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Innovation platform, farmers' organization and market to empower small farmers benefit from an autochthonous meat sheep value chain under low input production systems

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Abstract. Regional development in Tunisian livestock has been based mainly on segments rather than on an integrated system approach and a value chains concept. Even though efforts were made to improve production, livestock productivity is still low (.7 lamb/ewe/year). International cooperation through the Consortium Research Program-Dry land system led by ICARDA and INRAT launched an innovation platform in 2013 in Sidi Bouzid region to find suitable pathways to develop livestock in the region. The objectives of this study were (1) to describe farming systems in Zoghmar community at Sidi Bouzid site; (2) analyze the existing lamb production chain and (3) develop potential technical and organizational pathways to better respond to farmers and consumers needs. A total of 120 surveys was conducted in Sidi Bouzid region including sheep owners, butchers and consumers. The main results showed that beside the breeding operations, fattening activities (breeding-fattening or fattening) are becoming more and more important. While breeders and consumers still prefer, in their majority, the Barbarine fat tail lambs, butchers tend to favour thin tailed sheep because of the difficulty of selling the fat of the tail that represents up to 15% of the carcass weight. To meet the butchers' demand, farmers are shifting to thin tail breeds and crosses and in the studied areas, market changes towards thin tailed breeds were dictated by butchers' and not consumers' preference. The project initiated the formation of a farmers association at Zoghmar community to establish a transparent lamb production chain. The association was taken as a framework to rehabilitate the rangeland with the cooperation of the Ministry of agriculture (OEP-CRDA). More coordination is now put on place to bring all stakeholders together in a lamb value chain concept (lamb production-Allouch Sidi Bouzid label and market).

Keywords. Sheep – Value chain – Innovation – Barbarine.

Plateforme d'innovation, organisation des éleveurs et marché pour renforcer les petits éleveurs à partir de la chaîne de valeur mouton sous un système de production à faibles intrants

Résumé. Aujourd'hui, les 274.000 éleveurs ovins en Tunisie et en particulier les "petits éleveurs" (64% avec moins de 10 brebis) ne sont plus capables d'assurer un niveau de vie décent. La faible productivité de leur cheptel et l'absence d'organisation professionnelle ont favorisé la collaboration INRAT et ICARDA dans le cadre du programme CRP-DS afin de leur redonner la place qu'ils méritent. Les objectifs de ce programme étaient de (1) décrire le système de production dans la communauté de Zoghmar à Sidi-Bouzid ; (2) d'analyser la chaîne de valeur mouton et (3) développer les scénarios techniques et organisationnels pour mieux répondre aux besoins des éleveurs et des consommateurs. Un total de 120 enquêtes réalisées à Sidi-Bouzid qui ont montré l'émergence des activités d'engraissement de courte et de longue durée. Au moment où les éleveurs et les consommateurs préfèrent la race Barbarine, les bouchers s'orientent aux races à queue fine pour éviter le dépôt de gras difficile à commercialiser. Le projet en collaboration avec le CRDA de Sidi-Bouzid et l'OEP à initier la formation d'une association d'éleveurs de la communauté pour mettre en place et promouvoir la chaîne de valeur de mouton de Sidi-Bouzid.

Mots-clés. Agneau – Chaîne de valeur – Innovation – Barbarine.

I – Introduction

In Tunisia, approximately 65% of 274,000 sheep owners are small holders with less than 10 ewes. These small farmers are facing various constraints (due to low lamb prices at the production level and to intermediaries, inappropriate market channels, lack of a traceability system of meat sheep, high feeding costs and a lack of farmers' association) and do not have a decent life as they used to have and are not gaining their living by producing lambs. Regarding to Sidi-Bouzyd governorate, located in the center of the country, it was for many years ago disfavored in terms of infrastructural and institutional support and beside the limited natural resources, particularly arable land and water, a large number of the small farmers are deriving most of their family income from barley/livestock based systems and sheep fattening practice is quite profitable in the region. In fact, the Sidi-Bouzyd region produced in 2014 a total of 325,000 lambs and for the Aid el Edha festivity, this governorate contributed by 38% of the total national lamb production. Therefore, an integrated approach was implemented under the framework of CRP-DS program in agro-pastoral livelihood systems, to improve livestock productivity by empowering small farmers through a suitable flock management practices, an organization and a sustainable lamb value chain in particular with regards marketing of "Sidi-Bouzyd lamb".

The objectives were: (i) Assess the degree of change in sheep practices and flocks' structure, (ii) Evaluate the degree of crossing between Barbarine native breed and thin tail breeds and, (iii) Monitor the effect of actual market demands on existing sheep breeds.

II – Material and methods

A total of 120 Surveys were conducted in two major small ruminants' locations in Sidi Bouzyd Governorate: The Zoghmar community and the Jelma market. Zoghmar community is in the center of Tunisia and in the northern side of Sidi-Bouzyd governorate and it is limited by M'ghilla Mountain chain (North). The community is in the upper arid with an average annual rainfall of 290 mm. Three surveys were undertaken: One survey for livestock owners, a second one for butchers and a third one for consumers. All surveys aimed to identify reasons and trends concerning the farming system, the types of animals preferred by these three groups and the lamb value chain performance. Surveys were conducted from April 2014 to November 2014, just before Aid el Edha which is a religious Holiday when a large number of lambs are scarified. This survey included information related breeds raised, flock size, ram origin, feeding, genetic, health practices, fattening, marketing, period of sale, age at lamb sale, Selling price, breed preferences, reasons for raising the breed and animal body condition scores. After editing the gathered information, a statistical analysis was made using the recorded scores. All data were analyzed by SAS (SAS 9.1.3, 2003).

III – Results and discussion

1. Innovation platform

Based on the community development plan (Nefzaoui *et al.*, 2007), the first innovation platform took place in 2013 in Zoghmar community. Mostly farmers, development agencies, extension services, research centers, international organizations (ICARDA, FAO) attended this platform. An enabling environment was created with a Community-implementers' relationship, complementary interventions, services and capacity development, a Government support and links with other projects/CRP's activities. Through group discussions by gender (Women, men and youth) constraints faced by Zoghmar community at the social, agricultural, economical and environmental levels were identified. Also, livestock and cactus were prioritized as the most important commodities for household

livelihoods in Zoghmar, for tourism based livelihoods and handicraft production (carpet, klim) they generate also incomes for households. Concerns and challenges discussed included a lack of effective farm organizations for representing livestock farmers, weak economic ties across the sheep value chain. According to sheep value chain actors involved, the core problem was a poor performance of the VC. In the learning alliance held in 2014, main sheep market channels were described and key constraints and opportunities in the whole value chain (Inputs and services, Production, Processing, Marketing and Consumption) were identified (Dhraief *et al.*, 2014).

2. Sheep activities

The characterization of production systems for the purpose of the flock management program was concentrated on current breeding practices in small ruminants' flocks, on marketing channels and opportunities for marketing animals and animal products and on institutional settings that affect animal management. Based on a survey made for 120 farmers to characterize the livestock production systems in Zoghmar community and to identify fattening practices, flock management and market. Three major sheep practices were identified: the first group was the lamb producers (LP) only and they represent 21%, the second cluster was the lamb producers-fatteners at the same time (LPF) which represent 55% and the third one was the fatteners only (F) representing 24% of the total sheep practices in Zoghmar community. Compared to 2004, in Sidi-Bouزيد, livestock owners, who had been mainly breeders, represented 47% while 33% were breeder-fatteners and 20% were fatteners (Bedhief *et al.*, 2008). Livestock practices have changed from breeders to breeder-fatteners and to only fatteners with less dependency on degraded rangeland and more toward zero grazing relying on external purchased feeds.

For each group, there is a dominant genotype: the (LP) raised mainly the Barbarine breed (native one with fat tail) under low input production system (which means that farmers rely mainly on rangeland for feed resources with little supplementation when needed). The (LPF) group, have half and half Barbarine and Ouled Djellal (Algerian thin tail) breeds, this group is encountered in semi-intensive system which means they rely beside the rangeland on purchased concentrate. For the (F) group, they fatten mainly Algerian thin tail lambs, this breed is a trans-boundary breed between Tunisia and Algeria which used to be only at the border but it's now gaining more and more regions in Tunisia, and this group is mainly intensive and relies on purchased feed and concentrate. Even though raising sheep is still as an activity by itself, fattening activities (lamb producers-fatteners or only fatteners) are becoming more and more dominant.

For the two last groups that practice fattening, three fattening periods were followed in Zoghmar community: a short fattening period where fatteners sell their lambs at less than three months after weaning. A second cluster of fatteners that have an average of 3-6 months of fattening after weaning and a third cluster of long fattening period with more than six months after weaning and those animals were mainly for religious holiday (Aid el Edha).

The fattening operation is mainly practiced to satisfy the massive demand for lambs during the religious Holiday (Aid el Edha), where lambs are sacrificed. The breeding-fattening operation, on the other hand, serves more than one purpose, besides producing lambs for the Aid el Edha, lambs are also sold to meet the family financial needs (income) during the year round.

The strategy followed by CRP-DS program is to reduce the cost of production by reducing the concentrates used in the animal feed, and by relying more on on-farm feed production and other alternative feed sources that are cheap and locally available. Diagnosis of flock management in Zoghmar community showed that feeding calendar, we identified 4 types of diets in year round and diets includes 30 to 70 % of concentrates feeds (barley, wheat bran and commercial concentrate). In summer and autumn season, farmers rely on cactus to replace part of concentrate feeds and gross feedstuffs (stubbles, hay and straw).

In fact for lamb producers (LP) category, less concentrate was used in spring and in summer compared to the other seasons because they rely on rangeland, cactus and/or cereal stubble. For lamb producers and fatteners at the same time (LPF), they used 20% of rangeland and 60% of concentrate for feeding their sheep flocks and for the category of fatteners only (F), more than 70% of concentrates, 10% of hay and cactus were used. Cactus must be well used in this community to help farmers to a least cost ration using available by products, alternative feed resources (spineless cactus with high water use efficiency), also known for its anthelmintic activity and on meat quality of small ruminant.

3. Livestock systems

Main results showed that farmers are shifting their practices from a totally rangeland based to a mixed system based on 56% rangeland (the traditional sheep system) and 44% indoor (semi-intensive or intensive) with feeding concentrates for fattening lambs. Lambs are now produced from three genotypes: the Barbarine, the Algerian thin tail and their crosses. Also, sheep farmers in Sidi Bouzid have shifted (more than 50%) from the Barbarine fat tail to the Algerian thin tail breed to satisfy mainly butchers. The Barbarine breed known as a unique breed raised in the region is now equally with Thin tailed breed. The practices of indiscriminate crossbreeding of the local Barbarine breed with introduced ones (mainly with the thin tail breed) have led to many populations and to genetic erosion of the adapted indigenous populations, which represents a threat to the integrity of the local breed. In zoghmar community, breeders surveyed owned 57% the Barbarine breed, 32% the Algerian thin tail and 11% crosses genotype.

4. Sheep activity benefits

For market trend, we noticed at the same age and lamb weight, the prices payed by butchers for Algerian thin tail breed are 40 TND higher compared to fat tail lambs, this is dictated by butchers and this confirm a previous study (Bedhiaf *et al.*, 2008) within this acitivity it has been shown that (i) Consumers still prefer the fat-tail Barbarine breed, (ii) Barbarine lambs tend to be superior in flavour and juiciness, (iii) Lambs from Sidi-Bouzid tend to have better juiciness and flavour than lambs in urban area (iv) Butchers are an important force dictating a shift to thin tail breeds because they don't want to have problem in selling the fat. The result now in Sidi- Bouzid, we have 50% Barbarine breed and 50% Algerian thin tail, two decades ago, there was only the Barbarine breed.

Animal feeding costs estimated were 362 and 265 TND/head/year for the Algerian thin tail breed and the Barbarine breed, respectively. Based on surveys conducted at Jelma market in the period of Eid El Adha 2014, the profits generated from selling the lamb varied between 40 and 50 TND for the lamb producers (LP) and (LPF) categories and about 100 TND for the fatteners (F) group. The main genotypes sold by fatteners' category, which was the dominant category present in Jelma market, were mainly (80%) thin tailed breed and crosses genotypes, this high flow of thin tail breed is due to informal cross border trade of Algerian thin tail. The benefit ranges were between 40 and 0 TND/head, 50 and 10 TND/head and 100 and 0 TND/head for lamb producers, lamb producers-fatteners for a short period and lamb producers-fatteners for a long period, respectively.

IV – Conclusions

Regarding to the historical and emotional attachment of livestock owners for raising Barbarine fat tail sheep, a breed which is ostensibly indigenous to Sidi-Bouzid and to the massive crossing of fat-tailed and thin-tailed breeds, there is an urgent need to establish an appropriate flock management matching animal genotypes to improve small flocks productivity, increase farmers revenue and protect the Barbarine from the genetic erosion threats. The formation of the local community

based organization (CBO) will be a way to empower small farmers of Zoghmar to produce better lambs and sell lambs at better price. This understanding could provide important clues for research and policy makers to devise better strategies for the conservation and management of genetic resources, while helping rural farmers targeting their opportunities for a better income.

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