



Ministry of Foreign Affairs

Tomato value chain analysis in Tunisia

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Tomato value chain analysis in Tunisia

Business opportunities



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This study was carried out by the Wageningen Research Foundation (WR) and was commissioned by Rijksdienst voor Ondernemend Nederland (RVO) and financed by the Dutch Ministry of Foreign Affairs. Project title: Chain analysis / business opportunities horticulture Tunisia (MAT18TN02).

WFBR is part of Wageningen University & Research, the collaboration of Wageningen University and Wageningen Research Foundation.

Wageningen, June 2018

Report WFBR 1830

H. Soethoudt, Blom-Zandstra, G., H. Axmann, 2018. *Tomato Value Chain in Tunisia, Business opportunities*. Wageningen Research, Report WFBR-1830
ISBN: 978-94-6343-295-5

Keywords: Value chain, tomato, SWOT-analysis, knowledge gaps, business opportunities, Tunisia

This report can be downloaded for free at <https://doi.org/10.18174/452977>

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<https://www.wur.nl/en/Research-Results/Research-Institutes/food-biobased-research.htm>

Chamber of Commerce no. 09098104 at Arnhem
VAT NL no. 8065.11.618.B01

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Report WFBR report number: 1830

Photo cover: background from [2]: tomato farm in Korba (Nabeul), tomato can from http://www.sicam-tunisia.com/%3Fpage_id=6481/, viewed on 30-5-2018

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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 tomato 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 tomato 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 tomato sector is carried out on behalf of RVO and covered a period from April 1 to June 15 in 2018. This report is a result of an analysis based on a desk study a field visit to Tunisia in May 2018 and interviews with Dutch entrepreneurs doing business in Tunisia.

The tomato sector covers with between 1 and 1.3 million tons per year 14.2% of the agricultural production quantity and 4.8% of the production value. About 85% of the tomatoes go to processing and is turned mainly into DCT (Double Concentrate Tomato). The scale of sliced, peeled and dried tomato is marginal compared to DCT. Tomato consumption in Tunisia is the highest in the world with about 70 kg/y per person.

Although a lot less than many years ago, the government controls the prices of various products they consider crucial, including tomatoes. Either on the production or on the distribution side they fix margins, taxes and/or prices, hereby disturbing the market dynamics. Price liberalization is a sensible political topic, in discussion on a regular basis. Tunisia needs to find a delicate policy balance that gives equal weight to both support the poor (security) and economic issues.

The current potential of Tunisia for tomatoes is based on the climate, infrastructure and policy incentives. There are many sun hours a day, the humidity is not too high and infrastructure is available in many regions in the country for cars, ships and planes. Also, internet availability is organised well. In addition, certain regions provide the option of geothermal heating for tomato production.

The identified opportunities for the Dutch business sector are:

- Greenhouse production in geothermal areas (excellent climatic conditions) to export during winter time to Europe
- Waste stream use. About 60,000 tons of tomatoes are wasted annually. These flows can be used to make tomato juice or natural dyes
- Upgrading collection centres. Since 70% of the fresh tomato flow is aggregated at collection centres, this logistic hub is crucial in the supply chain and an opportunity for adding value is appropriate, i.e. when quality will be related to price. The design of activities, the level of technology and the scale are to be determined in order to arrive at a feasible business model for these collection centres.

Last but not least there is a task for the Tunisian as well as the Dutch agricultural bureau for the Maghreb to introduce Tunisia to more Dutch agricultural entrepreneurs by comparing its strong points with other African countries (often far away). Although the Arab Spring might be a hurdle for Dutch agro-partners, good communication of continuous signals on political stability, the high level of education and available technology and success stories might increase the chance that win-wins can be created in the agricultural business.

1 Problem analysis

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 prominent. 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. Main food imports are wheat, maize, soybeans, barley and refined sugar. 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 years 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 large exporter of agricultural products in the world and has a very advanced knowledge when it comes to agriculture. Education and research in close cooperation with the private sector in the Netherlands has 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.

Tomato is the main horticultural crop in Tunisia, with production between 1.0-1.3 MT/year ($M=10^6$). In general, the challenges in a supply chain of horticultural products are quite similar. In this context the tomato is selected as a representative of this sector. In Tunisia the fresh market is smaller than the market for processed products. Most cases tomatoes end up as Double Concentrate Tomato (DCT), which is the main tomato product for consumers in Tunisia.

Tomatoes are grown in the open field mainly, but part is grown under cold greenhouses or greenhouses heated by geothermal waters in the south of the country.

In a previous study in 2017 [3] the following challenges in this sector are identified:

- The quality of agricultural products does not comply with the quality required for export.
- Smallholders cannot afford well-equipped greenhouses with sustainable techniques that focus on saving water and managing climate. So, in mono-tunnel and plastic greenhouse represents the large share of protected crops in Tunisia.

In this context RVO has asked Wageningen University Research to identify win-win situations for the Tunisian tomato 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 Mountain range and the northern reaches of the Sahara Desert. Much of the rest of the country's land is fertile soil¹. 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 in surface, but very low in population. In that context Sfax and Tunis are the major governorates.

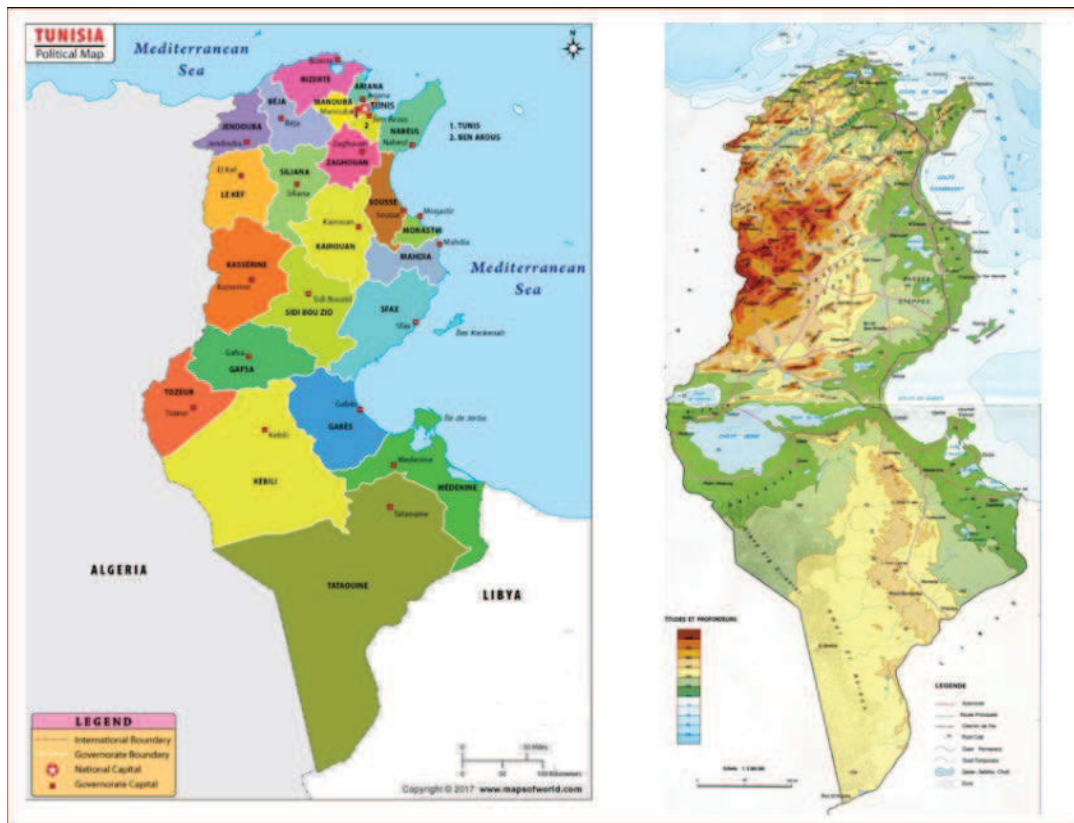


Figure 1: political and physical map of Tunisia²

2.2 Population

In Tunisia the current population size is estimated at 11,659,174 people³. 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://en.wikipedia.org/wiki/Tunisia#Climate>, viewed 19-4-2018

² <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

³ <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%⁴ (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 Algeria⁵.

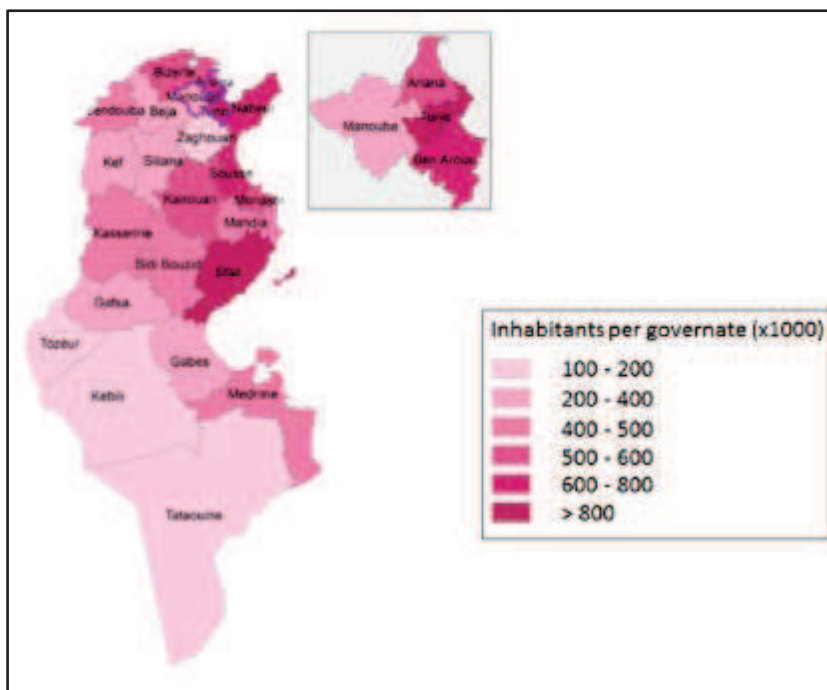


Figure 2: distribution of population per governorate [1]

The rural areas are typically in the South, Tozeur, Kebili and Tataouine. The North and North West of Tunisia are average with respect to amount of population.

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 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 agriculture⁶. The industrial sector is mainly made up of clothing and footwear manufacturing, production of car parts, and electric machinery. Services are very much related to government departments [5]. The GDP per capita in Tunisia equals 3496 US\$ in 2017 resulting in about rank 140 worldwide⁷. Although Tunisia

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

⁵ https://en.wikipedia.org/wiki/Urbanization_by_country , viewed 19-4-2018

⁶ <https://www.export.gov/article?id=Tunisia-Agricultural-Sector>, viewed 29-4-1018

⁷ <http://www.imf.org/external/datamapper/NGDPDPC@WEO/OEMDC/ADVEC/WEOORLD/TUN> , viewed 24-4-2018

managed an average 5% growth over the last decade it continues to suffer from a high unemployment rate especially among youth⁸.

Exports are 13.57 billion US\$, imports 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 first 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, although even before the date of entry came into force, Tunisia 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 tomato sector has a significant contribution to the production value [6]:

| 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 [7]. With respect to import the main products are wheat, maize, soybeans, barley and refined sugar [6]. These products are relevant to livestock feed and 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 negligible⁹

The FDI 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 in Tunisia as 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 GDP¹⁰.

⁸ <https://en.wikipedia.org/wiki/Tunisia#Economy>, viewed 24-4-2018

⁹ FAOSTAT, viewed 14-5-2018

¹⁰ <https://www.export.gov/article?id=Tunisia-Agricultural-Sector>, viewed, 24-4-2018

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 accounted for 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 of 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 | 400-600 |
| Arid | 100-400 |
| Desert (Saharan) | 20-100 |

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

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.

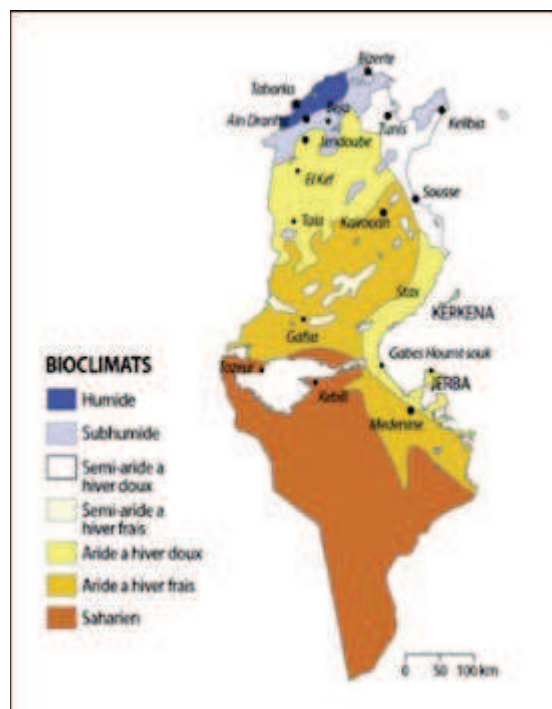
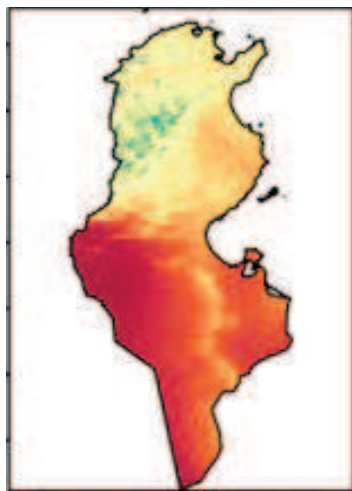


Figure 4: climatic zones in Tunisia

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 of 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 consistently turn around 45 °C, while can be cold in the desert.



Tunisia's Mediterranean climate with mild winter and sunny springs are suitable for most vegetables. Vegetable crops cover an area of 150,000 ha, mostly tomato (25,000 ha), potato (23,000 ha), melon, pepper and onions [13]. The most likely consequences of Climate Change for Tunisia will be a reduction in rainfall and an increase in the frequency of droughts [12]. However, the extent and the accuracy remain imprecise. Apart from an increase in drought, salinity is also a problem in Tunisia. Generally, surface water has a low salinity, but groundwater is badly affected with 84 % of all groundwater resources having salinity levels of more than 1.5 g/l and 30 % of the shallow aquifers more than 4.0 g/l [14].

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 has faced considerable delays, due to limited capacities at the Ministry of Employment and ANETI (Agence nationale pour l'emploi et le travail indépendant). But 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 and 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; and
- 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) operationalize 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 potential in Tunisia:

1. Agri- and horticulture;
2. Water;
3. Waste management;
4. Logistics;
5. Maritime sector.

3 Tomato sector

Contrary to the dairy sector, that is quite regulated, statistics in the tomato sector are scarce. Some can be found on the website of the Nationale institute of Statistics (L'Institut National de la Statistique: INS¹¹), but tomato data are extensive and updated more often. The quantitative information for this research is scattered over various reports [2, 16, 17] and based on interviews with stakeholders in Tunisia and the Netherlands.

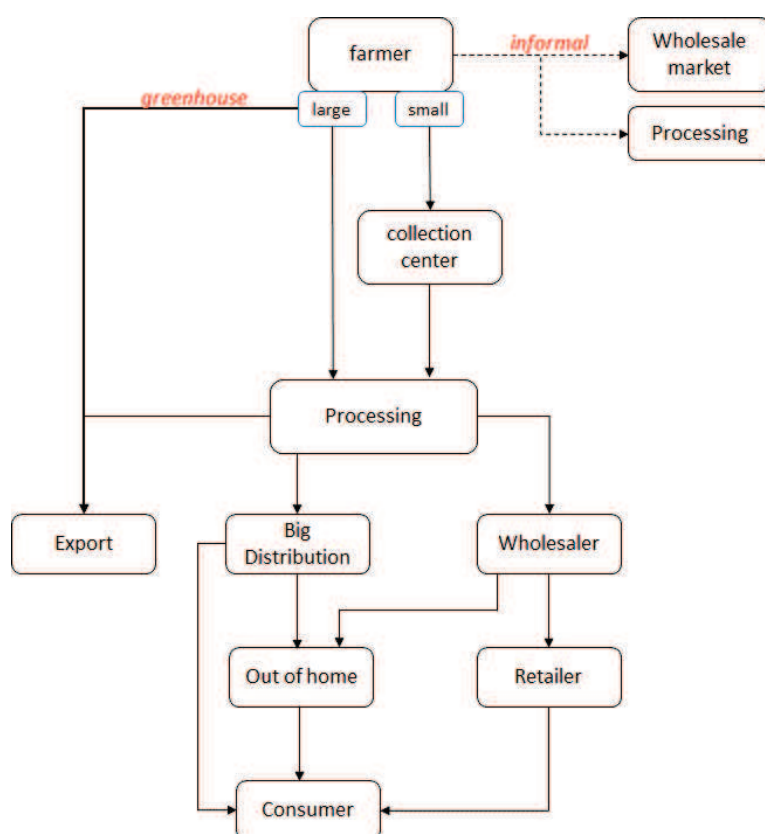


Figure 6: tomato value chain in Tunisia

Excluding export of fresh tomatoes, the distribution of flows is about: 70% to collection centres, 20% to processing and 10% to wholesale markets [17].

From the interviews during the trip in Tunisia (May 2018) it became clear that there are a lot of issues in this sector. There are many uncontrolled factors, which makes it hard to invest:

- Farmers are not cooperating, their horizon of strategy is tomorrow, no use for investment to improve quality, because prices are controlled by the government
- Banks don't give loans to most farmers since they lack the documentation for landownership
- Collection centres have no cooling, nor is any quality system installed. They do not add value.
- Processors make their own choice of varieties without taking into account consumer demand or nutritional quality
- The collection centres, because of their informality, do not respect the standards of storage and transport conditions, causing large losses in volume and quality.
- Overall, the organization of the sector, although it has improved in recent years, remains unstructured, which leads to frequent delays and expectations on delivery, not beneficial for the nutritional quality of the raw material.

¹¹ <http://www.ins.tn/en/front>, viewed 20-5-2018

Success seems to be in export mainly. The climate is very good for greenhouse production and especially for Dutch growers/companies Tunisia is an interesting production region during winter time.

3.1 Production

3.1.1 General production

Tomato is the second most important commodity produced in terms of quantity by the country and it is grown annually on an area of around 28,000 ha. In 2013 the average yield on national level was 45 tonnes per hectare, with 43 tonnes in Nabeul, and more than 60 tonnes per hectare in Kairouan and Sidi Bouzid. Average Production exceeded 900,000 tons in the past decade, with a peak of 1.35 million tons in 2015. The processing of tomato into Double Concentrated Tomato (DCT) is a main agri-industrial activity that is increasing to meet a rising demand currently estimated at 100,000 tons. The DCT product is intended primarily for local consumption and secondly for export mainly to Libya. In Tunisia the number of tomato farmers is hard to estimate but there are about 10,000 tomato farmers related to processing [2], [17]. Most farms are less than 2 ha, hence mechanization is not in place. The tomato production data are collected from various sources [2, 17-19]¹² and shown in **Table 5**:

| Tomato production | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2016/2017 |
|-------------------|------|------|------|------|------|------|------|-----------|
| Season | 1050 | 1100 | 1040 | 797 | | | | 850 |
| processing | | | | 677 | | | | |
| fresh | | | | 120 | | | | |
| Off-season fresh | 246 | 234 | 300 | 203 | | | | 220+? |
| Total | 1296 | 1284 | 1340 | 1013 | 1250 | 1350 | 1303 | 1070+? |

Table 5: tomato production in kton in Tunisia

For 2016/2017 data are from Onagri ([19]) and they have open field production data, but for greenhouse and tunnels only ha and no weights are provided: 300 and 342 ha respectively, whereas the same source shows more than 28,000 ha for open field tomato production. Hence about 2% is protected.

The distribution of the production in season over the country is shown in **Figure 7**¹³. Varieties in open field in Tunisia are: Sun 6800, Heinz 961, Podium, Perfectpeel, Roma, Firenze, Ventura, Némageant, Zenith, CXD 202, 206, 252, CXD 155, 254, Top sport, Ercole, Sabra (Hy Peel 303) and Chebli [17].

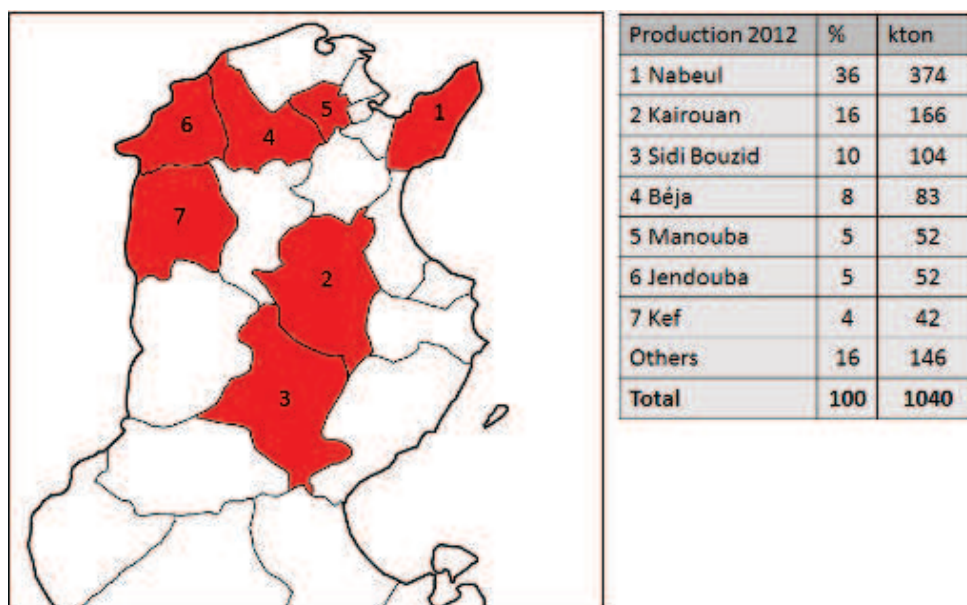


Figure 7: main tomato production regions in Tunisia

¹² <https://www.tridge.com/intelligences/tomato/TN>, viewed 30-5-2018

¹³ No later data were found on the distribution per region.

The tomato has one main season which is all open field and runs from June till September, when the late season starts until November. Off season production is in greenhouses. Non heated greenhouses (mostly tunnels covered with plastic) are located in Monastir, Sfax, Mahdia and Sidi Bouzid and grow from December to the end of May. Greenhouses using geothermal heating produce from November till the end of May and are in the regions Gabes, Tozeur and Kebili¹⁴. Off season tomatoes are only used for fresh consumption or exported as fresh.

3.1.2 Greenhouse production



Figure 8: geothermal greenhouse tunnel for tomato and pepper production in Gabes

To produce early vegetables on schedule and to the required quality for export, Tunisia has developed with the assistance of UNDP¹⁵ since 1986 the protected crops heated by geothermal water (see **Figure 8**¹⁶) in southern Tunisia. The area located to 2013 was 250 hectares. Currently, protected crops occupy about 5% of the areas reserved for vegetable crops, but their production, estimated at 400,000 tons, is about 14% of the volume of vegetable production and 20% of their value. This addition to their economic and social importance through the development of small areas and the employment of the workforce or 400 (melon) 1000 (tomato) working days per ha protected crops against 150 to 200 days per ha for vegetable field crops.

In 2015 the Tunisian Government (APIA) carried out a detailed research on greenhouses [20], from which the various types and investment costs are shown in *Table 6*.

| Greenhouse type | Surface (m ²) | Cost Greenhouse (TND/m ²) | Equipment costs (TND/m ²) | Tomato yield (kg/m ²) |
|-----------------------|---------------------------|---------------------------------------|---------------------------------------|-----------------------------------|
| Cold Tunnel 8-9m | 500 | 10 | 13 | 12 |
| Cold Tunnel 4m | 250 | 5 | 7 | 7 |
| Cold Canarian | ≥ 10,000 | 13 | 16 | 12 |
| Cold Multitunnel | ≥ 10,000 | 50 | 53 | 14 |
| Geoth Tunnel 8m | ≥ 10,000 | 10 | 17 | 14 |
| Geoth heated Canarian | ≥ 10,000 | 13 | 21 | 16 |
| Geoth Multitunnel | ≥ 10,000 | 50 | 72 | 20 |

Table 6: cost structure for greenhouse investment per type

¹⁴ http://www.gil.com.tn/fr/product?label=tomate_4, viewed 31-5-2018

¹⁵ United Nations Development Program

¹⁶ <https://www.flickr.com/photos/ulrichmunstermann/4910869896>, viewed 31-5-2018

In 2012 about 432 ha of tomatoes were grown in cold (unheated) greenhouses with a production of 41,955 tons (in 2013 428 ha and 42,187 tons). Chili pepper is the only vegetable with a higher production area in greenhouses (922 ha). The region with cold greenhouse tomato production are mostly on the Eastern coast of Tunisia.

The area of heated greenhouses in 2013 was 143 ha which is much less. It is concentrated in Gabes, close to the Sahara, where the geothermal heating is available. The production equalled 25,873 tons, implying a higher average yield than cold greenhouses (as stated in **Table 7**).

In small tunnels the area of tomato production in 2012 was 511 ha. Detailed data later than 2013 were not found. Only the total geothermal greenhouse potential in 2017 is estimated at 380 ha, but so far about 150 ha are operational [21].

| greenhouse type | cold greenhouse | heated greenhouse | small tunnel |
|--------------------------------|-----------------|-------------------|---------------|
| year | 2012 | 2013 | 2012 |
| region | area (ha) | area (ha) | area (ha) |
| Gabes | | 128 | 43 |
| Kairouan | | | 55 |
| Kebill | | 10 | |
| Mahdia | 33 | | |
| Monastir | 250 | | |
| Nabeul | 46 | | |
| Other | 36 | | 3 |
| Sfax | 1 | | 336 |
| Sidi Bouzid | 46 | | 74 |
| Sousse | 20 | | |
| Tozeur | | 5 | |
| Total area | 432 | 143 | 511 |
| Total production (tons) | 41,955 | 25,873 | 30,000 |

Table 7: production data on various greenhouse types

The main tomato varieties cultivated in greenhouses are Mussa, Jawhra, Amal and Twarga¹⁷. It is important to note that between November 15 and April 30 (off season, when greenhouses are in production) there is a period of exemption from customs duties to the EU for fresh tomatoes¹⁸.

3.1.3 Organic production

Organic farming is a growing niche, and its environmental, health and economic benefits have attracted increased public and especially government attention. The State has strongly strengthened professional skills in the organic farming sector, which has enabled Tunisia to obtain accreditation as an organic exporter. It has become the 8th country accredited in this field on the European Union market. In 2013 this accreditation has been renewed and renewed every year. Accordingly, the label 'Bio Tunisia' was created.



Figure 9: Bio Tunisia organic label

Incentives by the government for organic farming are:

- A 30% subsidy relating to equipment, instruments and means specific to organic production

¹⁷ <http://www.server-tn.net/fr/server-activites.html>, viewed 3-6-2018

¹⁸ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A21998A0330%2801%29>, viewed 1-6-2018

- A grant of 70% of control and certification fees up to 5000 Dinars for five years for the benefit of organic investors.
- Increase of the ceiling of the annual subsidy devoted to the control and the certification for the producers members of the groups of development, the cooperatives and the professional groups, from 5 thousand to 10 thousand dinars a year.

Other measures were also taken to give a new impetus to this sector, and it is for this reason that a "BIO" cell was set up at the level of the Interprofessional Group of Vegetables (GIL) in charge of the promotion of organic vegetables and identify marketing opportunities for organic products.

In Tunisia, the production of organic vegetables reached in 2012 about 783 tons from an area of 93 ha against 76 ha in 2013, the main cultivated species: faba beans, peas, potatoes, garlic, beans, parsley, tomatoes Artichoke and hot pepper. The production share of organic tomatoes is between 25 and 30%, about 200 tons, which is about 0,02% of the production of regular tomatoes¹⁹. There are no reference data available on organic tomato production in the Netherlands, but the market share in the supermarket for fruits and vegetables is about 4% and the acreage for organic agriculture is 3,1% [22]. In Tunisia Sanlucar (also known as "La Cinquieme Saison", the largest exporter in Tunisia) is a frontrunner in this area. It has an integrated vision on sustainability including pest management, organic production and waste management.

3.2 Collection centres

Collection centres are the intermediaries between producers and processors, but that does not mean that they constitute a mandatory transition between the two actors. In season 70% of the tomato farmers are supplying to collection centres, 10% to local wholesale and regional markets, and 20% to processing units. Generally, the small producers (less than 5 hectares) pass through the collection centres because they do not have sufficient capital to invest in means of transport for their harvest. The centres are close to the production sites, but in general processing centres are not. The transport from the collection centres is arranged by the processing companies (outsourced).

There are 300 collection centres in the country today. Their number varies each year. It is difficult to characterize them because of the informality of their infrastructures: most do not have storage or a head office. Each centre works with about 30 farmers. The biggest processors can work with about twenty centres. The commission charged by the collection centre is recommended at 3%, but processors influence the height of the centre remuneration (negotiated in the contract) [17]. Few standards apply to collection centres. For example, the weight of tomatoes delivered is officially equal to the weight of the means of transport, once full, to which the weight of the means of transport is subtracted from the empty boxes. In reality, the tare is very approximate (weight arbitrary means of transport), the scales have more or less large margins of error, and no control can ensure that the amount received by the collection centre is the same as that received at the factory. The centres do not have a storage platform. Delivery is not controlled, and informal sales to other companies (fresh market, industry) could take place before arrival at the plant. The manager of the collection centre, although in charge, has great difficulty in controlling the actual activities of the collection centre, as among other things the commission that it grants itself.

To tackle the complaints of farmers and processors the government decided in 2017²⁰ that four tomato processing units will be processing tomatoes for quality processing in the coming summer season, highlighting the need to control weighing equipment and stating that a commission will control the weighing methods. The action will focus on organizing tomato collection centres, within the framework of the law and transparency, taking into account the claims of farmers and industrialists. In this context GICA will work to implement the production contracts to ensure the win for both parties.

At the collection centres no added value activities take place like sorting, washing, quality control. Nevertheless, they are of importance to the processors as a logistic hub for collection and moreover

¹⁹ http://www.gil.com.tn/fr/staticPage?label=produits-biologiques_6, viewed 13-6-2018

²⁰ <https://www.webmanagercenter.com/2017/04/06/405232/nabeul-debat-sur-les-problematiques-de-la-filiere-tomate/>, viewed 17-6-2018

they have good insight in the production sites in the region, which is a competitive advantage late in the season when produce is scarce.

3.3 Processing industry

Between 650 and 950 kton of fresh tomatoes are processed annually into double and triple tomato paste and other canned tomatoes.

| Production (in kton) | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|----------------------|-------|-------|-------|------|-------|-------|-------|
| tomato concentrates | 140.8 | 141.4 | 134.3 | 96.8 | 111.1 | 134.0 | 102.2 |

Table 8: production of processed tomatoes in Tunisia [18]

By far DCT production is the highest. In 2013 about 92% of the processed tomatoes became DCT, 7.3% dried tomatoes and 0.7% the rest like cubed and peeled tomatoes (see **Figure 8**²¹). The conversion factor from fresh to DCT in 2013 was 6,4 kg fresh for 1 kg of DCT.



Figure 10: examples of processed tomato products in Tunisia

The processing sector employs 10,000 workers of which 80% is seasonal, which is from begin of June till the end of August. In 1995, 42 processing units produced double concentrate. Only 25 are functional in 2016. These are located mostly in Nabeul; an overview is shown in **Table 9**²²:

| Nabeul | Kairouan | Ben Arous | Béja | La Manouba | Ariana | Le Kef | Sidi Azoud | Total |
|--------|----------|-----------|------|------------|--------|--------|------------|-------|
| 14 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 25 |

Table 9: number of tomato processors per region in Tunisia

The main DCT processors in Tunisia are STICAP, SICAM, Jouda, Amira and Abida.

3.4 Distribution

3.4.1 Wholesale

Wholesalers buy their processed tomato products from processors, and the other way around they can be in contact with 150 to 250 wholesalers according to their size. These are not contracted, and wholesalers do not buy all the time from the same processor. The delivery can be done by subcontracting, by the processor or the wholesaler. Although price liberalization has been installed for most products some years, the price of DCT 4/4 (800 gr) has hitherto been administered by the state.

On the sales side retailers rarely visit processors (since almost all of them they order smaller quantities). Retailers usually work with a few wholesalers, often chosen by their geographical proximity, whose trade relations are long-lasting. Wholesalers deliver the goods themselves. The final price is administered by the state, and the wholesaler and retailer margins are set at 4% and 8% respectively. The price of double concentrate, whatever the volume ordered, is never negotiated. The price negotiated between 2010 and 2015 is shown in **Table 10**.

²¹ http://www.sicam-tunisia.com/%3fpage_id=6481/, viewed 27-5-2018

²² <http://www.gica.ind.tn/fr/index1.php?id=123>, viewed 27-5-2018

| DCT 4/4 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---------|-------|-------|-------|-------|-------|-------|
| Price | 1,670 | 1,600 | 1,600 | 1,890 | 2,050 | 2,300 |

Table 10: distribution price for DCT 4/4 (800 gr) fixed by the government

For fresh tomatoes there is no fixed price, only a reference price. The tomato price is very volatile (see e.g. October and November 2016 versus 2017 in **Table 11**). It is a push market, which makes investment difficult, because the price is very unpredictable. Data on the tomato wholesale price in Tunis²³ are shown below:

| Tunis wholesale market | Average price fresh tomatoes (millimes ²⁴ /kg) | | | | |
|------------------------|---|-------------|------------|-------------|------|
| | Year → | 2015 | 2016 | 2017 | 2018 |
| January | | 1192 | 926 | 1421 | 1276 |
| February | | 1295 | 988 | 1975 | 946 |
| March | | 1513 | 957 | 1981 | |
| April | | 1503 | 1105 | 2510 | |
| May | | 1418 | 1337 | 1391 | |
| June | | 923 | 1238 | 1060 | |
| July | | 653 | 731 | 778 | |
| August | | 584 | 703 | 829 | |
| September | | 595 | 733 | 1178 | |
| October | | 1046 | 665 | 2314 | |
| November | | 1158 | 599 | 2291 | |
| December | | 1001 | 770 | 2048 | |
| Mean | | 1073 | 896 | 1648 | |
| Stdev | | 336 | 237 | 610 | |

Table 11: wholesale price fresh tomato in Tunis



Figure 11: Tunis central wholesale market

In chapter 4 the pricing system is discussed.

3.4.2 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 mom and pop shops

²³ Picture is from <http://www.joaoleitao.com/adventure/visit-tunisia/>, viewed 3-6-2018

²⁴ 1000 millimes = 1 Tunisian Dinar

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) [23]. 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 [24].

The product range of tomato is fresh, concentrated (DCT and TCT), dried tomato, juice, powder and peeled tomato. The quality of the fresh tomato has a dip in September-October, and then there is a small price increase. Most of the retailers are relatively small and hence their order size is not cost-effective for processors. Therefore, retailers in general order from one or two wholesalers (in the proximity) for a longer period.



Figure 12: fresh tomatoes in Carrefour in Tunis (picture: Greet Blom)

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. The number of lodging locations and restaurants is increasing significantly every year:

| Year | 2012 | 2013 | 2014 | 2015 |
|---|--------|--------|--------|--------|
| number of lodging locations and restaurants | 29,698 | 31,493 | 33,503 | 35,761 |
| Increase | | +6% | +6% | +7% |

Table 12: development of foodservice sector in Tunisia

3.5 Export

There are two main tomato export products: fresh tomatoes and DCT. Fresh tomatoes for export are mainly produced in greenhouses of large farmer companies. Since most export is to the EU (between 80-85% in weight) these large companies are certified (GlobalGAP). France, the Netherlands and Germany cover already 78% of the tomato fresh export (see **Table 14**).

| Fresh tomato exports from Tunisia to ... (tons) | 2013 | 2014 | 2015 | 2016 | 2016% |
|---|-------|-------|-------|-------|-------|
| France | 7,654 | 6,350 | 4,608 | 4,947 | 37% |
| Netherlands | 1,020 | 2,069 | 3,011 | 4,055 | 30% |
| Germany | 494 | 216 | 769 | 1,492 | 11% |
| Russian Federation | 177 | 358 | 376 | 916 | 7% |
| United Arab Emirates | 777 | 1061 | 823 | 751 | 6% |
| Italy | 1,469 | 2,004 | 1,702 | 691 | 5% |
| Saudi Arabia | | | 48 | 197 | 1% |
| Czechia | 42 | 79 | 89 | 116 | 1% |
| Kuwait | 33 | 289 | 110 | 90 | 1% |
| Poland | 181 | 86 | 21 | 70 | 1% |

| | | | | | |
|--------------|---------------|---------------|---------------|---------------|-------------|
| Austria | 0 | 2 | 2,181 | 0 | 0% |
| Belarus | 29 | 0 | 306 | 0 | 0% |
| Other | 214 | 79 | 182 | 178 | 1% |
| Total | 12,092 | 12,594 | 14,224 | 13,503 | 100% |

Table 13: export of Tunisian fresh tomatoes 2013-2016

As mentioned in paragraph 3.1.2 currently between November 15 and April 30 there is a period of exemption from customs duties to the EU for fresh tomatoes. Note that it used to be from October 15 till May 31. These are exactly the months that fresh tomatoes are very competitive and exported as shown in **Table 14**.

| Monthly export fresh tomatoes (2016) | weight(tons) | value (k€) | price in €/kg |
|--------------------------------------|--------------|------------|---------------|
| January | 1,647 | 2,140 | € 1.30 |
| February | 1,641 | 2,038 | € 1.24 |
| March | 1,768 | 2,784 | € 1.58 |
| April | 2,249 | 4,370 | € 1.94 |
| May | 1,358 | 2,603 | € 1.92 |
| June | 477 | 502 | € 1.05 |
| July | 168 | 102 | € 0.60 |
| August | 21 | 22 | € 1.07 |
| September | 2 | 6 | € 2.99 |
| October | 4 | 13 | € 3.20 |
| November | 514 | 669 | € 1.30 |
| December | 1,146 | 2,261 | € 1.97 |

Table 14: monthly export of fresh tomatoes from Tunisia in 2016²⁵

Note that also for other fruits and vegetables like cucumber, melon and chili pepper there are certain months a year where customs duties are zero.

The export of DCT is to Libya mainly. The size of the flows however, is very unstable.

| DCT export Tunisia (tons) | 2013 | 2014 | 2015 | 2016 | 2016% |
|---------------------------|--------------|-------------|-------------|--------------|-------------|
| Libya | 16681 | 1425 | 5557 | 11282 | 88% |
| France | 359 | 296 | 456 | 639 | 5% |
| Algeria | 1093 | 58 | 67 | 104 | 1% |
| Other | 4393 | 1175 | 1242 | 829 | 6% |
| Total | 22525 | 2955 | 7322 | 12853 | 100% |

Table 15: export of DCT from Tunisia²⁶

3.6 Consumption

In 2015 the average expenditure on food and non-alcoholic drinks was 1118 TND, which is 28.9% of his total expenditure. Housing, electricity and water is the other large share of the expenses with 26.6%. The consumption of fresh vegetables was 85.3 kg per person.

The main tomato products eaten in the Tunisian society are fresh tomatoes and DCT. Fresh tomatoes are used in salads, whereas DCT is in the preparation of dishes. The annual consumption of fresh tomatoes is estimated at 20 kg/y, and the industrial consumption (mainly concentrate) is about 10 kg/y, which requires 60 kg/y of fresh tomatoes²⁷. This makes Tunisia the largest consumer of tomatoes in the world.

²⁵ UN Comtrade, data extracted 4-6-2018

²⁶ UN Comtrade, data extracted 4-6-2018

²⁷ <https://africanmanager.com/le-tunisien-est-le-plus-gros-consommateur-de-tomates-en-conserve/>, viewed 24-5-2018

3.7 Transport

Whether the collection centre or the industrial is responsible for transport, it is usually of poor quality. From production to the collection centre, transport is done in plastic crates (**Figure 10**)²⁸. But the delivery to the industry, by the centre or subcontracted, is realized in bulk. In this case the tomatoes at the lower level are crushed, the sand is infiltrated.

Tomatoes are delivered to the processors in bulk by the collection centres. This had a great impact on the quality of the delivered product: infiltration of non-filterable sand, loss of volume for the lower level, over-ripening for the upper level. The distance between production areas and processing areas during the last decade has increased tomato travel time. The impact on the nutritional quality of the product is certain, but difficult to quantify.



Figure 13: tomato transport in plastic crates

²⁸ <https://inkyfada.com/2014/12/culture-tomate-agriculteurs-tunisie/> , viewed 31-5-2018

4 The pricing system

The Tunisian price regulation legislation consists mainly of the Law on Competition and Prices which stipulates that the prices of goods and services are freely determined by the play of competition, except for those excluded from the free pricing regime. The goods and services excluded from the free pricing regime are listed in **Table 9**. These are all either "staples" whose price is subsidized by the State, services provided by State monopolies, or activities characterized by the absence of competition.

List of products and services subject to the authorized price regime at all stages

A Subsidized bread; subsidized flour and semolina; subsidized couscous and pasta; subsidized edible oils; subsidized sugar; paper; subsidized school textbooks and notebooks; tea; fuels, including LPG; electricity, water and gas; passenger transport fares; medicaments and medical acts; subsidized reconstituted milk; charges for postal and telephone services; tobacco; matches and alcohol; charges for port services; hot beverages (coffee and tea) served in cafés of categories 1, 2 and 3.

List of products subject to the authorized price regime at the production stage

B Salt; baker's yeast; roasted coffee; beer; metal barrels and containers; motor vehicles; lime; cement and reinforcing bars; compressed gas.

List of products subject to restrictions on distributor's margin

C Rice; citrus fruit; table grapes; dates; other fruit; potatoes; tomatoes; pimentos; onions; other vegetables; plants and condiments; poultry; eggs; bran and milling products; butter; tomato concentrate; lump sugar; roasted coffee; yeast; beer; artificial cement; white cement; reinforcing bars; metal containers; private cars; vans; coaches; buses; lorries; trailers; other road vehicles; school ink; compressed gas; school paper; school notebooks; baby food containing flour and milk.

Table 16: Goods and services at controlled prices; Decree No. 95-1142 of 28 June 1995

List A products are subject to the controlled price regime at all stages (production and distribution), that is to say, the price levels or price changes are predetermined by the State on the basis of the company's costs and accounts, or the data for the sector in the case of sectoral authorization. List B products are also subject to price authorization, at the production stage, in sectors with insufficient competition. List C products are subject to self-authorization at the distribution stage, that is to say, the company determines the price by applying to the cost price a mark-up fixed in advance by the State; prices in this category are subject to post facto checks. In practice, some of these products are no longer subject to these measures [25].

Tomato constitutes an important part of a Tunisian diet. The strategy of Tunisian agricultural marketing aims to maintain the production of tomatoes and other vegetables in domestic markets in order to ensure the necessary supply, avoid shortage and control prices. Despite this strategy, a rapid price increase is found after the revolution. It has led to unbalanced markets and unorganized circuit development with increasing numbers of intermediaries.

Concerning the tomato, the state is involved in the processed sector as in the fresh sector. The latter has the right to speak on the boards of directors of the various support groups. By this link, it intervenes in the fixing of the reference prices of the raw material. In addition, the Ministry of Commerce and the Ministry of Industry work closely with the industry when administering the price of the double concentrate of tomatoes. UTICA (representing the companies) and UTAP (representing the farmers) negotiate on a regular basis on the reference price for fresh tomatoes and the distribution price for DCT 800 gram. Currently, the price of the double concentrate of tomatoes for the box of 1/2 (400 grams) is not regulated, but it is negotiated for the box 4/4 (800 grams). Moreover, the DCT margins of wholesalers and retailers are set by the state at 4% and 8%, respectively.

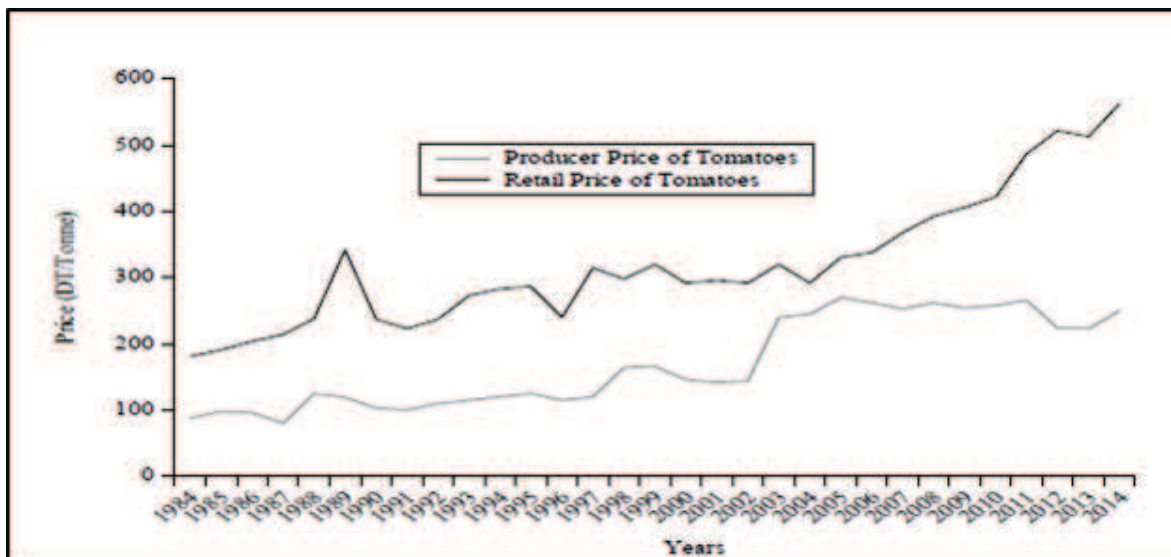


Figure 14: price development 1984-2014 in production and distribution/retail (at constant prices)

What happens to various price controlled agricultural products in Tunisia is that, whatever the quality of the product delivered, it is paid at the same price. All varieties delivered are mixed. A producer is not valued for the quality of his work, which does not encourage him in this process. Producers' dependence on processors limits the improvement of cultivation techniques that could improve the nutritional quality of tomatoes, reinforced by the non-existent quality bonus and which does not encourage producers to invest.

The liberalization of prices of tomato paste is discussed for a few years now. It enables the processors to diversify their assortment and thus better reflect consumer demand. But it could be very harmful for small producers and domestic production, since low quality will become unmarketable or only at very low prices. On the other hand, it would lead to better valuation for export. To avoid liberalization to eventually strengthen the duality within the sector a solution must be found for the transition of farmers to improve their performance on quality, yield, efficiency, etc.

5 SWOT analysis

In order to identify opportunities for Dutch companies to do business in the tomato sector in Tunisia a SWOT analysis is carried out. Information is collected from interviews during the field visit in Tunisia from May 6-12, 2018, and from literature.

| Strengths | Weaknesses |
|---|---|
| <ul style="list-style-type: none"> - Tunisia is nr 16 in worldwide production of tomatoes - The collection centres are the link between 10,000 farmers serving as logistic hubs to connect them to the market - The sunlight in Tunisia is better for tomato production than in Spain - The humidity in Tunisia is not to high - Government has various tax incentives to attract foreign investment - The availability of geothermal heating - Good infrastructure in Tunisia - Various tax incentives for foreign investment - International financial support in price liberalization process - Tunisia is the largest consumer of tomatoes in the world | <ul style="list-style-type: none"> - Field sizes too small (mostly 1-2ha) - Insufficient mechanisation - Time between harvest and actual transport to collection centre causes quality decay - No added value at collection centre itself - No proper equipment available for small plots - Not enough labour (especially in Nabeul) - Variability in price - Young people leave the agricultural sector - No quality incentive, no standards - Transport from collection centre to processor is in bulk - In processing choice of variety is not based on consumer preference - Tunisia is not marketed very well as a potential country for agricultural production |
| Opportunities | Threats |
| <ul style="list-style-type: none"> - Mechanisation offers great potential to increase yields substantially - Access to finance by registration ownership small holders - Adapt varieties to consumer demand - Add more value at collection centre - To rebalance the forces, institutions should educate producers to organize collectively (eg through a cooperative use of farm equipment). This would improve the exchange of information, to be less dependent financially and encourage investment. - Environmental issues are put on the political agenda recently, supported by financial incentives. This opens doors for waste treatment investment. | <ul style="list-style-type: none"> - Fear for unstable political situations in the region and hence in Tunisia - The impact of price liberalization on the small farmers (transformation process should be managed well) |

Most of the elements in this SWOT analysis are valid for fruits and vegetables in general. Only the involvement of the government in the pricing system is related to some products in this category.

6 Policy in the tomato sector

Due to the restructuring of the tomato industry and unbalanced relations between the actors, the state tries to get involved in the organization through taxes and incentives. When it struggled to compete on the international market, two taxes of 5 millimes / kg of raw material and 28 millimes per kg of DCT were levied from 2005 by the state and were used to subsidize exporting companies. Today, this tax serves to establish a strong and autonomous sector, with the following objectives:

- Improve yields, still low compared to the international average
- Establish a payment to quality
- Saving irrigation water
- Provide technical assistance and training programs to farmers
- Diversify the production range.



Figure 15: Tunisia's government in Tunis February 9, 2015. REUTERS/Zoubeir Souissi

Food subsidies have positive impact on the life of the vulnerable and those most in need, including the tomato growers. However, current food subsidies are financially unsustainable, in addition, universal targeting criteria undermines the effectiveness in achieving poverty reduction. Therefore, the design and implementation modality of food subsidies need to be re-evaluated. To reorient its balances, Tunisia needs to slash government spending. This means an end to highly subsidized goods such as fuel and food. The removal of subsidies puts pressure on vulnerable Tunisian pocketbooks, leading to a reliance on illicit markets for their survival.

The proper use of international assistance would help Tunisia realize the delicate policy balance that gives equal weight to both security and economic issues. Several states already provide aid to bolster the country's agenda. The influx of cash would allow the government to ease subsidies out while counterbalancing them with cash handouts to minimize the pain to citizens. New employment and job creation programs for border areas would prevent the temptation to resort to the informal economy.

There is already international support by a.o. the EU. The EU participates with Tunisia in de project TUNISIA 2020, a five-year plan launched in 2016, aims to achieve an annual growth rate of over 4 percent by 2020. It defines a new vision of social and economic development based on highly qualified human resources and first-class infrastructure. This plan aims to have a significant impact on the agriculture sector and rural development.

7 Opportunities for the Dutch agricultural sector

In this study various challenges for the Tunisian tomato sector are identified. If these challenges lead to opportunities for the Dutch agri-sector does not only depend on the availability of knowledge, technology and financial means. The main threshold for investment and cooperation between the two countries is the governmental control on price. If prices are fixed, whatever the quality is, there is no incentive to differentiate the market and add value by an investment. Nevertheless, these opportunities will come into place when the Tunisian government has taken the next steps in price liberalization, which is still for discussion. Hence, they will be mentioned, however not prioritized.

7.1 Greenhouse production

In the Netherlands tomato production is in competition with Spain and Italy in wintertime, because the sun is stronger in the South of Europe. To be competitive in the market year-round production is an advantage. Hence during winter growth-light is used to keep the production and quality on a high level. However, this kind of light is expensive, which reduces your margin and/or market. In that context Tunisia is a good alternative to start tomato greenhouse production, compared to Morocco the humidity is lower and compared to Spain there are more hours of sunshine. When production is transported directly to Europe there is no mixing with the price system and because of the high market prices investments can pay off. There are Tunisian tomato exporters growing in greenhouses, however interviews learned that Dutch knowledge is welcome for further upgrading and upscaling. A list of tomato exporters in Tunisia is in Appendix A.

7.2 Waste stream use

Losses occur at various stages in the tomato supply chain. First during transport from farm to collection centre because the time between harvest and transport can be long and tomatoes are in the sun waiting. Second, the transport in bulk (cost reduction) from the collection centre to the processors causes a lot of mechanical damage and hence losses. In 2016 the losses in tomato are estimated at 60,000 tons²⁹ (statistics on tomato are hard to find in Tunisia compared to e.g. dairy).

Waste of tomatoes can be used for bulk juices and natural dyes. Results indicated that tomato by-products are not only a green source of lycopene-rich oleoresin and tomato seed oil (TSO) and of protein with good nutritional quality but also a source of lignocellulosic matter with potential for bioethanol production [26].

The government implemented various incentives for (food) waste treatment, which is a new sector. The Dutch company Provalor³⁰ makes vegetable-juices and could invest or exploit their knowledge and try to connect to Tunisian investors.

7.3 Other

Opportunities in case price liberalization has taken place:

a) Upgrading collection centres

For the collection centres various challenges were described in the previous text. In the process of price liberalization quality will become important. This implies additional logistics are required in the supply chain to shift the flows to the different markets. The best place to do this in Tunisia is in the

²⁹ FAOSTAT, viewed 6-6-2018

³⁰ <http://www.provalor.nl/>, viewed 31-5-2018

collection centres. The farm scale is too small for that. Simple activities like washing, sorting, put it in optimal packaging for transport to processors and maybe some cooling. The following questions need to be answered:

- What activities need to take place in which collection centre?
- What is the appropriate scale for these activities?
- What is the appropriate technology for these activities (if necessary)?
- Can other fruit and vegetables be added in the new logistic structure (economies of scale)?
- What is the business model for this new version of the collection centre?

These kinds of activities are regular business for Wageningen UR/Food & Biobased Research, national as well as international. It is worthwhile to investigate the opportunity to do a pilot project for one or two collection centres and use the (methodology and) result to apply it for other collection centres, not only for tomato. This kind of intervention requires a multi-disciplinary approach and team where cross-learnings can be at a high level.

b) Optimizing transport

Currently food losses are large between collection centres and processors, because the transport is in bulk. Use of proper transport packaging and eventually cooling could reduce these losses significantly.

c) Mechanization

When the supply chain flows are based on quality level processors prefer uniformity of the product, which implies the need for upscaling the farms and standardization of the products and their cultivation. To reduce the cost efficiency can be induced by mechanization.

d) Standardisation

In a market driven supply chain where quality and price determine the direction of the flow it is important to make quality objective. The Netherlands can provide the product characteristics required for classification and eventually tools to automate this process.

From the interviews during trip very often issues were addressed that cannot be tackled by Dutch investors. Some of them are cultural (lack of degree of organisation), infrastructural (road quality in certain regions) and some are political (pricing system). In that context some opportunities of investment have to wait until the country is further developed. An example of a future opportunity could be the mechanization on farm level. If some kind of scale is achieved or organised (by a cooperative) and prices are more stable investments like this might pay off.

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 16**:

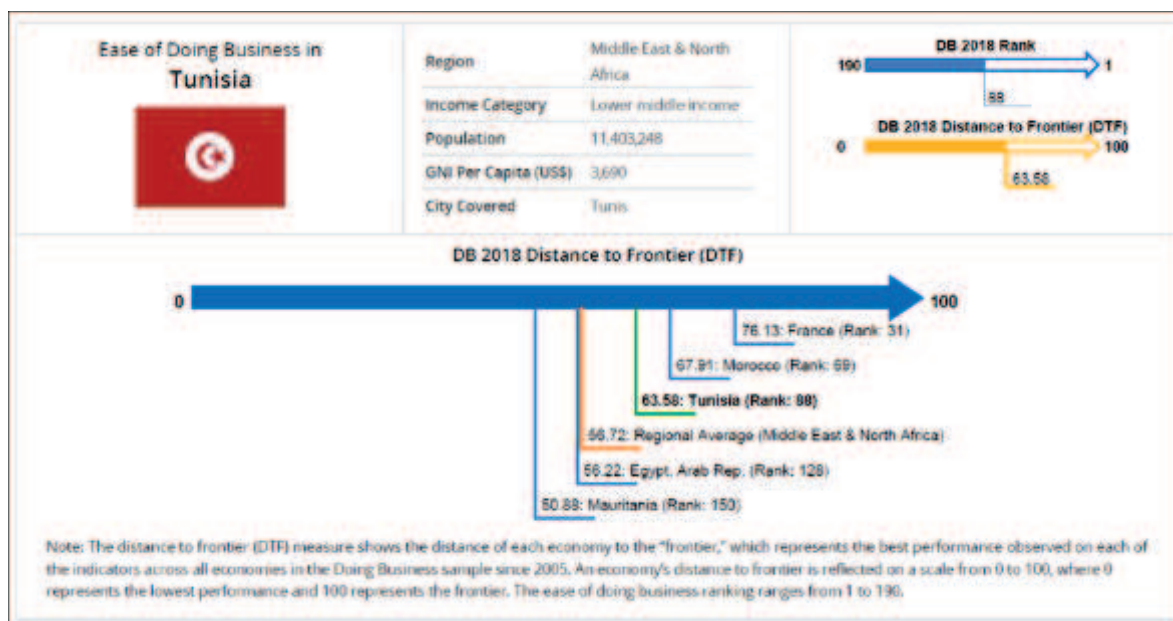


Figure 16: ease of Doing Business in Tunisia in 2018 according to the World Bank

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, Gêne 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 API³¹ 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 '*Greffe 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)
- i) File a declaration with the labour inspectorate.

³¹ Agency of Promotion of the Industry

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

Remark: these findings are not necessarily in accordance with the author's opinion.

General:

- There is a lot of bureaucracy
- The Dutch have a positive imago with respect to potatoes, dairy 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
- Local partner is necessary to deal with local banks, government and taxes
- Availability of educated staff

Logistics:

- Tunisia is relatively close to Europe. The trip from the greenhouse area in Morocco takes longer than from Tunisia
- The shipping from Tunisia to Marseille should remain reliable. The line is getting busier 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 2018³².



Figure 17: inflation rate Tunisia 2010-2018

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

Product related:

- Quality and food safety level of fresh and cherry tomatoes is similar to the Netherlands and hence year-round delivery is possible (competition with Spain and Italy in winter)
- For tomatoes the light in South Tunisia is perfect, better than Spain

³² <https://tradingeconomics.com/tunisia/inflation-cpi>, viewed 22-5-2018

-
- Tunisia enables a Dutch grower to supply the market
 - Knowledge and experience on production and climate control is not yet developed in Tunisia; in future probably electronically controlled

9 Conclusions

Tunisia belongs to the largest producers of tomato in the world, although the country is only three times as big as the Netherlands. The tomato (together with olive and date) is one of the most important crops in Tunisia. It is part of almost every meal of the average Tunisian citizen, mainly used as main ingredient (concentrate) of some sauce. But tomatoes are also produced in high quality in greenhouses for export. The Tunisian climate seems very good for greenhouse production. The analysis of the tomato sector in Tunisia led to the following conclusions:

- a) The tomato supply chain for the domestic market is (like other horticultural products) part of a push market. Hence prices are volatile and investments are a risk.
- b) Retail and out of home is still very much dominated by local companies. There are a few international players Carrefour, McDonald's in the market. Carrefour has some coverage of the country already but the rest is still at a small scale
- c) The government is involved in the pricing system of the tomato, by setting a reference price for the fresh tomato and a distribution price for the DCT (Double concentrate). Discussion on price liberalization is ongoing and when implemented will enhance quality-driven channel and price differentiation
- d) Collection centres are crucial for aggregation of flows but do not add value on the spot. This will change when quality becomes related to price
- e) The production of tomatoes is between 1 and 1.3 million tons a year. About 85-90% of the domestic tomato production is processed. Mainly in DCT.
- f) Tunisia is exporting fresh tomatoes to EU (France, Netherlands and Germany) in the off-season period from November till May. Between November 15 and April 30 there is a period of exemption from customs duties to the EU for fresh tomatoes. The export of DCT is mainly to Libya ($\approx 85\%$).
- g) Organic tomato production is negligible
- h) Short term opportunities for Dutch companies are:
 - greenhouse production: the climatic conditions are very good for tomato greenhouse production and enables Dutch tomato growers to be a year-round supplier, since during winter time production of excellent quality can be sourced from Tunisia
 - waste treatment: the waste is estimated at 60,000 tons and can be valorised by making juices and natural dyes
 - upgrading collection centres: quality will become an issue in the tomato supply chain, and hence logistics need to be adapted to make price differentiation possible. Activities like washing, sorting and transport packaging become important and can be implemented at the collection centres. Wageningen UR/FBR has a lot of experience in this field to match the actual local characteristics (e.g. sourcing area) with the appropriate scale and technology in order to have a feasible setup.
- i) Middle/long-term opportunities for Dutch companies are:
 - Upgrading collection centres
 - Optimizing transport
 - Mechanization
 - Standardisation of quality determination
- j) Tunisia is not well known in the Netherlands as a country to invest in. Although the political situation seems to stabilise, this is not the case for neighbouring countries. On the positive side the incentives for foreign investment and the level of the available infrastructure in various relevant areas look very attractive and justify more promotion for the country.

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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 Centre:</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. Group of Food Canning processors (GICA) | | | |
| GICA is a public economic utility, placed under the supervision of the Ministry of Industry, it brings together professionals from the fruit, vegetable and fish processing industries | | | |
| 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. Tunisian Union of Industry, Trade and Crafts (UTICA) | | | |
| The Tunisian Union of Industry, Commerce and Handicrafts is the national employers' centre; it brings together the professional structures of the different non-agricultural economic sectors (Industry, Trade, Services, Crafts and Small Professions). UTICA represents nearly 150,000 private companies from all sectors of activity (with the exception of Tourism and Banking and Finance). Most of these member companies are small and medium-sized enterprises. UTICA has more than 25,000 trade union leaders. Our mission revolves around actions to promote and energize the private sector, while being the spokesperson for companies with the public authorities. It plays a role in the pricing system for tomatoes. | | | |

| |
|--|
| 7. The Tunisian Union of Agriculture and Fisheries (UTAP) |
| The Tunisian Union 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. It plays a role in the pricing system for tomatoes. |

| 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) | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Name</th> <th>Function</th> <th>Phone</th> <th>Email</th> </tr> </thead> <tbody> <tr> <td>Ezzeddine Chalghaf</td> <td>Director</td> <td></td> <td>elies.hamza@iresa.agrinet.tn</td> </tr> </tbody> </table> | Name | Function | Phone | Email | Ezzeddine Chalghaf | Director | | elies.hamza@iresa.agrinet.tn |
| Name | Function | Phone | Email | | | | | |
| Ezzeddine Chalghaf | Director | | elies.hamza@iresa.agrinet.tn | | | | | |

| 9. Interprofessional Association for Vegetables (GIL) | | | | | | | | |
|--|------------------|---------------------------------------|--|-------|---------------|------------------|---------------------------------------|--|
| GIL is placed under the supervision of the Ministry of Agriculture and Water Resources and administered by a board of directors composed of twelve members, one-third of whom represents the administration. It's mission is: <ul style="list-style-type: none"> • Liaise between the different phases through which products pass through the value chains, help producers to integrate and encourage producers, processors and traders of agricultural products to work through production contracts, • Facilitate consultation between professionals and the administration in order to set the objectives of the various sectors, • Contribute to the balance of the market by using the various appropriate mechanisms and in collaboration and coordination with the professional and administrative organizations concerned, • To participate in the promotion of the export in collaboration and coordination with the professional and administrative organizations concerned, • Collect, analyze and archive information, set up data banks relating to the sectors that are the subject of their intervention, and carry out studies on the reality and prospects of these sectors at national and international level | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Name</th> <th>Function</th> <th>Phone</th> <th>Email</th> </tr> </thead> <tbody> <tr> <td>Ismail Ghezal</td> <td>Director-General</td> <td>+21671285522 +21699141542 (mobile)</td> <td>ghezal.iagronome@gmail.com</td> </tr> </tbody> </table> | Name | Function | Phone | Email | Ismail Ghezal | Director-General | +21671285522 +21699141542 (mobile) | ghezal.iagronome@gmail.com |
| Name | Function | Phone | Email | | | | | |
| Ismail Ghezal | Director-General | +21671285522 +21699141542 (mobile) | ghezal.iagronome@gmail.com | | | | | |

University

| 10. 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. | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Name</th> <th>Function</th> <th>Phone</th> <th>Email</th> </tr> </thead> <tbody> <tr> <td>Prof. Mahmoud Elies Hamza</td> <td>Director</td> <td>+21671840270</td> <td>elies.hamza@iresa.agrinet.tn</td> </tr> <tr> <td>Aniss Ben Rayana</td> <td></td> <td></td> <td>benrayana.aniss@iresa.agrinet.tn</td> </tr> </tbody> </table> | Name | Function | Phone | Email | Prof. Mahmoud Elies Hamza | Director | +21671840270 | elies.hamza@iresa.agrinet.tn | Aniss Ben Rayana | | | benrayana.aniss@iresa.agrinet.tn |
| Name | Function | Phone | Email | | | | | | | | | |
| Prof. Mahmoud Elies Hamza | Director | +21671840270 | elies.hamza@iresa.agrinet.tn | | | | | | | | | |
| Aniss Ben Rayana | | | benrayana.aniss@iresa.agrinet.tn | | | | | | | | | |

Embassy

| 11. Embassy of the Kingdom of the Netherlands | | | | | | | | | | | | |
|--|--|---------------------------------------|--|-------|------------------------------|------------|--------------|--|-----------|--|---------------------------------------|--|
| Address: 6-8 rue Meycen, 1082 Cité Mahrajène, Tunis | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Name</th> <th>Function</th> <th>Phone</th> <th>Email</th> </tr> </thead> <tbody> <tr> <td>Hans van Vloten Dissevelt</td> <td>Ambassador</td> <td>+21671155300</td> <td>tun-cdp@minbuza.nl</td> </tr> <tr> <td>Adel Ouni</td> <td>Deputy Head of the Economic Department</td> <td>+21671155303 +21698762163 (mobile)</td> <td>adel.ouni@minbuza.nl</td> </tr> </tbody> </table> | Name | Function | Phone | Email | Hans van Vloten Dissevelt | Ambassador | +21671155300 | tun-cdp@minbuza.nl | Adel Ouni | Deputy Head of the Economic Department | +21671155303 +21698762163 (mobile) | adel.ouni@minbuza.nl |
| Name | Function | Phone | Email | | | | | | | | | |
| Hans van Vloten Dissevelt | Ambassador | +21671155300 | tun-cdp@minbuza.nl | | | | | | | | | |
| Adel Ouni | Deputy Head of the Economic Department | +21671155303 +21698762163 (mobile) | adel.ouni@minbuza.nl | | | | | | | | | |

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. | | | |
| Name | Function | Phone | Email |
| Mourad Hichri | Manager fresh products | +21671940482 | Mourad.hichri@utic.com.tn |

| 12. Tomato exporters | | | |
|-----------------------------|--|--|---------------------------------|
| Name | Phone | Email | Product |
| ABAAB WAJDI | 71 859 185/ 186 | | tomato |
| ANIS DE COMMERCE | 96 997 548 | | onion, tomato |
| BAYREM IMPORT EXPORT | 71 332 568 | | tomato |
| BIOLIFE | 50523500 (Tarek) | | tomato biologique |
| CARTHAGE IMPORT EXPORT | 71 850 259 | | onion, tomato |
| DESERT JOY | 92 592 999 | zina-fresh@hotmail.fr | tomato geothermal |
| EASY FRESH | 73 237 127 / 29 329 021 Abdelaziz/ 23 252 112 rania | | tomato , squash, bean |
| JINENE ENNOUR EXPORT | 22 852 435 | | onion, tomato |
| LA CINQUIEME SAISON | (71) 656 555 / (75) 278 333/ 93 542 410 Dorra | siege@sanlucar.tn/ exploitation@sanlucar.tn | tomato geothermal |
| LES AGRUMES DU GOLFE | 72 256 420 / 751 / 72 211 323 / aziza 98 263 870 | stag@planet.tn | Dried tomato |
| LES DELICES DU SUD | (95) 900 558 / 75 335 335 | lesdelicesdusud@yahoo. fr | tomato geothermal |
| MAISON L'OASIS | 75 330 755 / 98 457 072 | | tomato geothermal |
| MED FRUIT ET LEGUMES | 93 056 678 imen | | potato, tomato |
| MEDITERRANEAN INTER-LINK | 70 731 197 NADER 25 903 526 | horchani.s@planet.tn | Dried tomato |
| SAMEC | (75) 279 199/ (98) 924 725 25 441 420 Ismail Htira | zinafresh@gmail.fr | tomato geothermal |
| SERVER | 71 296 948 / 25 999 732 IMED 26 733 999 hichem | server.sa@gnet.tn | tomato geothermal |
| STE CARTHAGE | 73 200 392/ 21 330 256/ 22 467 345 | | onion, tomato, chilli pepper |
| STUCOD-AGRI | 71 308 666 / 898/838/ 98 344 545 | stucod@planet.tn | Dried tomato |
| TAWIT | 71 948 695 | tawit.net@gnet.tn | tomato, artichoke |
| TUNISIA FOOD | 20 301 108/ 55 200 844 | tunisia.food@gmail.com | Dried tomato |
| ZINA FRESH | (75) 279 199/ (98) 924 725 / 25 441 420 /25 924 725 (nejib zarrouk) | zina-fresh@hotmail.fr | tomato geothermal |

Appendix B Persons/organisations visited

During the field visit in total 16 people were interviewed in 10 interviews. For the tomato sector following interviewees were relevant:

| | Name | From | Function | E-mail | Phone |
|----|------------------------|--|--|--|------------------------------|
| 1 | Dr. Chniter Mohammed | National Institute of Agronomy, Tunis (INAT) | assistant | chniter2005@yahoo.fr | +2150973105 |
| 2 | prof Djemali Mnaouer | National Institute of Agronomy, Tunis (INAT) | | mdjemali@webmails.com | |
| 3 | Aymen Taboubi | Advans | Agricultural operations | ataboubi@advanstunisie.com | +21629916481 |
| 4 | Elliott Saint Gilles | Advans | Project Agriculture | esaint-gilles@advanstunisie.com | +21629916481 |
| 5 | Ismail Ghezal | Vegetables Professional Group | Directeur Général | ghezal.iagronome@gmail.com | +21671285522 |
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Report WFBR-1830

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This is a publication of
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This publication was commissioned by the ministry of Foreign Affairs.

© Netherlands Enterprise Agency | June 2018
Publication number: RVO-079-1801/RP-INT

NL Enterprise Agency is a department of the Dutch ministry of Economic Affairs and Climate Policy that implements government policy for Agricultural, sustainability, innovation, and international business and cooperation. NL Enterprise Agency is the contact point for businesses, educational institutions and government bodies for information and advice, financing, networking and regulatory matters.

Netherlands Enterprise Agency is part of the ministry of Economic Affairs and Climate Policy.