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Red meat production in south-east Tunisia: typological outline of producers

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Abstract. In Tunisia, the livestock production systems with all their components are still inadequately regulated, weakly organized and suffer from lack of statistical data. This makes the red meat chain profoundly affected by many problems. To face these problems, a thorough analysis of chain components is crucial for better regional integration. This work is based socioeconomic data collected in 2012-2013 from surveys of sixty small ruminant breeders in Medenine province (South east Tunisia). The objective is to develop a typology of small ruminant breeders. All the elements of livestock activities have been considered such as breeders (socio -economics, income, assets, inputs and outputs), livestock (composition and herd management practices) and resources used in the production process. The typology shows five groups of breeders with different practices and strategies. Three groups, representing 56% of the sample are mainly specialized in breeding for red meat production. The other two groups are considered more as family breeders which are encountered in all regions of the study area. Nevertheless, livestock for red meat production is localized in large farms and it's correlated rather to the space (area) and also to the size of the flock.

Keywords. Meat sector – Typology – Producers – Small ruminants – Tunisia.

La production de viandes rouges au sud-est de la Tunisie : esquisse de typologie des producteurs

Résumé. *En Tunisie, les systèmes de production animale avec toutes leurs composantes sont aujourd'hui encore mal réglementés, mal organisés et manquent de données fiables et chiffrées. Ceci génère un grand nombre de problèmes dans la filière des viandes rouges. Face à cette situation une analyse approfondie des maillons de la filière est indispensable pour une meilleure intégration régionale. Cet article s'appuie sur un travail d'enquêtes socio-économiques, réalisé fin 2012-début 2013, auprès d'une soixantaine d'éleveurs de petits ruminants dans le gouvernorat de Médenine (Sud-est de la Tunisie). L'objectif est de mettre au point une typologie des producteurs (éleveurs) de viandes rouges ayant des petits ruminants. Tous les éléments définissant l'activité d'élevage ont été considérés, tels les éleveurs (socio-économie, revenus, patrimoine, recettes et dépenses), le cheptel (composition et gestion des effectifs) et les ressources mobilisées dans le processus productif. La typologie montre cinq groupes d'élevages avec des dynamiques de production différentes. Ainsi, trois groupes, représentant 56% de l'échantillon, sont principalement spécialisés dans l'élevage pour la production de viandes rouges. Les deux autres groupes relèvent, plutôt de l'élevage de type familial. Cet élevage de type familial est localisé dans toutes les délégations du gouvernorat. L'élevage pour la production de viandes rouges est lié plutôt à l'espace (superficie) mais aussi à la taille du troupeau.*

Mots-clés. *Filière viande – Typologie – Producteurs – Petits ruminants – Tunisie.*

I – Introduction

Despite the organization and structuring of livestock sector and commercialization chain, the animal products are important source of income especially for rural population in Tunisia. The Tunisian meat production in terms of the national agriculture gross domestic product (GDP) is around 16%. Nevertheless, Tunisia is not yet self-sufficient for the meat production and the import of meat represents one of the main factor of the agricultural deficit of the country. Small ruminant breeding plays a socioeconomic role for the pastoral populations (Snoussi *et al*., 2008). The

market and the productive systems of the red meat remained dominated by the informal sector (uncontrolled and illegal slaughtering of animals), the multiplicity of actors and their roles (Faye *et al.,* 2001) which makes difficult the intervention of government authority and their actions to structuring red meat and livestock sector. To deal with this problematic, a complete analysis seems indispensable along the production chain with special reference to the meat from sheep and goats in southeast of the country. The main objective is to understand firstly the organization of the meat sector and secondly to make recommendations allowing optimize, viability and sustainability of this sector (Petit, 1985). The present study analyses the main important component of red meat sector, which is the small ruminant livestock breeders in the region of Medenine southeast of Tunisia. Thus, the typological characterization of the main groups of the breeders in the study zone will be analysed in order to understand the diversity of existing breeding practices.

II – Materials and methods

The data were collected from socioeconomic surveys covering different delegations (counties) in the governorate of Médenine. 67 farmers' sample has been selected from the sampling frame. This sampling frame is an update list of small ruminant farmers in the whole governorate provided by the regional Office of Livestock and Pasture (OLP) of Médenine. The sample was identified and selected in a simple random 1.5% sample of the total population (4470 breeders) on the basis of a computer-generated random sampling frame. The aim of multivariate analysis in to treat the data for the typological analysis which would clarify the characteristics of the different types of existing farms. Variables used in this typology concern (Gibon *et al.*, 1999) land ownership, animal ownership, sheep and goats' flocks, flock management, numbers of entries and exits within the previous 12 months of the survey, production costs and sales returns for sheep and goats. A principal component analysis (PCA) was made using 17 variables (Table 1). This analysis synthesizes data which can be dispersed and heterogeneous for some variables and factors; this explains most of the total variability of the sample (Daniel *et al.,* 1994). The interpretation of the factors it was eased by the use of a hierarchical analysis (cluster analysis) that was performed on the coordinates of the farms (Hair *et al*., 1987) against the first three factors. This analysis differentiates and groups farms according to their homogeneity using Ward Criteria. Five groups were obtained from the cluster analysis. All calculations were made using the XLSTAT (7.5.2 version).

Table 1. Variables used for the principal components analysis (PCA)

Producer characteristics	Codes of Variables	Averages	Standard
Surface area ownership (hectare)	SURF_AREA	17	43,7
Small ruminant herd (head)	RUMINANTS	85	129
Sheep herd (head)	SHEEP	63	109
Goats herd (head)	GOATS	22	36
Returns for sheep (dinars)	RETURN_SHEEP	3069	5230
Returns for goats (dinars)	RETURN_GOATS	8609	15840
Livestock product in one year (head)	PDT_LIVEST	32	60
Fertility rate (%)	FERTILITY	88%	14%
Renewal rate of males (%)	MALE_RVL	43%	37%
Renewal rate of females (%)	FEMALE_RVL	55%	28%
Sales of animal in bad annual rainfall (head)	SALES_ AS	29	57
Purchase of animals in bad annual rainfall (head)	PURCHASE_ AS	4	24
Sales of animals in good annual rainfall (head)	SALES_ AP	29	57
Purchases animal in good annual rainfall (head)	PURCHASE_ AP	4	24
Labour cost (dinars)	COST_MO	1807	2140
Feed cost (dinars)	COST_ALM	1534	2028
Others cost (dinars)	COST_OTHERS	628	563

III – Results and discussion

Five groups were obtained from the cluster analysis. Two groups of 17 and 12 breeders belonging to family or domestic breeding (G_1, $G_{5)}$. The other three groups were composed of 16; 7 and 15 breeders considered as the most important because they represent the core of red meat breeding (G_2, G_3, G_4). The mean structural, technical and economic indicators that define each group were calculated to describe typological groups (Table 2).

The group of farmers rearing goats breeding (G_1): It is composed of 17 farms (about 25% of the sample) had an average total surface area of 7 ha. Mean age of owners was about fifty years, and the average family size was 5.4 persons. The flocks were small sized (42 heads) compared with the mean of sample (85 heads). On these farms sheep were not usually bred together with other livestock. Total mean labour employed was 2 persons, without salaried workers involved. In this group, owner and his wife usually work full time on the farm. With respect to flock management, in this group traditional heard management and livestock was the normal practice and there was not a specific performed production of kids over the year since the product was sold directly to local butchers. This was the group of farms which had existed in the entire southeast region and especially in mountainous areas. However, income from goats was 72% of the total income, due to the fact that a large proportion of other agricultural production was barely enough for their family and subsidies came mainly from goat's livestock. We note that this type of farming was both extensive and intensive farming system because both types are located in almost everywhere in these regions, even in Djerba Island).

The group of agro pastoralist and ranchers (G2): It is composed of 16 farms, representing 24% of the sample. Farms of this group had a mean total surface area of 33 ha. Mean age of owners was about 51 years, and the average family size was 5.6 persons. The mean size of flocks was high (147 heads) compared with others groups and with the sample mean (85 heads). However, the portion of sheep was 81% of the total flock. The mean total labour force was between 3 and 4 persons, most of them are family members (sons and daughters). Most of these types of farmers practice, or most of them alternate grazing (Bourbouze, 2000). This group had the highest mean livestock expenditure per head. They had to resort to buying livestock products more than the other groups. Mean sheep expenditure was more than 74 % of total expenditure, and income from livestock activities was 71% of total income. Finally, these farms had the highest economic productivity of farming and livestock activities.

The investing farmers (G3): this group was composed of only 7 farms or 10% of the sample, it represented a type of farm which was clearly differentiated from the rest of the sample surveyed. It's a group of farms with large sizes, positive and high level of profitability. This profitability is generally due to high performance of both sheep and goats. The mean size of flocks was high (120 heads) compared with the sample mean (85 heads). However, the portion of sheep and goat was respectively 53% and 47% of the total flock. The mean total labour force was between 4 and 5 persons, three of them are salaried workers. Most of these farmers practice, most often alternate grazing. This group corresponds to a core investor or who are in most cases owners of restaurants ("machwa") at the age of the main asphalt road and they had their own stock of cattle for immediate slaughter. These kinds of breeders were located particularly not far from cities.

The group of farmers keeping mixed herds of goats and sheep (G4): Composed of 15 farms or 22% of the sample had a mean total surface area of 10 ha. Mean age of owners was about forty-nine years, and the average family membership was 5.7 persons. The flocks were medium sized (82 heads) compared with the mean of sample (85 heads). On these farms sheep and goats were usually farmed together. Total mean labour employed was 2 persons, without salaried workers involved. In this group, owner and his wife usually worked on the farm. However, income from sheep was not equal to this from goats, due to the fact that sheep farming costs per sheep were low compared to thus for goats, and were only 35% of total farm costs. All farms had installations for separating sheep into lots and the practice of traditional heard management. As the same of group 1 livestock product was sold directly to local butchers.

The group of farmers rearing sheep (G5): Composed of 12 farms or 18% of the sample, had the lower mean total surface area of 5 ha. The average age of owners was about sixty-one years, and the average family membership was 6.2 persons. The flocks were small sized (48 heads) compared with the mean of sample (85 heads). Most of the flock was composed of sheep, or 82%. This group had a high mean livestock expenditure per heard. As the surface area was low, they had to resort to buying feed products more than the other groups. Mean sheep expenditure was more than 92% of total expenditure, and income from sheep was 88% of total income.

Table 2. Summary of main defining characteristics (mean values for the farm groups)

Farmer's groups	Sample Size	Household Size	Area (ha)	Flock (head)	Sheep (head)	Goats (head)	Sheeps return (dinars)	Goats return (dinars)	Global costs (dinars)	Global result (dinars)
Sample	67	5,8	17	85	63	30	7766	3985	9100	2578
(G1)	17	5,4	7	42	18	30	3576	1491	7163	-2096
(G2)	16	5,6	33	147	119	33	17163	3966	10841	10288
(G3)	7	7,1	30	120	64	56	10343	6150	13362	3131
(G4)	15	5,7	10	82	59	23	6000	3330	7672	1658
(G5)	12	6,2	5	48	39	9	1750	4988	6488	250

IV – Conclusion

In short, we may say that some types of farmers (G_2, G_3, $G_{4)}$ representing 56% of the sample, are very different from the rest. They are mainly specialized in breeding for the production of red meat and constitute the core of red meat industry. The other two types G_1, G_5, represent farming family type. They can be located in all regions of the study zone. Finally, it can be concluded that despite the low productivity of the farming systems identified by the typology, many advantages could be pointed out, particularly: First, the breeder is able to adapt his strategy to the climate and unusual conditions and has a very strong know how for using available resources and overcome in most of the cases the problems of livestock feed. Second, local breeds are well adapted to harsh conditions of the dry areas. However, the breeders are still obliged to cope with many other imposed constraints and, therefore, there is a serious need for the intervention of the government especially in terms of livestock sector organization.

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