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Constraints to improving forage feed resources and their impacts on the dynamics of the cattle breeding in Tunisia

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Abstract. The cattle breeding in Tunisia contributes currently for about 24% to the animal production and represents close to 8% of the agricultural production. Composed essentially of local races (Brown of the Atlas) and observed mainly in North areas of the country, the bovine farming was supported by favorable climatic conditions. Cattle feeding are based on permanent pastures complemented by forage production integrated with cereal crops. After 1960, the bovine population was progressively subjected to important transformations under the combined effect of different types of factors. These transformations, that affect the composition and the structure of the herd, were accompanied by a spatial extension of the bovine livestock all over the country, in particular the coastal and oasian zones with the imported dairy races, the North West and the Center with the local and mixed races. So, the question now is if this geographic extension of the bovine livestock is accompanied or not by a similar extension of forage areas. It seems to be difficult to meet this objective on the light of the current tendencies that seem to draw and because of the natural differences in climate conditions between the regions. To apprehend the description typologies of the spatial distribution or regional segmentation of the forage areas in Tunisia, a detailed study on statistics and the available data must be carried out using the most appropriate tools and techniques. The objectives of this work is to examine, through statistics, the impact of these spatial extensions of the cattle breeding, the main source of meat and milk in the country, on the abundance of forage production and its capacity to maintain the regional feed/herd balance.

Keywords. Cattle breeding forage production – Forage areas – Spatial distribution – Tunisia.

Les contraintes du développement des superficies fourragères et ses impacts sur la dynamique du cheptel en Tunisie

Résumé. *L'élevage bovin en Tunisie, contribue actuellement pour environ 24% à la production animale et représente près de 8% de la production agricole. Constitué essentiellement de races locales (Brune de l'Atlas) et conduit en extensif dans les régions du Nord du pays, l'élevage bovin était soutenu par des conditions climatiques favorables permettant d'entretenir l'alimentation. Cette dernière est basée sur un pâturage permanent complémenté par une production fourragère bien intégrée à la culture céréalière. Mais, à partir du début des années 60, l'élevage bovin a dû subir progressivement d'importantes transformations sous l'effet conjugué de différents types de facteurs. Ces transformations, qui touche la composition et les effectifs du cheptel, a été accompagnée d'une extension spatiale de l'élevage bovin qui s'est étendu à presque toutes les régions du pays, en particulier les zones côtières et oasiennes pour les races laitières importées, le Nord Ouest et le Centre pour les races locales et croisées. Ainsi, la question qui se pose actuellement est-ce que cette extension géographique des cheptels est accompagnée par une extension similaire des superficies dédiées à la production fourragères qui étaient jusqu'ici tant soi peu en concordance, ou est ce que c'est un objectif difficile à réaliser vu les tendances actuelles qui semblent se dessiner. Pour mieux appréhender la description typologique de la répartition spatiale ou encore la segmentation régionale des superficies fourragères en Tunisie, une étude détaillée sur les statistiques et les données disponibles doit être réalisée à l'aide des outils techniques bien appropriées. Ce travail essaye d'examiner, à travers des statistiques, l'impact de ces extensions spatiales de l'élevage bovin, qui assure l'essentiel de la production de viande et du lait dans le pays, sur l'abondance de la production fourragères et alimentaires et sa capacité à maintenir l'équilibre régional alimentation/effectifs.*

Mots-clés. *Production bovine sous fourrages – Superficies fourragères – Distribution spatiale – Tunisie.*

I – Introduction

In Tunisia, 16% of the total agricultural production and 24% of total animal production is provided by its domestic livestock (DGPDA, 2004). Most of this livestock is raised under extensive grazing conditions for small ruminant, in the South and the Center areas and cattle mainly in the North area. In recent years, the government has been encouraging animal production to increase national self-sufficiency in animal products (meat and milk). Livestock statistics for 2006 shows that 65% of the cattle are in the North, 60% of sheep and goats are in the Centre, and 80% of camels in the Centre and the South. But there are various problems for small ruminant systems of widespread overgrazing, and low animal productivity resulting in the deterioration of extensive grazing land (Jemai *et al.*, 2000) and for cattle breeding geographic extension is prohibited by scarcity and deficit of forage production, notably in Centre and South (Abaab, 2000). So the assessment of livestock feed that can be produced from different land use system provides a clue on the prospect situation of livestock production. In Tunisia, the majority of arid rangelands are located in the South-Eastern region of the country (Governorates of Gabes, Medenine and Tataouine) which covers 1/3 of the national territory, but include today only 1/10 of the small ruminants population and half of the camelines (Jaouad, 2004). Nowadays (2006), 65.2% of forage areas is located in the North and 25.4% in the Centre. They covered more than 338.7 thousands hectares in 1998 and 396.7 thousand hectares in 2006.

Therefore, the purpose of this study was to apprehend the description typologies of the spatial distribution or regional segmentation of the forage areas in Tunisia, and the cattle population distribution. Moreover, this study was conducted at the level of the administrative districts of Tunisia in order to help regional planners take advantage of its results and recommendations for improved sustainable management of both resources: domestic livestock and agricultural land.

II – Materials and methods

Relevant data for each of the 21 administrative districts of Tunisia were gathered from two official sources of information. The main source represented by the "Direction Générale de Planification et Développement de l'Agriculture" (DGPDA), provided species livestock census, as well as rangeland and forage feed surface areas. The second source of information was represented by the "Enquêtes sur les structures des exploitations agricoles" conducted in 1961, 1994 and in 2004. Statistical analyses were run with the multivariate analysis software package StaBox 6.40 and SPSS 13. At a first step, a total of 6 quantitative variables were identified for 21 administrative districts to describe female unit size of cattle population and forage areas (pure breed cattle, local breed cattle, sheep, goats, annual forage areas, and perennial forage areas). At a second step, two years: 1990 and 2006 were selected to prospect the dynamic evolution of this cattle extension by a principal components analysis (PCA). A cluster analysis using Ward method was conducted based on results from the three axes of principal components analysis.

III – Results and discussion

The main goal of the multivariate statistical analysis was to emphasize the types of links between descriptive variables that characterize the spatial distribution dynamic of cattle grade and forage areas between 1990 and 2006 and to create homogenous groups of livestock systems in relation to predominant variables. Three first axes accounted for 88.5% of total variation (Table 1). Five groups were finally selected and characterized (Fig. 1).

Table 1. Results of principal components analysis

Factors	F1	F2	F3	F4	F5	F6
Proper value	2.36	1.89	0.86	0.5	0.24	0.14
% of variance	39.35	31.56	14.57	8.37	4.03	2.12
% of cumulus	39.35	70.91	85.49	93.86	97.89	100.00

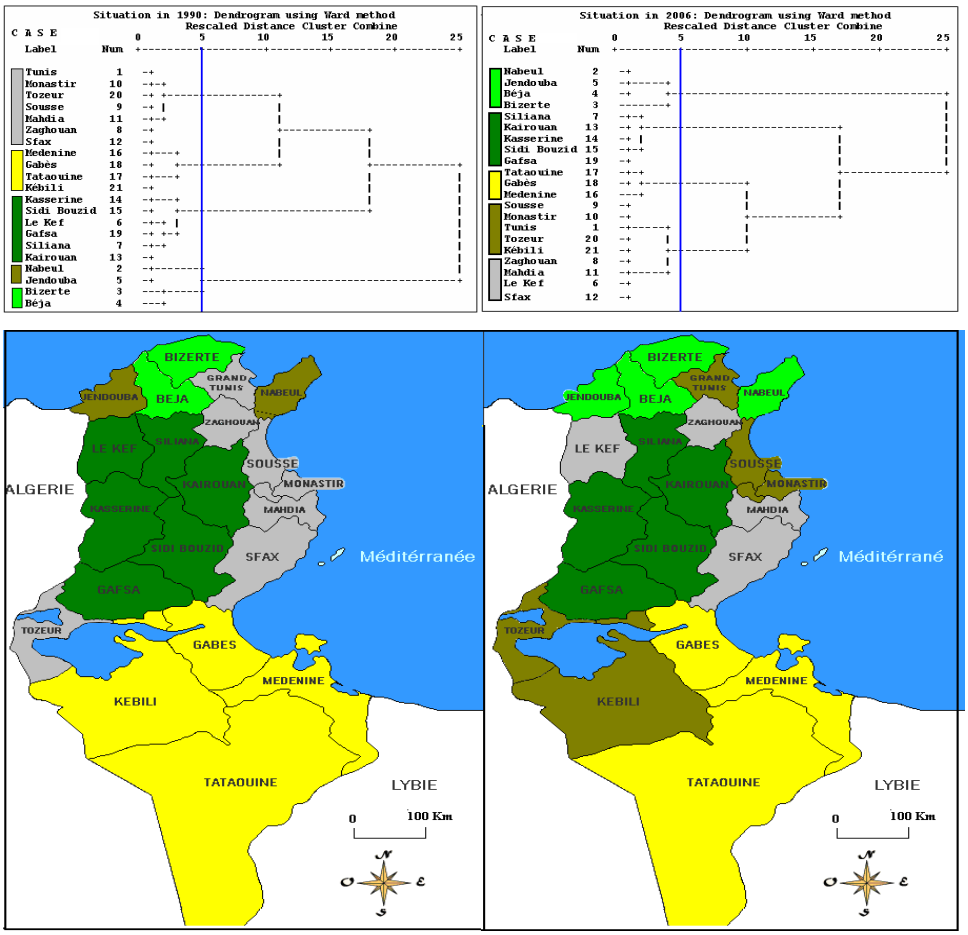

Fig.1. Situation of districts group representation in 1990 and 2007 extracted from dendrogram using PCA results.

Group 1 can be considered as zones of "typical extensive cattle farming with important annual forage areas". It gathers two districts in 1990 decade (Beja and Bizerte) and extended to four districts nowadays, 2006 (Beja and Jendouba in the North-West; Bizerte and Nabeul in the North-Est). In Bizerte and Beja district we find 53% of the whole area of annual forage and more than 40% of pure breed cattle population. However in Jendouba and Nabeul districts we find 17% of annual forage and 17% of local breed cattle population. This extension of this group is made mainly in the North.

Group 2 is representative of "successful extensive cattle and small ruminants breeding with important perennial forage areas". It is constituted by six districts, which are all from the North-West and the Centre-West regions of Tunisia, with more than 80% of perennial forage areas, more than 40% of sheep and 18% of cattle in 2007, against 60%, 43% and 26% respectively in 1990. The most obvious characteristic in this group is the combination of both small ruminants and cattle breeding systems.

Group 3 is affiliated to group 1 but it's an illustration of a "beginning of intensification in cattle breeding and feeding practice". With two districts in 1990 decade and 5 districts in 2006, it seemed very diverse in its composition, due to a large dispersion in the North (Tunis), Centre (Sousse and Monastir) and the South (Tozeur and Kebeli). A global majority of districts adopts local cattle population.

Group 4, is an illustration of "landless intensive cattle and feeding systems" in sahelian districts (Zaghouan, Sousse, Monastir; Mahdia and Sfax), is based on an intensive small irrigated holding and external feed, it can be qualified in many places as "landless" stock keeping and has shown a considerable expansion during recent years because of the increase in milk prices and the strong demand from urban and tourist zones. The most surprising example is the spectacular development of dairying in the Sahel (Sfax, Mahdia and Monastir) where it was not a traditional activity. Cultivated forages that mainly grown in these regions are: annual forages and perennial forages (essentially lucerne).

5– *Group 5*, with four South districts (Medenine, Tataouine, Gabès and Kebili), is composed by "small ruminant systems in pastoral areas". Their main characteristics of ruminant production systems are to vary according to the variety of feed resources which decrease with aridity.

Cultivated forage area has remained constant during the last 15 years and its contribution to animal feeding is limited (Colson *et al*., 1995), while livestock numbers have significantly increased, mainly dairy cattle. On the other hand and at the national level, statistics indicate that the contribution of natural pasture and rangeland in the feed calendar is decreasing dramatically because of frequent droughts and over-grazing. In short, the area of forage crops has changed little despite the large increase in livestock numbers and the factors that limit forage development are as follows:

(i) Fodder cereals are the dominant forages, occupying at least two thirds of the total area. However this lack of diversity influences forage quality enormously (FAO/TCP/TUN, 1989).

(ii) The stock farms do not like forages that occupy land for more than a year (Banque M., 1995).

(iii) Ruminant feeding, mainly dairy cattle, is based essentially on imported concentrate which competes with local forage and has influenced the development of fodder production negatively.

(iv) The rising price of forage, because of the rainfall situation, has caused a fall in cereal and forage production with a spectacular rise in the price of hay and straw.

IV – Conclusions

The variability of climatic conditions among regions in Tunisia, packed the agricultural potentialities and production systems adopted. This work shows that the spatial-temporal transformation process of the cattle herd that shifted from the North towards the coastal regions a few years ago, required special attention, especially on food and forage availability that has to be improved with the needs of an expanding flock. However, this herd redeployment between regions has the risk to impair the distribution of the forage areas between the three regions (North, Centre and South) which were in harmony with the livestock distribution in accordance with the composition of the ration. So, this redeployment trend of the livestock did not induce a

similar trend in the allocation of new lands to fodder crops. Otherwise, the forage production in these regions must be devoted not only to the local flock but also to supply the national herds and especially those of the Sahel regions.

References

Abaab A., 1995. Les politiques agricoles et la dynamique des systèmes agropastoraux au Maghreb. In*:* Les agriculture maghrébines à l'aube de l'an 2000. *Options Méditerranéennes* Series B, no. 14, p.139-165.

Banque Mondiale, 1995. Une stratégie pour le développement des parcours en zones arides et semi-arides. Rapport Principal Maghreb et Iran, document de la banque mondiale 1995.

Colson F., Kayouli C., Belloin J.C. and Nardello R., 1995. Study of dairy cattle sector in Tunisia. TSS1-TUN/94/01T-001/AGAM-FAO (April-May, 1995).

FAO, 1989. Programme de développement des productions fourragères et de l'élevage V, 66/88 T-TUN 61 FAO TCP/TUN/6652, 1989.

Jaouad M., 2004. Dynamique des cheptels bovins en Tunisie : Diversité régionale et contraintes climatiques. In: Actes du 11eme meeting FAO-CIHEAM sur la réhabilitation des pâturages et des parcours en milieux méditerranéens, Djerba (Tunisia), 29 October-1 November 2002. *Cahiers Options Méditerranéennes,* vol. 62, p. 421-424.

Jemaï A., 2000. Diagnostic et contribution à l'amélioration de la production ovine dans la région semi-aride du Kef. Mémoire de Fin d'Etudes du Cycle de Spécialisation, INAT-Tunisie, 2000.

Ministère de l'Agriculture. DGPDIA. Enquête des compagnes agricoles, plusieurs années (1976-2007).