
Dairy value chain analysis in Tunisia

Business opportunities



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Preface

At a conference in Tunis in 2017, representatives from FAO, the Tunisian Ministry of Agriculture, Fisheries and Water Resources and Wageningen University & Research (WUR) concluded that the sustainable development of Tunisia's agriculture was currently hindered by a number of obstacles. The three parties further concluded that the support of FAO and Netherlands knowledge on sustainable agricultural development could help to tackle these obstacles.

Therefore, Netherlands Embassy in Tunis and the Tunisian Ministry of Agriculture, Fisheries and Water Resources organized an exploratory mission led by three experts from WUR to evaluate the situation and to further identify the needs and key priorities. From this needs assessment it was learned that Tunisia has high ambitions to innovate the agricultural sector towards a high level of produce and export, capable to comply with the EU regulations and to resist climate change. Although Tunisia has ample knowledge and skills in various agricultural areas on meta level the country is lacking a value chain approach, shows a lack of access to knowledge and investment capital and has no strategy on climate change. The needs assessment showed that following needs and priorities in Tunisia can be considered:

1. For climate smart agriculture: increase water availability, reduce the need for water
2. For soil: decrease degradation, increase fertility
3. For primary production:
 - a. sustainable innovations at multiple level in horticulture
 - b. improve seed quality and introduce storage facilities in potato produce
 - c. improve continuity in production for the market and create added value by processing in the dairy sector
4. For the general supply chain: introduce a market driven approach
5. Farmer-inclusive agri-business development: organise farmers towards an efficient market orientation

In March 2018, the cooperation between Tunisia and the Netherlands was further strengthened by the signing of a Letter of Intent by the Tunisian Minister of Agriculture, Fisheries and Water Resources and the Dutch Minister of Foreign Affairs, in which further study and development of various sectors of the agriculture were mentioned. The value chain of dairy was one of these subjects.

In order to support the Tunisian government in their agricultural goals for the coming years, the Netherlands Embassy in Tunis requested for a value chain analysis and a business opportunity report for the dairy sector. Aim of this study was to identify weak points in the value chain and to provide insights in how to tackle these weak points, to stimulate social and technical innovations and to provide guideline's how to increase the level of organisation between smallholders, where possible with participation of the Dutch private sector and knowledge sectors.

The authors of this business opportunity report wish that it may help to increase the smallholders' access to knowledge on good agricultural practice, to new sustainable technology and to market demands. And that it may also increase their access to money for investment in technical development and increase their awareness of the need to shift towards sustainable farm management and care for the environment.

June 2018

Summary

This study on the Tunisian dairy sector is carried out on behalf of RVO and financed by the Dutch Ministry of Foreign Affairs and covered a period from April 1st to June 15th in 2018. This report is a result of an analysis based on a desk study and a field visit to Tunisia in May 2018 and interviews with Dutch entrepreneurs doing business in Tunisia.

In Tunisia the presence of Dutch agribusiness is still low. The instability after the Arab Spring, especially in neighbouring countries might be one of the reasons for this.

The dairy sector ranks second in production value after olives, however currently pressure is on the production. Animal feed prices are increasing (worldwide) whilst Tunisia is heavily depending on imports, since apart from the North West of Tunisia the climatic conditions are not appropriate for growing fodder.

Until recently, the government controlled the prices of various products that they consider crucial. Either on the production or on the distribution side, the government fixes margins, taxes and/or prices, whereby disturbing the market dynamics. Although well-intended from a social point of view, the current price settings in combination with fodder getting more expensive cause negative margins and farmers start selling their cows.

Price liberalization is a sensible political topic. In the Action Plan 2016-2020 the first steps are proposed towards another pricing system. The Interprofessional Group of Red Meat and Milk (GIVLait) and the Office of Livestock and Pasture (OEP) are responsible for the setup of a quality system and the introduction of a uniform program for the payment of milk quality. These are the required fundamental changes that will improve the status of the dairy sector for all stakeholders, including the consumer.

As long as the implementation of a quality based pricing system is not in place the quality of the milk flows will vary with respect to protein and fat. As a consequence the flows will be distributed suboptimal and hence supply chains will be ineffective. In such a situation investments are at risk unless the supply chains are fully integrated.

However, there are still numerous opportunities for Dutch companies. The biggest opportunity is in animal feed production, whereas the North West region could be the granary for the dairy sector in the whole country. Further, more Dutch involvement in registration, vaccination and artificial insemination can improve the Tunisian herd. Another option for Dutch companies is to valorise the current protein waste flows, which is currently not happening in Tunisia. More opportunities will arise after the introduction of a quality based pricing system.

Last but not least there is a task for the Embassy to introduce Tunisia to more Dutch agricultural entrepreneurs by comparing its comparative advantages with other African countries (often far away).

1 Introduction

Agriculture plays a leading role in Tunisia's economy, with approximately 16% of the country's workforce engaged in the agricultural sector. Historically, Tunisia's agricultural system was based on small family farms that grew subsistence crops with little market integration, but larger agricultural enterprises are increasingly involved. Public land may be leased by the government to private farmers or managed directly by the Ministry of Agriculture. Foreigners cannot own agricultural land but may obtain long-term leases.

Even though agriculture is an important sector in the Tunisian economy, the sector faces major challenges and Tunisia still depends on food imports. The government of Tunisia is looking for opportunities to increase national food production fitting the current and future climatic conditions. This would strengthen national food and nutrition security, generate employment and income, and save costs through import substitution. To achieve this, the Tunisian government launched an agriculture and rural development strategy and a five-year implementation plan to open up the local market internationally and import knowledge and experience in order to help the local economy. The Netherlands is the second largest exporter of agricultural products in the world and has a very advanced knowledge base when it comes to agricultural development. Education and research in the Netherlands have resulted in significant value creation. This requires a highly efficient system that incorporates new scientific insights continuously. A system in which research institutes collaborate closely with industry (including farmers), government and civil society.

Livestock (mainly dairy and poultry) has an important share of Tunisian agricultural production. In 2009 it contributed to approximately 40% of the total agricultural production value, whereas vegetables and cereals cover about 17% and 13% respectively [3]. However, the climatic conditions for dairy production are getting more and more harsh and farmers are even selling cows and move into the production of other produces. It is estimated that 4% of the cows was sold last year.

For a well-functioning agro-food supply chain, all relevant issues need to be addressed in order to match products to market demands and consumer preferences. These include product quality and food safety, transportation, storage, distribution and chain management. By matching supply to demand, food losses and waste can be reduced tremendously, efficiency increased and costs reduced.

In the dairy supply chain actors are not yet interlinked nor trading with each other with a supply chain approach to match products to market demands and consumer preferences. Dairy products are marketed through a fragmented chain characterized by many handlers, hardly any cooperation, and no integration, which results in high supply risks, high transaction costs, price inefficiencies and quality losses. On the small scale some first examples of chain collaboration are built in the dairy sector. But generally, there is still a lot of room for improvement in order to get the right agriproduct, in the right place, at the right time, in accordance with the right specifications, and at the lowest prices. Tunisia focusses much on production increase on farms, but the topic of transportation, storage, distribution and chain management is a new area, yet insufficiently taking along.

Due the low organizational rate in farmer's based organisations (FBOs), especially on the level of smallholders, the space for improvement is significant. Today, they heavily depend on hawkers to sell their products, leaving them with insecurity of availability of markets, prices and quality demands.

In this context RVO has asked Wageningen University Research to identify win-win situations for the Tunisian dairy sector as well as Dutch companies to support the sector.

2 Tunisia profile

Officially the country is called Republic of Tunisia, a sovereign state in Northwest Africa, covering 165,000 square kilometres (4x the Netherlands). It is bordered by Algeria to the west and southwest, Libya to the southeast, and the Mediterranean Sea to the north and east. Tunisia's population was estimated to be just under 11.660 million in 2018. Tunisia's name is derived from its capital city, Tunis, which is located on its northeast coast.

2.1 Geography

Tunisia contains the eastern end of the Atlas Mountains and the northern reaches of the Sahara Desert. Much of the rest of the country's land is fertile soil. Its 1,300 kilometres of coastline includes the African conjunction of the western and eastern parts of the Mediterranean Basin and, by means of the Sicilian Strait and Sardinian Channel, features the African mainland's second and third nearest points to Europe after Gibraltar. Tunisia is divided in 24 governorates of which Tataouine and Kebili in the Sahara region are by far the largest, but very low in population. In that context Sfax and Tunis are the major governorates.

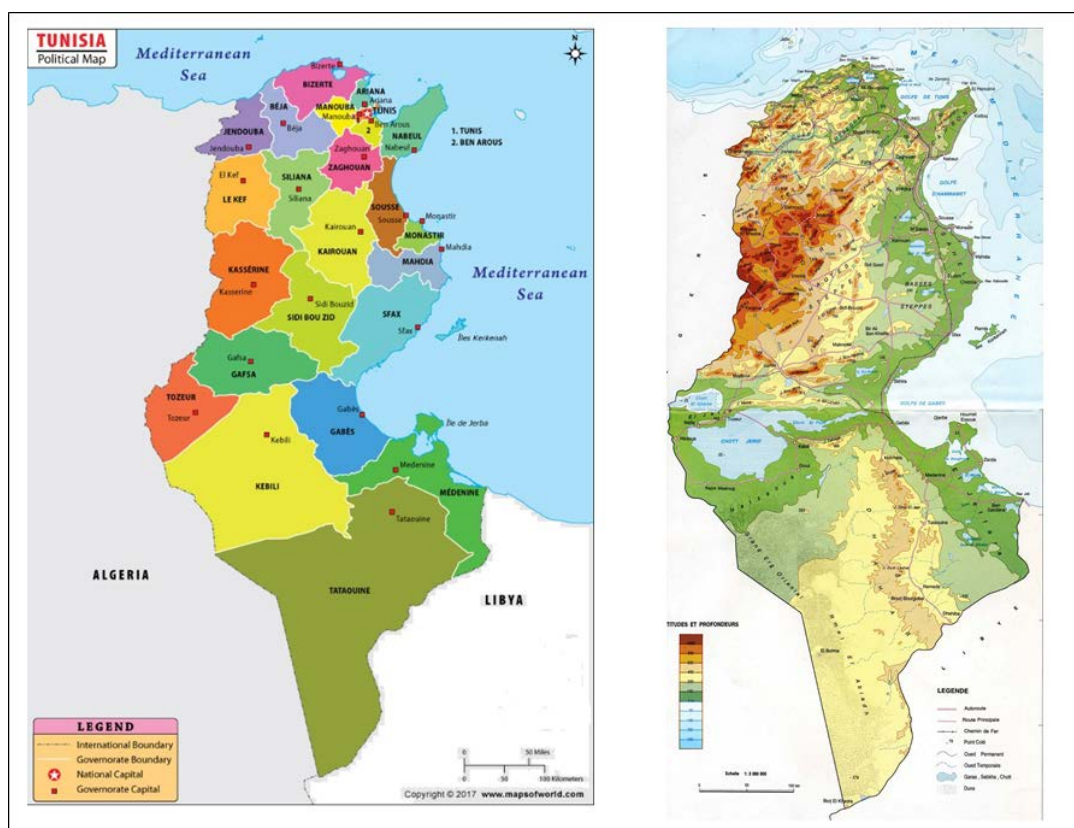


Figure 1: political and physical map of Tunisia¹

2.2 Population

In Tunisia the current population size is estimated at 11,659,174 people². The annual growth rate since 2010 is about 1.1%. The growth on the national level between 2010 and 2017 was 8.3% [4], but there are big differences between governorates. The governorates with the largest population have the largest growth:

¹ <https://www.cityzeum.com/carte-touristique/tunisie> , and <https://www.mapsland.com/africa/tunisia/large-detailed-physical-map-of-tunisia> , both viewed 7-5-2018

² <http://www.worldometers.info/world-population/tunisia-population/> , viewed 19-4-2018

Governorate	2017	2010-2017 index
Tunis	1070	104
Sfax	995	109
Nabeul	832	111
Sousse	717	115
Ben Arous	678	117
Ariana	629	123

Table 1: population (x1000) for 6 governorates with the highest population and index growth since 2010

Except for Tunis the governorate population has grown faster than the national average. This confirms the urbanization rate of 1.28%³ (further information in this paragraph is retrieved from the same website). The current level of urbanization in Tunisia is quite high: 67.3%, number 3 in Africa after Libya and Algeria⁴.

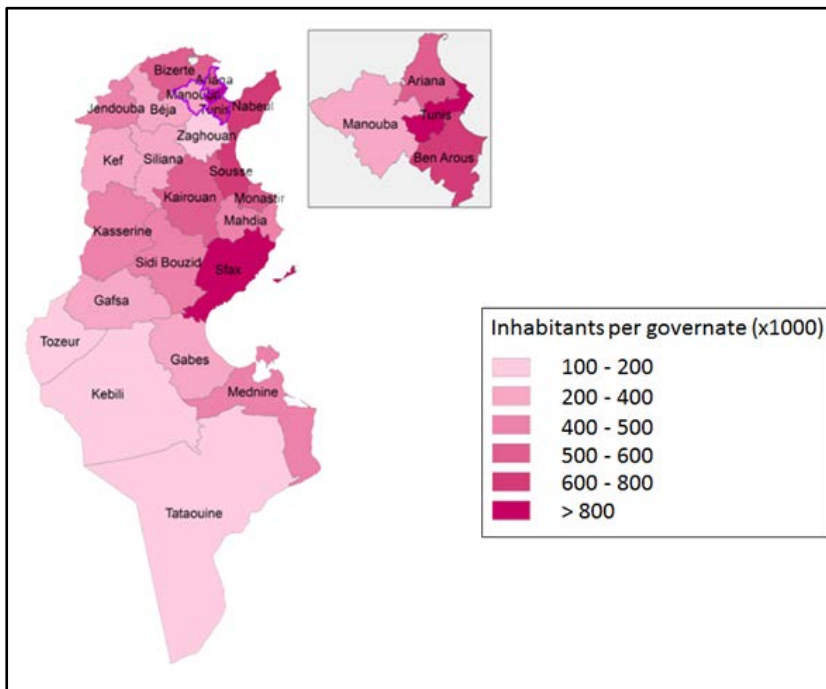


Figure 2: distribution of population per governorate [2]

The rural areas are typically in the South, Tozeur, Kebili and Tataouine. The North and North West of Tunisia are average with respect to size of population. The North West however is less developed than the North. Economic development in Tunisia has been characterized by significant regional imbalances, with coastal regions developing fastest and hinterland regions lagging behind. In 2010, poverty rates ranged from a low rate of 8-9 percent in the Center East region and Grand Tunis to a high rate of 26 percent in the North West [5].

About 98% of the population is Arab, 1% European, 1% rest; and 99.1% of the religion is Muslim. The commercial languages are Arab and French, whereas Berber is used in a more social context.

2.3 Economy

Contrary to many African countries Tunisia already managed to have a market-driven economy, which mainly depends on natural resources. It is ranging from agriculture, mining, manufacturing, and petroleum products, to tourism. The agricultural sector accounts for 11.6% of the GDP, industry 25.7%, and services 62.8%. About 16% of the Tunisian workforce is engaged in agriculture⁵. The industrial sector is mainly made up of clothing and footwear manufacturing, production of car parts,

³ https://www.indexmundi.com/tunisia/demographics_profile.html , viewed 19-4-2018

⁴ https://en.wikipedia.org/wiki/Urbanization_by_country , viewed 19-4-2018

⁵ <https://www.export.gov/article?id=Tunisia-Agricultural-Sector>, viewed 29-4-2018

and electric machinery. Services are very much related to government departments [6]. The GDP per capita in Tunisia equals 3496 US\$ in 2017 resulting in about rank 140 worldwide⁶. Although Tunisia managed an average 5% growth over the last decade it continues to suffer from a high unemployment especially among youths⁷.

Exports are 13.57 billion US\$ and imports are 18.37 billion US\$. Key exports now include textiles and apparel, food products, petroleum products, chemicals, and phosphates. Imports include electrical devices, machinery, mineral fuels, oils, vehicles, plastics, cereals and cotton. The European Union is Tunisia's largest trading partner, currently accounting for 72.5% of Tunisian imports and 75% of Tunisian exports. The country is one of the European Union's most established trading partners in the Mediterranean region and ranks as the EU's 30th largest trading partner. Tunisia was the first Mediterranean country to sign an Association Agreement with the European Union, in July 1995. Even before the date of entry into force, Tunisia had already started dismantling tariffs on bilateral EU trade. Tunisia finalized the tariffs dismantling for industrial products in 2008 and therefore was the first Mediterranean country to enter in a free trade area with EU.

In agriculture the dairy sector has a significant contribution to the production value [7]:

Product	Production quantity (%)	Product	Production value* (%)
Wheat	16.6	Olives	14.2
Tomatoes	14.2	Milk, whole fresh cow	10.8
Olives	10.1	Wheat	10.5
Barley	7.4	Meat, chicken	6.7
Watermelons	5.7	Meat indigenous, chicken	6.7
Chilies and peppers, green	4.7	Dates	6.3
Potatoes	4.6	Tomatoes	4.8
Onions, shallots, green	3.1	Almonds, with shell	4.4
Carrots and turnips	2.7	Eggs, hen, in shell	3.8
Dates	2.4	Chilies and peppers, green	3.4

Table 2: average agricultural production quantity and value 2012-2014 (FAOSTAT); * Gross Production Value (constant 2004-2006 million USD), data: average 2011-2013 (FAOSTAT)

Reference average production volume: wheat (2012-2014) = 1,337 kton

Reference average GPV (constant 2004-2006 million USD): olives (2011-2013) = 563 million USD

The most important agri-food exports are olive oil, dates, seafood, vegetable oils and fats, and cereals and derivatives [3]. With respect to import, the main products are wheat, maize, soybeans, barley and refined sugar [7]. These products are relevant to livestock feed. To show the level of self-sufficiency in Tunisia the import data are presented in Table 3:

Product	Import quantity (ktons)	Production (ktons)	Self-sufficiency
Wheat	1,486	1,337	< 50%
Maize	868	Not in top 10	< 20%*
Soybeans	467	Not in top 10	< 30%*
Barley	821	596	< 45%

Table 3: indication of self-sufficiency on feed products. *Dates in Table 2 correspond to 193 ktons.

Remark: Tunisian export of these four products is negligible⁸

The FDI (Foreign Direct Investment) in Tunisia in agriculture is 1%, whereas 52% is invested in the manufacturing industry [8]. One of the reasons is that public land may be leased by the government to private farmers or managed directly by the Ministry of Agriculture. Foreigners cannot own agricultural land but may obtain long-term leases. Agriculture is also not the most important business

⁶ <http://www.imf.org/external/datamapper/NGDPDPC@WEO/OEMDC/ADVEC/WEOWORLD/TUN> , viewed 24-4-2018

⁷ <https://en.wikipedia.org/wiki/Tunisia#Economy> , viewed 24-4-2018

⁸ FAOSTAT, viewed 14-5-2018

in Tunisia, which can be derived from the fact that approximately 16% of the country's workforce is engaged in the agricultural sector, and agriculture contributes about 12% to the country's GDP⁹. In 2011, after the Arab Spring, the economy slumped but then recovered and the GDP is increasing.



Figure 3: GDP growth in Tunisia

In 2015, the food processing sector has over 1,000 enterprises each employing 10 people or more, 20% of them producing solely for export. The production value of this sector is around \$5 billion annually and is continuously growing due to improved household purchasing power and changes in eating habits towards consumption of processed products versus fresh ones.

2.4 Climate

Tunisia covers about 165,000 square kilometers. This total area consists of 30% arable land, 27% pasture and forests, and approximately 43% agriculturally unusable land [9]. With respect to the climate, Tunisia can be divided in 5 dynamic climate zones: 1. humid, 2. subhumid, 3. semiarid, 4. arid and 5. desert [10]. The climate zones are shown in Figure 4.

Rainfall is a major, though variable factor, ranging from an average of less than 100 millimeters a year in the south, to over 1000 millimeters a year in the extreme north of the country. The estimated rainfall in Tunisia amounts to 36,000 Mm³/year, corresponding to an average rainfall height of 220 mm/year [11]. About 80% of the rainfall is concentrated between October and March. The annual potential evapotranspiration ranges from 1200 mm in the north to 1800 mm in the south (source: Aquastat Tunisia profile). In the northern part, the topography is more and more sloped, leaving relatively little cultivable land in areas with relatively high rainfall. A classification of the annual rainfall in the different bioclimatic zones is shown in Table 4.

Bioclimatic zone	Annual rainfall (mm)
Humid	800-1200
Subhumid	600-800
Semi-arid a hiver doux	400-600
Semi-arid a hiver frais	100-400
Arid	20-100
Desert (Saharan)	

Table 4: Annual rainfall in the different bioclimatic zones [7]

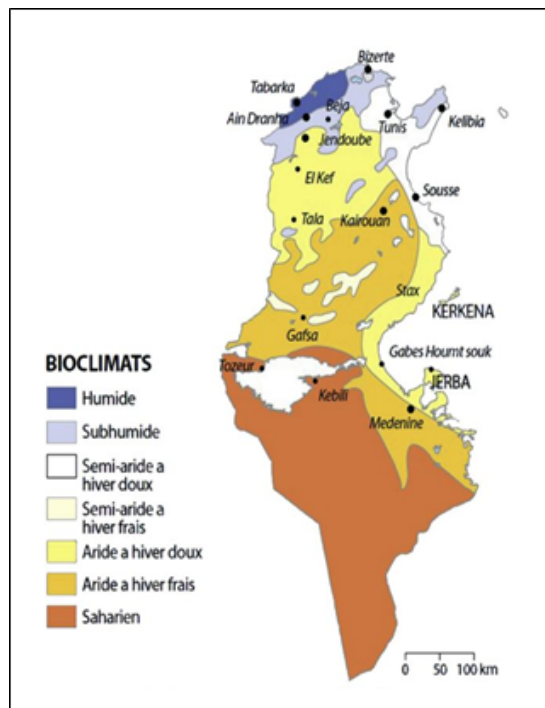


Figure 4: climatic zones in Tunisia

⁹ <https://www.export.gov/article?id=Tunisia-Agricultural-Sector>, viewed, 24-4-2018

The potential conventional water resources are estimated at 4.8 million m³ per year, of which 2.7 Mm³ is surface water and 2.1 Mm³ is groundwater [12-14]. The northern basins in Tunisia provide the largest contribution of surface water resources of the country. The major basins in the North are the Medjerdah Basin, in the extreme North, and the Oued Miliane.

It is expected that after 2020, an imbalance will appear between the conventional water resources regularized and the total water demand of the country. By 2030, demand is likely to exceed the conventional resources available. It is expected that climate change will result in a significant reduction in rainfall and an increase in the frequency of droughts [12]. However, the extent and the accuracy remain imprecise.

Temperature and wind are no less variable than rain, frequently causing serious damage to agricultural crops. In July and August, temperatures can exceed 40 °C when the tropical continental air mass of the desert reaches the whole Tunisia. Winters are mild with temperatures rarely exceeding 20 °C (exception is the south-west of the country). The terrain in the north is mountainous, which, moving south, gives way to a hot, dry central plain. In the south, daytime temperatures are consistently around 45 °C, while it can be cold in the desert.

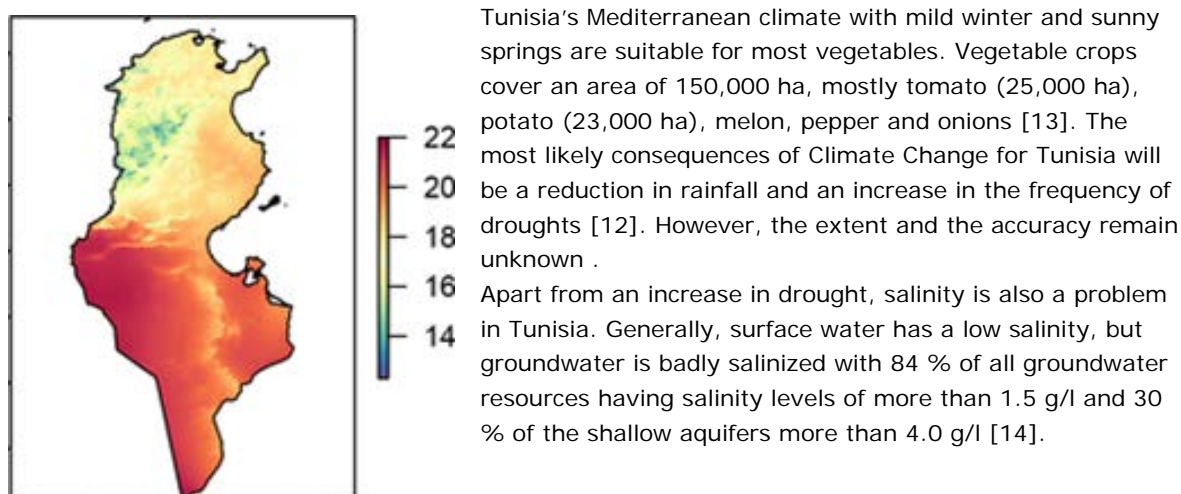


Figure 5: annual mean temperature map of Tunisia [9].

2.5 Policy trends in food and agriculture

Tunisia is an upper-middle income country and has been experiencing strong economic growth since 2000. This growth was interrupted during the mass protests and eventual ousting of the Government in 2011. High unemployment was one of the triggers for the 2011 "revolution" and continues to be a source of social unrest. Successive governments have been trying to address the problems of unemployment and social exclusion. In October 2012, new employment schemes were designed, The full implementation of these programmes have faced considerable delays, due to limited capacities at the Ministry of Employment and ANETI (Agence nationale pour l'emploi et le travail indépendant). However, by 2014, a new constitution was adopted, parliamentary and presidential elections were held, and a new government was formed with an agenda of tough economic reforms to boost economic growth and job creation [15].

Since 2007, the Government developed a number of plans and strategies to address agriculture, food and nutrition security, focussing on economic growth and job creation. In TUNISIA 2020, the five-year plan launched in 2016, the government aims at an annual growth rate of 4% by 2020 and to have a significant impact on the agricultural sector and rural development [15]:

- a. Improvement of Tunisian farmers income and modernization of farms (20,000 in 5 years);
- b. Contribution of the agricultural GPD (+11 percent);
- c. Strengthening agricultural production;
- d. Creating jobs in rural areas;

e. Improving national food security.

The Tunisian trade policy is characterized by market liberalization and commitment to higher integration in the global economy by: adopting new laws to open markets, lowering import tariffs and formulating a new tax strategy. The main challenge for the government is sustainable economic growth. As far as agriculture sector is concerned, the growth will be achieved through 1) linking social protection with employment programmes; 2) reform of subsidies; 3) operationalizing market reforms policies. In the area of sustainable trade and investment, the Netherlands Embassy mentions in her 'Country Strategy 2018 -2023 Tunisia' possibilities of five focus sectors with notable potentials in Tunisia: agri- and horticulture, water, waste management, logistics and the maritime sector.

3 Dairy sector

In the early 1950s Tunisia has experienced a rapid demographic growth coupled to a significant rhythm of urbanization. This has led to a marked increase in the demand of dairy products. In order to secure the supply, specific policies have been implemented. They mainly consisted of the establishment of a dairy industry, based on the processing of locally produced raw milk. These developments had significant consequences on the whole organization of the dairy chains in Tunisia, from cattle rearing practices, to milk collection and processing. They have also implied differences in milk and its derivatives' prices and levels of consumption. There are several challenges that will have to be addressed: a rising volatility of milk and other strategic inputs' prices (feed, machinery, cattle, etc.) in global markets, an improvement in processors' and consumers' awareness about milk quality, and a further pressure on natural resources (mainly soils and water) to get more raw milk, in a country already suffering an acute water stress. The structure and the flow size of the Tunisian dairy sector is shown in Figure 6 [1]:

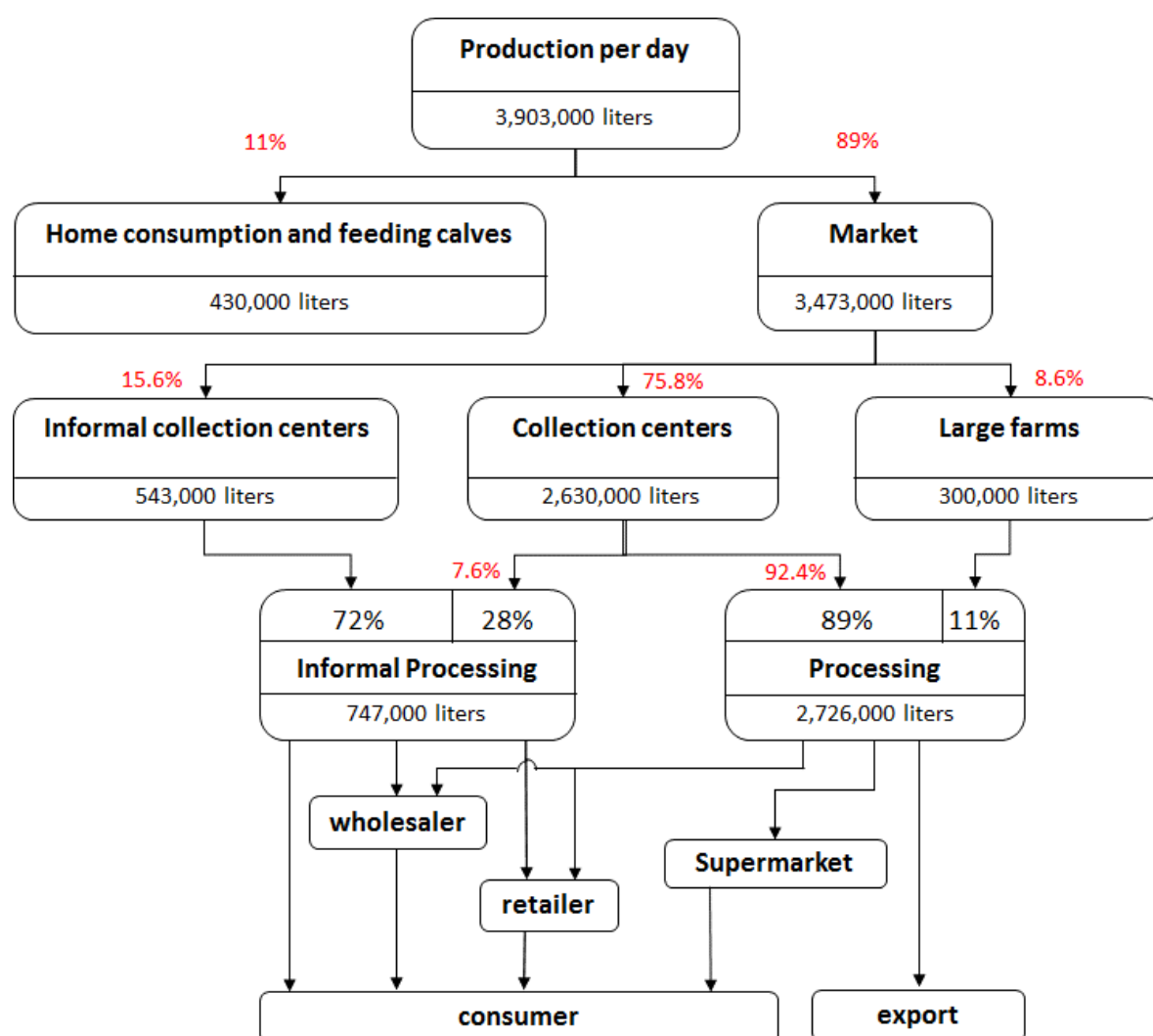


Figure 6: dairy value chain in Tunisia

As a consequence of the relevance of the sector and the involvement of the government a lot of information and statistics is available, mostly provided by GIVLait¹⁰.

¹⁰ Le Groupement Interprofessionnel des Viandes Rouges et du Lait

3.1 Production

In Tunisia there are 112,000 dairy producing farms, of which 12,700 are in Beja. Tunisian farmers have on average between 2-3 cows, in North-Béja 4 cows, and 94% of the small-holder farmers have less than 10 cows. The number of cows is decreasing as shown in **Table 5**¹¹:

year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
purebred	223	220	220	223	222	224	228	240	259	266	253
crossbred	231	229	220	216	208	202	196	197	191	192	184
TOTAL	454	449	440	440	430	426	424	437	450	458	437

Table 5: number of cows in Tunisia (x1000)

Note that these data include cows used for milk production as well as for meat. Although only two breeds are mentioned there is also a small share of local bred: Holstein 58% (± 5000 L/y), improved cow breed 32% (± 1100 L/y), local cow breeds 10% (± 600 L/y). In Beja there are about 48,000 cows, and in addition 222,500 sheep, that also have potential for dairy production [16].

The volume of milk produced by these cows throughout the years is:

year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Milk production	223	220	220	223	222	224	228	240	259	266	253

Table 6: milk production in Tunisia (in million liters)

The quality of the milk in the North is better than the one in the Centre and South. The reason for this is that cows in the North are fed with concentrate. The production in Beja is about 114 million litres. Tunisia knows two seasons (summer/spring and winter/autumn). In the summer/spring production is too high and stocking is not sufficient, leading to a problem with keeping milk fresh. On the other hand, milk production is limited in the winter and this needs to be regulated to produce enough milk throughout the year.

Milk surplus in summer/spring is stored in three ways: storage at low temperature, transformed into milk powder or as pasteurized milk. The strategic stock hold is at this moment 50.000.000 l/year. In general farmers do not own cold storage and milk is transported as fast as possible (depending on transport/hawker) to the collection centres.



Figure 7: cowshed in Utique on the farm from Ezzedine Ben Mustapha (picture: Greet Blom)

Production is strongly related to feed and fodder of the animals. National production of fodder covers approximately 76% of herd requirements [17], the rest is imported. Livestock farmers are constantly faced with rising prices for local or imported fodder products, which have a direct impact on the production cost of milk, resulting in a decreasing number of cows in Tunisia. Moreover, the quality of the feed ration drops with the aridity of certain regions in the country. In the north, where most of the

¹¹ <http://www.givlait.com.tn/presentation-de-la-filiere-lait.html> , viewed 17-5-2018

large dairy farms are found, grass and silage are available all year round. Supplementary feed concentrates are entirely destined to cover the production requirements of cows. In the centre and south, 'landless' livestock farms predominate and concentrated feeds partly supplement basic feed rations (hay, straw, cacti, etc.) to cover cattle maintenance, growth and gestation requirements.

3.2 Hawkers

Hawkers are the links between farmers and other links in the supply chain. In most cases hawkers collect milk for collection centers, but also processors and wholesalers are buying from them directly. The hawker benefits from the lack of organisation among the producers. Part of them avoid quality control and hence pose a serious threat to consumer health. Although there is a law that sets health and technical conditions on transporting raw milk, there is no enforcement because of the amount of people practising this job.

3.3 Collection centers

In 2017, Tunisia has 240 collection centres (out of which 229 are HACCP certified) with a total collection capacity exceeding 2.8 million liters of milk per day. In 2015 66 collection centers belonged to SMSA (Sociétés Mutuelles de Services Agricoles) covering 710,000 liter/day, 56 were in hands of the Sociétés de Services Agricoles with about 630,000 liter/day and 113 are private representing 1,260,000 liter/day [18].

In Beja there are 22 collection centers with a total stock capacity of 241,000 liters. The function of the collection centres is to collect the milk twice a day from small farmers and bulk it for transportation to the factories. In Tunisia in 2017 the collection centers received 892 million liters which represent more than 62.6% of the milk produced. The rest goes into the informal circuit. Hence the introduction of a health certification process for collection centres and dairy processing units was a major step forward for the Tunisian milk sector and for protecting consumer health. The risk is where hawkers collect milk from farmers and sell directly to wholesalers, retailers or consumers. The dairy plants source 89.6% of the fresh milk from the collection centers¹².

In a government master plan in 2013 it is decided to go from 233 to 358 collection centers [19]. In **Figure 8** it is shown that the collection centers are equally distributed over the non-saharian part of the country.

Most of the problems in the industrial circuit are due to the fragile nature of contractual relations between the various stakeholders in the chain, when they exist, and a large disparity in the balance of power, where major industries rule. As a consequence, in time of competition, e.g. in case of oversupply in the summer, some collection centers don't have money to pay the farmers.

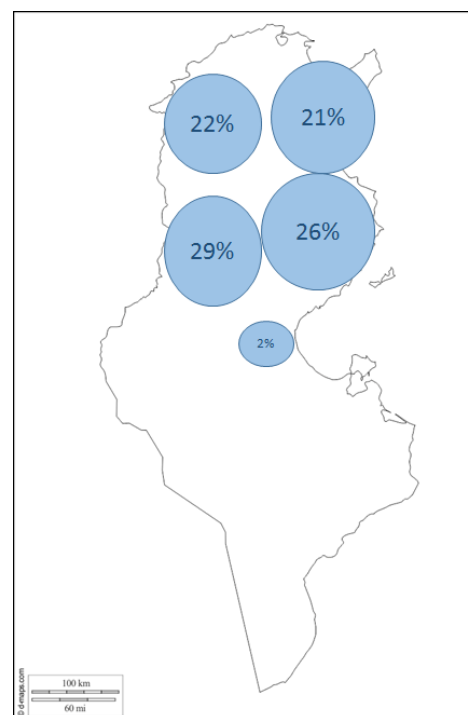


Figure 8: share per region in number of collection centers [1]

3.4 Processing industry

The milk processing sector in Tunisia is fragmented, with many companies of different sizes and ownership structures. Dairy processing activities are practiced by 45 industries:

¹² <http://www.givlait.com.tn/presentation-de-la-filiere-lait.html> , viewed 17-5-2018

Product	Number of processing units	Milk capacity in 1000 liter/day
Fluid milk (UHT)	11	4200
Powder milk	2	220
Cheese	25	450
Yogurt	9	750
TOTAL	45	5620

Table 7: overview of dairy processing sector 2017 [20], [1]

The utilisation rate is about 65% [1] corresponding to 995 million liters of milk in 2017 divided over the products as follows:

Fluid milk	Powder milk	Cheese	Yogurt	Other	Total
619	14	145	168	49	995

Table 8: milk input per industry in 2017 (million liters)¹³

The “Delice Danone” group is a strong leader in the dairy processing activities in Tunisia. It has two different plants, one for drinking milk and the other for yogurts’ production. This group represents almost 50% of the overall drink milk market shares and 70% of total sales of yogurts. Two other



Figure 9: Natilait dairy processing (pictures: Greet Blom)

important dairy processors are Vitalait and Laino, both active in drink milk and yogurts, but with limited market shares. Tunisia has a long tradition of cheese processing and some companies are specialized in that activity. This is the case of Centrale des Produits Laitiers Souani, which represent 60% of total cheese production of the country. Drink milk represents 75% of total milk processed, whereas yogurts and cheeses represent only 13% and 8% of total volumes. The remaining 4% are converted to dried milk, particularly in periods of high production, used in case of milk shortage, and some other milk products.

There is a big gap between the leading and small companies in the processing sector. Small units still display many weaknesses such as the lack of business plans, of industrial and marketing strategies, of robust management, of staff empowerment and of specifications, poor supervision, ignorance of good manufacturing practices.

¹³ <http://www.givlait.com.tn/presentation-de-la-filiere-lait.html> , viewed 17-5-2018

3.5 Distribution

3.5.1 Wholesale

Wholesale agents spread throughout the country and sometimes are linked to contracts with the large central dairies who play a crucial role in supplying small neighbourhood grocery stores on a daily basis.

3.5.2 Retail and foodservice

Over the last decade, the modern retail sector has seen in-depth development fuelled by the expansion of modern distribution outlets, supermarkets, and hypermarkets through joint ventures with foreign investors, mostly with France, including Carrefour and Casino groups (Geant and Monoprix). Although the traditional distribution network, based on over 210,000 neighbourhood grocery shops scattered throughout the country, continues to dominate the Tunisian market, modern distribution channels are growing rapidly. It represents now 20% of the Tunisian retail sector with a goal to increase the level to 50% in the next years. Currently, there are roughly 252 modern food retail outlets: 3 hypermarkets, 150 supermarkets and 100 'Superettes' (self-service food outlets with area less than 500 sq. m) [21]. Three main companies have emerged as the market leaders, namely Group Mabrouk (Monoprix, Géant), Ulysse Hyper Distribution (Carrefour, Carrefour Market, Carrefour Express) and Magasin Général Group [22].

The hypermarket and supermarket dairy product offer is quite varied. It includes milk, fermented milk, Yoghurt, cheese, butter, crème fraîche, milk-based desserts, etc. It generally consists of industrial and artisanal products supplied by small processors. Hypermarkets and supermarkets usually have a shelf space for dairy products and especially a cheese counter.



Figure 10: dairy products in Carrefour Tunis (pictures: Greet Blom)

Neighbourhood grocery stores represent a place for local purchases on a daily basis. The range of dairy products they offer is much smaller than that of the hypermarkets and supermarkets. In addition to industrial products, neighbourhood grocery stores can offer artisanal products which are generally supplied by small processors in the local area. Deliveries are on a daily basis and in small quantities. They take a significant share of food sales, especially in rural areas. This share is estimated at 80% and can be explained by several factors, the most important being the services and advantages offered by this type of retail (proximity, ad-hoc purchases and payment facilities, etc.).

Creameries are mostly part of the informal circuit inasmuch as they are not supplied by the industrial circuit but rather by small local processors. In addition to fresh milk in bulk, they display fresh artisanal products such as traditional Sicilian-type cheeses in all its shapes and forms (salted, semi-salted, unsalted, etc.). Some small processors have their own creameries, which represent sales outlets for their products [17].

The foodservice is not perceived as a separate market from retail as most hotels and restaurants source their food needs either through annual tenders or use the same distribution channels used by households. High-end hotels do import specialty cheese either directly or via import companies.

3.6 International trade

Since the end of the 1990's, despite reaching a state of self-sufficiency, the dairy industry is still very unstable and has experienced successive periods of gluts and shortages. As a result, Tunisia continues to receive ad hoc imports. The main imported products are milk (in various forms), condensed whey and cheeses, mostly destined for melting. France and the Netherlands are the most important partners in supplying Tunisia with dairy products.

Import (tonnes)	2011	2012	2013	aver.%
Milk, skimmed dried	4069	4833	4063	22%
Whey, condensed	2382	2503	3034	13%
Cheese, whole cow milk	2630	2982	2277	13%
Milk, products of natural constituents nes	2076	2974	2435	13%
Milk, whole condensed	1968	2150	2155	11%
Milk, whole fresh cow	1150	822	4244	11%
Milk, skimmed cow	516	2982	0	6%
Milk, whole dried	946	1048	1064	5%
Milk, whole evaporated	924	85	246	2%
Butter, cow milk	314	816	16	2%
Ice cream and edible ice	149	352	333	1%
Cheese, processed	21	38	0	0%
Buttermilk, curdled, acidified milk	31	0	0	0%
Whey, dry	0	15	16	0%
Cream fresh	5	6	18	0%
Yoghurt, concentrated or not	1	7	14	0%
Grand Total	17182	21613	19915	100%

Table 9: imported dairy products by Tunisia (FAOSTAT)

Tunisia mainly exports to Libya (about 85% in weight). The data are from FAOSTAT and they have no further updates later than 2013. Hence data from the restart after the revolution might be not so stable statistically. Another source for world trade statistics is UN Comtrade. They provide more recent data, but are not very specific about the products in the case of dairy.

Export (tonnes)	2011	2012	2013	aver.%
Margarine, short	20242	23439	26110	47%
Yoghurt, concentrated or not	10233	8924	10640	20%
Cheese, processed	9611	8216	10815	19%
Milk, skimmed cow	3760	2982	137	5%
Cream fresh	1554	100	1780	2%
Milk, whole fresh cow	3010	0	111	2%
Milk, whole condensed	565	341	655	1%
Ice cream and edible ice	285	430	681	1%
Buttermilk, curdled, acidified milk	484	370	167	1%
Milk, whole dried	522	49	92	0%
Cheese, whole cow milk	300	237	87	0%
Milk, whole evaporated	572	0	0	0%
Milk, skimmed dried	323	53	25	0%
Butter, cow milk	70	4	0	0%
Whey, condensed	0	16	0	0%
Milk, products of natural constituents nes	0	1	4	0%
Grand Total	51531	45162	51304	100%

Table 10: exported dairy products by Tunisia (FAOSTAT)

The lack of visibility did not allow the Tunisians operators to build a sustainable export strategy for UHT milk despite the opportunities (Libya, Mauritania, African countries ...). The government controls the milk supply chain and intervenes on prices based on conjunctural situations. Exporters suffer from the unstable market that is not governed by supply and demand.

3.7 Consumption

Milk and dairy product consumption has grown steadily since the 1990's. Consumption, however, is still characterised by strong seasonality, inverted compared to that of production. Indeed, the period of peak consumption (September to February) coincides with low production, whereas the period of low consumption (March to August) coincides with high production (lactation). In addition, peak consumption for dairy products is recorded during Ramadan. According to the National Institute of Statistics, the consumption of milk and milk-based products experiences a rise of more than 70% during the months of Ramadan. This steep rise is due to the fact that dairy products represent a vital ingredient and an essential product during this month because of their nutritional contribution and their use in several traditional recipes.

The consumption of dairy products in Tunisia is about 110 liter/year per capita, although there is a large gap between urban and rural areas (in rural areas 3 times less than in urban areas). The structure of dairy products' consumption has evolved significantly, as drink milk quantities almost stagnated, whereas cheese and yogurt figures experienced marked increases. Cheese however remains a luxury product with large disparities between the regions¹⁴ (in the order of 1 to 8 between the centre-west region and the district of Tunis) [17]. The development in the consumption of dairy products is shown in **Table 11**:

product	1985	1990	1995	2000	2005	2010	2015
Milk	37.5	38.8	40	44.5	53.9	95	109.7
Dairy products*	14.1	19.6	25.2	33.5	29.6	34.2	40.7
whereof:							
• Yogurt	29.0	33.0	28.0	35.0	48.4	72.2	102
• Cheese	0.2	0.2	0.4	0.7	0.7	0.9	1.4
• Butter	0.4	0.7	0.9	1.1	0.9	1.0	1.0

Table 11: consumption of dairy products in Tunisia (kg or liter/year); *=in fresh milk equivalents

3.8 Transport

The milk transport between farmer and collection center is one of the followings:

- farmers deliver their products once or twice a day to the collection centre and sometimes directly to the processor
- the collection center collects the milk from the farm
- hawkers collect the milk from farm

¹⁴ In Appendix B more information is available on the cheese sector



Figure 11: milk collection transport vehicles ¹⁵

The collection is done by hawkers mainly since farmers lack money for transport. Large producers are tied into contracts with factories which collect the milk from the farm or receive it at the factory if producers have refrigerated means of transport. The transportation from milk producer to the collection center is a vulnerable point for the quality and traceability of milk that require measures by the government like registration and standardised quality control. With quality control, rejection of milk collection centers is relatively low (1.4%) [23]

Currently the number of trucks available for milk transport is not sufficient. E.g. if transport from a collection center to a processor takes a 300 km drive (10 hours) and a 4-hour waiting in a queue at the factory, capacity runs short quickly. The centers are forced to double their transport capacity to ensure the flows of milk in 24h to all the connected processors. Another issue is that, other than operating expenses (electricity, water, wages, lab consumables, etc.) the costs of transportation of fresh milk to manufacturing plants are a significant burden for collection centers. Indeed, a journey of 500 km (round trip) costs about 200 D for fuel and amortization vehicle, thus without considering the payment of the driver. This is equivalent to a load of 0.014 D/L for carrying capacity of 15 tons [23]. The increase of number of collection centers, as planned by the government, will partly solve this problem.

¹⁵ www.amal-group.com, viewed 20-5-2018; <http://www.lactimed.eu/fr/filieres>, viewed 20-5-2018

4 The pricing system

Although the intention is to stabilize markets and support farmers' incomes, in fact all these interventions create distortions to market systems and reduce the efficiency of resource allocation, thereby undermining the performance of the agricultural sector. Although dairy products such as cheese, yoghurt and butter, etc. obey the law of the market, the price of milk is currently still controlled by the public authorities. The governments have adopted a policy that fosters production by setting a minimum price for fresh farm-produced milk, to be paid to the farmer.

Animal feed contributes 62-70% of the cost price of milk [17]. It mainly consists of concentrates like corn and soya because the reduction in natural grazing land and the inadequate growth in production of fodder crops has led to a shortage of fodder and increased the use of feed concentrates made from imported raw materials. These are paid for in foreign currency and, with constantly rising prices and huge domestic currency inflation, milk farming can hardly be profitable. In **Table 12** the cost structure in the milk supply chain is elaborated

Supply chain link	Price	Margin		Involvement gvt	Activities that cost
		Min	Max		
Farmer	766	-250	+30	fixed price	Labour, cowshed, equipment, heifers, food, veterinary fees, other expenses
Hawker	806	-23	-7		Van, cans, tank, fuel, repair, driver
Collection Center	816	-85	-65	premium 70	Building, tank equipment, truck, electricity, labour, analyses, other
Processor	1089	-208	-171	premium 175 stock 50	Buildings, machinery, packaging, electricity, marketing, labour, analyses, other
Wholesaler	1096	7			Shop, storage, labour, publicity, administration, other
Retailer	1120	24		fixed price	

Table 12: price structure for 1L UHT milk 2018 [1]

The farmer gets 766 millimes¹⁶ per liter of milk, the fixed price from the government. The collection centers that are certified get a premium of 70 millimes per liter, whereas the processors receive 175 millimes. For the stock of 1 L they get paid 50 millimes per month. The consumer price is fixed again. Now consider the yogurts in the Carrefour catalogue¹⁷, shown in **Figure 12**, which have a market driven price. For about 100 gram of yogurt the regular price is around TND 0.360, hence for a liter it is TND 3.60. If there is a market for these branded high-quality products, the farm and consumer price for fresh milk should be able to differentiate for quality (likely by branding). By good farming registration, standardised quality control and certification, the incentive is there to reduce health risk for consumers, to do profitable business and to perform better for all players in the supply chain. At the moment all costs are squeezed between the farm price and the consumer price, whereas some of the costs are gradually increasing. The huge consumption of milk in Tunisia seems to hinder intervention on the current pricing



Figure 12: 2 yogurts in promotion in the Carrefour Catalogue May/June 2018

¹⁶ 1 € = 2,98 TND, and 1 TND = 1000 millimes, so 766 millimes ≈ 0.26 €, 1120 millimes ≈ 0,38 €

¹⁷ Catalogue Carrefour la Marsa du 23/05 au 03/06 2018

system, since milk should be affordable for most people. In a transition period, there could be parallel systems, and when average incomes slowly increase (also for the farmers) the market can take over role in the price determination

Liberalisation of the milk price is a sensitive topic. For farmers it is a guaranteed income they don't have for almost any other product. The payment does not differentiate in quality reflecting the absence of efforts to improve it. The relevance of protein and fat content is crucial for cheese and butter respectively, hence the absence of good quality control induces suboptimal differentiation of inputs towards end products and makes business inefficient for all collection centers, processors and also all farmers with good quality milk. In the strategic plan 2016-2020 the government proposes to link quality to subsidy, which is a first step towards liberalisation and market driven production.

5 SWOT analysis

In order to identify opportunities for Dutch companies to do business in the dairy sector in Tunisia a SWOT analysis is carried out. Information is collected from interviews during the field visit in Tunisia from May 6th -12th 2018, and from literature ([17, 18, 20, 24, 25]). The SWOT analysis is carried out per link in the dairy supply chain

Link	Strength
Production	Self-sufficiency in fresh milk
	Existence of an incentive framework for milk production
	Continuous increase in the production
	In the North and North West there is more rainfall which favours the fodder production
	Part of a mixed farming system and therefore availability of manure for kitchen garden
Collection centres	Collection centres evenly spread over the whole productive surface of country
	Ensuring milk reception for small producers
	Ensuring industrial production of fresh milk (89% of processed milk is provided from collection centres) (see Figure 6)
	Collecting coverage rate and density increases every year (master plan)
Processing	Industrial produced dairy quantities increase every year
	There is a strong partnership with foreign companies having processing experience to transfer technology and knowledge
	New orientation towards diversification of transformation especially high value added Products
	The launch of investors in the establishment of new industrial units
Distribution	Increasing consumption of dairy products, especially cheese
	International demand for milk products (Middle East, Libya and Algeria)
	All collection centres are equipped with refrigerated tanks and chilling is either in place at the farm or in the form of collective refrigeration tanks. In many cases, large dairy farmers also have tanker trucks.

Link	Weakness
Production	Asymmetry in information. Sharing knowledge is difficult since only 5% of farmers is union member
	High price of barley
	Holstein cow needs lots of feed and is not completely adapted to Tunisian climate
	Farmers don't have continuity of cash flow to grow calves, hence they have to buy expensive cows; with no money herds will decline
	Predominance of small farmers
	Shortage of genetic improvement program
	The poor professional organisation of small livestock farmers: farmer membership rates to mutual agricultural service companies (SMSA) and agricultural developing groupings (GDA) are 8%;
	No payment for better milk quality
	Delays in payments to farmers due to the financial difficulties of some collection centres and/or central dairies; farmers are then forced to sell their milk to hawkers
	Unattractiveness of agriculture for young people
	Banks do not support them (absence of documents (property), unclear, insecure)
	Little collaboration of chain actors, no joined vision of sector
	No cold storage capacity no hard cheese making industry
Hawker	Refuse of dairy from collection centre
	Lack of refrigeration equipment and storage of milk
Collection centre	Little interest to support organization of the sector and value chain approach
	Contractual relationship between collection centre neither with farmers nor processors is established
	No payment on quality, lack of traceability, no control on food safety

	Capacity of cooling is restricted.
Processing	The high proportion of packaging (Tetra-pack type) in the cost price (25% compared to 10% in Europe)
	Insufficient installed chilling capacity compared to volumes processed
	Existence of parallel circuits not demanding transformation in terms of quality
	Lack of traceability
	The quality of the milk is poor, especially for cheese production diversification
	Under exploitation of existing processing capacity
	Price of UHT milk is capped
	Chemicals in milk
	The lack of quality certification systems (health certification, ISO, HACCP)
	Lack of diversification of dairy products (technological constraints and know-how)
Distribution	Artisanal and dispersed distribution with a lack of control of the cold chain
	The disconnection between the cycles of consumption and lactation that can generate shortages (from September to February), or production surpluses (from March to August);

Link	Opportunity
Production	Decrease production cost by adding more efficiency
	Farmers should get registration system
	Increase production of fodder in the North and North-West to support the dairy sector nationwide
	Increase the quality and yield of fodder production
Processing	Cheese and dessert supply chain can be improved since prices are free; focus on added value products where prices are free
	New dairy plants (Sidi Bouzid and Bizerte) and the allocation of licenses for other ones in Kairouan, Siliana, Beja ... etc
General	Strategies, development plans in place to develop the sector

Link	Threat
Production	Links further in the supply chain don't want farmers to organise themselves, Including the government
	Reluctance of banks to fund farming projects
	Direct influence of climatic conditions on the livestock sector
	Continued increase in production cost due to fluctuations input prices on the international market
Processing	Competition from unorganized sector (hawkers, cheese craft, dairies ...etc.)
	Export of cheese to EU is not allowed because of vaccination programme in Tunisia
	Volatile export markets much based on personnel relations, depending on politics and to a lesser end on competitive advantage
	Phenomena of smuggling and clandestine slaughtering
General	Competition from unorganized sector (hawkers, cheese craft, dairies ...etc.)

Previous chapters and the SWOT show that the dairy sectors possess strong points and opportunities but however as well some major challenges that need to be tackled first as they hamper growth. First of all, the huge growth of production costs because of structural price increase in (imported) animal feed need to be dealt with. The import dependency is retaining the desired growth in the sector and squeezes the margins between the fixed production and consumer prices. Secondly, the absence of a standardised quality system and corresponding pricing is acknowledged as a shortcoming. The social background on fixed farmer pricing to keep everyone on board in the economic society cannot be the main driver anymore in a competitive environment where climate (change) and world prices for animal feed have huge impact on the profitability of milk production. Thirdly professionalization is required by increasing yield of the cows and feed production. Registration of farms and cows will increase the controllability of output and provide traceability, which supports efforts towards export of dairy products.

People in Tunisia eat/drink 110L of dairy products on average per year, so dairy plays an important role in the consumption pattern. The SWOT shows that the government wants to be as much self-sufficient as possible by supporting farmers, increasing the number of collection centers and stimulating the increase of processing plants. If, parallel to these growth measures, quality and pricing schemes can be turned into market driven systems the dairy sector will stay one of the main drivers in agriculture and find potential growth in product diversification and exports.

6 Policy in the dairy sector

In 2016 the first Strategic Development Plan was launched since the revolution in 2011. It was built on two pillars: (i) Industrialization and value chains development; and (ii) Improvement of the quality of life for the people of the priority regions [6]. Dairy is one of the most important value chains (see paragraph 2.3) and the strategic plan 2016-2020 for this sector is covering several links in the supply chain. The strategic goals are [18]:

1. Production:
 - a) *Livestock development*: the strategic plan is to develop the workforce of the purebred herd and keep the flock of local and cross breeds. Thus, the number of cows will change from 424 000 female units in 2013 to 445000 female units in 2020, with an average annual growth rate of about 0.9%.
 - b) *Development of livestock born heifers and bred in Tunisia*: with the activation of the national plan for the promotion of the livestock sector heifers born and raised in Tunisia is expected to increase the total number of heifers by 1.5% per year.
 - c) *Improving productivity*: The strategic plan aims to improve the productivity of cattle herd to achieve by 2020 to 5447 liters for pure-bred, 1263 liters for crossbred and 643 liters for local breeds of cows.
2. Collection centers:
 - a) *Development of the national network of collection centers*: The strategic plan is to develop the national network of milk collection centers via the increase in the number of collection centers and increasing their collection capacity to collect as much as possible the quantities produced in small and medium farms. The collection rate will evolve to 85% in 2020.
 - b) *Evolution of the amounts collected*: based on the targets for the development of production and the national network of collection centers and to meet the expected changing needs of the link processing, the amount collected will increase in 2020 to about 1.102 billion liters.
3. Processing:
 - a) *Evolution of industry*: The link in the transformation currently experiencing significant changes following the launch of investors in the establishment of new industrial units such as:
 - Dairy plant "Delight" in Sidi Bouzid with a processing capacity of 500,000 liters / day
 - The Utica dairy plant in Bizerte with a processing capacity of 300,000 liters / dayOther intentions to invest in the creation new industrial units:
 - The dairy plant in Kairouan with a processing capacity of 400,000 liters / dayThus, processing capacity will evolve to about 5.7 million liters / day.
 - b) *Evolution processed quantities*: processed quantities will change from 850 million liters in 2013 to 1211 million liters in 2020.

The main conclusion of these strategic goals is the aim for growth at all levels. Although the main weaknesses of the sector seem not be addressed in the strategy they turn out to be covered in the action plan of which the highlights and responsible entities are presented in **Table 13**. Quality as well as production of animal feed is on the agenda and will be drivers for all stakeholders in the supply chain to differentiate and take the sector to a higher level. Although liberalisation of the consumer price is supported, not all intervention mechanisms are removed from the market. Probably the risk to vulnerable small farmers is a reason to act stepwise.

Action plan		Production
Programme	Action	Responsible Organisation
Herd statistics	<ul style="list-style-type: none"> Counting the number of cattle Enumeration of breeders Description of farms 	Directorate for Research and Agricultural Development
Cattle identification	<ul style="list-style-type: none"> Cover the entire herd 	Office of Livestock and Pasture (OEP)
Upgrading AI program	<ul style="list-style-type: none"> Give priority in the allocation of licenses of AI systems developers with proven experience in this field Upgrading the national production of animal semen center 	Office of Livestock and Pasture (OEP)
Strengthening of training and retraining	<ul style="list-style-type: none"> Strengthening human and financial means to AVFA Train the trainers 	The Agricultural Extension and Training Agency (AVFA)
Strengthen mentoring and support programs	<ul style="list-style-type: none"> Establishment of a special program to improve the quality of milk 	Office of Livestock and Pasture (OEP)
Implementation of national food resources herd security plan	<ul style="list-style-type: none"> Increase the area of forage crops, especially irrigated Improve pasture productivity Upgrading the feed industry sector 	General Directorate of Agricultural Production (DGPA)
Introduction of a uniform program for the payment of milk quality	<ul style="list-style-type: none"> Linking agricultural research with industry needs 	The Interprofessional Group of Red Meat and Milk (GIVLait), Office of Livestock and Pasture (OEP)
Professional organisation	<ul style="list-style-type: none"> Support for membership of small and medium farmers to professional structures 	General Directorate of Agricultural Production (DGPA)
Action plan		Collection center
Programme	Action	Responsible Organisation
Development of the national network of collection centers	<ul style="list-style-type: none"> Increase number of collection centers Increase storage capacity Increase milk collection from small and medium farms 	Office of Livestock and Pasture (OEP)
Quality promotion	<ul style="list-style-type: none"> Linking the subsidy to <ul style="list-style-type: none"> quality support for producers adaptation of contract system 	Office of Livestock and Pasture (OEP)
Restructuring of the milk transport sector from the far to the collection center	<ul style="list-style-type: none"> Revision of specifications governing milk transport capacity 	General Directorate of Agricultural Production (DGPA)
Organisation of the official control operations	<ul style="list-style-type: none"> Defining roles and official control structures 	Ministry of Commerce, Agriculture, Health and the Interior
Action plan		Processing
Programme	Action	Responsible Organisation
Revision of prices and subsidy system	<ul style="list-style-type: none"> Revision of prices at all links in the supply chain until the consumer Revision of the support system for the consumer (fixed low price) 	Ministry of Commerce
Regular activation and continuous market regulation mechanisms	<ul style="list-style-type: none"> Continue to support the regulatory mechanism of the market by storing milk Adaptation of the export mechanism as a strategic axis 	The Interprofessional Group of Red Meat and Milk (GIVLait)
Development of the cheese sector	<ul style="list-style-type: none"> Establishment of incentive mechanisms (financial and tax incentives) 	Ministry of Industry

Table 13: (elements from) action plan for dairy sector 2016-2020

7 Opportunities for the Dutch agricultural sector

In principle, there are several opportunities, as can be concluded from the SWOT. However, a precondition for the growth for the dairy sector is that the current pricing system with fixed production and consumer prices is adjusted by the Tunisian government. Next to that it is of outmost importance that a quality driven pricing system for milk gets introduced. Without the establishment of such a system investments are at risk as there is little guaranty that they lead to the intended added value.

The dairy sector is expanding in many ways, which will induce business opportunities. It is useful to distinguish between two types of opportunities. One on the production side and one on the market side. At the moment there is no standardised quality system nor verification nor certification structure in operation in Tunisia. The strategic plans are in place, but at the moment the flows of fresh milk is suboptimal with respect to transporting the right milk, with respect to protein and fat, to the right link in the supply chain. This implies inefficiencies and economic losses. In that context, currently setting up new product-market combinations like e.g. a special cheese processing facility for the domestic market is a suboptimal investment, unless you control the whole supply chain. In that perspective opportunities on the production side seem more promising, although the level of investment will relate to the dependency on a good quality and pricing system.

Based on the study the below business opportunities are identified. Ideally none of the business opportunities is offered as a standalone, but should be embedded in a roadmap with multiple activities leading to an overall improvement of the dairy sector.

7.1 Production of fodder

Cattle feed is the main cost driver in production costs of milk. About 62-70% of the production costs is related to feed. Hence in order to support the dairy sector as one of the main drivers of the Tunisian agriculture it is important for Tunisia to ensure the availability of fodder for the cows. Fodder is produced mainly in the North and North West, where the soil is fertile and average annual rainfall is at least 600 mm. Other dairy farms in the South and Center do not have fodder production and require concentrates in addition to forage like hay and straw.

There are a few challenges in the context of animal feed:

- The quality of the fodder produced in Tunisia is variable and many farmers (especially the larger ones) prefer concentrates
- Tunisia is far from self-sufficient with respect to animal feed, inducing imports of all kinds of grains (see **Table 14**)
- Because of the strong inflation (7.7% in April 2018) the import costs are increasing. Putting more pressure on the profitability of the sector

Availability of grains in Tunisia in kton									
year	source	wheat	corn	barley	soya	sorghum	oats	triticale	Total
2013	production	975	0	289	0	1	2	32	1299
	import	1486	867	821	467	6	0	0	3648
	% import	60%	100%	74%	100%	84%	0%	0%	74%
2014	production	1513	0	773	0	1	2	32	2320
	import	1665	1022	429	435	5	0	0	3555
	% import	52%	100%	36%	100%	80%	0%	0%	61%

2015	production	913	0	364	0	1	2	31	1311
	import	1949	1110	532	514	5	0	0	4111
	% import	68%	100%	59%	100%	81%	0%	0%	76%
2016	production	927	0	328	0	1	1	34	1290
	import	2142	1133	711	582	6	0	0	4574
	% import	70%	100%	68%	100%	84%	0%	0%	78%

Table 14: availability of potential fodder products in Tunisia (FAOSTAT, UNCOMTRADE)

Fodder companies such as the large 3 from the Netherlands: Agrifirm, ForFarmers and De Heus could achieve win-win situations on the basis of their knowledge, seeds and production. Setting up fodder production in the North and North-West of Tunisia at the level of the quality of the animals, hence on the one hand balancing the input price according to the market and on the other hand increasing the yield and quality of fodder, can make Tunisia more self-sufficient.

Note that this opportunity seems to be a no-regret option since the sector is growing and import of animal feed is huge. The investment is not depending on the implementation of a quality and pricing system, although the level of investment might.

7.2 Improving the herd in Tunisia

There are statistics about the breeds in the Tunisian dairy sector¹⁸, but there is hardly any registration on farm and cow level. Setting up registration has many advantages like traceability, insight in productivity and disease resistance. There are farmers that lack a steady cash flow to grow calves. A calf costs about 5-6 TND per day for about 2.5 years (total 5000-5500 TND \approx 1700 €), and a mature cow costs 7000 TND (\approx 2350 €). Moreover the National Agricultural Bank (BNA) does not provide loans to small and medium size farms. On top of that quality is not paid for and animal feed costs increase. The circumstances initiated illegal traffic of cows from Algeria and Libya which borders are also a place where cows can be vaccinated for free (Brucellosis).

These considerations show the need for a structured approach to dairy farming where animal registration, vaccination and artificial insemination should be organized and controlled. In the Netherlands the dairy sector is well known for its performance and knowledge. Registration and vaccination should be controlled by the government, but AI can be a privatized business. In general costs per AI are relatively low¹⁹ and Dutch companies like the cooperative CRV, NIFA Technologies and K.I. Samen are internationally oriented. Using AI contributes to a better yield and the costs are returned when the calf becomes a cow. To bridge these, 2.5 years financial support for the farmers is required.

7.3 Use of dairy waste

Casein and whey-containing waste is produced in large volumes by the dairy industry, and is expensive to dispose of due to its high organic content. Applications for partially or fully purified casein extracts including the formation of bioplastics, films, gels, adhesives, coatings, emulsions, reconstituted fibres, and biocomposites are well established. Hence, there is considerable potential for use of dairy waste materials in the production of biomaterials. Developments in the production of milk protein-containing biomaterials will result in an overall lower environmental impact. The isolation and extraction of proteins as well as some applications for the dairy waste flows are described in a study from Wageningen UR [26]. VION is putting reuse of proteins in practice, so they might be a partner for this opportunity.

¹⁸ <http://www.givlait.com.tn/presentation-de-la-filliere-lait.html>, viewed 28-5-2018

¹⁹ <https://www.crv4all.nl/tarievenkaart/#ki>, viewed 28-5-2018

7.4 Others business opportunities

There are multiple other business opportunities as well, and the most relevant will be illuminated below:

- Cold storage at farm level and the cold chain need to be arranged to keep the quality high. Dutch expertise in this area could be very beneficial.
- The logistics of the dairy supply chain is sub-optimal therefore leads to inefficiencies. The Netherlands are champions in (agro)-logistics.
- The economic way to arrange this development is to organize farmers in FBO's to achieve economies of scale. Policy measures (e.g. tax incentives by slowly releasing price support) on the one hand, and registration on the other hand enable the farmers to make bank arrangements. The Dutch have a long history with the organization of farmers.
- In addition, a cheese factory is an option following the market trend of increased cheese consumption. At the moment cheese processing is done at many places, without any input control. This is not an acceptable risk unless when you can control the whole supply chain.
- The establishment of attractive long-term investment conditions for Dutch dairy companies in Tunisia could trigger the interest of Dutch companies for setting up joint ventures to process local fresh milk and milk powder, especially in the North and North-West region.

The drawback of some of these initiatives is that investment will not be paid off until quality is related to price. These opportunities will pop up if the issues of quality standardization and fodder are solved.

8 Doing business in Tunisia

The attractiveness of Tunisia to Dutch companies is not depending on business opportunities only. The complexity of starting up a business, to get electricity or permits is just as relevant. Also, taxes, import regulations and cultural aspects are decisive elements before entering a new country for business. Annually the World Bank Group launches country reports and provides objective measures of business regulations and their enforcement across 190 economies and selected cities at the subnational and regional level. For Tunisia the overall result is shown in **Figure 13**:

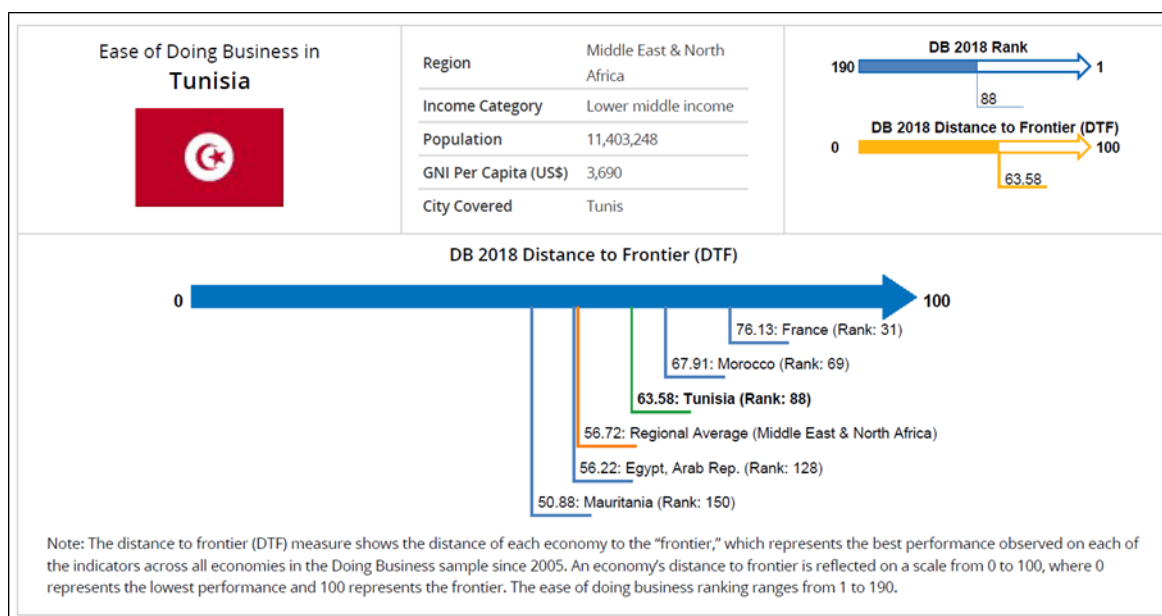


Figure 13: ease of Doing Business in Tunisia in 2018 according to the World Bank

Tunisia scores relatively well on energy supply (electricity, gas) and not so well on paying taxes [27].

8.1 Business environment

Although Tunisia is not well known to investors the country is ahead of many African countries with respect to all kinds of infrastructure:

- The proximity of the EU and other surrounding markets (the Maghreb and Middle East)
- A developed transportation system
 - Tunisia benefits from eight commercial ports equipped to accommodate a variety of different methods of transportation
 - The ports of Marseille, Gène and Barcelona are all relatively close to Tunis
 - Airport infrastructure is composed of seven international airports apportioned across the whole territory and frequented by the main airlines of Europe, the Middle East and Africa
 - The road network, of more than 32,000 kilometres, allows easy access to all regions of the country
- An effective telecommunication network, in which enormous investments have been made to develop a modern telecommunication system covering all regions of the country

In addition there are various financial incentives for investment in agriculture:

- Total exemption from tax on reinvested profits and income
- Total exemption from tax for the first ten years of operation
- A premium about 7% of the value of the investment

- 8% an additional premium of the value of the investment may be granted for agricultural investment in areas with harsh climate: Gabes, Gafsa, Medenine Kebili, Tataouine and Tozeur
- Suspension of VAT on imported capital goods which have not been manufactured locally
- The possibility of state participation in expenditure for infrastructure development areas for aquaculture and crops using geothermal energy.

Especially the last one is interesting for greenhouse investment near the geothermal zones.

For investments by companies for projects of environmental protection and waste treatment, which is mentioned as one of the opportunities, the Code provides for the following advantages:

- Abatement of 50% of revenues or profits reinvested
- Tax rate reduced to 10% of revenues and profits
- Bonus 20% of the value of investments
- Suspension of VAT for most of the goods.

There are more details (e.g. about labour) to be found in [28].

8.2 Starting a business

Starting a business in agriculture can be undertaken as a 'one-stop-shop' supported by the Agency of Promotion of the Agricultural Investments (APIA). The set-up process is as follows:

- a) Deposit capital in a bank opened in the name of the company to be incorporated
- b) Register the articles of association with tax administration at the API and obtain a certificate attesting that a declaration has been filed
- c) File a declaration of existence with the Tax Control Desk at the API²⁰ and obtain a '*carte d'identification fiscale*'. The documents required to make the declaration are:
 - Printed signature form
 - Registered copy of the articles of association
 - Copy of the minutes of the nomination of the managers (if not designated by the articles)
 - Copy of the managers' national identity cards (copy of passports for foreigners)
 - Copy of the rent agreement or the certificate of ownership of the premises where the head office is located
 - Any administrative authorisation that would be required to start the business
- d) Deposit documents at the '*Grefe of Tribunal*'. The following documents are required:
 - Printed forms (provided by the Greffe of Tribunal office) for the depositors to complete and sign
 - Declaration of honour signed by the managers
 - Registered statutes
 - Minutes that nominate the managers (if not designated by the articles of association)
 - Arabic translation of the main clauses of the articles
 - Declaration of the beginning of the business with the tax administration and tax identification card
 - Document providing the headquarters address
 - National identity card (or passport for foreigners) of the company manager(s)
 - Fiscal stamp
 - A proxy, if the formalities are undertaken by a party other than the manager
- e) Advertise in the Official Gazette (JORT) with the Government Printing Office and in two dailies, one preferably in Arabic
- f) Register with the registrar (Registre of Commerce at the Greffe of Tribunal)
- g) Register for social security
- h) Get inspected by the National Social Security Fund (CNSS)

²⁰ Agency of Promotion of the Industry

-
- i) File a declaration with the labour inspectorate.

8.3 Experience from Dutch investors

Real life experience is taken from interviews with three companies operating in Tunisia:

1. Desert Joy, tomato grower, El Hamma, Gabes, Tunisia
2. A. en G. van den Bosch B.V, beef tomato grower, El Hamma, Gabes, Tunisia
3. Grow Tunisia SARL, crafted plants for vegetables, especially cucumbers and tomatoes, Megrine, Tunis, Tunisia

General:

- There is a lot of bureaucracy
- The Dutch have a positive image with respect to dairy, potatoes, and tomatoes
- The political situation in Tunisia is okay for now, but the situation is hard to predict. Therefore it is wise to take small steps forward
- Talking French or Arabic is a must since many people don't speak English, especially in labour class
- Local partner is necessary to deal with local banks, governments and taxes
- Availability of educated staffs

Logistics:

- Tunisia is relatively close to Europe, with a relatively good logistic network.
- The shipping from Tunisia to Marseille should remain reliable. The line is getting more busy implying risk for delays.

Culture:

- Religion plays an important role, also at work. Especially Ramadan is a crucial period with respect to planning

Technology:

- Fiberglass is put in the ground until the border of the Sahar, hence the internet access is fine

Money:

- The inflation rate is increasing since January 2016 from 3.2% until 7.7% in April 2018²¹.



Figure 14: inflation rate Tunisia 2010-2018

Hence investments from Dutch companies are not sourced from Tunisian banks, but from the Netherlands

²¹ <https://tradingeconomics.com/tunisia/inflation-cpi>, viewed 22-5-2018

9 Conclusions

The dairy sector in Tunisia moves into a crucial phase of development. On the one hand some farmers are selling their cows, because margins become negative. Although a basic fixed price is given, the production costs are increasing too much. Especially the price for animal feed, which is the largest part of the costs, puts pressure on margins. In addition, the irregular climate makes it difficult to control production, since not only the animal feed but also the cows are affected by the weather conditions. Furthermore, the exodus of younger people from rural areas to the cities endangers the continuity of the sector. The main conclusions in this study are

- a) Most of the dairy farmers are not organised and hence have no access to knowledge, training, transport and investment opportunities (e.g. cooling)
- b) The absence of a registration system for cows makes it difficult to increase the yield and optimize artificial insemination
- c) The government increases the number of collection centers, which will enforce access for farmers to the market more easily
- d) The absence of a standardised supervised quality control system is one of the main obstacles for development of the sector. If there is no incentive related to price, the quality remains variable, which causes many inefficiencies in the dairy chains in Tunisia
- e) Currently the price control mechanism for milk is squeezing the margins of the stakeholders in the supply chain (even to become negative), because external factors like the world price for fodder is growing and the cost price exceeds the limit of feasible businesses
- f) According to the 2016-2020 Action Plan OEP and GIVLait are working on the introduction of a quality system for dairy and relate it to price
- g) There are 3 direct opportunities for Dutch companies:
 - 1. Fodder production in North West Tunisia for the whole Tunisian dairy sector
 - 2. The organization and coordination of animal registration, vaccination and artificial insemination together with the Tunisian government
 - 3. Reuse of dairy waste flows and by-products

Expansion of opportunities will take place after the introduction of a quality based pricing system.

- h) In the Netherlands Tunisia is not well known as an interesting country to invest. The climate (more sun hours than the South of Europe) in combination with the humidity (lower than Morocco) it may be wise to compare Tunisia an agricultural characteristics with other African countries where Dutch people invest now.

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Appendix A Organisations and contacts

Governmental organisations

1. The Ministry of Agriculture and Hydraulic Resources (MARH)			
The MARH mission is to carry out, in coordination with the departments concerned, the state policy in agriculture and fisheries, to ensure the promotion of this sector and to promote the creation of a favourable climate for its development.			
Name	Function	Phone	Email
<i>Livestock and Pasture Office:</i>			
Mohamed Nasri	General Director		dga@oep.nat.tn
Naziha Dridi Hajlaoui	Adjoint General Director)		dga@oep.nat.tn
Sana Zitouni	Chief Engineer Specialist in Animal Production		sana.zitouni1@gmail.com
<i>Agricultural extension and Training Center:</i>			
Zayani Khemales	General Director		zayani.khemais@inat.agrinet.tn
2. Regional Offices of Agricultural Development (CRDA)			
The regional organisation of the Ministry of Agriculture is governed by Decree n°89-457 of 24 March 1989, which delegates the Ministry's powers for agricultural production to the Governors. As such, a CRDA was set up in each Governorate as an administrative public establishment with legal status and financial autonomy. It is managed by a Commissioner appointed by decree based on a proposal made by the Ministry of Agriculture. The CRDA is responsible for implementing State agricultural policy in the Governorate. It undertakes regional development activities and carries out all specific tasks that are entrusted to it by the current legislation and regulations.			
3. The Office of Livestock and Pasture (OEP)			
OEP is a non-administrative public company reporting to the Ministry of Agriculture. It is responsible for the development and promotion of the livestock and pastures sector and acts as an advisor and technical expert for the public authorities. Its 4 main tasks are to develop fodder and pasture resources, to promote livestock farming techniques, to monitor the sector and contribute to its economic development as well as to accomplish all the specific tasks that the State delegates to it.			
4. The Agriculture Investment Promotion Agency (APIA)			
APIA is a non-administrative public establishment reporting to the Ministry of Agriculture. Its mission consists of encouraging, promoting and assisting investments in agriculture, fisheries and associated services as well as in first-level processing connected to farming and fisheries projects. APIA is crucial for foreign investors since they have an Investor Liaison Office (one-stop shop) in Tunis.			
5. The Agricultural Extension and Training Agency (AVFA)			
AFVA is an administrative public establishment placed under the authority of the Ministry of Agriculture. It monitors the implementation of programmes pertaining to social and economic development plans, essentially in terms of training and extension.			
6. The Interprofessional Group of Red Meat and Milk (GIVLait)			
GIVLait is an interprofessional organisation of public economic interest with legal status and financial autonomy, placed under the authority of the Ministry of Agriculture. They provide a lot of statistical information on the whole dairy supply chain every year (especially Ouhichi).			
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Ouhichi Riadh	Chief engineer	+21671286248 +21697444099 (mobile)	rlouhichi6@yahoo.fr

7. The Tunisian Union of Agriculture and Fisheries (UTAP)
The Tunisian Unionnot for Agriculture and Fisheries (UTAP) is a national organization of farmers and fishermen in multidisciplinary regional unions and specialized national federations. UTAP acts like a union of farmers and fishermen whose interests it defends; it also plays a role in the promotion of the profession and works closely with the administration of which she is the main contact. The National FederationLivestock UTAP represents the interests of farmers. It plays a role in the dissemination and promotional activities of breeding.

8. General Directorate of Agricultural Production (DGPA) / MARH			
DGPA is part of the Ministry of Agriculture and Hydraulic Resources and comprising 3 directorates (animal health, animal husbandry and public veterinary hygiene)			
Name	Function	Phone	Email
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University

9. Institution of Agricultural Research and Higher Education (IRESA) / Carthage University / National Institute of Agronomics Tunis			
The Institution of Agricultural Research and Higher Education is a public administrative institution which is financially autonomous, and has the following mission:			
<ul style="list-style-type: none">• Watching over the promotion of agricultural research within the framework of the Government's general policy while securing the liaison between agricultural research and higher education institutions on the one hand and agriculture producers on the other,• Drawing up agricultural research programs and necessary budgets, following up the implementation of these programs and coordinating the work of research and higher education institutions in the field of agriculture.• Making sure that agricultural research and higher education institutions are working for the farming production and their development.			
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Embassy

10. Embassy of the Kingdom of the Netherlands			
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Commercial actors

11. Carrefour			
Carrefour is a part of Ulysse Hyper Distribution and was the first Hypermarket in Tunisia. Currently they run 1 Hypermarket in Tunis and 48 Carrefour Market and 39 Carrefour Express supermarkets all over the country.			
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12. Natilait			
Natilait is a company specializing in the dairy industry, ranging from milk production to the manufacture of its derivatives: butter, yoghurt and fresh products. It is located in Bizerte in the North of Tunisia and has between 250-500 employees.			
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Supporting organisations

13. FAO			
FAO is a specialized agency of the United Nations that leads international efforts to defeat hunger. Serving both developed and developing countries, FAO acts as a neutral forum where all nations meet as equals to negotiate arguments and debate policy.			
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Appendix B Characteristics of cheese sector in Tunisia

All information on the cheese sector is derived from [17].

Cheeses produced in Tunisia fall into 4 main categories:

1. fresh Feta-type cheeses in brine produced from cow's or sheep's milk, or a mix of both;
2. pressed Gouda or Saint-Paulin-type cheeses, mainly represented by Kaiser;
3. processed cheese produced from other cheeses, milk powder, butter, etc.;
4. cheese specialities, blue cheeses, soft cheeses and soft ripened bloomy-rind cheeses (still marginal).

Main challenges in the sector are:

- the central dairies have much greater negotiating power with suppliers than the cheese-makers, inducing problems with supply for the cheese-processors
- the high prices of additives and milk powder;
- the high investment costs in the sector;
- the lack of a specialised labour force (cheese dairy technicians) and the high wage bill (competition with large cheese dairies)
- no differentiation on quality which makes processing inefficient

Strengths :

- Strategic nature of the dairy chain: maintenance of farmers on their farms, agricultural intensification and integration, food security;
- Importance of the dairy chain in the national economy; 35-40% of agricultural GDP, 4-5% of overall GDP and 42.1% of agricultural jobs;
- Expansion of the collection network and growth of industrial capacity;
- Use of local milk exclusively and elimination of imports;
- Multitude of small companies and artisanal production units;
- Processing enabling a constant outlet for milk and dairy products;
- Rapid growth in processing: +5.9% per year for cheese, +3.3% for milk and dairy products (+4.5% for yoghurt and +3.1% for sterilised milk);
- National market expanding rapidly: opening-up and steady increase in consumption;

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The mission of Wageningen University and Research is "To explore the potential of nature to improve the quality of life". Under the banner Wageningen University & Research, Wageningen University and the specialised research institutes of the Wageningen Research Foundation have joined forces in contributing to finding solutions to important questions in the domain of healthy food and living environment. With its roughly 30 branches, 5,000 employees and 10,000 students, Wageningen University & Research is one of the leading organisations in its domain. The unique Wageningen approach lies in its integrated approach to issues and the collaboration between different disciplines.



