

Short Research Article

Cattle breeding practices in the Savannah Region of Togo

ABSTRACT

Due to its geographical position, the Savannah region of Togo is more affected by the effects of desertification. Climate change and human actions are degrading the natural resources on which cattle breeding depends; which pushes breeders to adapt the practices of their activities. Our study aims to analyze the different practices in the management of cattle breeding in this region of the Savannah.

To this end, a representative sample of 150 breeders is constituted on the basis of their spatial distribution and the number of animals kept. A two-part questionnaire is submitted to him. The first part of the questionnaire allows us to have data on the breeder's operation while the second part provides us with information on the cattle herd. The analysis of the farm is carried out on the basis of the social status of the breeder and that of the herd concerns the number, breeds raised and management.

The result is that the average age of farm managers is 52 ± 6 years. These breeders combine agriculture with livestock breeding and they have no fallow plots or land reserves. What emerges is the coexistence of three breeding practices largely dominated by the fulani ethnic group: "Cultivating Breeders", "Breeding Farmers" and "Agro-breeders". Cattle farms also include other species including sheep (48% of farms), goats (17%) and the sheep-goat association (26%). The herds are formed from purchase (49%), inheritance (31%), donations (10%) and borrowing (10%). Faced with the degradation of natural resources, the former cattle breeding areas (prefectures of Tône, Tandjouare and Cinkassé) are intensifying agricultural activities; while new ones (Kpendjal, Oti and Oti-sud) are emerging in livestock areas.

Keywords cattle herd; breeding practice; natural resources; Savannah region; Togo

1. INTRODUCTION

In Togo, livestock farming has most often retained a traditional character, a strong direct dependence on natural resources and low productivity. The growth of cattle breeding is gradually reaching limits because available land is becoming scarce and in agropastoral areas the common rangelands allocated to livestock breeding are gradually being replaced by crops. Competition over available land is increasingly strong and modern customary and legal powers show limits in managing access to resources, so much so that conflicts between users are increasing. The mobility of herds across territories is reduced during the cultivation period, which often poses feeding problems (Bourbouze 2007, Vall and Diallo 2009).

The Savannah region of Togo borders the Sahelian countries and therefore constitutes a gateway for transhumant cattle. To access increasingly rare plant resources, cattle breeding systems are changing and local and foreign herds are adapting through mutual competition.

Comment [MOU1]: Separate paragraph should not start with To

Comment [MOU2]: Year of study is missing in the abstract

Comment [MOU3]: Don't write average age in plus minus form, in this form you can write in table but while explaining things write in only numbers

Comment [MOU4]: Conclusion part is missing

Comment [MOU5]: Rewrite this sentence

This study aims to describe the current breeding systems and practices of livestock households in the Savannah region.

2. MATERIAL AND METHODS

2.1- MATERIAL

2.1.1- Study area

The study area is the Savannah region located in the extreme northern part of Togo between 0° and 1° East longitude and 10° and 11° North latitude. It covers an area of 8,470 km² or 14.9% of the Togolese territory with a population of 1,054,700 inhabitants. It has seven (07) prefectures, 16 communes, and 69 cantons.

The economic life of the region is mainly dominated by subsistence agriculture practiced by 96% of households (RNA, 2012). The region excels in pastoralism and mainly raises small ruminants, poultry and cattle. The breeding system is of a traditional type focused on the exploitation of natural rangelands.

2.1.2- Technical material

The material used to characterize farms and breeding practices consists of a two-part questionnaire (herd and farm) submitted to farm managers and an interview guide submitted to the technical services in charge of breeding.

Other equipment was also used, notably: a GPS receiver to locate the position of different points in our study area, CPro software for map design and data entry, SPSS software for statistical analyses, Microsoft Office Excel for charts, Microsoft Office Word for designing the questionnaire and the interview guide.

2-2- METHODS

2.2.1- Sampling

The study site was chosen because of the relative importance of cattle breeding compared to other activities carried out in the area; and on the other hand in relation to other geographical areas of the country.

The sample size is determined from the following formula:

$$n = \frac{T^2 \cdot P(1-P) \cdot N}{T^2 \cdot P(1-P) + (N-1) \cdot Y^2} \quad (\text{Rea L.M.4 et al., 1997})$$

n= sample size ; **N**= size of target population; **P**= expected proportion of a population response. In this case, P=0.5 ; **T**= sampling confidence interval. By placing ourselves in a 95% confidence interval, T= 1.96 ; **Y**= margin of sampling error. For our study, the error is estimated at 5%.

This formula made it possible to obtain a size of 150 livestock breeder households to survey. The identification of these breeder households is made from the nominative list of 1266 breeder households established by the agents of the services in charge of livestock. The choice of breeders by prefecture is based on the proportion of breeders in this prefecture compared to the total number in the region. The choice of farms at the level of each prefecture is made by drawing lots with the condition of a minimum number of five (5) head of cattle (see figure 1).

Comment [MOU6]: Write some sentence to make link between these heading

Comment [MOU7]: Source?

Comment [MOU8]: Remove the space

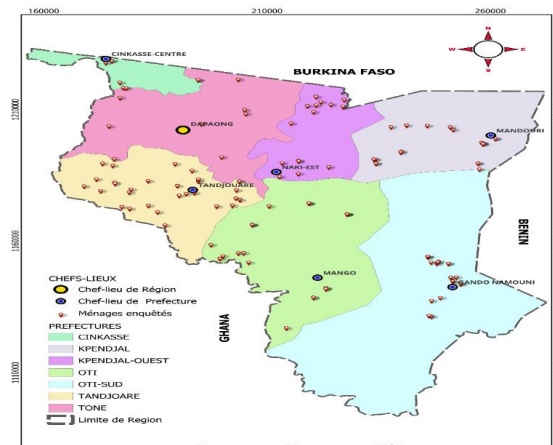


Figure 1: livestock households surveyed

2.2.2- Survey support

This survey support has two (2) parts including the identification and configuration of the herd.

The identification of the herd provides information on the name of the breeder head of household, origin, gender, age, marital status, other activities and available land.

The configuration and operation of the herd provide information on its establishment, its composition (breeds of cattle raised, average number of animals, etc.) and the know-how of the breeder (feeding, zoo-sanitary monitoring, animal dynamics in the herd).

2.2.3- Field data collection

Before the survey itself, seven (7) information and harmonization meetings, one per prefecture, brought together prefectural, cantonal and village breeder managers to provide them with the context, objectives and expected results of the study.

The surveys are carried out from April to September 2022 and concerned breeders who are heads of households in individual interviews; while in groups, they brought together the breeders sampled by canton.

2.2.4- Data management and exploitation

The data collected is entered into the CPro software using a mask conforming to the questionnaires described above. The data are processed using the statistical software SPSS 20. The necessary tables and graphs were produced in Excel. For quantitative variables, means and standard deviations are calculated. Analyses of variance (ANOVA) and comparison of means are carried out on zootechnical and socio-economic data.

Cattle breeding practices are determined using multiple correspondence factor analysis (AFM) on 150 breeders. The study of the correlations between the various variables considered made it possible to retain a set of 17 active variables giving 44 modalities. An ascending hierarchical classification (CAH) is carried out with all the data.

3. RESULTS AND DISCUSSION

Comment [MOU9]: Write some sentences between these heading

3.1- RESULTS

3.1.1-Socio-economic characteristics of cattle herds

In terms of marriage, polygamists represent 54% compared to 46% of monogamists. Cattle breeding is the prerogative of the Fulani (70%), followed by the Moba (16%) and the Mossi (5.5%); the Gourma, Hausa and other ethnic groups represent 8.5% (See figure 2). The average age of farm managers is 52 ± 6 years. The Fulani are omnipresent and operate in the 7 prefectures of the region.

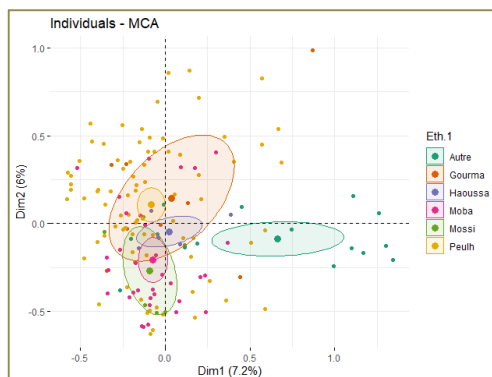


Figure 2: Distribution of respondents according to ethnicity

The herds are mainly formed by purchase (49%), by inheritance(31%), by donation(10%)and by loan(10%). (See Figure 3a).

Livestock breeding is associated with agriculture for 94% of respondents on an average surface area of 5.21 ± 4.54 ha of which they are not always the owners (See figure 3b). Due to the low availability of land, more than 90% of the livestock farms surveyed have neither fallow plots nor land reserve plots.

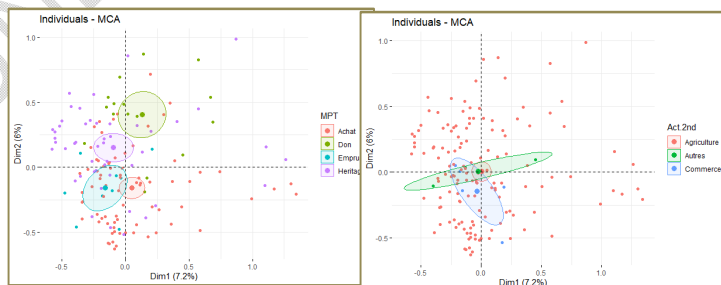


Figure 3: a Method of acquiring the herd b Secondary activity

3.1.2- Zootechnical characteristics of cattle herds

The average number of cattle per farm is 51 ± 36 . The cattle raised are zebu and bull breeds; but we find herds there which raise the two mixed breeds. Of the 150 herds sampled, we found 13% zebu herds, 15% bull herds, 33% mixed herds and 39% mixed race herds resulting from the cohabitation of the first two (see figure 4).

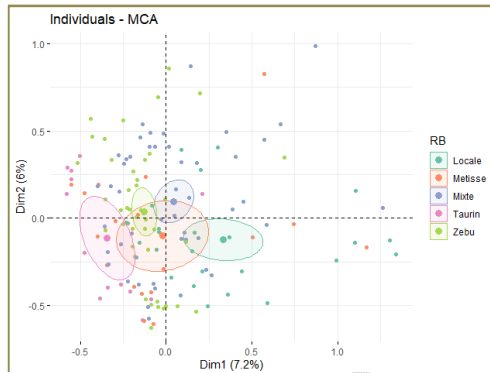


Figure 4: Distribution of respondents according to race

The total number of cattle from different herds surveyed amounts to 20,960 out of the 70,369 heads recorded. These herds are made up of 18% calves; 23% heifers; 9% bull calves; 40% cows; 4% bulls; 5% draft animals and 1% cattle for fattening. These cattle are raised in a single herd (9%) or in association with sheep (48%), goats (17%) and sheep-goats (26%).

3.1.3- Breeding practices

Three groups of different practices emerge from cattle breeding in the Savannah region of Togo (see figure 5) but natural grazing constitutes the basis of the animals' diet.

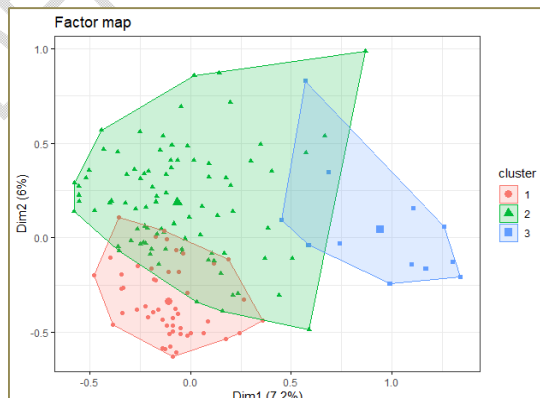


Figure 5: Projection of respondents in the factorial plan

Group 1

It brings together 50 farms in the sample. The cattle raised are mainly of mixed breed in association with sheep. The animals are driven mainly by the Fulani(58%)and the Moba(30%),especially in the prefectures of Cinkassé, Tône and Tandjouaré. Pasture and water difficulties affect 94% of the 50 breeders, especially at the end of the dry season. This situation pushes 52%,or 26 breeders, to go on transhumance to overcome grazing difficulties, while 38%(19 breeders)dig holes in the dry beds of rivers or ponds to have water to water their herds. Farmers do not have fallow areas or fodder production plots. Members practice agriculture with increasing yields; these are "**Farmers-breeders**" (see table 1).

Table 1: Description of group 1

Variable	Terms	
<i>Designation</i>	<i>Code</i>	<i>Group 1</i>
Lengh of rainyseason	L.Rs	Short (92%)
Lengh of dry season	L.Ds	Long (94%)
Amount of rain	A.R	Drought (86%)
Availability of pasture	A.P	Rare (94%)
Availability of surface water	A.Sw	Rare (94%)
Strategyyouadopt for wateringherds in difficult times	Str.wat	Dugholes (38%)
Moment of transhumance	MTr	Do not go on transhumance (48%)
Otherfarmedspecies	AFs	Sheep (60%)
Start of rainyseason	St.Rs	-
Cropyield	C.y	Rising (56%)
Animal health	A.h	Epidémic (14%)
Difficultperiod for wateringherds	DP.wat	End of dry season (80%)
Difficultperiod for grazingherds	DP.graz	End of dry season (58%)
Breeds of cattle	BC	Mixed (60%), Zébu (32%), Bullfighting (8%)
Préfecture	Pref	Tandjoare (31%), Tône (37), Cinkasse (32%)
Ethnic group	Eth.1	Fulani (58%) ; Moba (30%) ; Mossis (12%)

Group 2

It is made up of 88 farms, or 59% of the sample. In this group, the cattle raised are mainly of taurine and zebu breeds. Pastures being increasingly rare and droughts harsh, breeders leave early with their herds on transhumance. This type of breeding is led by the Fulani (66%),the Gourma (12%),the Moba(10%) and the Hausa(7%). It is located in the prefectures of Kpendjal and Kpendjal-west. The harshest periods for feeding and watering animals are at the end of the dry season. Fallow fields and plots of natural grazing are becoming increasingly rare. In their associated activities, the members of these farms also practice agriculture with declining yields. These are the "**Breeder-cultivators**" (See table 2).

Table 2: Description of group 2

Variable		Terms
<i>Designation</i>	<i>Code</i>	<i>Group 1</i>
Lengh of rainyseason	L.Rs	
Lengh of dry season	L.Ds	Normal (2%)
Amount of rain	A.R	Drought (47%)
Availability of pasture	A.P	Abundant (45%)
Availability of surface water	A.Sw	
Strategyyouadopt for wateringherds in difficult times	Str.wat	Transhumance (43%)
Moment of transhumance	MTr	Start of dry season (38%)
Otherfarmedspecies	AFs	-
Start of rainyseason	St.Rs	-
Cropyield	C.y	Failing (72%)
Animal health	A.h	-
Difficultperiod for wateringherds	DP.wat	End of dry season (64%)
Difficultperiod for grazingherds	DP.graz	End of dry season (34%)
Breeds of cattle	BC	Mixed (10%), Zébu (38%), Bullfighting (52%)
Préfecture	Pref	Kpendjal (53%), Kpendjal Ouest (47%)
Ethnic group	Eth.1	Fulani (66%), Gourma (12%), Moba (10%), Haoussa (7%), autre (5)

Group 3

It has 12 farms, or 8% of the 150 sampled. The cattle raised are of the zebu (40%), bull(33%) and mixed(27%) breeds. The associated animal species are sheep and goats at 75%. These farms are mainly run by the Fulani (75%) and the Gangan (25%)in the prefecture of Oti-sud and Oti. The difficult periods for watering and grazing are the end of the dry season, but the herds do not go on transhumance (66%). There are sufficient fallow areas and natural grazing plots. Livestock breeding is practiced at the same time as agriculture without preference, these are "Agro-breeders" (See table 3).

Table 3: Description of group 3

Variable		Terms
<i>Designation</i>	<i>Code</i>	<i>Group 1</i>
Lengh of rainyseason	L.Rs	Normal (58%)
Lengh of dry season	L.Ds	Normal (83%)
Amount of rain	A.R	Normal (58%)
Availability of pasture	A.P	Normal (50%)

Availability of surface water	A.Sw	Normal (75%)
Strategy you adopt for watering herds in difficult times	Str.wat	Water reservoirs (75%)
Moment of transhumance	MTr	Do not go on transhumance (66%)
Other farmed species	AFs	Sheeps and goats (75%)
Start of rainy season	St.Rs	Normal (66%)
Crop yield	C.y	Normal (75%)
Animal health	A.h	-
Difficult period for watering herds	DP.wat	End of dry season (83%)
Difficult period for grazing herds	DP.graz	End of dry season (83%) Mixed (27%), Zébu (40%), Bullfighting (33%)
Breeds of cattle	BC	Bullfighting (33%)
Préfecture	Pref	Oti Sud (66%) ; Oti (34%)
Ethnic group	Eth.1	Fulani (75%), Gangan (25%)

3.2- DISCUSSION

Cattle breeding remains the main activity of the Fulani and secondary for other ethnic groups as evidenced by the results of other studies in the same region (Douti, 2018). Similar results are obtained in Benin by (ALKOIRET et al, 2009) in the commune of Gogounou and by (DEHOUX and HOUNSOU-Ve, 1993) in the east of the Borgou department. Livestock management is presented under three main practices in the region; which practices result from the availability and accessibility of natural resources. Among the solutions to overcome these difficulties is the movement of breeders with their herds. The choice to move (nomadism, transhumance and migration) is determined by the water, nutritional and health needs of livestock and by the socio-cultural needs of breeders (Dehoux&HoussouVé 1993). In their travels, breeders and their animals are not concerned about the speed of progress. They make the most of the plant resources in their path. This behavior is similar to the result of Guilbert et al, (2009) when he states that this logic would require herds to be able to take maximum advantage of itinerant pastoral resources with the aim of avoiding weight loss or mortality due to an accelerated rhythm of movements.

Other breeders choose association with agriculture. This association can gradually lead to reconversion depending on the assets in the prefecture. This is how the prefectures of Cinkassé, Tône and Tandjouaré are more suitable for agriculture.

Conversely, the prefectures of Kpendjal and Kpendjal-west are becoming major cattle breeding areas. Similar observations on the geographical distribution of cattle breeding have been made by certain authors (Sraïri, 2004; Dongmo et al., 2012).

In the prefectures of Oti and Oti-sud, the indigenous breeders encountered are agro-breeders. These are farmers who acquire a few head of cattle which they keep themselves or which they entrust to herdsman. With their vast plains suitable for rice cultivation, the prefectures of Oti and Oti-sud constitute new centers of attraction for cattle breeding which benefits from rice straw after the harvest.

In general, "cultivating pastoralists" and "herding farmers" are the most common in almost all prefectures in the savannah region. Similar observations are made in northern Benin by certain authors (Sraïri, 2004); (Alkoiret et al, 2009) because these two geographical areas are juxtaposed and therefore suffer the same climatic effects and are home to the same ethnic groups.

4. CONCLUSION

Cattle breeding practices and systems are changing in the Savannah region to adapt to the agro-ecological conditions of the environment. The combination of challenges in cattle breeding increases pressure on pastoral resources. Thus, breeders, faced with difficulties with food resources, develop flexible strategies for organizing and managing the herd. The survival of cattle breeding in this region of the Savannah must rely on the provision or storage of food by targeting periods of unavailability of pasture during the year. In addition, anthropogenic activities must be environmentally friendly.

REFERENCES

1. Alkoiret, I.T., Awouhuedji, D.Y.G., Akossou, A.Y.J., Bosma, R.H., 2009. Typology of cattle breeding systems in the commune of Gougou in the north-east of Benin. *Annals of Agricultural Sciences* (12) 2: 77-98.
2. Benagabou, I.O., 2013. Effect of the practice of agriculture-livestock integration on the energetics of agricultural operations in the agro-pastoral systems of Burkina Faso. DEA dissertation, Polytechnic University of Bobo-Dioulasso, Burkina Faso, 71p.
3. Bourbouze A., 2007. Perspectives on pastoralism in the world and in northern Africa. Between resistance and mutations. *Mediterranean Network Pastoralism and society*. <https://resopasto.iamm.fr/index.php/fr/>
4. Dehoux, J. P., and G. Hounsou-Ve. 1993. "Productivity of the Borgou cattle breed according to traditional breeding systems in the north-east of Benin. » *world animal review*, 36-57
5. Dongmo A.L., Djamen Nana P., Vall E., Koussou M.O., Coulibaly D., Lossouarn J., 2012. From nomadism to sedentarization: livestock breeding in West and Central Africa in search of innovation and sustainability. *Journal of Ethnoecology* 1, 147-161.
6. Douti L., 2018. Characterization of cattle breeding systems in the prefecture of Tône, Togo: Strategies for adaptation to climatic constraints, INAT Research Master, 47 p.
7. Guilbert B., Banzhaf M., Soulé B.G., Balami D.H. and Idé G. 2009: Regional study on the contexts of livestock marketing/market access and challenges of improving the living conditions of pastoral communities
8. Herrero et al., Biomass use, production, feed efficiencies, and greenhouse gas emissions from global livestock systems. *Proceedings of the National Academy of Sciences* • December 2013
9. RNA., 2012. Fourth national agricultural census, Directorate of Agricultural Statistics, Informatics and Documentation (DSID) - Ministry of Agriculture, Livestock and Fisheries (MAEP).
10. Sraïri, M.T. 2004. Typology of dairy cattle breeding systems in Morocco with a view to an analysis of their performance. PhD Thesis, Fac. Univ. Sci. Agron., Gembloux, Belgium. 200 p.
11. Vall Eric, Diallo Mohamadoun Amadou. 2009. Local technical and practical knowledge: herding herds to pastures (Western Burkina Faso). *Natures Sciences Societies*, 17 (2): 122-135.

Comment [MOU10]: References are not as per journal guidelines, and many of these references are incomplete

Comment [MOU11]: Incomplete

Comment [MOU12]: Incomplete

Comment [MOU13]: Too old replace with recent finding

AkossouaFaustine KOUASSI and al 2019. Contribution of urban livestock farming to food security: adaptation strategies of cattle breeders in the Abidjan District, Ivory Coast. *Africa SCIENCE* 15(6) (2019) 218 – 228.

https://www.academia.edu/download/63036212/2019_Akossoua_et_al_Afrique_Science20200421-117256-23ea6p.pdf

Atakpama and al, 2023. Productivity and use of cattle rangelands in the prefecture of Tchamba in Togo. *Nature and Technology Review*.

<https://www.researchgate.net/publication/367545470>

Habibou Ibrahim and al, 2018. Pastoralism and developmental policies: inventory of pastoral land tenure systems in Sub-Saharan Africa. *Vertigo*, electronic journal in environmental sciences. <https://doi.org/10.4000/vertigo.20165>

Hessa. C. C and al, 2023. Characterization of silvopastoral and agrosylvopastoral cattle breeding operations in Benin. *Rev. Mar. Sci. Agron. Vét.* 11(1) (Mars 2023) 113-118. https://agrimaroc.org/index.php/Actes_IAVH2/article/download/1291/1725

Ibrahim-Naim and al, 2021. Floristic diversity and fodder biomass of potential grazing land of the Eburnean basement in Togo. *Rev Écosystèmes et Paysages (Togo)*.

https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://1bev-univlome.com/wp-content/uploads/2022/01/02-Ibrahim-et-al.-dec_2021.pdf&ved=2ahUKEwio0q31kdSIAxVuVqQEHeNQYwQFnoECB4QAQ&usq=AOvVaw3bU_55I0LBBvTDJL6gSY0V

Idrissou, Y., and al 2019. Pastoral livestock systems and climate change in West Africa: Status and perspectives. *Livestock Research for Rural Development*, 31. https://www.researchgate.net/profile/Yava-Idrissou/publication/334896486_Systemes_d'elevage_pastoraux_et_changement_climatique_en_Afrique_de_l'Ouest_Etat_des_lieux_et_perspectives/links/5d44581092851cd0469a6a4c/Systemes-delevage-pastoraux-et-changement-climatique-en-Afrique-de-lOuest-Etat-des-lieux-et-perspectives.pdf?_tp=eyJjb250ZXh0Ijp7ImZpcnN0UGFnZSI6InB1YmxpY2F0aW9uIiwicGFnZSI6InB1YmxpY2F0aW9uIn19

Jacquemot P. (2023). Does pastoralism have a future in Africa? Understanding the challenges of agriculture. *Willagri*. <https://www.willagri.com/2023/02/10/en-afrique-le-pastoralisme-a-t-il-un-avenir/>

Kiema A. and al 2014. Transhumance and management of natural resources in the Sahel: Constraints and perspectives in the face of changes in pastoral production systems. (French). *Vertigo*, 14(3), 1–19. <https://doi.org/10.4000/vertigo.15404>

RoukayathChabiToko and al, 2016. Demography and zootechnical performance of traditional cattle farming in Northern Benin [in French]. *Rev. Elev. Med. Vet. Pays Trop.*, 69 (1) : 33-39. <https://revues.cirad.fr/index.php/REMT/article/download/31169/30929>

Sourisseau J.-M and al, 2020. Towards peaceful transhumance on the border between Togo and Burkina Faso? Perspectives of a territorial and anticipatory approach. <https://agritrop.cirad.fr/597045>

DEFINITIONS, ACRONYMS, ABBREVIATIONS

RNA: Recensement National Agricole

UNDER PEER REVIEW

