Contribution of camel breeding to the household economy in southeast Tunisia

Tardif N., Jaouad M., Khorchani T., Faye B.

in

Baumont R. (ed.), Carrère P. (ed.), Jouven M. (ed.), Lombardi G. (ed.), López-Francos A. (ed.), Martin B. (ed.), Peeters A. (ed.), Porqueddu C. (ed.).
Forage resources and ecosystem services provided by Mountain and Mediterranean grasslands and rangelands

Zaragoza : CIHEAM / INRA / FAO / VetAgro Sup Clermont-Ferrand / Montpellier SupAgro
Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 109

2014
pages 745-749

Contribution of camel breeding to the household economy in southeast Tunisia

N. Tardif[1,*], M. Jaouad[2], T. Khorchani[2] and B. Faye[1]

[1]CIRAD, UMR SELMET, Campus Baillarguet, Montpellier (France)
[2]Laboratoire d'Economie et Sociétés Rurales, Laboratoire Elevage et Faune Sauvage
Institut des Régions Arides, 4100 Médenine (Tunisie)
*e-mail: nadjatardif@gmail.com

Abstract. Southern Tunisia is highly dependent on the agricultural sector and especially on pastoral breeding for livelihood. The Tunisian government has until now given little attention to the sector, especially to camel breeding. A better understanding of the socio-economic dynamics in the study area is needed in order to develop camel breeding. This work shows the importance of camel breeding as a source of income (on average 79% of the household income) and employment (on average 43% of family labour) for the people in southeast Tunisia, and the impact of drought on related activities (feeding and shepherding). Despite the resilience of these farmers to adverse weather conditions, this study also shows the breeders' concerns and willingness to develop camel breeding.

Keywords. Camels – Household economy – Livestock – Rural development – Pastoralism.

Contribution de l'élevage du dromadaire dans l'économie des ménages du sud-est tunisien

***Résumé**. La population du Sud Est tunisien dépend grandement du secteur agricole et en particulier de l'élevage pastoral comme moyen de subsistance. L'Etat tunisien a pourtant mis de coté le secteur de l'élevage et en particulier la filière cameline. La promotion de l'élevage camelin passe par une meilleure connaissance de sa dynamique socio-économique dans la zone étudiée. Ce travail montre l'importance de l'élevage camelin, comme source de revenus (en moyenne 79% du revenu pour un ménage) et de travail (en moyenne 43% du temps de travail familial) pour la population du Sud-est de la Tunisie, ainsi que le poids des sécheresses sur les charges liées à cet élevage (alimentation et bergers). Malgré la capacité d'adaptation de ces éleveurs aux conditions climatiques difficiles, la présente étude atteste aussi de l'attachement des éleveurs à l'élevage camelin et de leur envie de le développer.*

***Mots-clés.** Elevage camelin – Economie familial – Développement rural – Pastoralisme.*

I – Introduction

Geographically restricted to arid and semi-arid areas, camel breeding plays an important economic role in these areas, providing a wide diversity of goods and services (Faye, 2009): food (milk and meat), maintaining population in remote areas, secondary products (wool, skin, bones and feaces), transport and agricultural works. Its social importance is also major both in religious, cultural and traditional practices as well as in providing security for income where it is considered an alternative source of cashflow (Vias and Faye, 2009). Tunisia, where threatened areas are estimated at 94% of the country, is characterized by the magnitude of the desertification processes (CNEA, 2007). The main arid pastoral areas are located in southern Tunisia where the economy is based on agriculture (olive and date palms) and pastoral livestock (small ruminants and camels), followed by tourism and finally mineral resources (Béchir *et al.*, 2011). Family farms represent the major part of the farming systems. This activity is practiced by 92.5% of the population in southeast Tunisia (Jaouad, 2010). The present paper aims to contribute to the assessment of the role played by camel rearing in household economies, and to identify the areas for improvement and innovation to enhance this breeding system.

II – Materials and methods

The data were collected through a socio-economic survey based on semi-directive questionnaires, conducted between May and July 2013 in the four governorates: Gabès, Kébili, Médenine and Tataouine. The study area is regarded as the cradle of the Tunisian camel breeding. Indeed, 83% of the camel breeders of the country are located in the Southeast. (Ould Ahmed, 2009). The questionnaire included 52 questions separated into five sections. Sections 1 and 2 were relative to the household head and family composition. Section 3 provided information on the lands owned by the household and theirs uses. Section 4 was the main part of the questionnaire, and regarded livestock (species, animal purchase and sales, animal production, animal feed). Finally, the last section was an opening question on drought adaptation. The breeders were chosen randomly based on the list of camel breeders obtained from local authorities[1]. As a whole, 61 camel farmers were interviewed and analysed in this study.

From the 52 questions, 16 quantitative variables were selected due to their variability and convenience for describing the farming systems. These data were analyzed by PCA (Principal Component Analysis) in order to extract the main combinations of variables (factors) explaining the most important part of the observed variability in the farmers population. Then, an AHC (Ascending Hierarchical Classification) was applied on the datatable to identify homogeneous groups. These groups help set typology of household. These analyses were carried out with XLSTAT software (Addinsoft ©).

III – Results

The principal component analysis highlighted three main factors axes explaining 57% of total variability. The first factor (28%) described the households according to the importance of their size and to the contribution of income from camel breeding to total income. The second factor (16%) reflected households by their family labour. The third one (13%) described the households according to the presence of sheep and goats in the herd and agricultural activities. The first factor expressed the size of the farm (usually the size of the family is linked to the size of the herd), the second, the contribution to agricultural wage and the third, the diversification of the activities.

The cluster analysis identified five main groups. Following these multivariate analyses, a test of means' comparison was carried on more contributive variables: HHD_taille, %.trav_fam_cam, %trav_fam_PR, %trav_fam_agri, Rev_cam, Rev_ov, and Rev_cap.

The first group (**big specialized camel farm**) was represented by one household only (less than 1% of the sample). This household was made up of 38 people, the head of family (father) and his seven sons and their family. They owned three herds, 510 camels, 1300 sheep, and 300 goats, but no income was declared from the small ruminant activity: all revenues were directly attributed to camel breeding. The camel herd provided 100% of income. It was also the principal family labour time (60% of their time).

The second type (**crop-livestock farmer with camel predominance,** 4% of the sample) included farmers located in Ben Guerdan and consisted of medium-size households (7 and 11 people) with large camel herds (mean = 112). The family labour was shared between camel breeding (46%) and agriculture (43%). It was camel breeding which brought most of the income (75% of total income) to the household.

[1] Arid Regions Institute(IRA), Office of Livestock and Pasture (OLP) and Regional Offices of Agriculture Development (CRDA).

The third type (**traditional small camel breeders)** reflected the major part of the sample (44%). It characterized the Southeast of Tunisia where many people practice camel rearing for a livelihood. Camel breeding represents 85% of the household income, but they had a small herd (mean = 47) and 44% of family labour was allocated to camels.

The fourth type (**mixed agro-breeder,** 30% of the sample) was mainly localized in the periphery of towns such as El Hamma and Douz and was characterized by the main part of household income coming from camel breeding (64%), then from olive culture (24%) and the remaining from small ruminants (12%). This group had the smaller size camel herd (mean = 41). The family labour was shared equally between these three activities, 33% of their time each.

The fifth and last type was **traditional mixed livestock owners** who obtained their income from the camel herd (65%) and the remaining from small ruminants. They had medium-size herds (mean = 62) and were located in rangeland areas such as Ben Guerdan (Medenine), Douz (Kébili), and Dhiba (Tataouine). The family labour was essentially invested in breeding, 72% in the camel herd and the remaining in the sheep and goat flocks (28%).

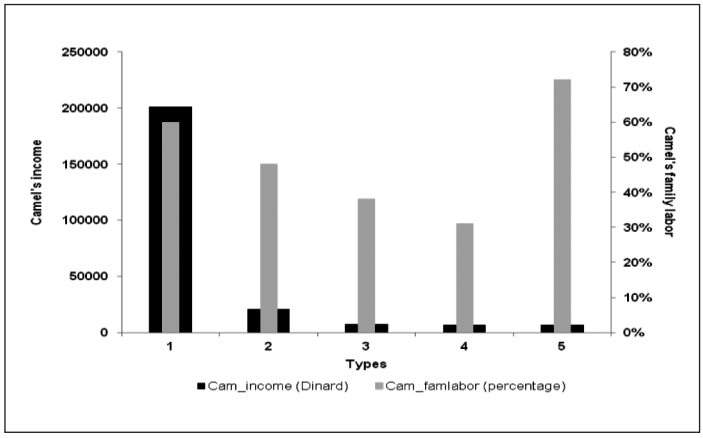

Fig. 1. Level of camel income and time spent of camel activity.

There was no difference between the 5 types identified in the present cluster analysis regarding the percentage of income coming from the camel breeding activity. This observation highlights the huge importance camel breeding has in household economies. Indeed, the camel activity allows comparable levels of income regardless of the identified types and the importance of the camel herd (Fig. 1). The other sources of income were variable according to the types. Sheep and goat incomes differentiated the types 4 and 3 ($p<0.05$), but the breeders of type 4 had higher income than those of type 3. Family labour was not similar according to the types. For camel labour, types 5 and 1, where the time spent on camel breeding was more important, were different from types 3 and 4 ($p < 0.001$). The labour time spent on small ruminants was higher in types 4 and 1 than in types 2 and 3 ($p <0.001$). Finally, the agricultural labour time differentiated types 1 and 5 ($p<0.001$) from the others who did not practice agriculture.

IV – Discussion

A farm typology is basal information and useful to all projects on sustainable agriculture development because providing insight into the different profiles of breeders and into the identification of

the possible changes (Abdallah and Faye, 2013). The present classification confirms the changes in socio-economic structures observed in the study area for thirty years (Abaab, 1986) regarding the pastoralism practices, the animal breeding, the use and the landscape occupation. The main change regarded drought adaptation. Before the independence, the only adaptation practice was the population moving to more humid areas. This movement was long, random and the mortality rate in the herd was high. Between good and poor years, the animal numbers were regularized and stable thanks to considerable loss and many years of recapitalization. Later, these changes were characterized by the diversification of livestock activities as it was observed in Sahelian countries (Correra *et al*., 2009). Such diversification assures livelihood for households in a rapid changing situation but, this securization and relative autonomy is allowed in the frame of the social group organization. There was complementarity between camel and small ruminant breeding, although their respective rearing modes are in opposition. Camel breeding remains more pastoral and is conducted by a specialized herd keeper whereas small ruminant breeding is subject to intensification. Moreover, the main objective of small ruminant breeding activities is meat production, while the camel still plays a symbolic role of social success. However, some changes are also observed regarding camel rearing with the increasing demand for camel milk and meat with, in consequence, a better market integration of the camel products (Faye, 2013).

In Saudi Arabia, a typological survey identified also some adaptations of the Bedouins to the new urban demand for camel products. Thus, when pure camel breeders remained in the desert in a traditional way, the new farmers types started to be located increasingly more in periurban areas with higher market integration for providing meat and milk to urban consumers (Abdallah and Faye, 2013), despite the low organization of the milk sector (Faye *et al*., 2014).

Our typology highlighted the uncertainty in the breeder definition: it consisted of traditional breeders, officials, merchants, immigrants rearing only with the objective of making interesting investments and marking their entitled status on the collective lands and to get it in a future share. Lots of breeders only wish the government to acknowledge their activity. Yet, the government supported sheep production with subsidies and few of them for camel production. Pastoral breeders (types 1, 2 3 and 5) would like to continue to manage their farming system, with a better organization of the camel sectors. A few breeders, like those of type 4 and the 'investors' of type 3 would look for technical innovation (artificial insemination and grouping oestrus) and to start a more structured milk production. This typology showed that the most discriminant differentiation between breeders was between those keeping pastoral system and those changing to more intensive production system or at least more market integrated.

V – Conclusion

Camel breeding is a major source of income (79% on average) and represents the biggest part of the time in family labor (43% on average). Their socio-economic importance is undeniable. But for this activity to be developed, advanced knowledge and acknowledgment are needed. Moreover, breeders are aware of the importance of camels for the Tunisian southeast, such as social, cultural, economic and environnemental aspects and the fact that dromedaries have multiple functions since they provide a diverse range of consumer goods and services (Faye and Konuspayeva, 2011; Senoussi, 2011).

Acknowledgements

The present study was achieved in the frame of the PROCAMED project ("Promotion des systèmes camelins innovants et des filières locales pour une gestion durable des territoires sahariens" reference number I.B/1.1/493) aiming to promote camel breeding, increase population and stimulate economic growth in the Mediterranean area (Tunisia and Egypt), but also an area of major environmental issue in the management of natural resources. The contents of this document are the sole responsibility of « Institut des Régions Arides de Médenine, Tunisia » partner.

References

Abaab A., 1986. Mutations socio-économiques de la Jeffara orientale (Sud tunisien). In: Revue de l'Occident musulman et de la Méditerranée, N°41-42, 1986, p. 327-338.

Abdallah H. R., Faye B., 2013. Typology of camel farming system in Saudi Arabia. Emir. J. Food Agric., 25(4) 250-260.

Béchir, R., Ounalli, N., Sghaier, M., 2011. L'inégalité territoriale dans le Sud-est Tunisien : une mise en évidence à travers l'analyse des indicateurs régionaux de développement. *Canadian Journal of Regional Science/Revue canadienne des sciences régionales* 34(2-3), p. 61-68.

CNEA, 2007. Elaboration d'une étude sur l'état de désertification pour une gestion durable des RN. p. 191.

Correra A., Lefeuvre J.C., Faye B., 2009. Organisation spatiale et stratégie d'adaptation des nomades du Parc National du Banc d'Arguin à la sécheresse. Revue Sècheresse, 19 (4), p. 245-251.

Faye B., 2009. L'élevage des grands camélidés : vers un changement de paradigme CIRAD-ES, campus international de Baillarguet TA C / dir B, 34398 Montpellier Cedex. *Renc. Rech. Ruminants*, 16, p. 345-348.

Faye B. and Konuspayeva G., 2011. Valorisation des produits camelins dans les zones désertiques: un atout essentiel pour la sécurité alimentaire. *'L'effet du Changement Climatique sur l'élevage et la gestion durable des parcours dans les zones arides et semi-arides du Maghreb'*. Université KASDI MERBAH - Ouargla- Algérie, du 21 au 24 Novembre 2011, p. 55-65.

Faye B., 2013. Camel Farming Sustainability: The Challenges of the Camel Farming System in the XXIth Century. J. Sustainable Dev., 6(12), p. 74-82

Faye B., Madani H., El-Rouili A.H., 2014. Camel milk value chain in Northern Saudi Arabia. Emir J. Food Agric., 26(4), p. 359-365.

Jaouad M., 2010. Constraints to improving forage feed resources and their impacts on the dynamics of the cattle breeding in Tunisia. The contribution grasslands to the conservation of Mediterranean biodiversity. *Options Méditerranéennes*, A, n° 92, p. 39-43.

Ould Ahmed M., 2009. Caractérisation de la population des dromadaires (*Camelus dromedarius*) en Tunisie. These de doctorat en sciences agronomiques. *Institut National Agronomique de Tunisie,* p.172.

Senoussi A., 2011. Le camelin : facteur de la biodiversité et a usages multiples. *Actes du Séminaire International sur la Biodiversité Faunistique en Zones Arides et Semi-arides*, p. 265-273.

Vias F.G., Faye B., 2009. *Camel farming, an important contribution to the poverty alleviation in Niger.* Proc. of the 2nd conference of ISOCARD, Djerba (Tunisia), 12-14 march 2009, abstr. 96, p. 77.