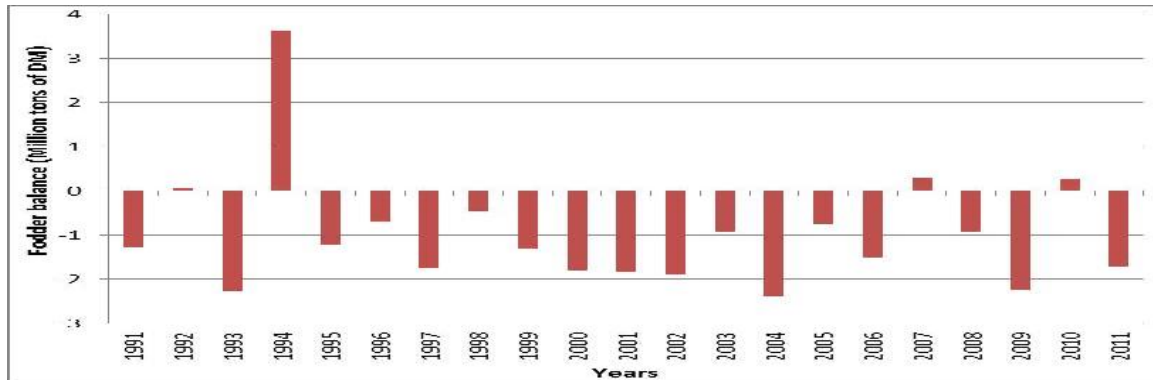


Figure 3. Evolution of fodder balances in the Region of Diffa from 1991 to 2011  
Source: Data from DNP (2010) and DREIA (2012)

### Materials and methodology

Based on agro ecological parameters, the Region of Diffa has been divided into three (3) survey areas (pastoral bowls zone, Lake Chad zone and Komadougou River zone).

#### Agro ecological zoning

- Pastoral bowls zone: It corresponds to the Sahelo-saharan belt laying between isohyets 150 and 250 mm per annum (Northern part of the Region of Diffa). Livestock is the main economic activity of communities (Fulanis, Mangas, Arabs and Toubous).
- Komadugu zone: It is located in the Southern part of the Region, 150 km along Komadugu Yobe River. It receives 250 to 300 mm of rainfall per annum. Farming (Irrigated or/and floodwater) is the main economic activity of populations (Mangas and Mobeurs essentially). It is also a retreat zone for breeders during the dry season.
- Lake Chad zone: It is located in the far Eastern part of the Region in Lake Chad Basin. It receives 250 to 300 mm of rainfall per year. Floodwater farming is the main economic activity of communities (Mangas and Budumas) in the zone. This is a retreat zone by excellences for breeders.

#### Sampling and conduct of the survey

Sampling was conducted with the household as survey unit (all individuals living under the same roof and sharing the same amenities of life). The sample includes 150 households with sedentary livestock (50 households per agro-ecological zone) and 150 households with mobile livestock (50 households per agro-ecological zone). Sedentary households were drawn at random on the basis of attendance lists established during focus groups conducted in different villages selected. Mobile households were randomly made encounters of the encampments in territories of the villages selected because of their mobility.

The survey was conducted from February 10th to April 5th 2012. But the difficulties of meeting mobile breeders in Komadugu zone at the time of our passage have changed the structure of the sample so that the results of counting give 147 sedentary households (55 in pastoral bowls zone; 50 in Komadugu zone and 42 in Lake Chad zone) and 152 mobile households (45 in pastoral bowls zone, 31 in Komadugu zone and 76 in Lake Chad zone). However, this modification does not affect the quality and focus of the study.

### Results and discussion

#### Composition of the livestock surveyed

Figure 4 shows the compositions of the livestock surveyed with a total number of 15,618 head of animals in majority dominated by small ruminants (57.6% of livestock surveyed).

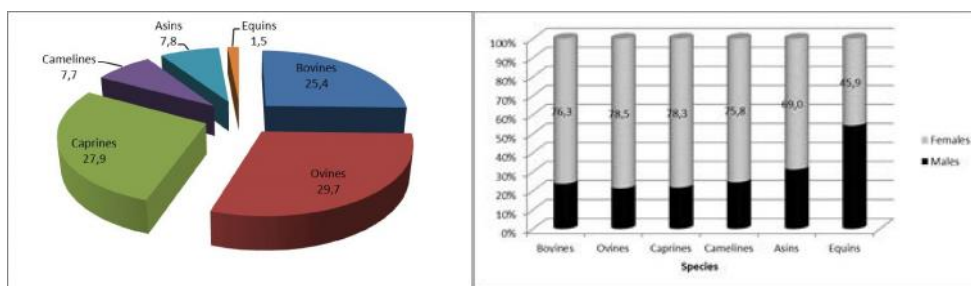


Figure 4. Composition of livestock population surveyed per species (%) Figure 5. Distribution of the livestock species per gender (%)

Livestock distribution per gender and species (figure 5) shows a preponderance of females (¾ of the herd) over males, all species combined, except horses where males represent 54.6% of their effective. Such a composition of the herds translates the strategic orientation of households towards livestock for breeding.

#### Composition of sedentary and mobile herds

Figure 6a shows that the sedentary herds in the Region of Diffa remain to large extent dominated by small ruminants representing 71.1% of livestock with a preponderance of goats (40.6%) over sheep (30.5%). Bovines and camels represent respectively 19.8% and 1.6% of sedentary herds. In mobile herds, small ruminants represent 51.8% of livestock with however a preponderance of sheep (29.3%) over goats (21.5%). Large ruminants contribute around 39% to mobile livestock numbers in the Region (Figure 6b).

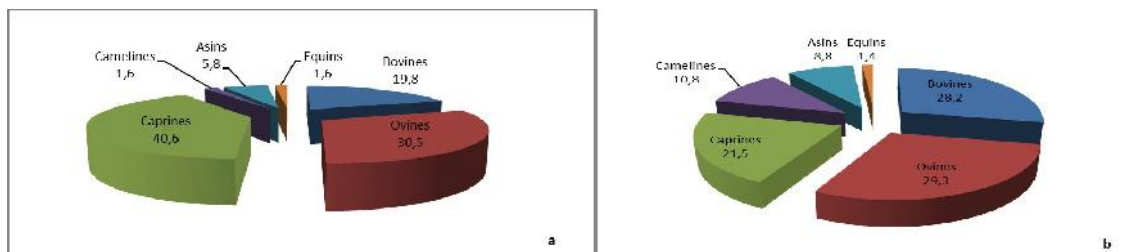


Figure 6. Comparison of the compositions of (a) sedentary herds and (b) mobile herds (%)

Composition herds according to agro ecological zones

Analysis of the composition of sedentary and mobile herds by agro ecological zone shows zonal disparities (figure 7). In the Lake Chad area, small ruminants represent 80% of sedentary herds against 72% in the pastoral bowls zone and 62% in the Komadugu zone (Figure 7a). These results indicate a trend towards capitalization in large animals such as cattle (29% of sedentary livestock), of Komadugu area sedentary households for whom animal husbandry is a secondary economic activity after agriculture. Households increasingly invest surplus generated by sales of agricultural products in cattle breeding. Such farming-livestock integration values rainfed and irrigated crop residues (rice straw) through cattle fattening.

Comparison of the compositions of mobile herds surveyed per zone (Figure 7b) shows a domination of small ruminants in Lake Chad (53%) and in the pastoral bowls zones (51%). In the Komadugu zone, large ruminants dominate (49.6%) with a high presence of camels unlike the two other areas certainly related to the period of survey.

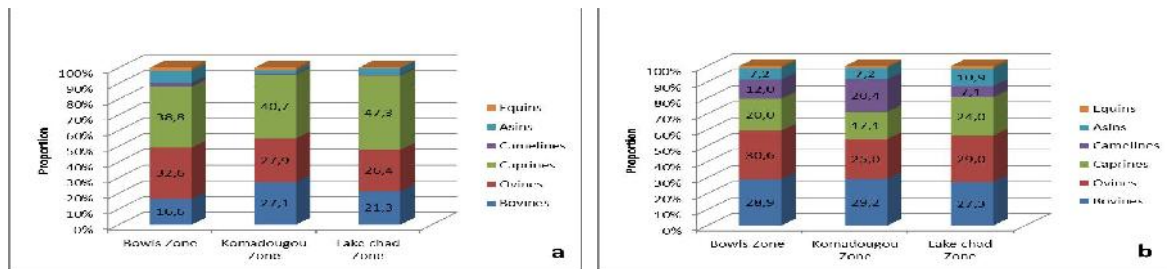


Figure 7. Comparison of (a) sedentary and (b) mobile herds by agro ecological zone (%)

Structure of livestock

Out of the 300 households surveyed, 270 (131 sedentary households and 139 mobile households) provided information considered exploitable for the purpose of this exercise. The total number of livestock population was 13,415 heads, including 3,625 cattle; 3,844 sheep; 3,883 goats; 786 camels; 1,096 donkeys and 181 horses.

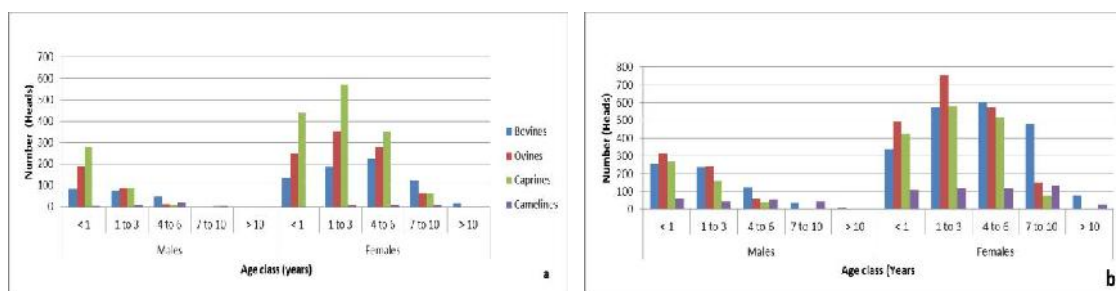


Figure 8. Structure of (a) sedentary and (b) mobile herds according to species and gender.

Analysis of the figure 8 shows the degree of systematic and early exploitation of male in comparison to female individuals, ceteris paribus. The gap is much more significant in the 1 to 3 years age group and beyond. For all livestock identified, 7.5% of male small ruminants are 1 to 3 years old against 29.3% for females. For cattle, proportions are respectively 8.7%

and 21%. However, the level of exploitation of male individuals varies according to the sedentary or mobile status of the livestock. In sedentary herds, 64-73% of male small ruminants are less than one year old against 39.7% for cattle and 13.3% for camels. In mobile herds, the proportions are 51-57%; 38.7% and 29.4% respectively.

Such a structure characterizes a rearing system oriented towards reproduction both mobile and sedentary herds. This reproduction is ensured by a core of female spawners more or less stable and largely dominated by young ones (figure 7). In small ruminants, more than one third (1/3) of females (37.8% of ewes and 38.1% of she-goats) are 1 to 3 years old. Thus, considering the age of first birth in large ruminants 45 to 48 months, we may say that reproduction in cattle and camels is ensured respectively at 54.1% and 42.2% by females aged 4 to 6 years. Females aged 7 to 10 years old represent respectively 39.6% and 47.5% and very few are above 10 years of age.

### **Discussion**

Such results translate a change in the composition and structure of the livestock population in the Region of Diffa which is characterized by a more or less significant dominance of small ruminants (especially goats). In 1970, according to the official human populations and livestock census, small ruminants represented 56.8% (sheep 21.3% and goats 35.5%) of herd in Diffa against 37.6% for cattle. Camels, asins and equines represented respectively 2.5%, 2.1% and 1% of herd in the Region (Republic of Niger, 1970). In 1978, small ruminants represented 62.4% of herd again 30.2% for cattle; 3.4% for camels; 2.8% for donkeys and 1.2% for horses (Republic of Niger, 1979). According to the results of the 2004-2008 Census in the Region of Diffa, small ruminants represented 65.3% of sedentary herds (ovine 24.9% and caprine 40.4%) and 39.6% of mobile herds (ovine 20.4% and caprine 19.3%).

The results of the livestock population structure resemble those obtained by Faugère and al. (1990a et b) in “Traditional small ruminants rearing system in Senegal...” marked the one hand, by scarcity or absence of older animals particularly the males, and secondly, by a domination of females regardless of the age group considered. The structure of cattle herds in sedentary areas of Diffa at the end of 1982 shows that 64.1% of females are aged 4 years and above; 23.9% are 1 to 3 years old and 12% are 0 à 1 year old. In the pastoral zone, the proportions are respectively 59.4%; 26.7% and 13.8%. 61.2%; 27.1% and 11.7% (PENCE, 1985).

In a nutshell, it is very rare to find in the Region of Diffa small ruminants of more than 7 years of age or cattle of more than 10 years of age. This is attributable to a large extent to the series of recurrent fodder and food deficits the Region has experienced for more than a decade (cf. figure 2). To this is added the occurrence of epizootic diseases (pleuropneumonia, piroplasmosis, etc.) which further weaken already malnourished livestock.

### **Conclusion**

Pastoralism in the Region of Diffa is changing in terms of livestock practices in the face of recurrent and even structural fodder and rainfall deficits. Over the years, many breeders have witnessed a change in the composition and structure of their herds. The share of cattle has

decreased in favor of small ruminants (especially goats) which are more resilient to climate shocks by feeding, where necessary, on aerial pastures. However, in the Komadugu zone, sedentary herds contain a much more significant proportion of cattle (29%) in comparison with other zones.

Livestock structure is characterized by a core of young spawners more or less stable. To exploit his flock, the breeder selects preferably male then female aged and / or sick. This strategy enters in the reproductive process and capital livestock accumulation in order to ensure the reproduction of flocks and milk production, and secondly, to keep potentially powerful and resistant animals in an environment marked by structural deficit rainfall and forage causing significant losses of animals and the pauperization of breeders.

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