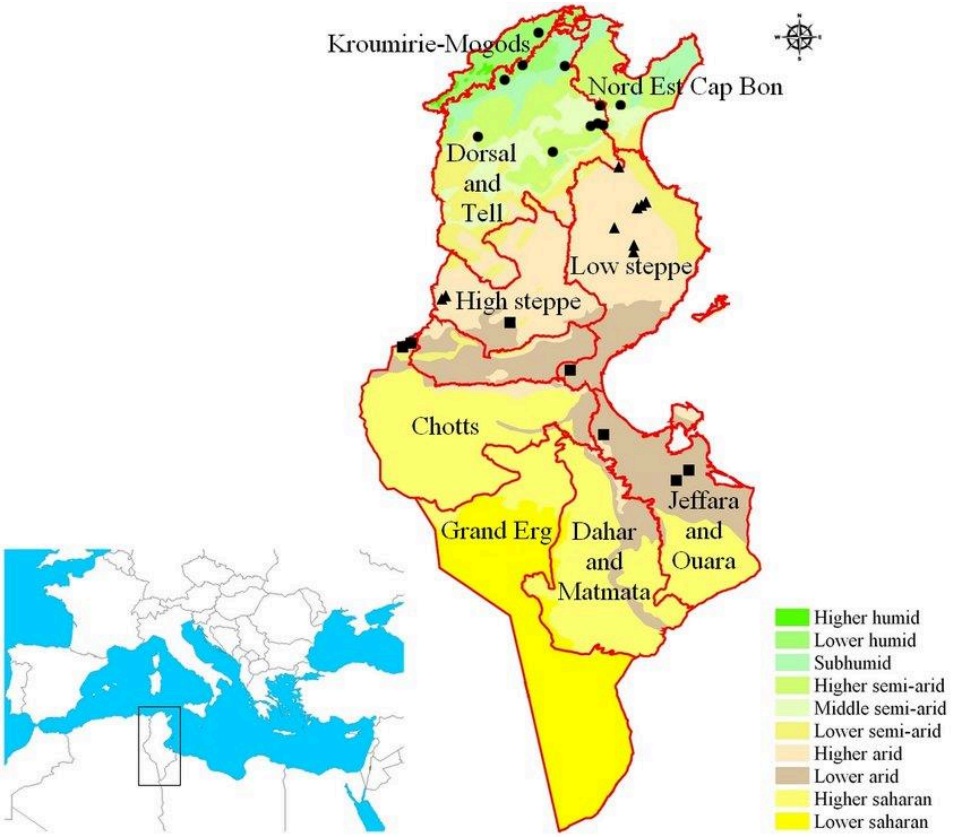
Netherlands Enterprise Agency

Business opportunities in Water- and Climate Smart Agriculture in Tunisia



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Authors: Niek Schelling, Martine de Jong

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Section 1. Setting the scene

1.1 Introduction

General Facts	
Name:	Republic of Tunisia
Capital:	Tunis, 30 Governorates
President:	Kais Saied
Surface:	163,610 km2, borders with Algeria, Libya and Mediterranean
Arable land:	25,950 km2 (16% of total area)
Population:	12.5 mln (2023), 91% Arabic, 5% Berber/Amazigh, 4% European
Languages:	Arabic (French)
Religion:	Islam (98%)
Currency:	Tunisian dinar (1 TND = € 0.30, November 2023)
Geography:	North: Atlas hills and mountains. South: Sahara Desert, coastal plains
GDP:	€ 40.6 bn (2022). Per capita: € 3,181. High unemployment rates
Total exports:	€ 12,35 bn (textiles, olive oils, dates, agrifood, petrochemicals, phosphate)
Total imports:	€ 16.72 bn (wheat, barley, maize, soy, machinery, vehicles, oil)

Since antiquity Tunisia is an appreciated producer of a large variety of agricultural products for local and foreign consumers. Europe is the most important export destination for olives, dates, tomatoes and other horticultural products, and fish, in fresh or processed form. Still, Tunisia is not self-sufficient in basic food commodities like cereals and sugar. Production methods are in many cases traditional, low-cost, low-tech, less efficient and not sustainable. Since 2016 Tunisia has turned into an economic decline, aggravated by the COVID crisis, and is suffering high unemployment rates especially among youth and women in rural areas. Changing climate conditions are severe and are causing long periods of extreme drought and high temperatures, affecting agricultural productivity, competitiveness and food security. Sweet water scarcity, product safety and quality and market access are tough challenges. Farmers are struggling for their livelihoods and look for solutions in better production methods and technologies. Investment in smart innovations, education and new entrepreneurship can help modernizing the Tunisian agricultural sectors and support sustainable rural employment. The Netherlands can help generating competitive business approaches and partnerships, arrange targeted training courses and provide useful materials and innovative technologies.

Therefore, the Dutch Government and Embassy have decided to organize a trade mission for Dutch companies and institutions in the field of water- and climate smart agriculture. The main objective of the mission is to get acquainted with the Tunisian needs and challenges and explore cooperation opportunities for sustainable improvement. Dutch companies and institutions will be introduced to their Tunisian counterparts to promote joint activities in the field of water- and climate smart agriculture, applied research and training. As a preparation of the mission, RVO will hold a seminar (26 January 2024) on climate smart agricultural opportunities to inform and motivate interested Dutch companies and institutions. The mission is scheduled for the first week of June. This trade mission and seminar are initiatives in the framework of the Programmatic Approach Sustainable Economic Development (PADEO) strategy for Tunisia of the Dutch Government. PADEO is focusing on stimulating youth employment and entrepreneurship in the agrifood sector.

The purpose of this mapping – as preparation for the seminar and trade mission - is to understand the challenges of some crucial value chains in Tunisia with regards to efficient water use and other sustainable agricultural techniques. The objective is to find Dutch solutions for these challenges and support cooperation opportunities with Tunisian counterparts. Dutch knowledge and expertise, especially on innovative methods of water and soil management, can help modernise critical parts of the sector, with the goal to be more efficient, economically viable and sustainable. In that way the agricultural enterprise will also become more attractive for skilled youth and investors.

In this research, stakeholders were interviewed to collect information on their experiences, problems and challenges, and to reflect on business opportunities (technology, methodology or knowledge) that may generate solutions. Also, a literature study has been performed on recent materials to source the demographic, economic, social and political situation in Tunisia. This is analysed to discover the potentials and obstacles to take in export to and from Tunisia.

1.2 Tunisia at a glance

Demography

The total population of Tunisia is estimated around 12.4 million in 2023, with a falling growth rate of 0.83%. The life expectancy is 75 years for male and 78,6 for females. High birth rates in the 80ties and 90ties have caused high numbers of young adults now with high unemployment. The median age is now 32.2 years and is on the rise. The population is expected to grow more calmly to 13.1 million in 2030 and 14.3 million in 2050. Tunisia is strongly urbanised especially in the cities along the mediterranean coast. The interior Governorates and the South are typically rural. Currently 69.3% of the Tunisian population is urban (2023). The rural population is now 30% (3.8 mln) and is expected to drop to 22% in 2050 (3.2 mln) of the total population. Some 820,000 persons are economically active in agriculture or 19.2% of the active population (FAO 2019). This demographic development indicates that less farmers must produce more food for more and mostly urban inhabitants. Together with the effects of climate change, this requires a development from small-scale (subsistence) farming to sustainable efficiency, market orientation, youth employment and resilience improvement in food production.

Political setting

High unemployment, mainly under youth and women, was one of the drivers of the 2011 revolution. Successive Governments have been trying to address these problems, but so far with limited success. Also, the present president Kais Saied sees modernizing agriculture as a key to create new perspective. The current Government is struggling with its migration approach especially of migrants from sub-Sahara Africa. Government policy targets for Tunisian agriculture are:

- improvement of farmers income and modernization of farms
- enhancing the contribution of agriculture to GDP (+ 11%)
- strengthening agricultural production
- creating jobs in rural areas
- improving national food security

The Ministry of Agriculture has some specific policy notes on water management and agriculture development and subsidy programs, extension service and regional authorities to implement policies and support farmers. The interviews underlined that the governmental policies focus on strengthening the agricultural value chains. However, those made also clear that the decisiveness of the government is demanding, and budgets are limited. Fighting widespread corruption is a big challenge for the Government.

Economy

Tunisia is a lower middle-income country with a market economy with strong Governmental regulations. Tunisia finalized tariffs dismantling for industrial products in 2008. It is associated to the EU in 1995 and it was the first Mediterranean country to enter in a free trade area with the EU. High birth rates in the last century and a low availability of decent jobs have caused high unemployment rates especially for youth and women. Most of the work in agriculture is for underskilled workers and for well-trained youngster is little employment available. The country was strongly hit by the COVID crisis (GDP -/- 9%) and it has high public sector wages and public debt. The large number of jobless young, working-age adults, deficiencies in primary and secondary education and the lack of job

creation and entrepreneurship, skills mismatches, hinder economic and societal development and cause misery and despair. Many young people choose to look for a future outside Tunisia, like migration to the EU or to the oil industry in Libya. Agriculture counts for 11.6 % to the GDP but is considered unattractive as the work is heavy and not well paid. The demand for food, urbanisation and need for sustainability, may boost agriculture as an opportunity for new employment, especially if skills development and entrepreneurship get the right motion.

Dutch cooperation
For the Dutch Government, Tunisia is a partner country with specific targets for development cooperation. The Dutch ministry of Foreign Affairs took the PADEO-initiative in 2021, as a programmatic approach in which the Embassy, RVO, agencies, local partners and knowledge institutions work together for a system change in private sector development, towards sustainable enterprise and decent employment. This approach brings synergy between Dutch support programs and promotes structural exchange of knowledge. The water- and climate smart agriculture trade mission in 2024 is part of this approach, promoting knowledge and business cooperation for rural economic development and youth employment (SDG 8). The Embassies have an important role in setting priorities, through (multi)annual planning. The existing support facilities are the main instruments for implementation, such as RVO (NFIA, PSD, BDC), Nuffic, FMO and PUM. The Dutch private and knowledge sectors should get more integrated in this framework to get good results.

1.3 Summary

Tunisia has a long agricultural tradition with strong connections to Europe and Africa. It has a splendid climate for the production of a large variety of crops appreciated by local and international consumers, including olive(oil), fruits and vegetables. This mapping recognizes the enormous impact and challenges of water scarcity, climatic changes, rural poverty and lack of innovative enterprise, putting pressure on the traditional food production systems. This urges the Tunisian society to direct the whole food production system to more technology, competitiveness and resilience. Dutch technology and expertise can help ambitious Tunisian farmers to improve their performance and resilience, through cooperation in business development, partnership and exchange of knowledge.

The Dutch Government and Embassy have launched the PADEO strategy to combine support mechanisms for strengthening the economy and youth employment in line with Tunisian policy priorities. The water- and climate smart agriculture mission is a crucial element in this approach and could be connected to other PADEO-activities, specific initiatives of other donors and in partnerships with Tunisian start-ups and incubators.

Section 2. Market attractiveness

2.1 Introduction

Several factors determine the attractiveness of Tunisia as a market for food products and agricultural development. The steady growth of the population, urbanisation and growth of supermarkets, physical conditions and the potentials of the work force can contribute to sustainable growth of the food value chains. Water scarcity, climate change, unemployment and bureaucracy are challenges that need to be addressed thoroughly. If these advantages and challenges are rightly tackled, Tunisia may offer promising opportunities for fruitful cooperation in agribusiness. Foreigners cannot own land in Tunisia but can get long-term lease contracts or cooperate with a local partner. Initiatives for new sustainable enterprises, start-ups and incubators, supported by education and training, can offer new employment and perspective.

2.2 Agriculture in general

Tunisia is only for 70% self-sufficient in basic food products such as cereals. Agriculture counts for 9.0% of the GDP, 10% of investments and 16% of the workforce is engaged in agriculture. Tunisian farmers produce wheat and barley, olives and olive oil, potatoes, tomatoes, watermelon, peppers, onions, carrots, dates and also dairy. Important agricultural exports include olive oil, dates, tomato (paste), potatoes and sea food. Rain-fed production of cereals is taking place in the humid north of the country, horticulture in northeastern and central irrigated zones and greenhouse production in the semi-arid zones in the south-east. Olive production takes places all over the country and production of soft fruit like strawberries is concentrated at the Cap Bon peninsula. There is an important organic sector for olives and vegetables, mainly for export to Europe. The food processing sector counted for 1,000 enterprises (> 10 employees), 20% for export purposes most in the northeast of the country.

Rural situation

Tunisia counted 516,000 agricultural (family) enterprises of more than 10 ha and 3% is more than 50 ha. Half of this area is covered with fruit trees (including olives) and one third by cereals. According to FAO Statistics, only 6% of farmers is organized in a cooperative or syndicate. Most small farmers sell their product to traders, collection centres or processors before harvesting. Planting materials, chemicals, machinery and harvesting are usually provided and prefinanced by these commercial parties. These costs are subducted from the farmers revenues. The interviews show that fragmentation of small farmers means that they are played off by these trading parties and are therefore unable to generate a good family income or investment capacity for their businesses. Collaboration can lead to a more market driven approach and improved bargaining position for small farmers in the value chain.

The farming population is aging rapidly and requires new and attractive perspectives for young farmers including women. Currently mostly unskilled workers are employed in agriculture for unattractive heavy work in the field or in food industries for low salaries. Agriculture currently offers limited opportunities for skilled young people and women. New attractiveness can come from new entrepreneurship, in combination with targeted education, focused on innovation, sustainable development and profitability. Access to land, credit, technology and markets are preconditions for successful entrepreneurship and higher-level rural employment.

Ecology, climate and water

Some 30% of Tunisia is arable land (16% productive), 27% pasture and forest, 43% unsuitable for agriculture (desert, mountains). Rainfall varies from 900 mm per year in the very North to less than 100 mm per year in the arid South with an average of 220 mm per year, mainly October – March. In summer temperatures can exceed 40°C and even 45°C in the desert. The winters are usually mild

(except for the arid SW). In general, the humidity levels are quite low and sunshine hours are high (good for horticulture).

The potential conventional water resources are estimated at 4,800 mln m3 per year (2,700 Mm3 surface water; 2,100 Mm3 ground water). In the northern and central parts, dam reservoirs are most important for agriculture while in the South the use of geothermal nappe water is dominant. Water consumption varies very much per product. Olives use 4.4 ton per kg, open field tomatoes consume 184 l/kg (in high-tech Dutch greenhouses, the water consumption is only 8 l/kg!). Proper irrigation, soil treatment and fertilization can make a huge difference in the use of natural resources like water and fertilizers.

Average water consumption in litres per kg of product, examples (WUR, Y. Hoekstra 2010)

Product	Liter/kg	Product	Liter/kg	Product	Liter/kg
Tea	24,960	Olives	4,393	Oranges	457
Beef	15,497	Rice	2,291	Onions	214
Cheese	4,916	Soybean	1,789	Watermelon	160
Eggs	3,340	Wheat	1,334	Tomatoes	184

It is expected that climate change will cause further imbalance between water resources and total water demand from 2020 onward. According to recent reports of IPCC, North Africa is extremely vulnerable and sensitive to the impact of climate change. In the past six years (2017-2023) long periods of extreme drought have caused harvests failures in the whole of North Africa and in particular also in Tunisia. Especially the production of rain-fed products like cereals, has suffered serious decline while also dam reservoirs get exhausted. This has forced Tunisia to import large quantities of wheat, barley and maize for bread and animal feed. These imports seriously exhaust the national budget.

In November 2023, the National Agriculture Observatory (ONAGRI) reports a precipitation deficit of 94% in most regions of the country. The most affected are regions in the North-West and Nort-East of the country with a rainfall of less than 8 mm in the period of 1 September – 15 November. The largest dam reservoir of Sidi El-Barrak produced in that period only 20 million m3 of water, only 10% of the average quantity. The reservoir fullness factor has dropped to 22.4%, underlining the urgency of the water scarcity problems and possible impact on food security. The Government needs to take measures and make water consumption by agricultural and other users, more efficient. The water policy (Eau 2050) gives priority to: 1. preservation of the northern water resources, 2. rehabilitation of water infrastructure, 3. incentives, restructuring and scientific support to rainfed agriculture, 4. aquifer recharge and water banking, 5. technological development on wastewater treatment, aquifer recharge and desalination, 6. improve water management and water use efficiency.

Technology

Technology levels in agriculture are mostly low especially in small-scale farming, because of lack of knowledge, low access to credit, inputs and technologies. Small farming enterprises cannot afford a well-equipped greenhouse or smart irrigation techniques to deal with water efficiency, automation and climate management. This makes farming unpopular for well-trained youngsters. Water scarcity, high temperatures and soil degradation force farmers to look for solutions to stay in production and competitive. Medium size farms and organized farmers (syndicates, associations, cooperatives) have some possibilities to modernize within the limits of their investment possibilities and market position. At the same time better education, knowledge transfer and entrepreneurship are needed to make technical innovations work. Innovative entrepreneurship is needed to modernize the sectors, through start-ups and incubators. The agricultural schools do not provide the appropriate skills needed for starting or running a modern, sustainable and profitable farming operation. So, a reconsideration and modernization of the education curriculum to more practically trained youngers will improve their

chances for decent employment or enterprise. On the other hand, some innovator companies and start-ups are active in climate smart agriculture and water efficiency.

Organic production
With a certified acreage of 320,000 ha (2020), Tunisia is the biggest producer of organic products on the African continent, followed by Tanzania (278,000 ha) and Egypt (116,000 ha). In Tunisia 74% of this area is for olives and olive oil, and 22% is for organic dates and is strongly export oriented. Other products comprise vegetables (tomato, garlic, potato, peas) and fruits, aromatic plants and herbs. As the EU is the main importer, the Tunisian government supports harmonizing legislation with the EU rules regarding organic production. Branding and marketing of these products is a challenge and opportunity at the same time. Organic production is supported by Government subsidies such as:

- 30 % for investments in specific machinery and equipment
- 70% for certification and audit costs

Products are marketed under the brand of: BioTunisiaOrganic.

Knowledge infrastructure
The Universities of Sfax and of Tunis (Carthage University) have full specialisations in agriculture, water management and rural development. The Institute of Agricultural Research and Higher Education (IRESA) is promoting and coordinating agricultural research and education among the different knowledge establishments, the agricultural extension and farmers. The National Agronomy Institute of Tunisia (INAT) in Tunis resorts under the ministries of Agriculture and of Education and is linked to the Carthage University of Tunis. It provides higher agronomic education and research.

Vocational and technical education and training (TVET) resorts under the “Ministry of Professional Education and Employment”. The connection between business needs and training programs is still weak. Strikingly, for higher educated youngsters in agriculture it is more difficult to find employment than for people with a lower level of education. The mostly low-tech SME’s do not require highly educated personnel but more practically trained and cheaper workers. Attractiveness of this agricultural work is usually low, uncertain and it is not well paid. Since 2013 the national vocational training system was reformed, but still the transition from school to work is difficult.
There are numerous public professional education centres for agricultural training (see www.raidet.tn), like the Centre de Formation Professionelle Agricole de Manouba. In the past the Netherlands has worked together on dairy with the education centre in Sidi Thabet (20 km from Tunis). There is also the National Institute for Continued Agricultural Education, the Institut National Pédagogique et de Formation Continue Agricole de Sidi Thabet. This institute develops education programs for trainers, extensionists and private advisers in agriculture. Many professional educational centres for agricultural training are outdated and lack basic needs, buildings need to be modernized and some machines replaced.

The Universities of Tunis and Sfax, INAT, AVFA, IRESA and the National Institute of Sidi Thabet, seem to be potential starting point for knowledge cooperation in sustainable agriculture. Nuffic is working with AFVA in the implementation of the Orange Knowledge Programme (OKP), focusing on promoting agricultural growth and employment in Agriculture (see Tunisia, Nuffic country Plan of Implementation OKP).

Collection centres and pricing
There are some 300 collection centres for tomatoes in the country. Most of them are badly equipped. Cooling or storage capacity is hardly present. Most important customer is the processing industry. The average collection centres serve some 20 or 30 local farmers. Collection centres may purchase harvest in advance from farmers and provide harvesters and other services (seeds, chemicals) to farmers.

Although prices for food are set in the free market, the Tunisian Government has a pricing system for some specific essential food products to protect both consumer and farmers. Subsidized products like bread, flour, pasta and couscous have an authorized price regime. Vegetables (like tomato, potato, onion) have a restricted distributors margin.

Wholesale prices of vegetables in Tunisia in 2023:

Product	Price low €/kg	Price high €/kg
Onions	0.48	0.58
Carrot	0.58	1.35
Lettuce	0.50	0.77
Tomato	0.28	1.48
Cucumber	2.23	5.09
Potato	0.30	0.55
Bell pepper	2.51	4.07

Processing industry

Many oil mills produce high quality olive oil across the country with a total production of 350,000 ton in the 2019/2020 harvest. Much of the exported oil is marketed under international brands. FAO and EBRD are working on a Tunisian origin system to keep added value in Tunisia (FAO 2023). Some 650-950 kTon of tomatoes are processed into double or triple concentrated tomato paste and other canned tomato products. In 2016 some 25 tomato processing plants were operational mainly in the north-east Cap Bon region. Potato processing is limited to one factory producing potato chips, in the Tunis region.

Government policies and branch organizations

The National Government of Tunisia wants to develop the agricultural sector into a modern, sustainable and profitable private business for food security and decent rural income. The Government gives special attention to deal with water scarcity and soil degradation problems. The Ministry of Agriculture and Hydraulic Resources and Fisheries (MARH) in Tunis is responsible for national policies in the field agricultural and rural development and water resources. It supports these policies through a number of professional agencies for knowledge development and extension, investment promotion and trade. Universities and a structure of research and vocational education institutes aim to help farmers in their production and business ambitions. The ministry operates regional programs for agricultural development and is taking care of the management of dam reservoirs and problems caused by drought, salinization and silting. Several national strategic plans have been launched to improve the rural, agricultural and water situation in Tunisia like the Vision 2035, Economic Development Plan 2022-2025 and Eau 2050. There are subsidy programs for more efficient water use by converting surface irrigation into drip irrigation.

To implement policy goals and enforce legislation, the MARH has regional offices of Agricultural Development (CRDA) in each of the 39 Governorates. Under this ministry also operate some specific agricultural agencies: the Agricultural Investment Promotion Agency (APIA) and the Agricultural Extension and Training Agency (AFVA). Also, under the supervision of MARH resorts the Interprofessional Association for Vegetables (GIL), liaising between farmers and market operators on production and trade. It is also involved in balancing market mechanisms, export promotion and collection and analysis of market data. Under the Ministry of Industry operate the Group of Food Canning processors, GICA (tomato paste etc). Interests of farmers and food industries are organized in the Tunisian Union of Agriculture and Fisheries (UTAP) with its sectorial federations, and in the Tunisian Union of Industry, Trade and Crafts (UTICA).

2.3 Agricultural trade

Tunisia is a net importer of food products but also an exporter of commodities like olive oil, dates, vegetables, fruit and sea food. In 2023 Tunisia exported for € 570 mln of olive oil to the EU. In 2021 leading agricultural imports were wheat (€ 542 mln), soybeans (€ 253 mln), barley (€ 241 mln), maize (€ 240 mln), vegetable oils (€ 188 mln) and sugar (€ 67 mln). The drought periods of the past 6 years have caused increasing imports of cereals to cover national needs for human consumption and animal feed. At the same time the consumer prices of olive oil have almost doubled. Tunisian food exports show yearly variations also caused by drought periods and water scarcity. The EU is by far the most important trading partner in both imports and exports. Over 70% (€ 12,6 bn) of Tunisia's exports go to the EU, and 46% (€ 13,6 bn) of the imports come from the EU. Trade and investments are regulated in the EU-Tunisia Association Agreement of 1995 and is regularly updated. A free-trade zone with the EU was implemented in 2008. Further free-trade negotiations are still running. Libya and Algeria are important regional trading partners for Tunisia.

International trade Tunisia in million Euro

Trade / Year	2020	2021	2022
Total import into Tunisia	14,196	21,300	
Total export from Tunisia	17,017	17,100	-
Total food import	2,311	2,594	-
Total food export	1,758	1,690	-
Total food import from EU	504	558	1,071
- cereals	189	278	725
- dairy products	34	24	33
Total food export to EU	710	615	796
- olive oil	443	345	462
- fruits/nuts	126	116	117
- vegetables	62	68	68

Tunisia and Turkey are the largest producers of olives and olive oil outside the EU (Spain, Italy, Greece). Much of this product is exported in bulk to Italy and Spain for further sales in the EU and beyond. Tunisia is the 15th exporter of tomatoes and tomato products in the world and 10th tomato processor. Tunisia is still a small supplier to the EU of fresh tomatoes with 21,000 tons in 2021. France is the largest buyer with 37% of the total Tunisian export followed by The Netherlands with 30% of fresh Tunisian tomatoes. Most of these tomatoes are produced in sophisticated greenhouses by Dutch and Spanish growers in the Gabes region.

Customs procedures

Although Tunisia liberalised its import regime through WTO and in the framework of the EU Association Agreement, still restrictions exist. Especially for agricultural products an import licence of the Ministry of Trade is required. There also some quotas for products that compete with local producers. For import procedure you can consult the Manual des Procédures à l'importation of the ministry of Finance (www.douane.gov.tn). The EU regulates the import of agricultural products to facilitate Tunisia and protect European farmers/consumers (see: www.policy.trade.ec.europa.eu).

Retail

Over 250,000 small grocery shops and outdoor markets (Soukhs) scattered throughout the country continue to dominate the Tunisian fresh market. Modern distribution channels have been growing rapidly in the last decade, also thanks to joint ventures with foreign investors mainly from France. Since 2010 the number of large surface outlets has grown from 200 to 655 in 2021. In the centre of the country and outside urban areas, modern retail distribution is still limited and prevail the local small shops and open markets. Tunisian law prohibits wholesale and retail marketing to foreigners and restricts domestic distribution to Tunisian nationals. So joint ventures with national companies are the common approach for foreign investors in distribution and retail.

The supermarket sector is dominated by three primary operators:

1. Ulysse Hyper Distribution is the largest with Carrefour super- and hypermarkets (94 outlets)
2. Groupe Mabrouk / Casino with Monoprix and Géant (90 outlets)
3. Groupe Magasin Général with MG Maxi is the oldest (since 1920) with over 90 outlets.

Until 2010 most supermarkets were sourcing fresh food products through wholesale markets. Currently more and more specialized trading and exporting companies and packers supply supermarkets, especially if they are GlobalGap and ISO certified for high quality and safety standards. In general, 87% of products sold in supermarkets is of national origin and 13% imported.

Tunisia has 68% Internet coverage (2021), the third highest in Africa and almost 8 mln internet users. E-commerce is still small with a turn-over of only € 58 mln in 2017. Online payment is still limited, and people are used to and prefer pay cash at delivery. This market is evolving rapidly.

2.4 SWOT analyses

On the basis of the collected information from literature and interviews, a SWOT analysis is presented here from the perspective of the Tunisian (SME) agricultural value chains.

SWOT analysis Tunisia SME perspective

Strengths	Weaknessess
Farm level Suitable land, basic machinery, dam reservoirs Good climate conditions for early vegetable production, different qualities Low humidity/ low phytosanitary disease pressure Geothermal water sources and irrigation networks, but limited Cheap work force for production work Presence of educated personnel Markets Local open markets (soukhs) and grocery shops for different product qualities Growing local supermarket sector for high quality products Vicinity of EU and Libya as export destinations Experience with export of fruit, olive oil, dates Services Basic supplies available Presence of collection centres, distributors, exporters Presence of a (low-tech) processing industry for tomatoes Good physical infrastructure (roads, ports)	Farm level Weak organisation of farmers and their interests Low level of mechanisation and investment Many small no-tech farms, low yields, high post-harvest losses, low rural income Lack of operational farming knowledge (GAP, data processing, economics, sustainability) Dependency on import of seeds and inputs and production materials Lack of (access to) sweet water and bad irrigation infrastructure Lack of market driven approach by small farmers Degraded soils, salinization, silting of dams Lack of storage, packaging, logistics No long-term perspective for farmers investments. Not attractive for youth Markets Lack of markets transparency at all levels, distrust, corruption Fluctuating prices strongly Little reputation of Tunisian origin products (olive oil) Small farmers are badly connected to markets, only indirectly through traders Services Difficult regulatory framework for enterprises and investors Insufficient access to credit for investments Insufficient access to education and practical training Limited technical supplies market Lack of English language
Opportunities	**Threats**
Farm level Farmers to be better organized and better practical training Modernize business models for quality, efficiency, data collection, youth employment Innovations for quality improvement and higher farmers income Affordable innovations for efficient use of water and resources Organic products, soil improvement, crop rotation, saline agriculture Markets Competitive products for EU markets with high labour intensity High quality products for growing presence of local supermarkets Add value at collection centres Develop products of Tunisian origin (certification, olive oil) Services Access to finance, microfinance for SME investments Develop appropriate training programs for farmers Extension of innovative supplies for farmers Business cooperation with foreign partners Connect to support programs (PADEO, WB/NL, GIZ) Wastewater treatment, desalinization	Farm level Competition at export markets from Morocco, Egypt, Spain Strong impact of climate change, droughts, extreme temperatures Limited access to credit for investments Limited access to irrigation water Markets Competition from Egypt, Morocco etc. at EU markets Market requirements (quota, duties, food safety, pesticides) New sustainability trade regulations in the EU Unstable political situation Impact of price liberalization for small farmers Products marketed under international brands or no brand (olive oil) Services Limitations market access for import of innovations Bureaucracy in procedures Limited Government budgets for modernization and sustainability support

2.5 Summary

Tunisia has an attractive climate for growing a large variety of high-quality vegetable products for local and international markets. It has an inviting and growing urban local supermarket sector and also the vicinity of European, Middle East and African consumer markets. As water scarcity and climate change urge Tunisia to modernize its agricultural value chains, it is a promising market for suitable technologies and business models for more efficient and sustainable food production. Tunisian agriculture offers a market for new technologies, education and business models that trigger the interest of investors and young farmers. Water- and climate smart agriculture farming offers new opportunities and interesting jobs for well-trained youth and women. Tunisian innovation hubs, start-ups and incubators in water- and climate smart agriculture may attract Dutch investors to jointly develop new technology markets with Tunisian partners. It is an attractive market for knowledge cooperation especially for practical training and curriculum modernization in the field of agribusiness, entrepreneurship and digital agri-technology. The Dutch support mechanisms for international development are suitable for joint activities in this field (Embassy, RVO, Nuffic, Orange Corners).

Section 3. Business opportunities in agricultural value chains

This section delves into specific agricultural value chain gaps and solutions across key stages in Tunisia. It also covers the business opportunities identified in Tunisia and it addresses high-potential renewable energy and water efficiency applications across the value chains to optimise and promote climate sustainability. The technological progress should follow a logical development path in balance with the investment possibilities (financial and knowledge) in the business model. Right-tech is more important than high-tech.

3.1 Horticulture Value Chain

The vegetable sector is characterized by open field production (90%) and production in unheated greenhouses and tunnels and a geothermal-heated greenhouse in the South. Main products are tomatoes, watermelon, onion, pepper, lettuce, strawberries. Many farm types are present from very simple no-tech, without any mechanization, to more advanced technical and (partly) mechanized production models.

Product (2014-2018)	Area (x 1,000 ha)	Production (x 1,000 ton)	Export (x 1,000 ton)
Tomato	28	1,200	14
Pepper	20	346	
Lettuce		14	5.3
Melon/watermelon	17.9	510	
Onion	16.3	390	2

Source : Groupement Interprofessionel de Legumes, Tunis 2023. Additonal sources.

Significant is the production of tomatoes (1 – 1.3 mln ton/year), of which 85% is for processing, mainly double concentrated tomato paste (DCT) largely for the local and Libyan markets. Some larger (foreign) companies, produce fresh (cherry and beef) tomatoes for export in the winter season. The local small-scale farming sector is badly structured, banks hardly give loans, collection centres are very informal. Tomatoes are produced on 28,000 ha with a production rate of 43-60 ton/ha. Some 10,000 small farmers are connected to the processing industry (often through collection centres) with less than 2 ha/farm open field without mechanization. Less than 2% of the area is protected production (342 ha). Important regions for tomatoes are the NE (Nabeul, 36 %), and central zone (Kairouan/Sidi Bouzid, 26%). The geothermal greenhouse production (Desert Joy) is in Gabes, El Hamma). This greenhouse complex is owned and managed by a Dutch company.

The open field season runs from June till September/November. Off season greenhouses (non-heated) produce from November-May. The geothermal heated greenhouses produce from November until end of May. Production of soft fruit (strawberries, blackberries, raspberries) is concentrated around Nabeul.

Greenhouse production

Many different farming models exist, but most of the usual greenhouse farms are small tunnels (< 2 ha) and unheated plastic houses with basic equipment. To produce early vegetables on schedule and to the required quality for export, Tunisia has developed with UNDP assistance, a system for protected crops heated and irrigated by geothermal nappe-water in Southern Tunisia (Gabes/Tozeur). The yields and production value here are much higher than average per ha. In 2013 the area was 250 ha and is growing. Dutch producer Desert Joy is extending its production facility of 40 ha with a new location of 120 ha. This new location is supplied of nappe water added by water from a (planned) desalination plant near Gabes.

Simple cold tunnel requires an investment of 12-30 TDN/m2. A geothermal multispan may require 125 TDN/m2. (WUR, 2018). Cold tunnels and Canarian greenhouses are found along the eastern coastal and central zones (1,000 ha). The geothermal heated greenhouses are in the Southern zone (143 ha. 2013). Also, other vegetables are produced in greenhouses (922 ha) mainly in the North.

Important large scale vegetable producers are: 1) Hortimag group (Ghariani family), with Dutch partners (peppers, tomatoes and young plants), 2) AgroCare/DesertJoy has 40 ha of geothermal greenhouses for cherry tomatoes and is extending with 120 ha near Gabes, 3) A&G van den Bosch is growing beef tomatoes (4,5 ha.) and 4) Spanish company San Lucar. Also, in the Gabes region, is a front runner in the field of integrated pest management, sustainable production and waste management.

3.1.1 Opportunities for the Dutch horticulture sector

A. **Seeds and inputs resistant to extreme climate conditions.** Currently, most of the seeds and the inputs are imported (65% of the total seeds). Despite there are 2 specialized local companies, producing vegetable seeds. Hybrid varieties represent only 20% of the total imported quantity, but the cost represents 90% of the imported seeds, because prices of hybrids are 10 to 40 times higher than that of non-hybrid varieties. There is a decrease in using self-produced seeds by farmers (30%). Most of the used seeds are bred abroad, in different climate conditions, and less resistant to the extreme climate conditions (heat, drought and salinity) in Tunisia. Improving new varieties responding to the farmers demand and extreme climate conditions and giving technical solutions to farmers to improve their production and farmers' income.

B. **Farmer equipment and technologies to support open field production in extreme climate conditions**. The level of technology in the horticulture sector is low. The majority of the small-scale farmers have insufficient access to irrigation water and climate smart agriculture data and technologies. Also, the low technology and profitability systems are not attractive for young well-trained farmers. Introduction of equipment for water-storage, smart irrigation and technologies to monitor the water consumption, soil health and plant needs will increase yields and decrease losses. Moreover, the technologies and equipment have to be robust enough to persist in heat circumstances.

C. **Technical solutions and training**. Climate resilient solutions in the production stage of the value chain are mostly limited to large-holder farmers and international investors. Greenhouses and desalinations require high investment and extend expertise on water-, climate- and crop management and modern technologies. Sensor technologies and data collection are available but not commonly used. Supporting the professional development of trainers and strengthening entrepreneurial mindsets could improve investments and innovations in agriculture. Several innovators and start-ups in the field of water efficiency and smart agriculture are active and connected to knowledge institutes, like Tunisie Aquaponie (related to INAT), Smart Farm TN (www.smartfarm.com.tn).

D. **Improvement of the agriculture value chain**. The level of cooperation among small scale farmers is low. The majority of the small-scale farmers do not have a good bargaining position in the value chain. Introduction of associations or cooperations will substantially strengthen their market position and market awareness and will increase farmers' income. In order to reach this goal appropriate cooling and storage equipment is needed to maintain the quality as currently the infrastructure at collection centres is lacking, these pleas for the introduction of cooperative

systems and solutions to maintain the quality of the vegetables in the distribution channels. Cooperation with strong value chain partners as Hortimag, UTAP or Synagri is recommended.

3.1.2 Actors for business opportunities

Dutch actors

The table below shows in summary the type of Dutch horticulture companies, that may be interested in doing business with Tunisia, what can be supplied and what kind of activities are identified:

Actor	Seeds and inputs resistant to extreme climate conditions	Introduction equipment to support open field production in extreme climate conditions	Introduction high tech solutions	Value Chain Improvement
Breeders (seed)	Seeds of varieties tolerant to drought or saline			
Equipment supplier		Smart irrigation, water collection and storage	Desalination solutions, greenhouses, climate and water management systems, water storage, sensor technology	Storage and cooling facility (low, mid and high tech)
Inputs (IPM, biological control, fertilizers)	Inputs tolerant to extreme heat and salinity			
Suppliers of hardware and software		Sensors, weather data tools/apps		Registration tools
Service providers				Labs, registration
Financial institutions	Micro finance solutions	Micro finance solutions	Agri finance	
Knowledge institutes	Know how (practical and adaptable) and demonstration	Know how (practical and adaptable) and demonstration	Know how (practical and adaptable) and demonstration	Know how (practical and adaptable)

Tunisian actors

In Tunisia, most important actors for cooperation are summarized in the table below.

	Organisation	Department	Name	Function
1.	Hortimag Group	Management board	Mr. A. Ghariani	CEO
2.	Desert Joy	Head Quarters Maasdijk	Mr. I. Vellinga	Director CSR and public affairs
3.	Groupement Interprofessionel de Légumes (GIL)		Mr. Helmi Kalai	General Manager
4.	UTAP (Union de Tunisienne de l'Agriculture et de la Peche)			
5.	Synagri (Syndicate des Agriculteurs de Tunisie)			
6.	GIL (Groupement Interprofessionel des Legumes)			

3.2 Cereals and Potato Value Chain

Cereals

Wheat is the largest crop produced in Tunisia with 1,337 kTon (2017), that is 16.6% of total production volume and 10.5% in value. Barley is fourth with 7.4% in production. Other cereals cover small areas

and values. Cereals are mostly produced in the northern and central areas, partly rainfed or under irrigation from dam reservoirs. Tunisia is not self-sufficient in these crops and imports over 50% of wheat and barley and between 70% and 80% of maize and soybean. The continued droughts of the past 6 years and low levels of dam reservoirs have seriously reduced production. Better irrigation approaches, avoiding soil degradation and of course, more rainfall could stabilize or improve the situation.

Potatoes
In Tunisia, potatoes have a significant contribution to the production value and daily menu. Around 27,000 hectares (17% of the country's cultivated land) are used for potato production and supplies yearly on average 370,000 tons of ware potatoes. Thus, the need for seed potatoes is high, making Tunisia a net importer of seed potatoes from Europe. The main focus of the potato chain is on primary production of ware potatoes. Most of the produced potatoes are sold to the consumer, while processing of potatoes hardly occurs. Tunisians consume between 22,000 and 25,000 tonnes of potatoes a month. However, throughout the year supply and demand for ware potatoes are not well balanced. When supply exceeds the demand, potatoes are exported, mainly to Libya. When demand exceeds supply, the government starts to import potatoes. Potatoes are locally multiplied for the after-season production.

The study *Needs assessment of Agriculture in northwest Tunisia* by Wageningen University & Research (2017) identified needs and priorities for development of the potato value chain:
- For climate smart agriculture: increase water availability and reduce the need for water
- For soil: decrease degradation and increase fertility
- For primary production: sustainable innovations, improve seed quality and introduce storage facilities, improve continuity in production.
- For the general supply chain: introduce a market driven approach
- For farmers: organize farmers towards and efficient market orientation.

Potatoes are mainly grown by small farmers (< 1.5 ha). Only 10% of the farmers plant more than 3-4 ha. Yields of smallholders are low due to lack of Good Agricultural Practices (crop rotation), access to inputs, mechanisation and proper stocking conditions. Tunisia imports seed potatoes mainly from France and The Netherlands (5,000 ton in 2022).

Potatoes are grown in the northern coastal region of Cap Bon and in the irrigated zones of the interior, in Jendouba, Kasserine, Kairouan, Gafsa and Sidi Bouzid. Tunisia has four potato seasons: the most productive is January-June, followed by September-January. Two smaller production seasons are October-February and December-April. The small farmers produce 12-15 ton per year through manual harvesting. More advanced and larger farms around 20 ton per year with mechanization. Potatoes are sold directly from the farm or at local markets, or through brokers and retailers.

Storage is important in July until December, but capacity is very limited and not affordable for small unorganized farmers. Some 30,000 ton per year cannot be stored properly and post-harvest losses are therefore high. This leads to fluctuating prices of ware potatoes over the year. There is some processing industry of potatoes into chips for to local markets. Potatoes are locally multiplied for after season production.

3.2.1 Opportunities for the Dutch cereals and potato sector

A. **Equipment and technologies for smart water management (storage – desalination - precious irrigation)**. For cereals and potatoes, farmers largely depend on rainfall and dam reservoirs. Many dams and irrigation channels are in a bad state of maintenance and have lost reservoir capacity by

sediment accumulation from erosion (silting). The long periods of drought, further lower the water availability. Water and soil salinity are on the rise and are a threat to farmers with no access to desalination or saline agriculture technologies. Introduction of equipment and technologies that contribute to increased water availability and reduce the need for water will substantially increase yields and decrease of losses. Saline agriculture and crop rotation may solve certain farming problems and offer new options to farmers.

B. **Advanced equipment and know-how to adjust to changing climate conditions.** The level of mechanization is low. The majority of the small farmers do their field preparations, planting, farm management and harvesting manually. Crop rotation is not always properly applied, causing diseases, lower yields, high use of pesticides and loss of soil health. Introduction of equipment for soil cultivation, potato planting, harvest equipment, storage equipment will substantially increase yield and decrease losses. Also, simple sensor technology and data collection/processing with smartphone software can help farmers managing field interventions. These technologies must be accompanied by appropriate training and demonstration.

C. **Stronger value chain by cooperation and processing.** In developing markets, the potato consumption in fresh form is still much higher than in processed form. However, with increasing urbanisation, move of young consumers to cities and growth of the middle class, an increase of processed potato products can be noted all over the world. The growing urban middle-class in Tunisia implies that the consumption of processed potatoes is expected to rise. This trend is supported by the launching of Kentucky Fried Chicken in Tunis and Sousse. The value chain of processing of potatoes (mashed potatoes, chips, French fries) can be developed towards different stages of complexity, different amounts of investments and different needs for training and capacity building. The processing of potatoes into fresh French fries (in restaurants or hotels) can be a start with short-term potential and perspective for investors. Cooperation with the existing factory Mad Chips is recommended. It will enable to use the network of the factory and it will become an opportunity to boost the production of the factory and its continuity. For realisation, the introduction of equipment for storage, peeling and cutting is needed. Processing also needs special varieties with better product characteristics, longer dormancy and preferably consistency in quality. Varieties more appropriate for processing are required.

   The development of a processing value chain needs consistent supply of high-quality potatoes by large numbers of small farmers. In Tunisia the small farmers are scattered, and do not have a market driven approach, nor collaborate on production planning, collection and storage and market access. For small farmers, it is necessary to work together in a business association and thus be able to share the added value (increase yields and income) that arises from the processing activities. The local restaurant/fast food sector should be involved in formulating the right business model. The size of the local market should be analyses and the competitiveness of imported potato products (for instance from the Netherlands) should be considered. Other varieties of potatoes can be introduced to Tunisian consumers, to give access to more choice.

3.2.2 Actors for business opportunities

Dutch actors

The table below shows in summary the type of Dutch cereals and potato companies, that may be interested in doing business with Tunisia, what can be supplied and what kind of activities are identified:

Actor	Equipment and knowledge for smart water management	Equipment and technologies to adjust changing climate conditions	Improved value chain by cooperation and processing
Breeders (seed)	Improved seeds or varieties tolerant to drought or saline conditions	Improved seeds or varieties tolerant to drought or saline conditions	Improved seeds suitable for the processing industry
Equipment supplier	Improved water harvesting techniques, smart irrigation, water collection and storage, desalination solutions, improve waste-water reuse for agricultural purposes	Mechanisation (planting, harvesting)	Storage and cooling facilities (low, mid and high tech), processing facilities Sorting and packaging
Inputs (IPM, biological control, fertilizers)	Inputs tolerant to extreme heat, soil management (incl. Improvement)	Inputs suitable via mechanization, soil management (incl. Improvement)	
Suppliers of hardware and software	Sensors, weather data tools/apps, soil analysis	Sensors, weather data tools/apps, soil analysis	Registration tools
Service providers	Remote sensing	Remote sensing	Labs registration
Financial institutions	Micro finance solutions Subisidies	Micro finance solutions Subsidies	Agri finance
Knowledge institutes	Know how (practical and adaptable) and demonstration	Know how (practical and adaptable) and demonstration	Know how (practical and adaptable) and demonstration

Tunisian actors

In Tunisia, most important actors for cooperation are summarized in the table below.

	Organisation	Department	Name	Function
1.	Centre Technique de la Pomme de Terre et de l'Artichaut (CTPTA)	Storage and processing	Khalifa Rachid Kharachid@yahoo.fr	Service chief
2.	idem	Physiology and variety selection	Essid Moh. Farouk Essidinat@yahoo.co	Service chief
3.	Groupement Interprofessionel des Legumes (GIL)	www.GIL.com.tn		+216 71 793056
4.	Agriculture Investment Promotion Agency (APIA)	www.apia.com.tn		+216 71771300
5	Farmers Union (UTAP)	www.utap.org.tn		+216 71806800 Contact@utap.org.tn

3.3. Fruit Value Chain (including olives)

Tunisia produces a large variety of fruits, both for local consumption and exports. Important products are olives, dates, grapes, citrus, peaches, pomegranates, watermelon and apple. Fruit trees cover more than 2 million hectares of land in Tunisia. Olive plantations are found throughout the country, while grapes and citrus fruits are mainly located in the north (Cap Bon). Dates, almond and fig trees are grown in the southern parts.

The dry climate contributes to a low incidence of mycotoxins, supporting the markets for dried fruits like apricot, peach, raisins and figs. Tunisia produced in 2021 over 345,000 ton of dates for local and many export destinations. Increasing consumer demand for affordable fruits such as bananas, oranges, and naartjie, as well as increased demand for derived products such as fruit juices and jams, have led to the expansion of the fruits market in the country. Libya, Morocco, France, Italy, Germany, and Spain are some of the major importers of Tunisian fruits, fresh or processed.

Tunisia and Turkey compete to be the largest producer of olive oil outside the EU. Tunisia produces a large number of specific, regional olive varieties including organic production. Much of the high-quality olive oil is further processed, bottled and marketed by international companies under their international brand. Tunisia wants to export its high-quality olive oil, bottled under their own Tunisian brand, in order to gain added value for their farmers. FAO and EBRD are supporting Tunisia in this effort. Also in fruit production, Tunisia is a large organic producer with equivalence to EU legislation, mainly in olive oil, dates, vines, aromatic plants and certain vegetables.

3.3.1 Opportunities for the Dutch fruit sector

The most significant business opportunities exist for goods and services supportive of the local agriculture and agro-processing industry:

A. **Equipment and knowledge for smart water management.** New satellite land data are available in Tunisia since 2023 for remote sensing and soil mapping. These data analyses can help farmers and local authorities to better manage agricultural use and water management. Dutch companies are world leaders in remote sensing and data interpretation. Sensor technology for fruit production is essential for modern sustainable fruit farming and available in the Netherlands, both at private and institutional level. Low-cost (wireless) sensor technology including smartphone software can help young skilled farmers to improve profitability and sustainability. Dutch water expertise (water boards, consultancy, contractors) can help strengthening (local) water management, reduce water losses, salinization problems, wastewater treatment, distribution and pricing.

B. **Inputs, machinery and knowhow to improve production output.** The per ha output of the fruit production is low. The lack of integrated management is key obstacle to efficient growth, and mechanisation is limited. Although the Netherlands is not familiar with olives, dates or citrus, expertise on integrated farm management is available. The knowhow in this field can be introduced to Tunisia. Further, integrated pest management is available in the Netherland and can help Tunisian farmers in sustainable and organic production of fruits

C. **Improved value chain in processing.** Post-harvest needs better and more transparent collection, sorting, packaging, marketing. Lack of generating added value of olives by own system of processing, bottling, branding and marketing. The Netherlands can provide expertise, equipment and materials for conditioned storage, cooling, sorting, packaging of fruit and vegetables for local and export markets.

3.3.2 Actors for business opportunities

Dutch actors

The table below shows in summary the type of Dutch fruit companies, that may be interested in doing business with Tunisia, what can be supplied and what kind of activities are identified:

	Equipment and knowledge for smart water management	**Inputs, machinery and knowhow to improve production output**	**Improved value chain in processing**
Breeders (seed)	Improved seeds or varieties tolerant to drought or saline	Improved seeds or varieties tolerant to drought or saline	Improved seeds suitable for the processing industry
Equipment supplier	Improved water harvesting techniques, smart irrigation, water collection and storage, desalination solutions, improve waste-water reuse for agricultural purposes	Mechanisation (planting, harvesting)	Storage and cooling facilities (low, mid and high tech), processing facilities

Inputs (IPM, biological control, fertilizers)	Inputs tolerant to extreme heat, soil management (incl. Improvement)	Inputs suitable via mechanization, soil management (incl. Improvement)	
Suppliers of hardware and software	Sensors, weather data tools/apps	Sensors, weather data tools/apps	Registration tools
Service providers	Harvesting, storage, sorting, packaging Quality control Remote sensing	Harvesting, storage, sorting, packaging Quality control Remote sensing	Labs registration Cooperative services
Financial institutions	Micro finance solutions	Micro finance solutions	Agri finance
Knowledge institutes	Know how (practical and adaptable) and demonstration	Know how (practical and adaptable) and demonstration	Know how (practical and adaptable) and demonstration
Markets	Fruit trades	Fruit traders	

Tunisian actors

In Tunisia, some specific actors for cooperation or information are summarized in the table below.

	Organisation	**Department**	**Name**	**Function**
1.	Ministry of Agriculture and Hydraulic Resources	Observatoire nationale de l'agriculture	www.onagri.tn	+216 71 801055
2.	Groupement Interprofessionel des Fruit (GIF)	GIFruit@gifruit.nat.tn	Najeh Ben Ammar	+216 71787721
3.	Centre technique de l'Agriculture Biologique (CTAB)	www.ctab.nat.tn	Ctab@iresa.agrinet.tn	+216 73 327278
4.	Office National de l'Huile de Tunisie (ONH)	www.onh.com.tn Pdg@onh.com.tn	Mohamed Ben Mohamed	+216 71 345 566
5.	Carrefour Tunisie	www.carrefour.tn	M. Khemais Bouchoucha	Manager of fresh produce

3.4 Summary

In the three main agricultural value chains considered, Dutch public and private expertise can play a constructive role in supporting Tunisia's ambition of strengthening water- and climate smart agriculture. The climate change reports and drought problems underline the urgency of measures and initiatives to modernize to sustainable food production and offer new perspectives especially for young farmers and women. Strong policies and improved business models are needed to facilitate young farmers to improve farming value chains and build new farming concepts through start-ups and incubators.

Dutch companies, institutions and NGO's should be motivated to support these processes through cooperation in investment, introduction of innovations, knowledge sharing and trade. Dutch support instruments like RVO and Nuffic can help to inspire and implement new partnerships.

Section 4 Conclusions and recommendations

4.1 Conclusions

Tunisia has a persisting high unemployment rate especially under the youth and women work force, caused by demography, economic crisis, lacking decent jobs and education disconnected to the economic needs.

Tunisia has a long agricultural tradition and strong connection with the European agribusiness and consumer market. It has good physical and climatic conditions for production of some strategic crops, such as vegetables, fruit, olives and dates. Europe is a main importer of olive oil, tomatoes, dates and sea food and a supplier of agricultural technology, seeds and agrochemicals.

In contrast Tunisia has a vulnerable climate and is very sensitive for the effects of climate change, resulting in long periods of drought, extreme temperatures and exhaustion and salinization of water resources. The country is not self-sufficient in basic food products, especially cereals, causing high imports that exhaust the national budget.

Most small and medium size farms for cereals, vegetables and fruit are lacking basic technologies and knowledge for efficient and sustainable production (seeds, proper irrigation, data) and post-harvest handling (storage, packaging, marketing). Some large European agricultural companies produce high quality vegetables in high-tech greenhouses in the South, for export to (mainly) Europe. Olive oil is mostly exported in bulk to Europe for further added value through processing, bottling, marketing.

Many SME farms have limited possibilities to improve their performance due to lacking organisation, improper education, plots are small and they have little access to technology and credit. National subsidy programs (drip irrigation) and international organisations (FAO, WB, GIZ, USAID, Netherlands, France) are running programs to support small farmers to improve their skills, performance and living standard.

Urbanisation and growth of supermarket retail is boosting the demand for high quality and safe food products. This growing high-quality market requires better and more sustainable performance of Tunisian farmers and traders.

Producers of some specific Tunisian products (olive oil, dried fruit, dates) may penetrate international markets with Tunisian origin and brand.

Lacking entrepreneurial capabilities, combined with weak organisation and ineffective education, hold back the initiative of new and modern enterprise and creation of attractive jobs in agribusiness.

4.2 Recommendations

1. Help groups of SME farmers in establishing member organisations in market power and expertise for buying basic materials, machines/services, selling final products, knowledge needs
2. Improve transparency, access and fair pricing of irrigation water resources for SME farmers. Integrate water pricing in production business models.
3. Improve education and training curricula for farming skills in modernization of water management, water efficiency, digitalisation, quality control
4. Connect the urgency of climate change adaptation, food security and rural employment to business opportunities, knowledge sharing and the suitable RVO support instruments.
5. Develop business trajectories for agricultural production that fit in the local value chain, regarding market demand, investment capacity, sustainable technology (right-tech).

6. Develop public-private demonstration and training facilities to introduce modern, low-cost technologies for water and inputs efficiency, Good Agricultural Practice, yield improvement, quality control.
7. Demonstration and training programs should not be limited to knowledge sharing but also to entrepreneurship, access to funding, credits and system transition.
8. Long-term partnerships are needed to get full performance of results. This requires confidence, responsibility and serious long-term commitment from partners reflected in business agreements and solid project management structures.
9. An agribusiness program in Tunisia (like Orange Corners) would be a good promotor to inspire young ambitious professionals for innovations and entrepreneurship in sustainable agriculture. The program should support promising start-ups and incubators for water- and climate smart agriculture in cooperation with Dutch agribusiness partners.
10. Pay attention to the opportunities of wastewater treatment and its application as irrigation water in sustainable horticulture.
11. Translate results of public remote sensing programs to practical tools for local authorities and farmers.
12. After the seminar: invite Dutch agribusiness participants to express their views and business options on working in Tunisia. Build exploratory consortia for developing specific project ideas.

ANNEX 1 PERSONS INTERVIEWED

Name	Organisation	Remarks
Victor Langenberg	Acacia water	Cowriter water report Maghreb
Mohamed Laroussi	Laroussi trading	Fruit and vegetable import form Maghreb
Mink Vermeer	Delphy	Horticulture consultancy, project management
Imre Vellenga	AgroCare	Tomato producer Tunisia
Norbert vd Straaten	Holland Greentech	Intl horticultural projects
Nico de Groot	De Groot Consultancy	Intl. Horticultural projects, ex-WUR/LEI
Paul Kengen	Quantified	Sensor technology agriculture
Sabrina Waltmans	LNV	Ex-Agricultural Counselor Algeria/Tunisia
Karst Weening	NAO	Seed potato promotion
Petra vd Bosch	VD Bosch Tomato	Beef tomato production in Tunisia
Robert vd Donk	Ridder	Horticulture technology
Robert vd Lans	HortiXS	Greenhouse construction
Wassim Beaineh	WUR	MENA expert science and research cooperation
Marc de Ruiter	Horti Synergy	Intl horticultural training
Mieke Hartveld	Nuffic	Intl. knowledge cooperation
Walid Gaddas	STECIA International	Sustainable Agri Food Value chain development Consultants in Tunisia
Adel Ghariani	Cotugrain/Hortimag Group	Company in horticultural supply and horticultural production in Tunisia
Ben Zwinkels	AfricInvest	Investment and financial services company
Khemais Bouchoucha	Carrefour Tunisie	Manager fresh produce
Others		

ANNEX 2 LITERATURE AND INFORMATION SOURCES

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Nuffic 2019, Tunisia – Country Plan of Implementation Orange Knowledge Programme (OKP).

ONAGRI 2023. Several reports on www.onagri.nat.tn

Devrim Yilmaz et al. 2023: Climate Change, Loss of Agricultural output and the Macro-economy – the of Tunisia, Agence Française de Développement on www.afd.fr

USAID 2018: Climate Risk Profile Tunisia

World Bank Group 2021: Climate Risk Country Profile: Tunisia

ANNEX 3 SUPPORT PROGRAMS

The following foreign programs and partnerships are important for supporting agricultural and rural development in Tunisia:

1. TRACE: The Dutch Embassy in Tunis finances the World Bank project TRACE (Tunisian Rural and Agricultural Chain of Employment) with US$ 14,9 mln for supporting 350 investment projects for youth and women employment in agribusiness. These projects are operated by three NGOs in three Governates: Kairouan (Union Tunisienne de Solidarité Sociale), Gabes (Enda Inter-Arabe) and Jendouba (Microfinanza).

2. NUFFIC/OKP Tunisia (www.nuffic.nl): In the Orange Knowledge Program, Nuffic provides training courses and scholarships and supports knowledge cooperation between Dutch and Tunisian institutions in the field of the agriculture and food value chains. The Nuffic program is working together with institutes for higher education IRESA (Institution de Recherche et de l'Enseignement Supérieur Agricoles), for vocational training AVFA (Agence Vulgarisation et Formation Agricoles), and for agricultural training, CFPA (Centres de Formation Professionelle Agricole).

3. FMO and Enda Tamweel (www.endatamweel.tn): the leading Tunisian microfinance company, have a loan agreement of € 60 mln, syndicated to 5 funds. This loan helps Tamweel to finance women, young people and farmers to improve their living conditions through education and housing. Enda Tamweel supports sustainable agriculture through the Professional Agricultural Organisations (OPA) and the GIZ driven Sustainable Agricultural Economy Project (PEAD)

4. GIZ, Germany in Tunis, (www.GIZ.de; giz-tunesien@giz.de ; +21671967229 Manfred Matz) Program for rural development, objective: improvement income and employment at SME's and their organisations. Activities: support agricultural entrepreneurship, support economic cooperation models, support agricultural financing, develop public and private support structures. GIZ also works on: Protection and regeneration of degraded soils, green innovations centres, management of natural resources and water management and awareness building.

5. Agence Française de Développement (AFD) has supplied in 2022 a loan of € 200 mln for social and economic reforms.

6. USAID promotes private sector-led economic growth through direct support to SME's in their JOBS program (www.tunisiajobs.org). Stops in 2024.

7. World Bank sees decline in productivity due to excessive regulation of economic activity, reduced trade orientation, low investment and limited innovation. WB Country Partnership Framework (CPF) supports job creation in private sector, access to financing for innovative SME's and start-ups.

8. UNDP continues its cooperation with the Attijari Bank for social-economic inclusion and resilience against climate change in Tunisia.

9. FAO has a framework program (2021-2025) to promote an inclusive and sustainable social-economic development and decent employment.

10. RVO Instruments and programs: www.rvo.nl ; Invest International: www.investinternational.nl