



Volume 2 No: 8 (2018)

**Value Chain Assessment of Sidi Bouzid Sheep
Production and Marketing in Tunisia: Challenges
and Opportunities of Linking Breeders to the
Markets**

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February 2018



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Citation

Dhraief¹ M.Z., Oueslati¹ M., Dhehibi² B. Daly¹ H. and Bedhiaf-Romdhania¹ S., (2018). Value Chain Assessment of Sidi Bouzid Sheep Production and Marketing InTunisia: Challenges and Opportunities of Linking Breeders to the Markets. FARA Research Reports Vol 2(8) PP22

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ISSN: 2550-3359

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Abstract

Sheep production is a key component of rural household livelihoods in central Tunisia. Within this arid and poverty-stricken environment, scarcity of water and prolonged bouts of drought have led to significant variability in crop production; and therefore reliance upon livestock holdings as a secure source of wealth from which to draw upon during periods of hardship. Our geographical interest in this paper is Sidi Bouzid, a governorate which has had a traditional affinity to an indigenous Barbarine sheep breed. Historically valued by Tunisian consumers for its ranged meat quality, this fat tailed breed is well adapted and suited to a parched environment. Yet, an increasingly larger proportion of thin tailed Algerian breeds are now present and growing. Given the relative advantage of Barbarine breeds, in terms of reduced risk, adaptation, and consumer preference, our paper seeks to explain the observance of a decrease in pure Barbarine breed lines. This is of particular importance given that Barbarine breeds would appear to be poorer, relative to the Algerian breeds, and in an area with significant poverty.

Utilizing a mixed methods approach (focus groups and survey), we characterize the dominant sheep production system within Sidi Bouzid, identify the main stakeholders, marketing channels for inputs and outputs, challenges and opportunities to production, and recommendations for policy and research that are aimed at enhancing sustainable livestock production systems for poverty reduction. Our findings indicate that the major challenge for this value chain is economic in nature, which has been exacerbated since the Tunisian uprising of 2011. With higher meat to carcass ratios (lower fat ratio), abattoirs and butchers are increasingly demanding thin tailed breeds over the indigenous fat tailed Barbarine breeds. This has placed an increased burden on small livestock producers, given higher feed consumption needs for thin tailed breeds, and increased production risk in periods of sustained drought. We make an argument for more contemporary forms of social and economic organization at the community level with the end to protect the livelihoods of poor livestock producers, while placing less pressure on degraded rangeland resources.

Keywords:

Sidi Bouzid, Barbarine Sheep, value chain, social organization, poverty.

Introduction

In Tunisia, sheep plays a key role in the development of agriculture in central and Southern regions where environmental conditions can be very harsh due to the scarcity of water. In 2012, the contribution of the sheep production is 57.7% in these areas compared to national production. In Central Tunisia, the governorate of Sidi Bouzid is the most famous place for lamb production. "The Lamb of Sidi Bouzid" has a national reputation based, firstly, on the adaptation of the Barbarine breed sheep to the environment largely predominant in this region and secondly

for the image that the Tunisian consumer have from animals raised on major rangelands of Central Tunisia. In 2012, Sidi Bouzid sheep production contributed for 9.2% out of the national production

Sheep breeding in the region of Sidi Bouzid is facing increased difficulties because of the reduction of rangelands and forage resources following the increase of the areas allocated to vegetables and fruit trees. These changes made it difficult to fulfill the nutritional needs of livestock (Chihi, 2006). It was recorded in 2011 a remarkable decrease of about 10% in the number of ewes reaching 320 000 units compared with 2010 (355 000), (table 1). This is the result of the illegal migration of sheep herds to Libya in the period following the Tunisian revolution (Development office of West Central, 2012).

Table 1. Evolution of the number of ewes in Sidi Bouzid (1000 heads)

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of ewes (1000)	308	312	316	322	350	354	350	354	355	320	330

Source: Development office of West Central, 2012.

Moreover, there is a transition in the type of breeds in the governorate of Sidi Bouzid. In fact, despite their preference for the Barbarine breed which has a good adaptation to the environment and has a superior quality for meat, breeders in Sidi Bouzid shifted from the autochtonous breed to the Algerian thin tale which is illegally imported from Algeria. According to Chihi (2006), these farming practices present a real threat to the local Barbarine breed in the long term. Barbarine breed represents 53% of the cattle while the Algerian thin tail represents 42% and the crossbreed 5% (Chihi, 2006).

The major objective of the paper was to characterize the Zoghmar sheep value chain in order to facilitate the development of stakeholder-driven strategies for improving the marketing efficiency, postharvest management and value addition. The specific objectives of the paper include diagnosis and selection of the relevant stakeholders in Zoghmar sheep value chain, mapping the sheep value chain, to identify the weaknesses, strengths, opportunities and threats that affect the sheep value chain and to suggest key intervention areas for development stakeholders and policy action.

Methodology

The Value Chain concept

According to Humphrey and Oetero (2000), the value chain concept is derived from two main analytical approaches. The first source is the business and industrial organization literature, exemplified by the work of Porter. He defines a “value chain” as “the activities performed in competing in a particular industry” (1990), defined at the level of the individual firm. The second

approach derives from the world systems literature on commodity chain where Gereffi (1994) defined “Global commodity chains” as they have three dimensions: (1) an input-output structure (i.e. a set of products and services linked together in the sequence of value-adding economic activities); (2) territoriality (i.e. spatial dispersion or concentration of production and distribution networks, comprised of enterprises of different sizes and types; and (3) a governance structure (i.e. authority and power relationships that determine how financial, material, and human resources are allocated and flow within a chain”.

These value chain approaches have been utilized by development practitioners and researchers to analyze markets in developing countries and to examine the inter-relationships between diverse actors involved in all stages of the marketing channel (Kaplinsky, 2004; Giulani et al., 2005; Bair and Peters, 2006; Pietrobelli and Saliola, 2008, Beneberu and al, 2012).

Typically, the “value chain” describes the full range of value-adding activities required to bring a product or service through the different phases of production, including procurement of raw materials and other inputs, assembly, physical transformation, acquisition of required services such as transport or cooling, and ultimately response to consumer demand (Kaplinsky and Morris, 2002). As such, value chains include all of the vertically linked, interdependent processes that generate value for the consumer, as well as horizontal linkages to other value chains that provide intermediate goods and services (see figure 1) Value chains focus on value creation typically via innovation in products or processes, as well as marketing and also on the allocation of the incremental value.

Collection data

In order to collect information for the sheep value chain analysis, a combination of different techniques were applied:

- Literature review: Relevant literature review through documents and publications were consulted especially from the Mashreq/Maghreb (M&M) Project and Femise/ICARDA project
- Secondary data: Provided by the regional department for agricultural development of Sidi Bouzid; the territorial cell of extension and the office of livestock and pasture
- Participatory approaches: Through focus group discussions, main stakeholders’ workshops and regulatory actors meetings. The focus groups were held with 18 farmers in the region and 10 butchers in the governorate of Sidi Bouzid (Jelma, Lassoueda, Sidi Bouzid market). Age, location and level of education are considered in the identification of participants. The first stakeholder workshop took place in December 2013 with the launching of the innovation platform in Sidi Bouzid site (Zoghmar community). This workshop brought together the main stakeholders in the field of agricultural development. A total of 192 participants attended the workshop (38 women). Group discussions by gender (Women, men and youth) identified social, agricultural, economical and environmental constraints faced by Zoghmar community. The second workshop took place in November 2014 with the launching of the learning alliance in Sbeitla (Zoghmar community) which brought together the main stakeholders in the sheep value chain. The learning alliance is a process of continuous learning, jointly undertaken by research organizations, farmers, marketing agents, donors, Non-Governmental Organizations (NGO’s), financial service providers, policy makers and relevant civil society actors. The main objective

of this learning Alliance workshop is to identify and share good practices in research and development related to sheep value chain.

Study area

This research focused on the governorate of Sidi Bouzid, will consider the district of Jelma as the case of the study of the sheep value chain and more specifically the sub-district of Zoghmar. Zoghmar community was created in 1993 and covers about 2400 ha, it is located in the NorthWest of Sidi Bouzid Governorate. It belongs to arid climate with cold winters. This zone is constituted by a set of hills separated by valleys. It is limited on the north by M'ghilla Mountain, on the east by Baten El-Ghezal sub-district, on the west by Selta sub-district and by Jelma in the South.

According to the National Statistics Institute (2013), the total population of the community of Zoghmar is approximately 400 households distributed over 8 groups (Hnazla, Rhamna, Chouayhia, Anaybia, Baaounia, Jwewdia, Zlaâtia and Mrazguia), for a total of 2410 people including 1129 male and 1281 female.

Sheep and goats production is the main activity for Zoghmar community. Sheep herding is the main economic activity with 5000 heads. Their numbers apparently decreased due to the degradation of rangelands and the lack of shepherders. Transhumance has practically disappeared but some collective rangeland is still present. Livestock sector is strongly dependent on feed resources, which was not the case 4 or 5 decades ago where rangeland covers most of livestock requirements (CDP Zoghmar, 2002). The largest numbers of sheep are among the ethnies of Jwewdia and R'hamna, the Chouayhia and Zlaâtia are most favorable to the acquisition of enhancer rams. Zlâatia, Jwewdia and H'nazla practice especially fattening.

Results

Main stakeholders of the sheep value chain in Zoghmar

The core functions of the sheep value chain include: Input supply, production (breeders), intermediaries, processing (butchers, abattoirs), marketing (market access and channels) and consumption. All these functions are coordinated by regulatory actors.

Input supply

The input providers in Zoghmar concern the livestock feed suppliers; they are four with an average quota of 425 tons of subsidized barley per provider and per month. Barley is the most requested product by breeders; however, the quantity offered by the suppliers cannot meet the demand of all the farmers in the area. Indeed, breeders in Zoghmar are obliged to buy barley at high prices to cover the needs of the cattle. Breeders always ask for regular controls from the authorities for the animal feed suppliers to punish opportunistic behavior. In the district of Jelma, there are about 250 points of sale of animal feed but they sell the products at higher prices than the subsidized price. For example, soybean packed in 50 kg bags is sold at 13 Tunisian dinars (TND1) by the suppliers while its subsidized price is 10,8 TND.

The livestock feed suppliers explain that the demand for animal feed is greater than the supply and they are forced to pay more for transportation and sometimes they also give money for

delivery. They reject the idea of opportunism and think that the problem will be solved by a larger supply amount.

Veterinary services in Zoghmar count 50 private veterinarians and 10 public doctors; these latter complain from the lack of means of transport and analysis laboratories. CRDA is used in most cases to call on private veterinarians to intervene on time. Health coverage is about 75%.

Breeders

Sheep breeding is the main economic activity in the area, but the numbers of herds are shrinking because of the degradation of the rangelands and the reduction of the number of the shepherds which affected the reorganization of the farming activity and led to intensification in its conduct (Selmi et al., 2003). In Zoghmar, the number of sheep (ewes) decreased from 8380 in 1994 to 5970 heads in 2014.

In the 1960s, herds took their supply essentially from rangelands. Nowadays, fattening animals is a growing activity due to the degradation of rangelands. Sheep production is constituted by the Barbarine breed and the Algerian thin tail which is becoming more and more important in the farming system of Zoghmar breeders through illegal imports of this breed from Algeria. Breeders have various criteria for the perception of the breed type (table 2). The barbarine is a breed of resilience that is resistant to the lack of feed and to the diseases, it requires a highly technical know-how and produce a tasteful meat. In contrast, the thin tail is a breed that produces more meat and is available all the year. Its degree of fertility is higher than the barbarine especially in the case of a suitable feeding. However, this breed is more exposed to diseases because animals are imported from abroad. Cross breed have intermediate quality between barbarine breed and the thin tail breed.

Table 2. Perception of the breeders

	Barbarine	Thin tail	Cross-breed
Adapted to nature	++		+
Resistant to the lack of feeding	++		+
Resistant to the diseases	++		+
High meat yield		++	+
Need high technical skills	++		
Organoleptic meat quality	++		+
Disseminate diseases		++	
High fertility		++	
Availability during the year		++	

Source : Focus Group with butchers, 2014

(++) Very important (+) important

Intermediaries

Intermediaries are an important player in the value chain to the extent that they can intervene at various links in the chain and capture a significant margin. In 2004, Selmi and al identified two types of intermediaries:

1. The permanent intermediaries who practice this activity throughout the year and are specialized in the purchase and marketing of sheep products between regional markets and the markets of major cities,
2. Occasional intermediaries who practice this activity only in the period of Eid el Idha and have also other professional activities (agriculture, trade, etc.).

Intermediaries can be breeders, butchers or traders originally from Sidi Bouzid and living in big cities and who take benefit from the period of Eid El Idha to earn money. In 2014, in the framework of the sheep value chain workshop organized in Sidi Bouzid, we met a butcher who buys at around thousand sheep from Algerian borders to fatten them among breeders of Zoghmar community before selling them to markets in the region and in major cities. This intermediary even provides food to farmers and pays them according to the percentage of sale. There are other intermediaries that are specialized in buying lambs one to three months before Eid El Idha to fatten and sell them on the major cities markets where prices are interesting.

With the rising prices of lambs and meat, intermediaries are more cautious in their purchasing strategy for several reasons:

- The cost of food is high and the intermediary has no interest in fattening animals during long periods of time ;
- The consumer has showed a lack of willingness to buy lambs in the period of Eid. In 2014, the Eid El Idha was marked by a great reluctance from Tunisians in the purchase of lambs and many intermediaries sold their animals at a loss ;
- The farmers do not want to sell lambs at low prices to intermediaries due to the high cost of food ;
- The prices of sheep on the local, regional and national market became high.

Intermediaries can be classified according to their financial capital. There are in one hand large intermediaries that have the ability to buy large number of head, to practice fattening and sell in the markets of large cities and in the other hand small brokers who are generally farmers that have very close relations with regional and national markets.

Butchers

For sheep production in Sidi Bouzid and especially in the district of Jelma, butchers play a key role in promoting the breed of the animals. Due to the vocation of the region, butchers can be of different types: butchers-traders, breeder-butcher-traders and breeder-butcher-traders-intermediaries.

1. Butchers-traders (type1) are butchers who buy from local markets and practice only their profession as butchers. They are more specifically butchers from Sidi Bouzid market.
2. Breeder-butcher-traders (type 2) are butchers who buy from local markets but also have their own breeding of 100 heads of animals. This type of butchers has an important advantage over the butchers-traders because they can also purchase lambs from farmers in the region and especially the farmers of the family (uncle, cousin, etc.),
3. Breeder-butcher-traders- intermediaries (type 3) are butchers who have great financial capacity and can buy a large number of animals and distribute them among a number of farmers by providing them food. After a fattening period that varies between 2 and 4 months, the animals are sold by the butcher and a share of the profit will be distributed to farmers. This type of butchers supply mainly from the border markets of Tunisia (Algeria and Libya).

Purchase price and sale price according to butchers

The purchase prices of lambs are different according to the place of purchase (weekly market, import, breeder, etc.). But generally, the price of the Barbarine breed is lower by at least 20 to 50 TND from the thin tail outside the season of Eid El Idha. Concerning the sale price, there is no differentiation between the three types of meat (barbarine, thin tail or cross-breed), there is no difference at the marketing levels (see table 3).

Table 3. Purchase price and sale price according to the type of breed

	Barbarine	Thin tale
Carcass weight	20kg <	20kg <
Age	6-12 months	6-12 months
Purchase price live animals	280-320	330-370
Purchase price TND/kg	17-18	17-18
Sale price TND/kg	20-22	20-22

Source: Focus Group with butchers, 2014 Slaughterhouses

Currently in Tunisia there are 201 slaughterhouses divided between North (39%), Central (44%) and South (17%). Clandestine slaughtering represents nearly 50%. In most of the countries, the slaughterhouse is an important source of information on livestock and epidemiology that are interesting for the production of milk and meat. Their management mode is questionable; the hygienic rules are not respected, and the health and livestock control escapes the services of the Ministry of Agriculture. The slaughterhouse of Jelma is small and lack of modern and hygienic equipment.

The causes of clandestine slaughter are multiple; they include the lack of specialization of the activities of the sector, only one person is responsible for slaughtering, high fees in some slaughterhouses, problems linked to transport when slaughterhouses are distant from the places of consumption, strict application of the legislation on logging in some slaughterhouses and the displayed tolerance of the authorities.

Consumers

Meat consumption in the community of Zoghmar can be analyzed through the perception of market butchers in the district of Jelma or consumers in the region of Sidi Bouzid.

Selmi et al. (2004) demonstrated that consumers of lamb in the period of Eid El Idha do not give much importance to the breed of the lamb but rather to the presence of fat in the tail. Consumers of the Eid El Idha make their choice based on budget, color, weight and general appearance. In 2006, a detailed survey was conducted among 32 consumers while buying meat from butchers. 50% of consumers surveyed were in the area of East-Sidi Bouzid and West-Sidi Bouzid since both delegations represent the majority of the butchers of the municipal markets and specifically "Lahwez" and "Faidh" (Chihi, 2006). The conclusions of this study show that:

- The periods of purchase of meat sheep are three. 59% of consumers buy throughout the year against 25% who exclusively buy during the spring season and 16% buy only in autumn. The purchase price of the kilogram of meat varies from period to period. During the survey, the price was 10 TND / Kg.
- Consumers buy mainly from the market with 94% and 6% only buy from breeders. Regarding the quantities purchased per week, they vary from one consumer to another and depend on the financial conditions.
- For the quality of the meat, consumers prefer more Barbarine breed (59%) rather than the Algerian thin tale (41%). This indicates the growing relevance of the Algerian thin tale in the governorate of Sidi Bouzid which is traditionally known for being the birthplace of the Barbarine breed.
- The Algerian thin tale is preferred for 89 % of the consumers because it is the most available on the market, against 11% for Barbarine Breed. This confirms the fact that the Algerian thin tale is the most sold in the local markets of Sidi Bouzid.

In 2015, the focus groups conducted with the Butchers and consumers in the region of Jelma and particularly in Zoghmar have identified the following conclusions:

- Prices for sheep meat has doubled between 2005 (10 TND/Kg) and 2015 (20 TND/Kg) which pushed the consumers to look for cheapest meat such like poultry products.
- Consumer preferences are different depending on the purchasing conditions. The barbarine breed is mostly preferred at the period of Eid El Idha and wedding parties. The Algerian thin tail is preferred mostly by older people, the inhabitants of large cities and by butchers.
- In absence of signs of quality, Barbarine breed is sold on the same channel as the Algerian thin tail and do not benefit of quality differentiation from the supermarkets.
- Consumers buy sheep meat generally from the butchers of the neighbourhood and rarely directly from farmers. For the period of Eid El Idha, this strategy changes and the consumers try to buy from several channels namely the breeder, the intermediary, the butcher and the local or regional market.

The Marketing Channels for Sheep in Zoghmar

The sheep production in Zoghmar has several marketing channels which link production to final consumption through several stakeholders (figure 4). The number and type of actors vary from one distribution channel to another. There are long channels and short channels, it depends on the selling season and the type of product sold (lamb in the period of Eid or cut meat). The same player in the sector can play different roles. It can be breeder, butcher and intermediary. The calculation of the profit margin is difficult because the product can go through several players before reaching the final consumer. The main marketing channels identified are:

Sheep purchased by individual consumers

This marketing channel is the shortest since consumers may buy their sheep at the period of Eid El Idha or festive occasions at the farm. Sheep producers are breeders, breeders-fatteners or fatteners; they can sell their lambs at the time of Eid in the different markets in the region. Breeders from Zoghmar choose in most cases the market of Jelma for proximity reasons. Zoghmar breeders buy sheep from three suppliers: the farmers of the region, the market mainly Jelma and the imports of the thin tale from Algeria's borders. Prices of sheep are highly variable depending on economic conditions, the season of Eid and the law of supply and demand in different markets.

Sheep slaughtered at butcheries

This marketing channel is longer than the first since the butcher sells cut meat. Butchers buy in the majority of carcasses carcass of animals which does not exceed 20kg. The butchers have several options: buy from small farmers, who sell their animals several times a year to earn money, buy from intermediaries sheeps from Algeria to fatten them during two or three months, buy carcasses at the slaughterhouse of Jelma, buy at the market of Jelma sheep from Zoghmar or other markets in the region and buy directly sheep from Algeria's border in collaboration with other butchers.

Sheep transported to cities markets

Major cities are supplied with sheep from Sidi Bouzid and Zoghmar community in two ways: At the time of Eid, breeders from the community of Zoghmar sell their lambs in the markets of major cities and their products are highly demanded. The market of Tunis is the most important for breeders from Sidi Bouzid because prices of sheep are very interesting, Outside the period of Eid El Idha, sheep from Jelma are transported to slaughterhouses of big cities and they are also highly demanded. Butchers can at the time of Eid become intermediaries and sell lambs on the markets of major cities together with their family members. Restaurants and hotels can contract with the butchers in the region for regular delivery in sheep meat.

Sheep purchased by other farmers

Farmers buy sheep to increase the number of heads or for replacement. Prices vary depending on sheep breed. In the market of Jelma the Thin tail ewe is more expensive than Barbarine ewe due to higher fertility. Farmers usually buy sheep after harvest crops or after earning money from

off-farm activity. Farmers buy sheep from breeders in the region, from the market and sometimes from intermediaries because they sell highly appreciated rams (Figure 4).

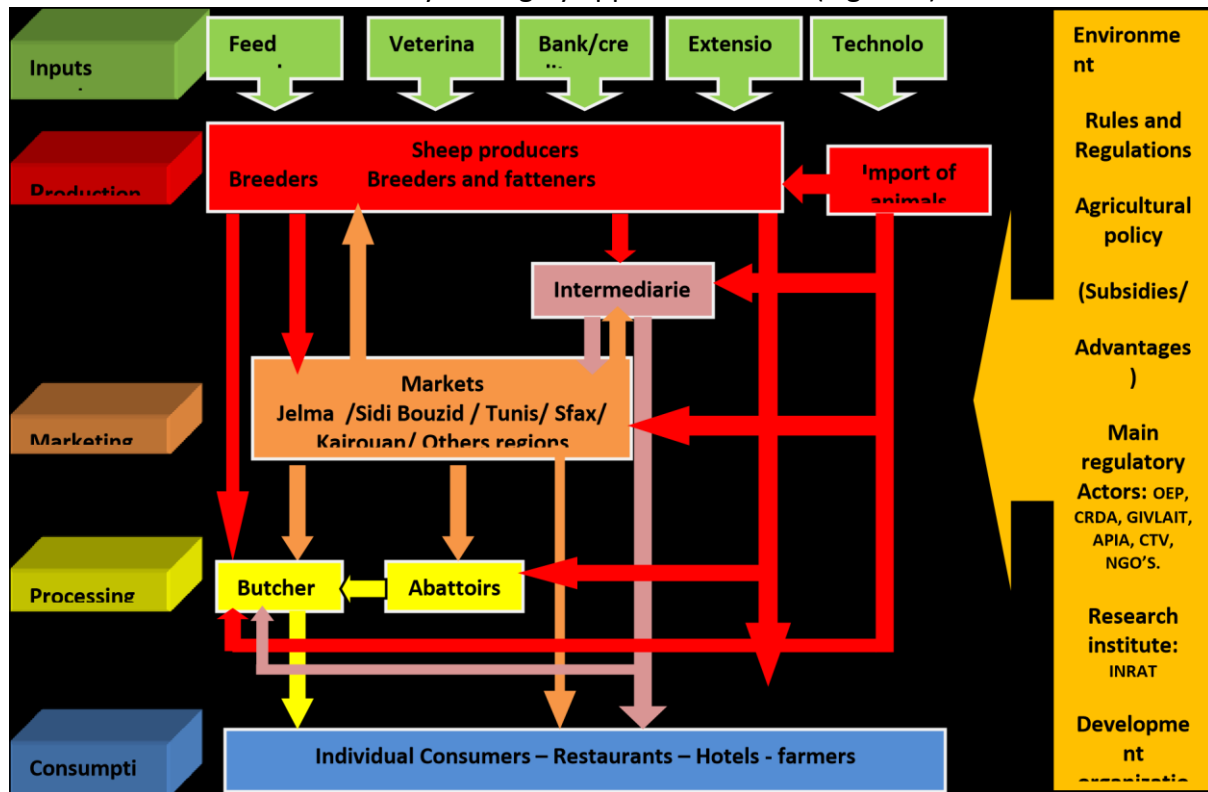


Fig. 4. Sheep value chain mapping in Zoghmar

SWOT Analysis Along the Sheep Value Chain

The SWOT analysis allows highlighting the main Strengths, Weaknesses, Opportunities and Threats along a value chain (figure 5).

Strengths of the sheep value chain

Concerning the Strengths, Sheep value chain has several strengths in Zoghmar community especially for Barbarine breed. The highly technical know-how of the breeders of this area is an important characteristic of this region asset. Zoghmar inhabitants are attached to the Barbarine breed because of its adaptation to severe environmental conditions and especially to its low production cost. This region has also large rangelands that are rehabilitated through the intervention of the office of livestock and pasture by planting spineless cactus. Consumer preferences for Barbarine breed on the occasion of Eid Al Edhha are an important asset since this breed is rooted in the traditions and history of Tunisia.

Weaknesses of the sheep value chain

However, the sheep sector also has several weaknesses. The high costs related to food, the unavailability and a non-diversified fodder affects the activity of livestock in Zoghmar. Rangeland

degradation, a small irrigated area and a small forage area make the farmers increasingly dependent on the market of feed products. The introduction of the Algerian thin tail breed can end up with a severe inbreeding problem that can worsen with low health care for animals; this breed is in high demand by butchers who want less fat. Other weaknesses of this sector are also institutional insofar extension service is specifically addressed to irrigated areas, the sector is mostly disorganized in the marketing of fodder and the role of professional organizations in the technical monitoring and supervision are insufficient. This sector also suffers from a lack of funding and investment. The breeders are not organized in a professional structure and do not have access to information.

Opportunities for the sheep value chain

The sheep sector of Zoghmar present real Opportunities mentionned by the different stakeholders. The creation of a production market in Sidi Bouzid will offer to the farmers of Zoghmar a space to buy and sell and to achieve greater sales transactions. In addition, the specification of their product by a sign of quality especially for Barbarine breed will create an added value. The creation of a new modern slaughterhouse allows the production area to ensure a smooth flow and quality levels for these kind of services. The creation of a mutual agricultural services organization is an important opportunity for Zoghmar breeders because of the advantages which may be granted to this organization. The joint purchase of fodder at subsidized prices solves the problem of the high cost and unavailability of forages. Creating a sign of quality can be achieved only through this organization. Real opportunities in the sector are in the development of agricultural and industrial waste for animal feed and in the valuation of assets of research.

In Zoghmar community, contribution of the rural women in final decisions is not important. Their role can be enhanced when they become members of rural women association. In this context, the first women association is created for Zoghmar community in December 2014 with the help of the FAO.

Threats of the sheep value chain

The Threats of the sheep value chain that can at short-term hinder its development are the effect of illegal importation of sheep from Algeria on animal health and on the domestic market, the decline of the Tunisian purchasing power which leads to drop out of purchase of the lamb or to diminish the sheep meat consumption to the profit of poultry products which are much more cheaper, increased production costs and their impacts on the income of the farmer, opportunism of intermediaries who seize opportunities to monopolize the margin of breeders, rangeland degradation through erosion and youth rejection of farming and migration to coastal areas.

<p style="text-align: center;">Strengths</p> <ul style="list-style-type: none"> - Highly technical know-how of the breeders - Barbarine sheep is rooted in the traditions and history of Tunisia. - Zoghmar inhabitants are attached to the Barbarine breed - Adaptation of Barbarine sheep to severe environmental conditions - Low production cost of Barbarine breed compared to others breeds - Rehabilitation of rangelands by planting spineless cactus - High demand of Barbarine on the occasion of Eid El Idha 	<p style="text-align: center;">Weaknesses</p> <ul style="list-style-type: none"> - High cost of inputs - Unavailability and a non-diversified fodder - Rangeland degradation, a small irrigated area and a small forage area - Introduction of the Algerian thin tail breed - Inbreeding problem - Poor extension for livestock sector - Inappropriate feed market - Inefficient professional organization - Lack of funding and investment
<p style="text-align: center;">Opportunities</p> <ul style="list-style-type: none"> - Creating a lamb production market in Sidi Bouzid - Creating labeled quality especially for Barbarine - Creation of a new modern slaughterhouse - Creation of a mutual agricultural services association (SMSA) - Potential incentives - Promotion of rural women and youth - To use agricultural researches 	<p style="text-align: center;">Threats</p> <ul style="list-style-type: none"> - Effect of illegal importation of sheep from Algeria on animal health and on the domestic market - Decline of the Tunisian purchasing power - Increasing cost of Production - Opportunism of intermediaries - Natural resources degradation due to erosion - Slaughtering illegal female - Abandonment of agricultural activity by youth - Migration of youth to coastal regions

Fig. 5. SWOT analysis of the sheep value chain in Zoghmar

Suggested Interventions from Main Stakeholders

The relevant stakeholders of the sheep value chain of the sub-district of Jelma proposed some interventions to overcome the challenges encountered at three levels for the breeders: The input supply level, the production and the market levels (table 4).

Interventions for the input supply

In terms of input suppliers, the identified challenges can be summarized in four main points:

- A lack of resources such as the means of transport or laboratories for veterinary analysis. Interventions from veterinarians take time and the risks for both animals and humans become important. The interventions came from the development agency (CRDA) which tries to provide the necessary means for the work of veterinarians on the long term. In the short term, an agreement between the CRDA and private veterinarians will intervene in time for animals. The livestock office (OEP) is also committed to intervene for the health surveillance of animals in the region of Sidi Bouzid.
- The inhabitants of Zoghmar complain about the existence of only 4 input suppliers, they are then obliged to buy livestock feed at high prices because the supplier add the cost of transportation on the selling price. The GIVLAIT offers a transport allowance to help the breeders.
- To maintain the sheepfold or to buy inputs, farmers don't find any organization to have grant loans at low rates. Small farmers cannot get credit from banks because they have no land title. Some NGO's are short-term solutions but the interest rates are high, ENDA is one example as it offers credits up to 20,000 dinars with interest rates of around 18%. The creation of a mutual agricultural services firm will allow producers to have easy access to credit from banks.
- The farmers complain from the opportunism of the suppliers of inputs that sell their products at prices higher than the subsidized prices fixed by the government. In addition, the amounts of subsidized products are unavailable in most of the time. The Trade Office must strengthen controls in order to limit abuses.

Interventions for the Production

At the level of production, three main challenges are identified:

- The high cost and the unavailability of inputs is a major problem constraining the development of sheep production in particular in Zoghmar for the intensive mode. Rangeland degradation is the main constraint for breeders in extensive mode. Interventions from OEP with research and development organizations (ICARDA, INRAT, CRDA) aim to provide breeders new forage resources. Thus, the OEP is considering planting 100 hectares of spineless cactus, consolidation of acacia plantation / periploca and other fodder shrubs, valuing cultural residues, granting subsidies for irrigation for farmer's fodder, aid for the purchase of straw and enhancers rams.
- Disease occurrence and increased mortality rates following the illegal imports of sheep from Algeria poses a major challenge to the productivity of livestock farming in Zoghmar and even at the sheep sector level in Sidi Bouzid. The autochthonous breed: the Barbarine is declining compared to the Algerian thin tail. The regional trade office with the help of local authorities can control the transit of sheep across the border. OEP and CRDA will organize vaccination campaigns in case of outbreaks of new diseases.
- The Lack of training and technology transfer is a limiting factor for the productivity of sheep farming in Zoghmar. INRAT, ICARDA, OEP and AVFA undertake to disseminate adequate training and transfer of good practices to farmers in the region.

Interventions for the Market

At the level of the market, four major challenges were identified:

The dispersion of the supply in sheep from the breeders of Zoghmar does not allow them to have a strong bargaining power with buyers. The GIVLAIT proposes to create points of sale dedicated to a specific breed such as Barbarine for example.

The Lack of vertical relationships between breeders and the other stakeholders in the value chain poses a particular problem with the marketing of sheep. The GIVLAIT proposes to make production contracts between breeders and sellers and / or contracts with supermarkets. The problem of lack of horizontal relationships between breeders is solved by the creation of a mutual agricultural services organization (SMSA). CRDA, ICARDA, GIVLAIT, OEP will work together with breeders from Zoghmar to implement this organization. This SMSA will do the marketing of its products: milk, wool and sheep. It can negotiate the purchase of inputs and the sale of products with the large supermarkets.

The sheep meat sold is not differentiated and the chain loses added-value especially for barbarine breed known for its good quality meat. CRDA, ICARDA, GIVLAIT, OEP and other development agencies (GIZ, FAO, etc.) will commit to help breeders to create a sign of quality for sheep from Sidi Bouzid.

Table 4. Suggested interventions from main stakeholders

Stages of value chain	Suggested interventions	Implementing actors
	Improve veterinarians facilities	CRDA
	Agreement with private veterinarian	OEP
	Incentives for feed transportation	GIVLAIT
Input supply	Credits up to 20000 TND	NGO's
	Creation of a mutual agricultural services association (SMSA)	FAO ICARDA CRDA
	Regular control of market channels	Regional office of trade, CRDA

Production	Planting 100 hectares of spineless cactus, acacia plantation / periploca and other fodder shrubs, valuing crop residues, incentives for crop production Improving roms	OEP ICARDA INRAT CRDA
	Control of transboundary diseases and breeds vaccination campaign	Regional office of trade, Local Authorities , OEP, CRDA
	Technology transfer of innovations	ICARDA ,INRAT OEP, AVFA
	Promotion of lamb market	GIVLAIT
Marketing	Contract between breeders and supermarkets	GIVLAIT , CRDA
	Creation of a mutual agricultural services association (SMSA)	ICARDA,INRAT OEP CRDA
	Development of labeled sheep meat	ICARDA, INRAT OEP, CRDA

Conclusion

Analysis of the sheep value chain in Zoghmar shows the major challenges for breeders and for institutional and development actors. The major constraint for this value chain is due to its weakness in a difficult economic environment, especially after the revolution of 2011. Thus, the increase in production costs and fluctuations in selling prices directly affect the income of breeders who try to resist and to adapt to the new context. The sheep sector of Zoghmar community, known for a long time for its autochthonous breed from Sidi Bouzid “Barbarine breed”, is now threatened by the introduction of the Algerian Thin Tale which is better sold on the markets especially at the butcher’s level.

Analysis of the sheep sector in Zoghmar also shows great opportunities for development that requires the cooperation of all stakeholders in the sector. The creation of a Mutual Agricultural services organization (SMSA) for breeders is an important step for the development of sheep value chain in Zoghmar. Through this organization, breeders can solve the problem related to the access of inputs, the access for credits, loans and subsidies. The SMSA allows also the creation of a sign of quality for Sidi Bouzid lamb. This differentiation of sheep meat quality due to the origin allows breeders to create added value in the value chain and improve their access to markets

(supermarkets, exports). The role of the main stakeholders in the sheep value chain (OEP, FAO, GIVLAIT, CRDA, INRAT, ICARDA, NGO'S, etc.) is crucial in the institutional, economic and technical supervision of breeders. The synergy between the development projects in Zoghmar Community is an important asset to better guide the farmers and to better communicate with representatives from public institutions. In this context, GIZ invited on December 2014 the development project stakeholders in value chains in central and southern Tunisia (UNIDO, FAO, ICARDA and INRAT) to share the results of their different projects and plan regular communication meetings. The promotion of gender equality is also an important opportunity in the sheep value chain in Zoghmar. Women and youth should adhere more to the active life of the community and seize the opportunities offered by the various development projects to achieve their own projects. The participatory approach adopted through the Innovation platform and learning alliance is very beneficial to the developing of the sheep value chain in Zoghmar.

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