Regional Initiative for Promoting Small-scale Renewable Energy Applications in Rural Areas of the Arab Region (REGEND)

Assessment Report of Prevailing Situations in Rural Areas in Tunisia

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Economic and Social Commission for Western Asia

Regional Initiative for Promoting Small-scale Renewable Energy Applications in Rural Areas of the Arab Region (REGEND)

Report on the Baseline Study for Tunisia

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Preface

This baseline study report was developed by the Energy Section in the Climate Change and Natural Resource Sustainability Cluster (CCNRS) of the United Nations Economic and Social Commission for Western Asia (ESCWA) within the framework of the "Regional Initiative for Promoting Small-scale Renewable Energy Applications in Rural Areas of the Arab Region" (REGEND), implemented by ESCWA in partnership with the Swedish International Development Cooperation Agency (Sida).

The REGEND project focuses on three pilot countries, namely Tunisia, Lebanon, and Jordan and includes baseline studies as preliminary assessment of prevailing situations in rural areas of each of the pilot countries to collect existing and relevant qualitative and quantitative information regarding, energy and rural development needs which will serve as a basis for the identification of the main key issues to be addressed, potentials and opportunities for safe and sustainable use of renewable energy, and possible strategies and interventions (information and awareness campaigns, training, research, projects, policies). The assessment study served to select the local communities where the project activities will be undertaken, especially pilot projects.

The present report covers the case study for Tunisia, and was prepared by Mr. Khaled Bedoui, Sustainable Development Expert, with substantive contribution and under the supervision of Ms. Radia Sedaoui, Chief Energy Section, CCNRS, ESCWA. Valuable inputs and substantive contribution were also provided by Mr. Mohamed Abdessalem, Central Director, Regional Development General Commission (CGDR); Mr. Nafaa Baccari, Director of Renewable Energy Department and Head of Field Crops Department, National Agency for Energy Conservation (ANME), Tunisia; Ms. Helene Ben Khemis, Chief of Section, ANME, Tunisia; Ms. Kaouther Kouki, Chief of Service, Agence de Promotion des Investissements Agricoles (APIA); Mr. Rafik Missaoui, Sustainable Energy Policies Expert, ALCOR, Tunisia; Ms. Hedia Sassi Chaabouni Director Société Nationale D'exploitation et de Distribution des Eaux (SONEDE), Tunisia; Mr. Jil Amine, Sustainable Development Officer, CCNRS, ESCWA; and Mr. Mohammed Zied Gannar, Economic Officer, CCNRS, ESCWA.

Data sources

This report relies on data collected from a combination of data sources, data collected in the field, and data provided by key national stakeholders and the members of REGEND's Local Facilitating Team: Commissariat Général de Développement Régionale (CGDR), Agence Nationale pour la Maitrise de l'Energie (ANME), and Agence de Promotion des Investissements Agricoles (APIA), Municipality of Chorbane, as well key stakeholders interviewed as well the outcomes of the focus group discussion on the development of the study.

Executive Summary

The United Nations Economic and Social Commission for Western Asia (ESCWA) is implementing the Regional Initiative for Promoting Small-scale Renewable Energy Applications in Rural Areas of the Arab region (REGEND) in partnership with the Swedish International Development Cooperation Agency (Sida). The project aims to improve livelihoods and economic benefits in rural communities, particularly among marginalized groups, and promote social inclusion and gender equality. It seeks to satisfy energy needs and showcase the effectiveness of the bottom-up approach in achieving results by addressing energy poverty, water scarcity and vulnerability to climate change and other natural resources challenges. Pro-poor investments will be promoted using appropriate small-scale renewable energy technologies to facilitate productive activities and develop entrepreneurial opportunities.

A baseline study was developed within the REGEND framework, and an assessment conducted to guide REGEND's future activities in Tunisia. This assessment covered the following: socioeconomic and political dynamics, and environmental considerations linked to productive activities by sector; access to energy services and availability of supply sources; and the associated technologies needed to support resilience in rural communities. The main findings are as follows.

Tunisia has taken important steps to advance its democratic transition but remains fragile to economic, security and social shocks. Growth has been stagnating, with little reduction in the unemployment rate, and elevated fiscal and current account deficits. For 2018, data shows an annual gross domestic product (GDP) growth of 2.6 per cent, well below the economic potential.

Modest improvement in the economic activity in 2018 could not ease job market deficiencies at the structural level as much as the operational one, with the situation characterized by high rates of unemployment (15.3 per cent in the first quarter of 2019, and much higher among rural populations, women, youth and skilled workers).

The development model has also led to wide regional disparities, between coastal and interior regions, and urban and rural ones. Concurrently, disparities in gender and education persist, particularly affecting inland regions, rural populations, women and higher education graduates.

In 2018, the national regional development indicator decreased, and most governorates saw a decline in their Regional Development Indicator (RDI). Regional imbalance is considered one of the most important issues facing the country. Indeed, Tunisia is effectively split into two: coastal regions, with basic socio-health infrastructure far exceeding the national average, and the interior western and rural regions, where, with few exceptions, economic activity is reduced to agriculture and small-scale commerce, and the unemployment rate exceeds 40 per cent. Inequalities between people from different regions, genders and educational backgrounds are persistent, profound and, to some extent, structural.

Poverty is primarily a rural phenomenon in Tunisia. The North-West and Centre-West are the poorest parts of the country with the highest level of rurality. This applies both for income

poverty and human development indicators such as stunting, health outcomes and maternal mortality. Access to energy and drinking water, sanitation and hygiene (WASH) services is inequitably distributed between urban and rural areas and among governorates.

At the national level, the access rates to drinking water (97 per cent in 2017), electricity (99.8 per cent) and sanitation (93.6 per cent) indicate a positive environment, but challenges remain in poverty and WASH service coverage. The greatest deficiencies in access to water and sanitation are in the Centre-West and North-West regions, with the largest proportion and number of people using unimproved sources for drinking and deprived of sanitation services.

In rural regions, agriculture, the main source of income, faces many challenges, including difficulty in accessing financial services and relatively weak rural organizations that lack the training and support to take on responsibility for their own development. The situation is accentuated by climate problems and agricultural land fragmentation, as well as historical land problems that deprive the sector of bank credits. The underdevelopment of the sector in rural regions also pushes Tunisian youth to migrate to urban areas looking for employment.

Since 2000, Tunisia has faced a structural energy deficit that keeps growing. To secure the country's energy future, decision-makers have been pushed to adopt new solutions based on renewable and energy-efficiency projects.

In the Tunisian experience, the renewable energy technology that has succeeded in rural regions is solar photovoltaic (PV) technology at the small-scale level. It has shown great performance for rural electrification, for pumping and for other agribusiness activities. Conversely, most biogas experiences and small-scale wind energy initiatives have failed, at the household level and industrial scale, for various reasons (lack of technical skills, monitoring and maintenance, among others).

The second part of the study focuses on the selection of the pilot rural community, based on defined criteria validated with key stakeholders. Two rural communities were initially shortlisted, Chorbane in Mahdia, and Maamoura in Nabeul.

During the assessment, numerous interviews were conducted with the leaders of targeted stakeholders, including the Mutual Agricultural Services Company (SMSA), women's agricultural development groups (GDAs), non-governmental organizations (NGOs), agriculture departments and farmers. Focus group meetings also took place with rural women who lead small income-generating activities. Finally, a meeting with the mayor of each municipality and all relevant stakeholders was held to summarize findings and discuss the next steps.

Chorbane is characterized by a very high level of rurality and poverty, both for urban and rural regions, and a high unemployment rate compared with the Governorate's average, especially for young graduates. It has good performing socio-professional entities such as the SMSA and the rural women's GDA despite a lack of infrastructure, equipment and training.

Maamoura has high socioeconomic indicators compared with Chorbane but does not have good-performing professional structures. The SMSA experiences many difficulties, and the rural women's GDA is relatively new and lacks equipment and training.

This study, which comprised a desk review, interviews and site visits, and national focus group meetings with stakeholder support at the national level, selected Chorbane as the community where REGEND will implement its pilot projects and capacity-building activities. The decision was formalized at a coordination meeting in Chorbane, chaired by the mayor. The study also includes a preliminary list of potential projects and interventions assessed in the field.

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Abbreviations and Explanatory Notes

ANME	National Agency for Energy Conservation
BNA	Banque National Agricole
CGDR	Regional Development General Commission
CRDA	Regional Commissariat for Agricultural Development
CSO	civil society organization
CTV	Territorial Unit for Agricultural Vulgarization
DGGREE	General Directorate of Rural Engineering and Water Exploitation
ESCWA	Economic and Social Commission for West Asia
FAO	Food and Agriculture Organization of the United Nations
GDA	agricultural development group
GDP	gross domestic product
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GWh	gigawatt-hour
HDI	Human Development Index
IMF	International Monetary Fund
ITCEQ	Tunisiann Institution of Competitiveness and Quantitative Studies
LFT	local facilitating team
MW	Megawatt
MWp	megawatt-peak
NGO	non-governmental organization
ONAS	National Office for Sanitation
PDRI	integrated rural development programme
PV	photovoltaic
RDI	Regional Development Indicator
SMSA	Société Mutuelle de Services Agricoles (Mutual Agricultural Services Company)
SONEDE	National Company for Water Distribution
SPIS	solar-powered irrigation systems
STEG	Tunisian Company of Electricity and Gas
SWOT	strengths, weaknesses, opportunities and threats
TND	Tunisian dinar
TSP	Tunisian Solar Plan
UNDP	United Nations Development Programme
WASH	water, sanitation and hygiene

Introduction

The United Nations Economic and Social Commision for Western Asia (ESCWA) is implementing the Regional Initiative for Promoting Small-scale Renewable Energy Applications in rural areas of the Arab region (REGEND) in partnership with the Swedish International Development Cooperation Agency (Sida). The project aims to improve livelihoods and economic benefits in Arab rural communities, particularly among marginalized groups, and promote social inclusion and gender equality. It seeks to satisfy energy needs and showcase the effectiveness of the bottom-up approach in achieving results by addressing energy poverty, water scarcity and vulnerability to climate change and other natural resources challenges. Pro-poor investments will be promoted using appropriate small-scale renewable energy technologies to facilitate productive activities and develop entrepreneurial opportunities.

A baseline study was developed within the REGEND framework, and an assessment conducted to guide REGEND's future activities in Tunisia. This covered socioeconomic and political dynamics, and environmental consideration linked to productive activities[1] by sector; access to energy service requirements and the availability of supply sources; and the associated technologies required to support resilience in rural communities. Data were collected on current and potential productive activities in the selected rural areas by sector (for example, agricultural, agri-food, animal husbandry products, tourism, small industries, water resource management, food security and environment), and on identified energy service needs (present and potential future evolutions and desirable levels of access) as well as existing sources of supply and technologies (costs, affordability and reliability, among others). A political, socioeconomic and environmental analysis addressed the local community context by collecting data on risks and the security situation, jobs by sector, and the potential to build entrepreneurial opportunities, create jobs and poverty alleviation, and in defining environmental and socioeconomic development priorities taking population dynamics and economic growth into account.

In 2011, Tunisia made a peaceful political transition, the only democracy to emerge from the wave of Arab uprisings, but its fledgling democratic state has faced repeated challenges. After eight years, its faltering economy is still unable to meet the aspirations of its young people. The national unemployment rate remains high, with even higher figures for western and southern regions due to a historical regional disparity between the interior and coast, and urban and rural areas.

Action on rural development is relatively established in Tunisia, and investment over the long period has resulted in improved living conditions (education, health, infrastructure) and working conditions in these regions.

There is, however, significant economic and social disparity between rural and urban areas, with the latter having easier access to the advantages of economic exchange. More isolated, rural areas experience higher levels of poverty and unemployment, reflected in higher vulnerability to food insecurity and increased pressure on natural resources. This indicates the low degree of diversification of the local economy, and the unequal access to energy and basic services such as education,

health care and water, and to decent jobs, which affect a significant portion of the rural population. Water and food security, manifestations of climate change and energy security all represent major challenges for the sustainable development of rural areas.

Since the 2000s, Tunisia has become a net energy importer after years of surplus power generation, and the gap between production and demand increases every year. Consequently, the development of energy efficiency and renewable energy has been seen as an important solution for securing Tunisia's energy future. That is why, in recent years, the country has made visible efforts to support the deployment of renewable power to take advantage of its significant solar and wind potential. It should be noted the strategy focuses more on developing large-scale renewable energy power generation systems. This ignores the role that small-scale renewable energy can play, particularly in rural areas, including rural electrification, income generating-activities, agri-food production and water pumping. Small-scale renewable energy could be catalyst for integrated rural development and improved livelihoods.

This study fits into the context of REGEND, which aims to influence rural communities to make the most of renewable energy applications to help meet their needs and ensure sustainable development.

The use of appropriate small-scale renewable energy technologies to facilitate productive activities and develop entrepreneurial opportunities will be pursued, as well as empowering women with an emphasis on job creation, and developing robust value chains in a nexus approach to encourage a sustainable economy.

Finally, the project will support the move from a model based on handouts to one based on knowhow, to ensure a promising way forward for the region.

The first part of this study will draw a baseline assessment of the Tunisian political, socioeconomic, environmental and technological context. This phase will include data collection and analysis on current and potential productive activities in rural areas (agricultural, agri-food, animal husbandry products, tourism, small industries, water resource management, food security and environment, and income-generating activities), and identify energy service needs (present and potential evolutions and desirable levels of access) and existing sources of supply and technologies (costs and affordability).

The second part will focus on the selection of a rural community in Tunisia where REGEND's pilot projects and activities will be implemented. A participatory diagnosis/assessment will be established in two rural communities to collect and analyse qualitative and quantitative information on the socioeconomic context and energy and rural development needs. This assessment will also suggest instruments and potential interventions to be considered under the REGEND framework and national initiatives addressing other issues deriving from the observations, in particular how to use small-scale renewable energy to generate income and act as a catalyst to integrated and sustainable rural development in Tunisia.

Methodology

A mixed-study methodology was adopted to develop the assessment and baseline study, based, first, on the literature review of reports, studies and updated data on the political, socioeconomic and environmental situation in Tunisia, in particular those related to rural development.

The literature review is a formal process that allows data and information to be processed at national levels, and an understanding of the situation at different scales. These include: analysis of productive activities by sector; access to energy services requirements and availability of supply sources; access to water resources and sanitation; understanding of the political and economic situation and the constraints and technologies required to support resilience in the rural community, and of the rural dynamics; and evaluation of historic regional development experiences.

This process was consolidated using interviews with key stakeholders to update data or clarify quantitative and/or qualitative information on rural development.

The assessment methodology combined these inputs with the outcomes of focus group discussions with key national stakeholders, including government organizations, non-governmental organizations (NGOs), local/community authorities, water and waste management authorities, and women's associations. The participatory approach allowed mutual understanding, dialogue and collaboration between stakeholders and will enhance their commitment to participating in concerted action throughout the lifetime of the project and after its completion.

The second part of the baseline study selected a pilot rural community where most of REGEND's pilot projects and activities will be implemented. Two communities were selected for assessment, to collect qualitative and quantitative information regarding socioeconomic context, energy and rural development needs. The methodology consisted of interviews with stakeholders and site visits to identify the key issues, potential and opportunities for safe and sustainable use of renewable energy as a catalyst for rural development, and potential strategies and interventions (information and awareness campaigns, training, research, projects and policies).

The strengths, weaknesses, opportunities and threats (SWOT) analysis was used as a strategic evaluation technique for each assessed community and entity.

Finally, a focus group of national stakeholders validated the selected community.

1. Country Assessment Study

1. Country Assessment Study

A. Country overview

Tunisia, the smallest country in North Africa, has a surface area of 163,610 km^2. Situated at the northern most point of the continent, it is bounded by Algeria to the west, Libya to the south-east and the Mediterranean Sea to the north and east. The country is divided into four physiographic regions: the mountains of the north-west, the mountains of the south, the coastal plains and the desert plains. From an administrative perspective, the country is split into seven regions and 24 governorates.

A mild Mediterranean climate dominates the northern and central regions, while the Saharan south is hot and dry. Average annual precipitation is 207 mm, with a spatiotemporally disparity, varying from 1,500 mm in the north and 900 mm in the Atlas Mountains, to less than 100 mm in the desert of the south. Only 20 per cent of the land is arable (field crops, such as cereals and vegetables), 6 per cent is forest and woodland, 20 per cent pasture and 13 per cent is under permanent crops (arboriculture, such as citrus trees).

Tunisia is a water-scarce country, with only 380 m^3 of water per year for each person. There is a 94 per cent mobilization rate of water resources through dams, while groundwater resources are overexploited.[2] A network of canals and transfers transport water from the north to the south. The Medjerda River, the country's only major river system, originates in Algeria and ends in the Gulf of Tunis.

In 2018, nearly two thirds of Tunisia's population lived in urban areas. The ethnic majority is of mixed Arab-Berber origin. Islam is the official State religion and most people are bilingual in French and Arabic.

Tunisia is divided into 24 governorates, each made up of several delegations. Individual delegations are comprised of several sectors, the smallest administrative division of the country.

B. Demographics indicators

In 2018, Tunisia's population was estimated at 11.5 million people.[3] Between 2004 and 2014 it grew by a rate of 11 per cent, approximately 1 per cent per year, a decrease from the 2 per cent average since the 1980s. Tunisia has been going through a period of demographic transition, with the proportion of the people aged 60 and above increasing from 7 to 11 per cent between 1984 and 2014, and that aged between 0 and 4 decreasing from 15 to 9 per cent.[4]

Territories are classified as communal (urban) or non-communal (rural). A communal area, as defined by the National Institute of Statistics, is a "well-delineated part of the territory, instituted as such by a decree which subjects it to municipal law and is comprised of one or several urban sectors". As rural communes do not exist in Tunisia, any part of the territory not under commune status is considered rural. About one third of the population lives in rural or non-communal areas, with a strong trend towards urbanization since the 1960s. Approximately 48 per cent of the population is concentrated in Greater Tunis and the Central-East region. This population is also rather urban: figures indicate that 100 per cent

of the population living in Tunis and Monastir reside in communes (urban areas). On the other hand, the smallest urban population is found in the Governorate of Sidi Bouzid (27 per cent of the governorate's population). Figure 5 shows the distribution of rurality in Tunisia.

Another key demographic characteristic is the large youth bulge, with about 47 per cent of the population aged under 30.

It should be noted that the concentration of population in attractive regions has resulted in the overexploitation of some natural resources (water, forest and agriculture).

C. General socioeconomic development

1. National economic and financial environment

Tunisia's economy has long been considered well-performing. Its positive performance, with at least a 4 per cent annual growth, is testament to genuine improvements prior to the uprising. The development model has produced reasonably good macroeconomic results, helping the country avoid major crises sparked by budgetary or external imbalances and keep inflation under control.

Since 2011, the economy has performed below expectations, and the situation has become more difficult due to terrorist attacks, political uncertainties and social tensions, all of which have weighed heavily on economic activity.

During 2017, the economy again experienced a difficult year, characterized by persistent pressure on macroeconomic balances, but with a slight improvement in growth of 1.9 per cent, against 1 per cent in 2016.[5] For 2018, data shows an annual growth of 2.6 per cent (table 1), which remains below the economy's potential and the level required to lower the unemployment rate.

In 2018, growth was driven by sustained agriculture, services growth, continued recovery of the tourism industry, phosphate mining and manufacturing. In the medium term, economic growth is projected to pick up gradually to 3.5 per cent in 2019/2020, against an improving business climate achieved through structural reforms and greater security and social stability.[6]

(a) Inflation

Inflation accelerated to a record 7.5 per cent in December 2018, from 4.2 per cent in December 2016, driven by the depreciation of the Tunisian dinar (TND), administered energy price (highly subsidised) increases and wage inflation, and the value-added tax (VAT) rate increase.

Table 1 Key socioeconomic indicators (most updated data)

Population	M	11.4	**HDI**	0.735	**GDP per capita (PPP)**	$	11 599
Population growth[a]	% p.a.	1.1	**HDI rank of 189**	95	**Gini Index**		35.8
Life expectancy	years	75.5	**UN Education Index**	0.685	**Poverty[b]**	%	9.1
Urban population	%	67.0	**Gender inequality[c]**	0.289	**Aid per capita**	$	42.1
Unemployment rate	%	15.5	**Inflation**	7.5%	**Economic growth**	%	2.6
Poverty rate 2015	%	15.2	**Extreme poverty 2015**	2.9			

Sources: Compiled data from the National Institute of Statistics, http://www.ins.tn/fr/statistiques. UNDP, *Human Development Indices and Indicators 2018 Statistical Update*, available at : http://hdr.undp.org/sites/default/files/2018_human_development_statistical_update.pdf.
Note: Footnotes related to 2017.
[a] Average annual growth rate.
[b] Percentage age of population living on less than $3.20 a day at 2011 international prices.
[c] Gender Inequality Index (GII).

(b) External deficit

Tunisia faces a large external deficit. The current account deficit reached a historical record of 11.2 per cent of GDP in 2018, against 10.2 per cent in 2017, following the worsening of the trade balance deficit that negatively affected the net foreign exchange assets, which amounted to 84 days of imports in 2018.

The economy also suffered from the impact of the crisis in Libya, its number two trading partner, after the European Union. Libya was an important market, especially for agri-food products and construction materials.

The economic slowdown and slippage in implementing structural reforms have created major macroeconomic imbalances. The scale of these imbalances prompted authorities to seek support from the International Monetary Fund (IMF). The first programme for $1.73 billion, which was signed in 2013 and expired in December 2015, had mixed results in stabilizing the economy. A new four-year $2.8 billion programme was approved by the IMF in May 2016, targeting four areas:

- Macroeconomic consolidation;
- Reform of institutions;
- Financial sector development;
- Improvement of business climate.

2. Risks and challenges facing the Tunisian economy

While resources are being employed to improve the security situation, high levels of youth unemployment, notably in the regions lagging behind, and rising inflation may reignite social tensions. The Government must balance social stability with the need for reform, which highlights the importance of promoting greater social and economic inclusion to create sufficient support for reform. Moreover, reform to stimulate private sector growth, job creation and entrepreneurship are key to creating opportunities and hope for the future. Wage negotiations with unions, which are still pending, and rising oil prices are substantial risks of upward pressure on spending and the deficit.[7]

3. Social indicators

Tunisia's Human Development Index (HDI)[8] value for 2017 is 0.735 – which puts the country in the high human development category – positioning it at 95 out of 189 countries and territories. The rank is shared with Jordan. Between 1990 and 2017, the national HDI value increased from 0.569 to 0.735, reflecting improved outcomes in health, education and income (table 2). Life expectancy at birth increased by 7.1 years, mean years of schooling by 3.8 years and expected years of schooling by 4.6 years. Tunisia's gross national income (GNI)[9] per capita increased by 87.9 per cent over the period.

Table 2 Trends in Tunisia's HDI component indices, 1990-2017

	Life expectancy at birth	Expected years of schooling	Mean years of schooling	GNI per capita	HDI value
1990	68.8	10.5	3.4	5.46	0.569
1995	17.5	11.6	4.1	5.89	0.607
2000	73.2	13.1	4.9	7.31	0.653
2005	74.2	14.2	5.8	8.44	0.689
2010	74.8	14.5	6.7	9.97	0.716
2015	75.5	14.9	7.0	10.20	0.728
2016	75.7	15.1	7.1	10.19	0.732
2017	75.9	15.1	7.2	10.27	0.735

Sources: UNDP, "Human Development Indices and Indicators: 2018 statistical update", briefing note (New York).

4. The job market and unemployment

The modest improvement in economic activity over 2018 could not ease the job market's deficiencies at the structural level as much as at the operational level. Measures implemented to absorb unemployment and give impetus to the market remain insufficient while the unemployment rate stands at the same high levels as 2017 and 2018 (about 15.5 per cent, corresponding to 640,000 people not having jobs). Concurrently, disparities between regions, gender and education levels persist, affecting particularly inland regions, women and higher education graduates.

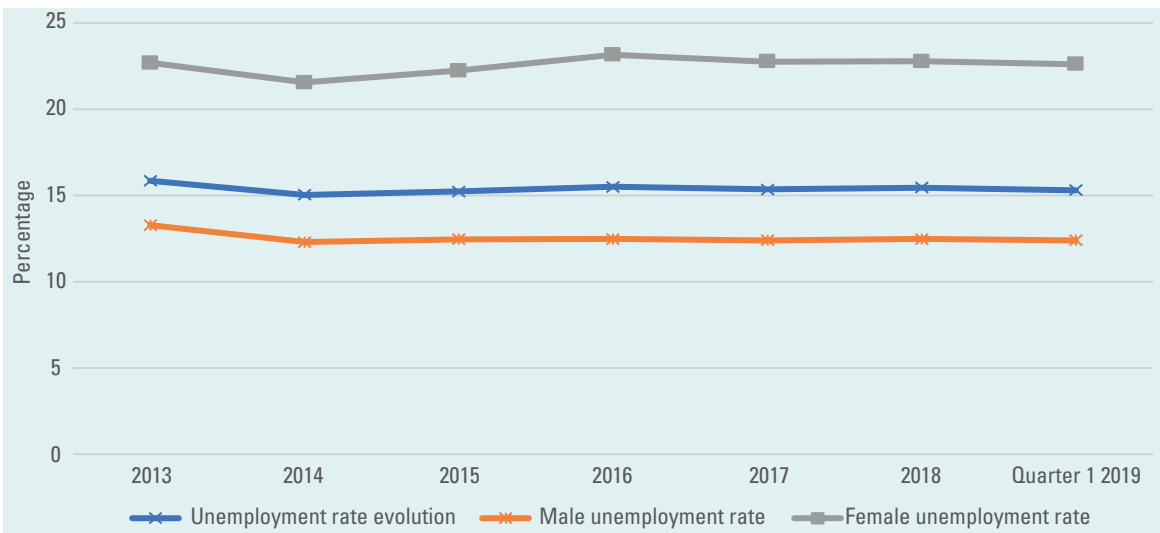
As shown in figure 1, a breakdown of unemployment by gender shows strong disparities between men and women, with unemployment rates reaching 12.5 and 22.9 per cent, respectively, at the end of 2018, against 12.5 and 23.1 per cent in 2016.

Despite its reputation as a regional leader in terms of women's rights, Tunisia lies in the bottom fifth of countries in the United Nations Development Programme (UNDP) Gender Development Index (GDI), which reflects significant differences in outcomes for males and females.

Similarly, regional disparities also persist, although the unemployment rate decreased in all regions, from one year to the next, except for the Centre-West and South-East regions, where it rose by 0.2 and 1.2 per cent, respectively. The southern and western regions recorded the highest levels. Broken down by region, the unemployment rate was 24.3 per cent in the South-East, 10.4 per cent in the North-East, 9.7 per cent in the Centre-East, 25.6 per cent in the South-West, 16.7 per cent in the North-West and 17.4 per cent in the Centre-West.

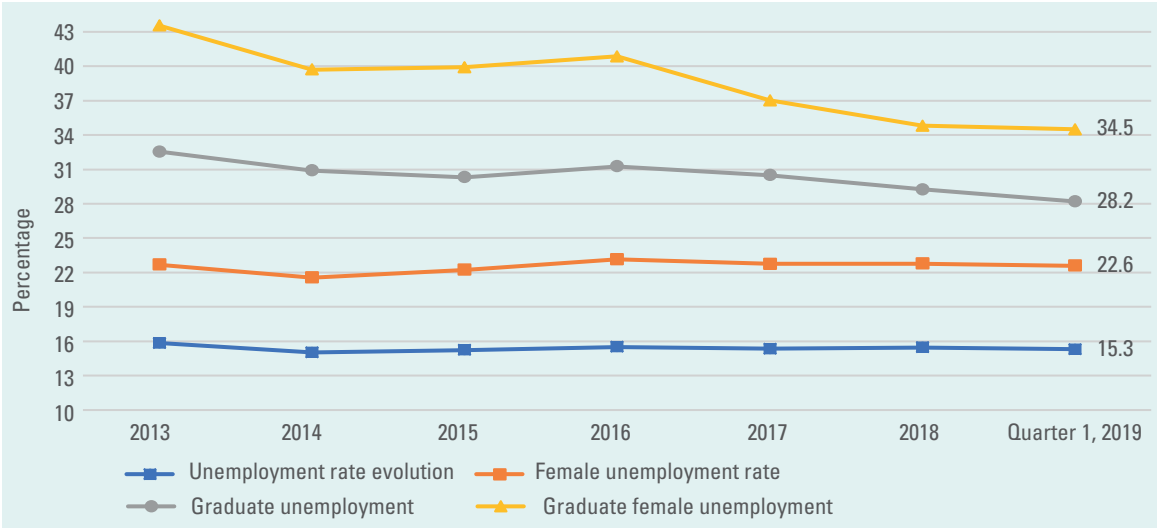
Taking account of the challenges with regard to employment, the Government moved towards a new inclusive approach. This was based on boosting economic opportunities to remove specific social and economic obstacles that prevent young graduates from accessing quality jobs. Likewise, a series of measures in 2017 and 2018 simplified the entry of higher education graduates into professional life, including a project on social and solidarity-based economy, developing the green economy and fostering the public-private partnership for professional training and employment, as well as the economic inclusion project for youth, or "initiators", conceived by the World Bank and targeting underprivileged graduates.[10]

Figure 1 Evolution of unemployment rate, percentage



Source: Compiled by author, using National Institute of Statistics publications. Available at http://ins.tn/sites/default/files/publication/pdf/Note_ENPE_1T2019_F.pdf and http://ins.tn/sites/default/files/publication/pdf/Note_ENPE_2T2018_F.pdf.

Figure 2 Evolution of unemployment rate, percentage - national average, graduate and female



Notes: Data compiled by author, using National Institute of Statistics publications.

Government efforts have only succeeded in maintaining the fixed rate of unemployment since 2015. In addition, many donors (including the World Bank, the German State-owned development bank KfW, and the French development agency AFD), with international technical cooperation (the German development agency GIZ and United Nations agencies) and assistance from NGOs, have tried to improve job access, in particular for the rural population, by implementing projects and employment facilities such as training, subsidies, job hackathons and start-up initiatives.

Unemployment varies between the coast and interior, and within governorates, according to place of residence, with a higher ratio in rural areas.

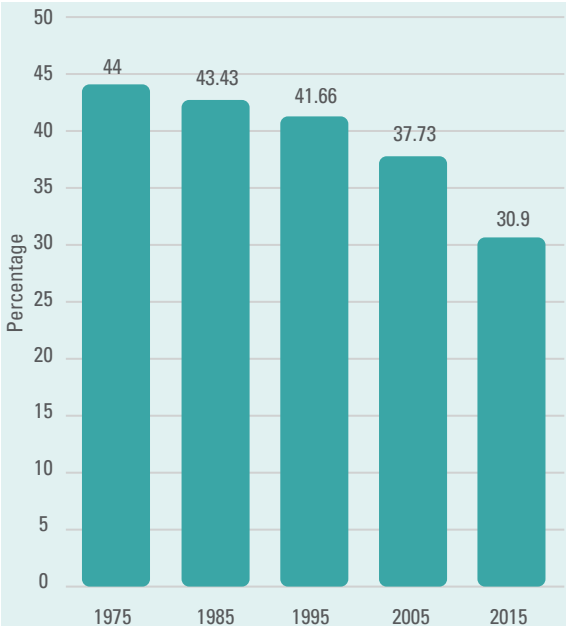
D. Regional disparity

Political, economic and institutional factors have contributed to the rise of regional inequality. This division likely started during Tunisia's colonial period, and continued in the policymaking of the post-independent state. The fault lines that have split the country into a more prosperous coastal area in the north, including Greater Tunis, and the deprived central and southern regions have led to multiple marginalization.

Inequalities between different regions have intensified over time, reflecting regional imbalances between the inland and the coastal governorates, which contributed to the uprising of 11 January 2011. Tunisians were discussing regional inequalities just after the revolution, due to the centralized – and type of – governance at the top level of the State. Inequality has decreased since 1995, but it remains high, with the Gini Index[11] hovering around 30.9 per cent in 2015, against 37.73 per cent in 2005 and 41.66 in 1995 (figure 3).

In Tunisia, multiple marginalization encompasses three manifestations of alienation, namely regional/spatial estrangement, economic and development estrangement, and human estrangement.[12] Disparity is not only a question between interior and coastal areas but also about inequalities between rural and urban spaces, including in the more advantaged regions of the north. In other words, development in Tunisia, while especially acute in deprived regions, remain a nationwide problem.

Figure 3 Gini Index, 1975-2015, percentage



Source: Nadia Mbazia, "Inequality and growth in Tunisia: empirical evidence on the role of macroeconomic factors", MPRA Paper No. 81127 (Faculty of Economic Sciences and Management of Tunis, 4 September 2017).

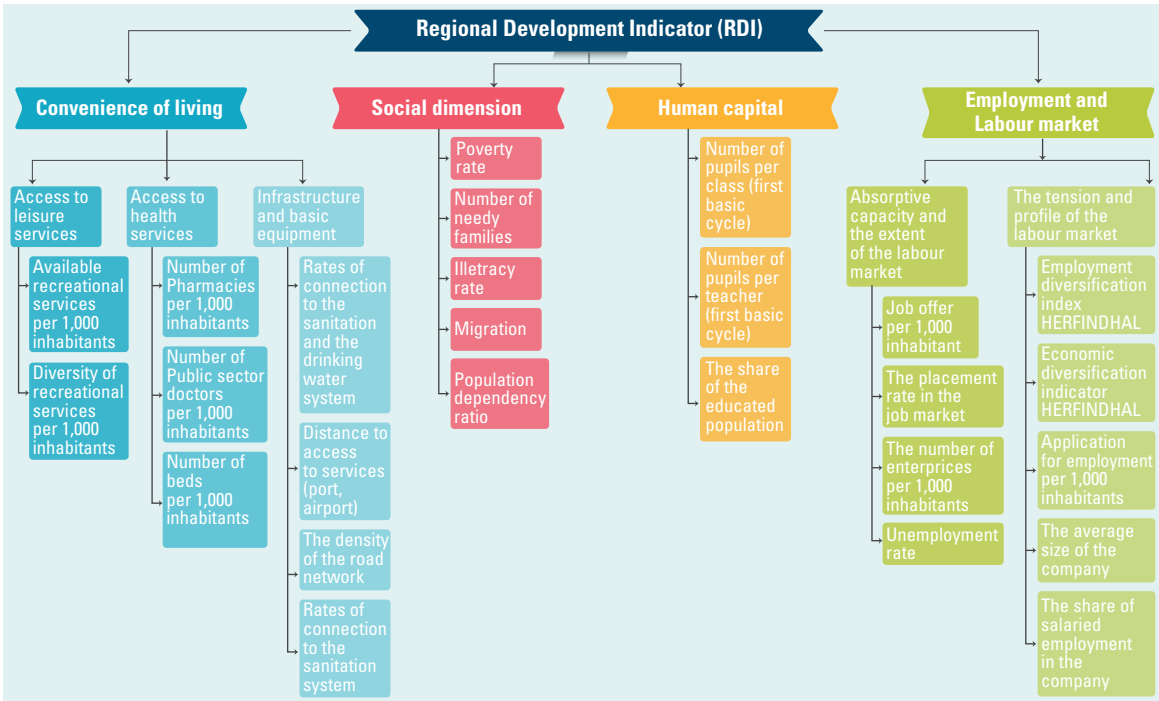
Development has been unequally distributed across the country's regions, and socioeconomic growth has favoured some areas more than others.

To understand the regional disparity, reference is made to a report published in 2018 by the Tunisian Institute of Competitiveness and Quantitative Studies (ITCEQ),[13] in which the indicator that measures regional inequality in Tunisia is calculated, and governorates and delegations are classified accordingly.

1. Regional Development Indicator (RDI)

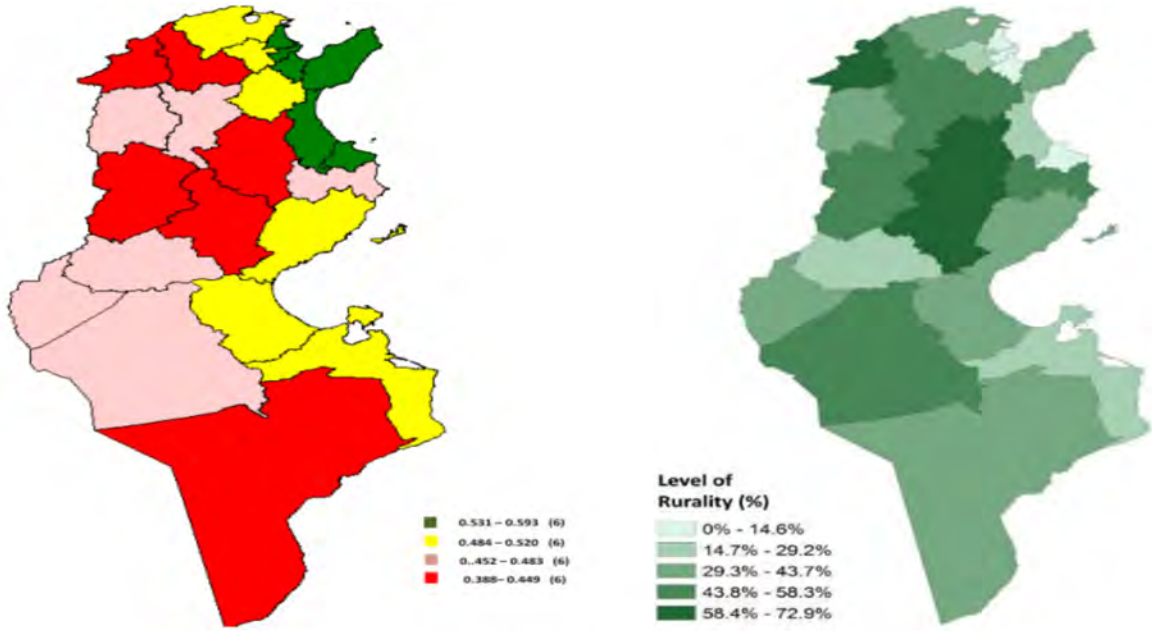
Developed by ITCEQ in 2011, the Regional Development Indicator (RDI) is an average (score) of 17 standardized socioeconomic variables that represent an average of four indices, namely, knowledge, wealth and employment, health and population, and justice and equity. Figure 4 shows the 17 indicators used to calculate the RDI. [14]

Figure 4 Indicators used to calculate the RDI 2018



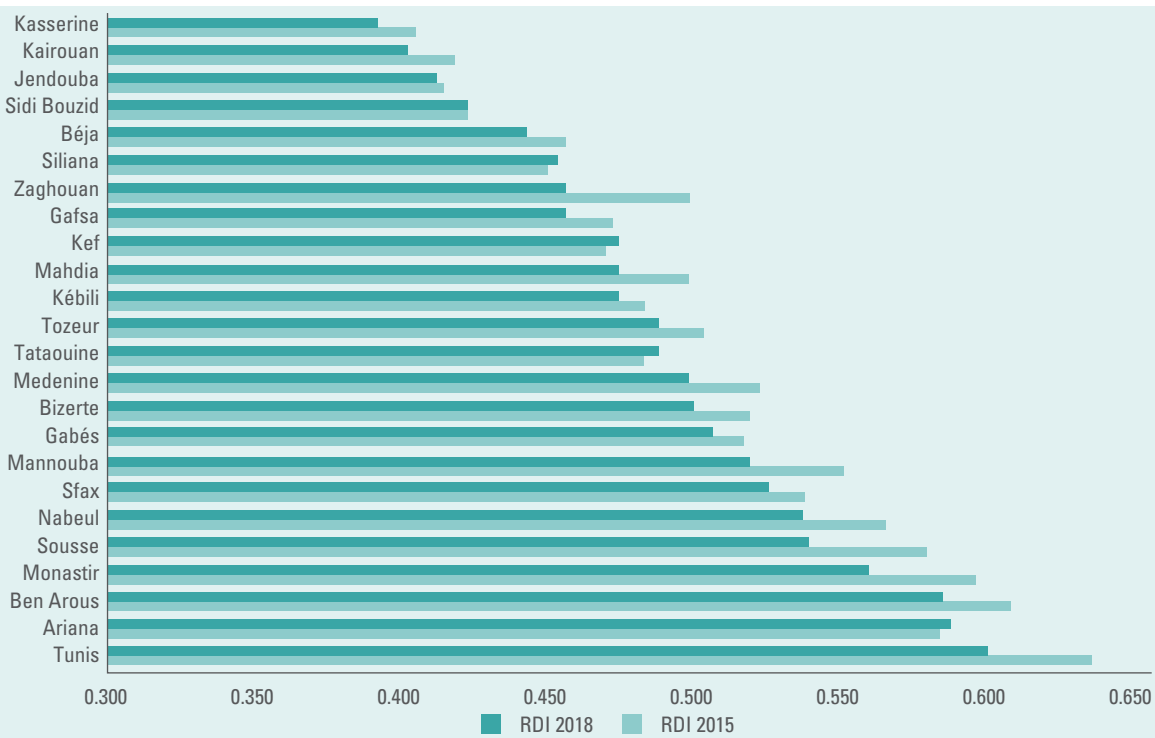
Source: Boussida, Ben Rabah and Ben Salhine, "Indicateur de Développement Régional" (2018).

Figure 5 Distribution of governorates according to RDI 2018 correlated with national rurality



Source: For the first map, Boussida, Ben Rabah and Ben Salhine,"Indicateur de Développement Régional" (2018); for the second map, World Bank, "Tunisia WASH and Poverty Diagnostic" (2017).

Figure 6 Comparing RDI 2015 and 2018



Source: Boussida, Ben Rabah and Ben Salhine,"Indicateur de Développement Régional" (2018).

The objective was to have a means to monitor and evaluate regional development in Tunisia, classify regions and discern failures and inequalities hampering development. The review of the RDI suggests the North-West and Central-West have not benefited much from the country's growth, in terms of living conditions, health, education and employment, among others. Figure 5 shows the distribution of governorates according to RDI 2018, correlated with rurality. It can be concluded that there is a strong relationship between poor development and rural regions, governorates with a low regional development index showing a high rurality percentage.

As figure 6 shows, in 2018, the RDI decreased compared with 2015, demonstrating Tunisia's difficulties during the transition period. The constraints of land tenure and slow, heavy administrative procedures were the predominant causes, constituting real obstacles to realizing public projects within regions, and most governorates experienced a decline in their RDI.

Regional imbalance is now considered one of the most important issues facing Tunisia. The country is effectively split in two: the coastal regions, which has a basic socio-health infrastructure far exceeding the national average, and the interior western regions, where the economic activity is reduced, with few exceptions, to agriculture and small-scale commerce, and where the unemployment rate can reach 40 per cent.

Table 3 Last 10 delegations in the national RDI ranking, 2018

Delegation	Governorate	Ranking
Nefza	Beja	255
Sejnane	Bizerte	256
Ghardimaou	Jendouba	257
El Alaa	Kairouan	258
Foussana	Kasserine	259
Majel Bel Abbes	Kasserine	260
Elaoun	Kairouan	261
Bouhajla	Kairouan	262
Fernana	Jendouba	263
Hassi El Ferid	Kasserine	264

Each region has specific potentialities whose rational exploitation would give it a comparative advantage. It is necessary to promote these strengths by creating the appropriate conditions to enable regions to build solid economic basis capable of stimulating development, thus contributing positively to national wealth. The competitiveness, job potential and attractiveness of these regions must therefore be strengthened by improving access to transport, health care and energy and water services, and promoting women's employment and gender equality.

It should be noted that if regional balance cannot be achieved through policies, it is imperative the Government put into place economic and social reforms to ensure an equitable distribution of wealth.

2. Poverty and rural areas

The analysis of certain key indicators, such as poverty, reflects their significant influence on regional differences. Extreme poverty rates in rural areas were approximately six times higher than those in urban areas (table 4).

Rural poverty is a consequence of regional imbalances in basic infrastructure and economic activity, which affect access to transport, education, health, employment and housing. Inequalities between people from different regions, genders and educational backgrounds are persistent, profound and, to some extent, structural.

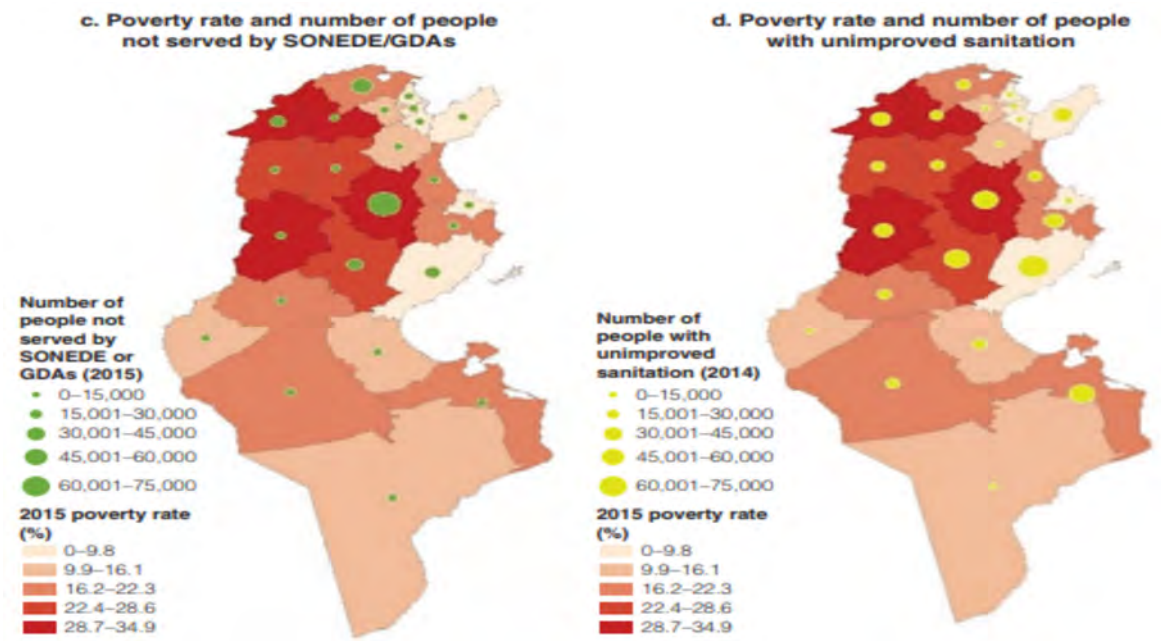
Table 4 shows that poverty is primarily a rural problem, with approximately two thirds of impoverished people living in the country's hinterlands. The North-West and Centre-West are the poorest parts of the country and have the highest level of rurality. A lack of human capital, household sizes far above the national average and a dearth of industry contribute to poverty in these regions. For overall poverty (figure 7), Kairouan has the highest incidence (34.9 per cent, almost one in three people), closely followed by Kef (34.2), Kasserine (32.8), Beja (32) and Siliana (27.8).

Table 4 Poverty rate by place of residence, percentage

	2005	2010	2015
Poverty rate at the national level	23.1	20.5	15.2
The poverty line in communal areas	14.8	12.6	10.1
The poverty line in non-communal areas	38.8	36.0	26.0
Extreme poverty rate at the national level	7.4	6.0	2.9
The extreme poverty line in communal areas	3.0	2.1	1.2
The extreme poverty line in non-communal areas	15.5	13.6	6.6

Source: Compiled by author using National Institute of Statistics data. Available at http://www.ins.nat.tn/fr/themes/m%C3%A9nages-et-conditions-de-vie#sub-3672.

Figure 7 Distribution of poverty and extreme poverty rates, by governorate



Source: World Bank,"Tunisia WASH and Poverty Diagnostic" (2017).

E. Agriculture in rural areas

1. General overview

Agriculture has played an important role in Tunisia's development since independence. Over the past two decades the country has undergone substantial structural change. Services and industry are the largest contributors to GDP, but the agricultural sector remains an important source of income in rural areas, contributing 9.5 per cent of GDP in 2017 (table 5). Agricultural products represent about

Table 5 Evolution of GDP composition by sector

	2010	2011	2012	2013	2014	2015	2016	2017
GDP annual growth (%)	3.5	-1.9	4.0	2.9	3.0	1.2	1.1	2.0
Industry, value added (% of GDP)	29.9	29.8	29.6	28.8	26.9	24.9	24.0	23.1
Services, value added (% of GDP)	62.6	61.7	61.3	62.3	63.9	64.8	66.5	67.4
Agriculture, value added (% of GDP)	7.5	8.5	9.1	8.9	9.2	10.3	9.5	9.5

Source: World Bank, "World Development Indicators", DATABANK. Available at https://databank.worldbank.org/data/reports.aspx?source=2&country=TUN#.

6 per cent of export earnings. The most significant export commodities are olive oil, dates and macaroni. Industry share in GDP decreased to about 23 per cent of GDP, with services accounting for the remaining 53 per cent.[15]

In the first quarter of 2019, employment in agriculture as a share of total employment was 14.3 per cent, the services sector 51.8 per cent, manufacturing industry 18.8 per cent and non-manufacturing industry 15.4 per cent.[16]

The importance of agriculture to the rural economy has meant the first rural development policies have been based mainly on the sector, which must generate sufficient income to enable people in rural areas to have decent lives. The failure of this strategy and, crucially, the worsening imbalance between rural and urban areas have led to a greater emphasis on rural development in a broader sense.

Development projects implemented since independence are characterized by their top-down approach and in the limited role given to the people in identifying development, choice of solutions and project implementation. They were not participatory, but administered rural development projects.

2. Agricultural policies for rural areas

Tunisia is affected by structural and historical socioeconomic inequality. Before 2011, an annual GDP growth of 4-5 per cent was accompanied by high unemployment and poverty rates, with strong regional disparities. These have been exacerbated by government interventions favouring export-oriented companies in the coastal governorates.

For the agricultural sector, policy measures have subsidized products produced mainly in coastal areas, and for which Tunisia is not competitive (cereals, beef and milk, for example), while disregarding those produced in the interior regions. Government subsidies and larger, market-oriented farmers have improved the added value of agriculture – which increased at about 4 per cent per year over the period 1980-2000 – because they could use new technologies, such as fertilizers and other chemical inputs, and irrigation systems, and make management and efficiency improvements. However, this growth has not corresponded to an increase in labour demand in the same period. Additionally, the minimum salary in the agricultural sector

The development of agriculture, the main source of income for rural people, is impeded by the lack of non-agricultural activities in rural areas, difficulty in accessing financial services and relatively weak rural organizations that lack the training and support to take on responsibility for their own development. Climate problems and land dispersion due to fragmentation, as well as historical land problems that deprive agriculture of bank credits accentuate the situation.

has only increased by 0.5 per cent per year. As a result, small farmers have been forced into additional economic activities, for instance in the construction sector.[17] In Tunisia, structural constraints limit farming productivity. These include scarcity of natural resources, such as water, particularly during drought periods, inadequate access to new technologies and financial resources, and uneven land distribution. Agricultural activity remains mainly pluvial, extensive and highly dependent on climate change, with subsequent consequences for food security.

In the sector, land is parcelled due to existing property distribution rights and demographic pressure. The majority of the population in rural areas does not own land, or micro-farms.[18] Land property fragmentation limits farmers' access to credit and insurance, and negatively affects poverty and consumption rates. Where land is mainly collective or lent by the State, emigration is limited due to the fear of losing land rights (in the mid-west, and in extreme North-West region) while the land ownership regime facilitates population movement.[19]

3. Financing farming activities in rural areas

Financing small-scale agriculture has been the subject of several experimental programmes, including mutual funds, the Special Fund for Agricultural Development (FOSDA) credits and credit projects by NGOs. These have not improved the financial inclusion of small farmers.

The objective must be to identify new, alternative financing models that facilitate access to agricultural credit for small and micro-entrepreneurs while avoiding traditional constraints.

To facilitate access to credit and financial facilities, it has become necessary to envisage models based on local micro-finance and on value chains that involve actors from different links, one guaranteeing the other to reach the small farmer.

The value chain approach corresponds to an economic logic applicable to agricultural and agro-food products. It is a process of a series of complementary steps through which the product moves from the production stage (farm) to consumption (final customer).

The alternative modes of financing need to reference microfinance and interface financing. Tunisia has had microfinance since 1999, through the creation of microcredit associations (AMCs) and microfinance institutions (MFIs), particularly since 2011.

The microcredit association system has had positive results but has also shown its limitations. This led the Tunisian Solidarity Bank to adopt a strategy to restructure the current system, and encourage mergers with microfinance institutions.

In addition to the Tunisian Solidarity Bank system, microfinance institutions operating outside of it also intervene at the local level to finance micro projects. The Banque Nationale Agricole (BNA Bank), with 110 agencies in this field, operates at the level of the major agricultural delegations, and contributes to the financing of micro-projects directly and/or by interfacing within the framework of the value chains.

This diversified but well-structured architecture should help improve the financing of small-scale farming.

Interface financing as part of the value chain is usually based on mediation, including – between banker and small farmer – a third enterprise (an agro-industrial platform or service company) to make the connection.

Within this framework, small farmers in rural areas need to get together to share operating costs, production and marketing, which can be established through the Société Mutuelle de Services Agricoles (Mutual Agricultural Services Company, or SMSA).

F. Rural migration: principal drivers of rural youth migration

In Tunisia, research shows that rural migration patterns, including among young peoples, are complex, determined by a variety of push and pull factors. Analysis of intergovernorate migration indicates flows are mostly from rural to urban areas, especially for male youth.[20] Between 2009 and 2014, both internal and external migrants were predominantly aged between 20 and 40 years.[21]

In 2018, a report by the Food and Agriculture Organization of the United Nations (FAO) on rural youth migration in Tunisia[22] indicated that non-migrant households and households with recent migrants (leaving after 2011) are more likely to perform agricultural production and livestock farming as a main activity, while households with migrants who left before 2011 are more likely to be involved in construction jobs and salaried work. According to the FAO report, this can be explained by considering it alongside evidence given that a "reduction in income from agricultural activities" is the reason for migration, which is particularly relevant among internal migrants and those who migrated before 2011.

Migrants who left for an internal destination and those who migrated before 2011 might have done so because of a decline in agricultural productivity and increasing land fragmentation, which can, in turn, change or diversify the main activity of migrant households. Beside specific problems within the sector, the key reasons for migration, especially internal migration, are connected to the search for better job opportunities and improved living conditions.[23] Data on occupational status before migration reflect these results, with most internal migrants stating they were unemployed prior to migration. Emigrants are more likely to have been employed before departure, indicating the higher resources required for an international move.[24]

The FAO report "provides evidence of the significant feminization of migration", particularly internal migration by young women from rural areas moving to work in other regions, often on a seasonal basis. There has also been an increase in emigration since 2011. This, it says, is associated with an increase in highly educated migrant women, with more than half of post-2011 migrant women having a university degree. International migration is aimed at pursuing university education, with an increase in study-related reasons and a fall in those for marriage when comparing those who migrated before 2011 and those after.

Relationship between agriculture and rural youth migration

Agricultural activities constitute a major share of the economy of rural regions, and underdevelopment of the sector pushes youth to migrate to urban areas to look for a job.[25] Analysis of intergovernorate migration in Tunisia between 1999 and 2004 shows movement from the economically depressed interior areas of the west to coastal governorates with low unemployment rates and high per-capita expenditure.[26] Further, coastal regions are perceived to offer better opportunities to develop commercial (legal or illegal) activities with foreign economies and to migrate abroad.

Unemployment among young women aged between 15 and 24 years was particularly high (34.4 per cent) in 2018.[27] Female participation in agricultural employment is often limited to unpaid family work or seasonal work, which offer low wages. Social norms limit women's employment opportunities and their scope for mobility. Families were found to more likely tolerate young women moving to other areas when their employment was sociably acceptable, such as nursing or teaching, or increased their chances of marriage.

G. Tunisia energy profile

The last 50 years have witnessed profound changes in the country's energy resources. The first oil field began operating in 1966, and although natural gas emerged in the 1970s, it was not operational until the 1980s. Since the 1990s, the availability of natural gas has increased significantly due to the Trans-Mediterranean pipeline (Algeria-Tunisia-Italy), which provided Tunisia with compensatory[28] volumes of natural gas. This allowed the country to offset a decline in oil production after a peak in 1980.

Since the 2000s, the overall energy balance, in surplus since the end of the 1960s, became negative, due to the steady increase in national demand. The energy situation has changed drastically over the past two decades. Primary energy demand has risen much more steeply than production due to economic development. After years of surplus power generation, Tunisia has become a net energy importer, and the gap between production and demand is growing every year. Energy dependency reached 49 per cent in 2018 compared with previous years, which will likely continue to increase, and impact on energy security.

Developing efficiency and renewable energy is considered important to the country's energy future. In recent years, Tunisia has supported the deployment of renewable and energy efficiency projects. These efforts are aligned with the national strategy's ambition that, by 2020, 30 per cent of energy is generated by renewables and primary energy consumption is reduced by 30 per cent. Tunisia's renewable energy potential, particularly solar and wind energy, is important in light of opportunities for economic growth and foreign investment potential.

Regulatory and policy frameworks to support renewable energy integration have been encouraged. In May 2015, to reach its targets, Tunisia's Ministry of Energy, Mines and Renewable Energies, established a law to cover the development of renewable energy projects and encourage private sector investment. In August 2016, the Government approved the decree of application of Law No. 2015-12, finalizing the legal framework for renewable energy projects eagerly awaited by foreign investors.

In April 2018, Tunisia reached a new milestone in its 2016-2020 national programme for producing electricity from renewable resources. Results were launched of the international companies selected to construct several wind and photovoltaic (PV) power stations with a total capacity of 210 megawatts (MW). With so much potential in the country, diversifying the energy mix is a strategy to solve the national energy deficit.

1. Tunisian electricity sector

(a) Electricity production

In 2017, national electricity production reached 19,133 gigawatt-hours (GWh), with an installed capacity of 5,309 MW.[29] The Tunisian Company of Electricity and Gas (STEG) generates most of the country's electricity (table 6), accounting for up to 81 per cent in 2017 (15,431 GWh per year). The main source utilized by STEG remains natural gas, which accounts for 14,286 GWh per year, representing 96 per cent of total production.

Tunisia covers approximately 53 per cent of its gas demand by means of a usage fee paid in kind on the Algeria to Italy pipeline. It attempts to cover the rest with its gas resources. The steady decrease of the resource, however, has led to increased dependency on gas imports from Algeria.

The contribution of renewable energy in 2017 stood at 3 per cent of national electricity production. Wind power topped production from renewable sources, with 441 GWh, against 23 GWh in 2000. Hydropower contributed just 17 GWh because of climate factors, such as drought, and decreasing dam reserves

Table 6 Electricity production in Tunisia, in GWh, 2017

Available electricity	2016	2017	Distributed electricity	2016	2017
1. STEG production (by source)	14 806	14 964	**1. Billed consumption**	15 255	15 665
Gas	14 286	14 964	**1.1.** STEG customers	15 127	15 594
Fuel, gas oil	1	1	High voltage	1 377	1 358
Hydraulic	45	17	Medium voltage	6 489	6,666
Wind	474	449	Low voltage	7 171	7 466
2. STEG purchases from CPC	3 337	3 543	Fraud	90	104
3. Exchanges	7	37	**1.2.** Sale GECOL	128	71
4. Purchases from third parties	106	122	**2. Total loss (transport and distribution**	3 001	3 468
Total general	**18 256**	**19 133**	**Total general**	**18 256**	**19 133**

Source: STEG, "Annual report 2017" (Tunis).

between 2015 and 2018. Solar PV generation, characterized by a slow start since 2010, increased from 1 GWh to more than 30 GWh in 2017, although the increase has been achieved mostly through home solar systems and not the development of large-scale projects. Other sources are mainly composed of thermal (stem) power plants and combined-cycle gas turbines.

The share of energy generated by independent power producers accounts for 18 per cent of the 2017 total, with 3,543 GWh.

In Tunisia, the demand for electricity is increasing by 5 per cent annually, which could be related to the country's steady electrification. Since 2014, the electrification rate has reached 99.9 per cent (100 per cent in urban areas, 99.6 per cent in rural areas),[30] compared with 95 per cent in 2000. But this is not the only influence on electricity consumption, and the multiplication of electrical appliances in households and in cities could represent a key factor. This explains why actors in the sector are focusing not only on implementing new renewable energy projects, but also on energy efficiency and conservation.

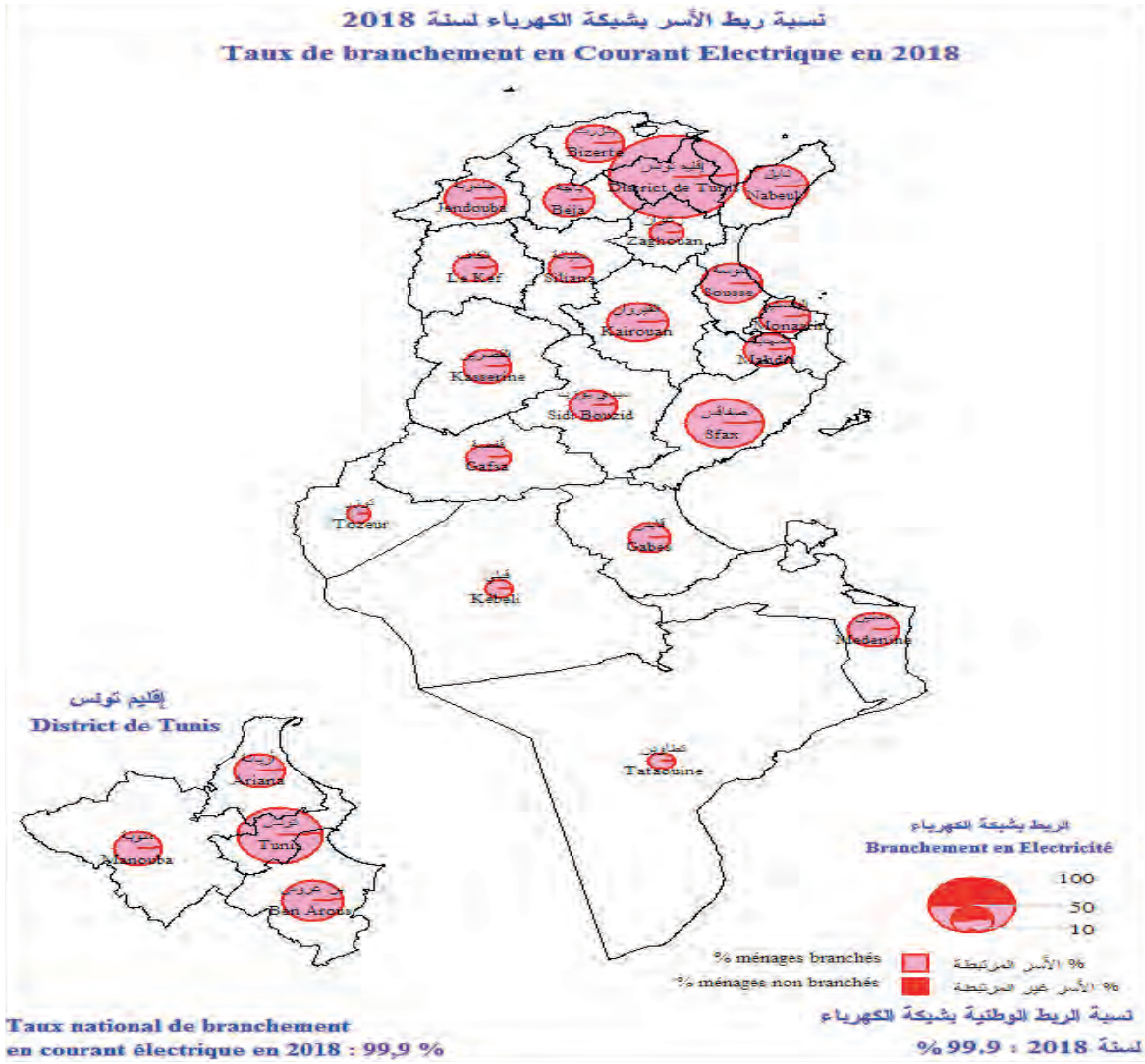
2. Renewable energies

Over recent years there has been ongoing discussion about the role of renewable energies in the national energy mix. As in the majority of net-energy importing countries, it is a discussion approached with differing expectations and objectives. Typically, this relates to the energy-policy triangle and its characteristic elements of cost-effectiveness, security of supply and environmental sustainability.

Following the 2011 uprising, the importance of political and economic constraints increased due to fossil fuel subsidies climbing to record levels. With rising demand and the fall in national gas resources, coupled with the high unemployment rate, the Government was forced to hike energy prices. To tackle the situation, an energy efficiency strategy was adopted (2016-2030), based on two pillars: improving the energy efficiency and the development of renewable energy sources.

The Government's efforts to support renewable and energy efficiency improvements are also visible in its adoption of a new Tunisian Solar Plan (TSP).[31] The official long-term plan for renewable energy, the TSP sets out Tunisia's ambition to harness its

Figure 8 Electricity connection rate per governorate, 2018



Source: National Institute of Statistics, "Rapport annuel sur les indicateurs d'infrastructures" (2018).

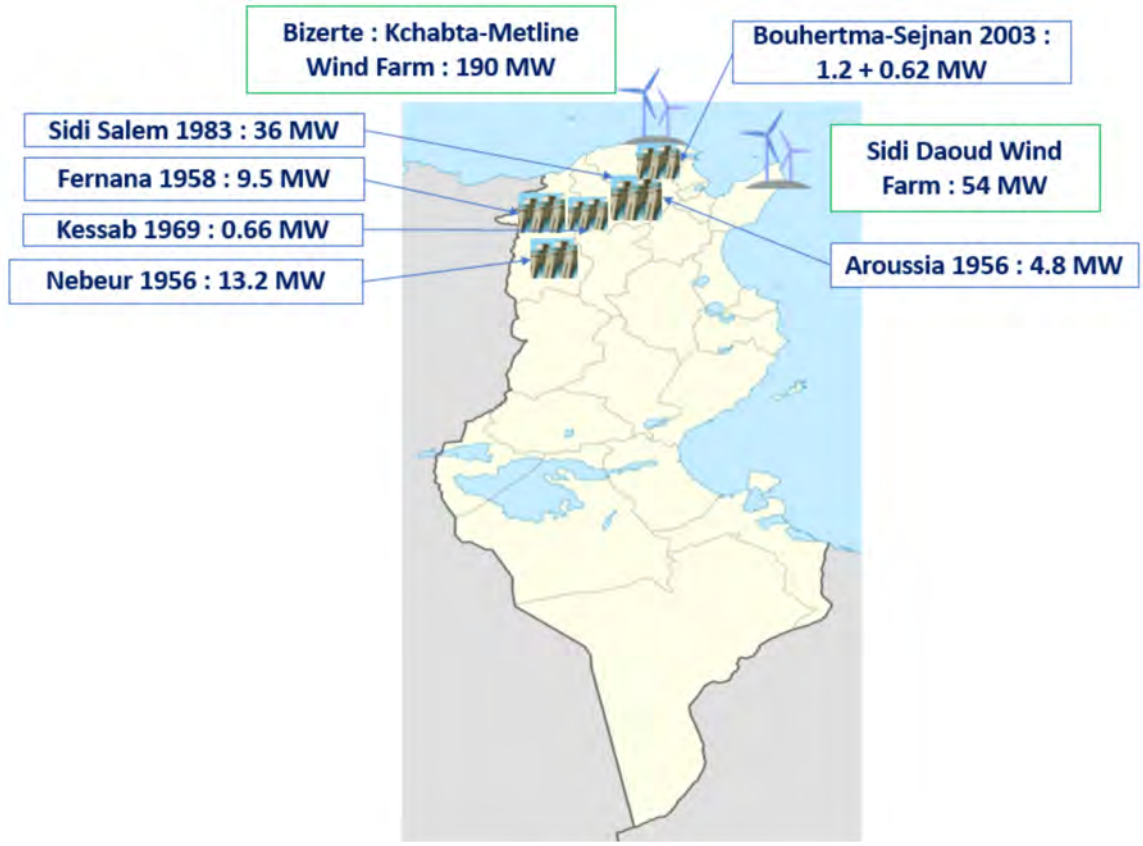
renewable energy resources to advance sustainable development, and includes targets for investment in wind energy, solar PV and concentrated solar power.

The TSP, formulated in 2009 and revised in 2015, seeks a total renewable energy penetration of 30 per cent of the electricity generation mix by 2030. The 2030 target for wind energy is 15 per cent, or 1,755 MW of installed capacity, the target for solar PV is 10 per cent, or 1,510 MW, and for CSP it is 5 per cent, or 460 MW.

In 2018, the renewable energy installed capacity for large-scale projects was equal to approximately 313 MW (wind energy and hydropower). The recent increase in renewable energy production is due mainly to the implementation and expansion of wind farms in Bizerte since 2012, confirming Tunisia's intention to develop a significant renewable energy sector.

Hydropower, or hydroelectricity, the renewable resource first exploited in Tunisia, has been implemented since 1956 when the hydro station

Figure 9 Renewable energy current installed capacity, STEG



Source: Map developed by author, using data from STEG and Ministry of Agriculture, Water Resources and Fisheries.

of Arroussia was installed, with a total capacity of 4.8 MW. Gradually, several sites were exploited and hydropower remained the main renewable energy source until 2012. Currently, the national hydraulic installed power accounts for 62 MW, with a variable production of between 40 and 160 GWh per year, depending on water availability in related dams.

Today, wind power is the main source of renewable energy. It leads the country's energy transition, with growth of production up to 245 MW of power installed in 2016. To date, two main wind farms have been developed, Sidi Daoud, and sites at Kchabta and Metline in the Bizerte region (as shown in (figure 9).

In 2018, Tunisia began implementation of a new solar PV plant in Tozeur, with a 10 megawatt-peak (MWp) capacity.

3. Rural electrification

A brief history of the Tunisian experience

In Tunisia, electricity is considered a minimum public service to which every household has a right. Rural electrification has had strong support since the early 1970s. Although the programme has done much right to achieve the goal of universal access, it has been the subject of extensive consultation with other agencies and has relied on funds from rural development programmes. From the beginning, the programme has been integrated in a broader strategy of rural development. When it was launched in the mid-1970s, only 6 per cent, or 30,000, of rural households had electricity. At the time, about half of Tunisia's population lived in rural areas.

Rural electrification became the third pillar in an integrated rural development drive that also emphasized basic education and improved health service, and was therefore a top priority in the Government's social and economic development plans. The Electricity VI Project was included in the country's ninth (1997-2001) and tenth (2002-2006) national development plans.

Over the ensuing years, impressive progress has been made in providing electricity to the rural population. By the end of 2000, 88 per cent of all rural households had electricity. Today the coverage rate is 100 per cent in urban areas, and 99.8 per cent in rural areas, a remarkable accomplishment given the conservative definition of rural areas, which includes only households outside incorporated areas. Many populations that in other countries would be defined as rural villages or towns are considered urban in Tunisia. Thus, the rural population is highly dispersed and isolated. The country has successfully balanced the sometimes conflicting priorities of substantial State subsidies, integrated rural electrification with rural development goals, and maintained the commercial viability of a public electricity company.

Factors contributing to this success include the following:

- Strong government policy and financial commitment;
- Gender and social equity;
- Institutional coordination;
- Technical innovation;
- An integrated approach;
- Complementary PV strategies for isolated areas.

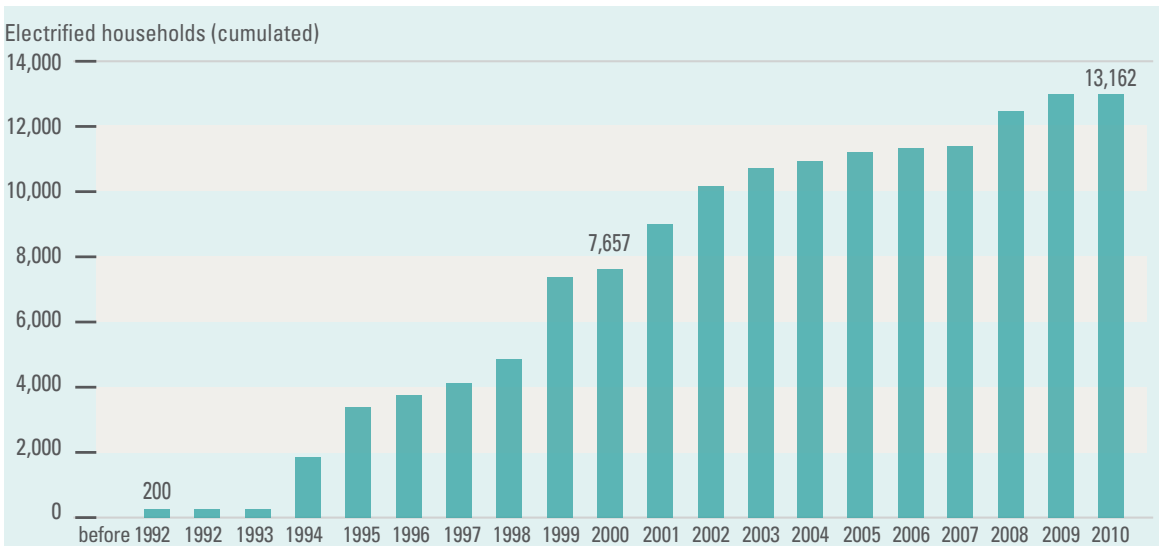
As a result, in 2018, rural electrification reached 99.8 per cent.[32]

4. Small-scale renewable energy introduction in rural areas

(a) Photovoltaics: a solution for users in isolated rural areas

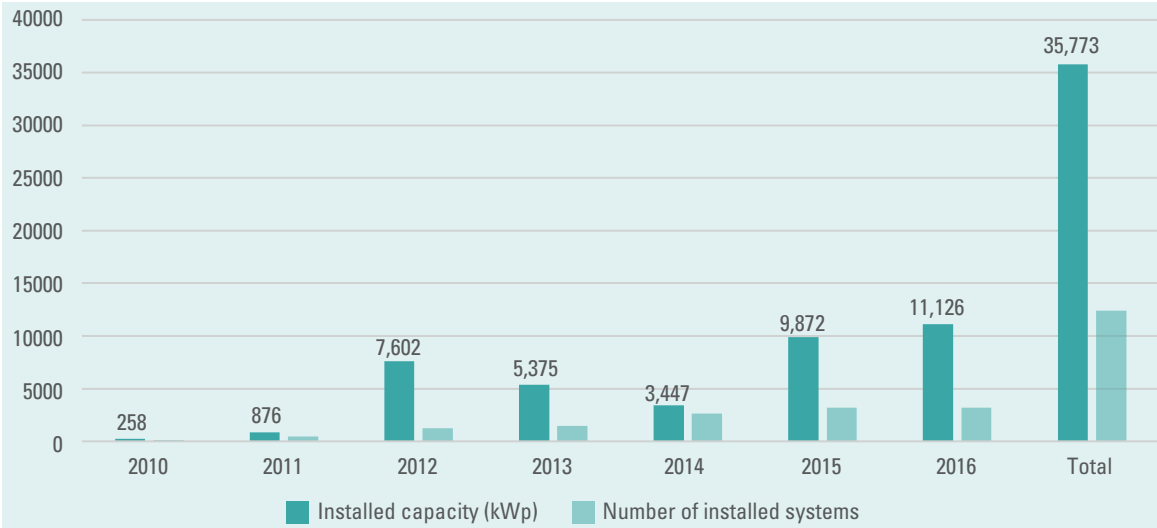
Tunisia's solar PV programme demonstrates the commitment to providing at least a minimal electrification service to even its most remote

Figure 10 Solar PV systems installed in the context of rural electrification



Source: GIZ and ANME, Renewable energy and energy efficiency in Tunisia - employment, qualification and economic effects (Tunis, December 2012).

Figure 11 ROSOL-ELEC programme, evolution of installed capacity



Source: Compiled by author, using data from ITU-CITET regional training workshop on ICT and climate change mitigation and adaptation in Arab region (Tunis, July 2017).

rural households, which otherwise would remain unconnected. Interest grew during the early 1980s, based on environmental and social grounds. Several demonstration projects were followed by pilot projects that showed the technology could help meet the basic electricity needs of isolated households. Individual solar PV systems are more cost effective in providing electricity to such households than centralized systems, biogas or grid extensions.[33] Grid and solar PV programmes are complementary. Solar PV systems give a basic electricity service, including for lighting, television and radio, but are not feasible for activities requiring higher power, such as irrigation and refrigeration.

The use of solar PV for residential demand has mainly been of interest for rural electrification. A total of 13,000 households had been electrified using PV kits by 2010, compared with 7,600 households in 2000 (figure 10).[34] Since 2010, the National Agency for Energy Conservation (ANME) has promoted PROSOL-ELEC, a solar roof programme, encouraging the use of solar PV systems for residential electricity. In 2016, total solar PV capacity was 35 MW (figure 11), comprised of mostly small-scale private installations. By the end of 2018, the total installed capacity exceeded 50 MW.[35]

(b) The PV market in rural areas

Under the rural electrification programme launched in the 1990s, 2,112 systems were installed between 2005 and 2010, representing a total investment of around 3.6 million dinars. For evolution of the rural electrification market, (table 7).

Apart from the PROSOL-ELEC programme, which installed micro-PV plants connected to the STEG grid, other initiatives helped expand this market, including:

- JBIC project by ANME: 63 wells fitted with PV pumping units and/or brackish water desalination units, and electrification of 500 new housing units for 2010;
- Solar PV pumping programme: total capacity of 152 kW installed 2005-2007, with an investment of 2.6 million dinars. Facilities operated and maintained by the Regional Commissariat for Agricultural Development (CRDA), under the agriculture ministry's jurisdiction.

Table 7 Market evolution of decentralized solar PV systems

Solar photovoltaics	2005	2006	2007	2008	2009	2010	Total
Rural electrification programme							
Number of housing units	235	105	128	1 052	584	8	2 112
Turnover (TND Million)	0.4	0.2	0.2	1.8	1	0	3.6
Number of suppliers	3	3	3	3	3	50	50
Numbers of installers	0	0	0	0	0	50	50

Source: GIZ and ANME, Renewable energy and energy efficiency in Tunisia (2012).

Table 8 Impact of past solar PV promotion programmes

Rural electrification	2005	2006	2007	2008	2009	2010	Cumulated impact 2005-2010	Savings Ktoe/ year
Number of housing units	235	105	128	1 052	584	8	2 112	
kWp	26	12	14	116	64	1	232	
Cumulated kWp	26	37	51	167	231	232	232	
Cumulated primary energy savings (ktoe)	0.01	0.02	0.02	0.07	0.1	0.1	0.3	
E savings over lifespan (ktoe)	0.2	0.1	0.1	1	0.6	0	2	0.1

Technological progress in solar PV energy and steadily improving competitiveness are indicators that the use of this technology will pick up in the years to come, which bodes well for the prospects of job creation in the sector.

(c) Stand-alone solar pumping systems in Tunisia

Solar water pumping, or PV water pumping, provides an alternative to groundwater pumping. With technological advances, it has proved to be operationally, financially and environmentally sustainable. In recent years, costs have dropped tremendously. Prices for the solar panels used in such systems have decreased by up to 80 per cent. In addition, panels last about 25 years and require little maintenance. These advances have made solar water pumping an extremely viable way to expand energy access, while creating a strong resistance to shifting rainfall caused by climate change or unreliable seasonal patterns. The Government has opted to subsidize the cost of solar pumping, increasing the pool of shared learning for this emerging technology.

Irrigated agriculture is important to the Tunisian economy, in the trade balance and in food security. It is highly related to the groundwater availability, in particular in rural areas in the centre and south of country. The costs of pumping, by electricity or gasoil, have increased because of the ongoing growth in energy prices. In Tunisia, the PV market evolved following the adoption in 2009 of a new regulatory framework. Two financial mechanisms are applied to enhance the implementation of solar-powered irrigation systems (SPIS), namely the Energy Transition Fund (FTE) and the Tunisian Investment Fund (FTI). SPIS have gradually become a reliable solution for irrigating off-grid farms.

Table 9 Distribution of solar-powered irrigation systems in Tunisia, 2010-2017

Year	Number of SPIS	Installed PV Capacity (kWp)	Investment (DT)	Subsidies FTE (DT)
2010	1	1	9 340	3 736
2011	4	26	167 853	67 141
2012	5	21	148 024	59 210
2013	4	45	187 081	65 507
2014	8	68	305 795	113 716
2015	16	186	607 365	237 930
2016	30	270	966 625	368 574
2017	56	454	1 509 536	574 894
Total	**124**	**1 071**	**3 901 618**	**1 490 708**

Source: Data collected from ANME's renewable energy department 2019.

From 2010 to 2017, 124 SPIS were installed in Tunisia, with a total solar PV capacity of 1 MWp. Table 9 shows the distribution and total installed capacity of these systems.

It is important to note that statistics concern only authorized wells that are able to benefit from National Fund for Energy Conservation subsidies. The actual number is bigger, because in addition to authorized systems, there are those that have been installed without receiving a national subsidy, especially in the many regions suffering from overexploited groundwater resources, such as Kebili, Kairouan and Sidi Bouzid. They use illegal wells, and are therefore not allowed a subsidy.

In a recent FAO and GIZ study, the estimated number of installed SPIS exceeded 1,000, the installed capacity exceeds 10 MWp.[36] It indicates access to solar pumping has encouraged farmers to irrigate in rural areas deprived of electricity. SPIS support the expansion of agricultural activity and indirectly enhance the value of water by encouraging farmers to choose crops with high added value or to intensify farming activities.

5. Experience of biogas systems in rural areas

Tunisia has experimented since the 1980s with biogas systems in a wide range of sectors and variety of applications.

The first pilot biogas plants were installed in 1982, and there was fresh impetus in the field through the GTZ's special energy programme, which started in 1987. So far, about 50 biogas digesters have been installed on farms. The main objective has been to avoid deforestation by replacing the consumption of wood fuel and to reduce consumption of liquid petroleum gas. Digesters of $10m^3$ were installed, capable of producing about $300m^3$ per year. One cubic metre of biogas has the cooking potential of 2.7kg of wood and is, therefore, a viable solution when the waste of as few as 6-10 cows is treated. AME/GTZ's biogas programme has shown that simple, small biogas digesters can work in Tunisia. However, the programme to promote biogas in rural areas has not included local biotechnologists in research and development efforts, nor has it been able to establish a structure to provide technical advice and follow-up to farmers willing to invest in biogas digesters but who live outside the narrow regions where demonstration plants have been installed.[37]

Later, Biogas production for the treatment of agro-industry waste was tested on a pilot scale in the poultry sector and at the laboratory level at the National Institute of Agronomy, Tunis and at the National Engineering School of Tunis.

In 1993, an egg-producing society near Sfax established a 1m^3 pilot digester in cooperation with the Centre of Biotechnology of Sfax. The reactor has run only intermittently, however, and the initiative has not been a successful one.

Other examples of biogas production include:[38]

- As part of Tunisian-Chinese cooperation, a pilot project was established to produce electricity on a poultry farm in Hammam Sousse;
- As part of the quadrennial programme for energy management 2008-2011, two projects to develop the use of biogas have been implemented;
- The production of biogas in farms and rural areas generally by valorizing agricultural and animal waste through methanization was promoted. The objective is to establish 200 digesters to produce biogas for family use as a substitute for liquid petroleum gas.

At the industrial scale, biogas initiatives have included pilot projects at Hammam Sousse and at the Bir Elgasaa wholesale market, and those involving discharge from Jbal Chakir and sludge mechanization from wastewater treatment plants.

In conclusion, most biogas initiatives have failed in Tunisia at household and industrial levels for various reasons, including the lack of technical skills and insufficient monitoring and maintenance.

At a small-scale level, solar PV is a renewable energy technology that has shown great performance in electrification for pumping and other agribusiness activities in rural areas.

H. Water and sanitation

Tunisia has made substantial progress in improving its population's access to drinking water and sanitation services in recent decades. From 1990 to 2017, the rate of access to improved drinking water went up from 82 per cent to 97 per cent,[39] and the rate of access to improved sanitation increased from 73 per cent to 93.6 per cent in cities connected to the sanitation network controlled by the National Office for Sanitation (ONAS).[40] More than 4 million people gained access to sanitation between 1990 and 2017. Despite this progress, approximately 250,000 people are still using unimproved sources – mainly wells, as well as other unprotected sources – to obtain drinking water. This situation has been aggravated in recent years because of the drought, which was rife in the country between 2015 and 2018.

In addition, about 900,000 people are using unimproved sanitation services. The sixth Sustainable Development Goal (SDG 6) of the 2030 Agenda for Sustainable Development binds Tunisia to guaranteeing universal access to water, sanitation and hygiene (WASH). This includes ensuring adequate management of faecal sludge and wastewater across the full chain of sanitation services, and calls for a safely managed universal access to water supply, which entails all households having access to water by 2030.

There are also substantial imbalances in water-resource distribution between the better endowed north and the semi-arid south. If left unaddressed, deficiencies could become more severe. Tunisia is a water-scarce country, and water supply security challenges are predicted to be exacerbated by climate change in the coming years.

1. Drinking water

The drinking water sector in Tunisia is managed in two main ways:

1. The National Company for Water Distribution (SONEDE) has a mandate to

ensure water supply across the Tunisian territory. Currently, SONEDE supplies water to all urban areas and rural agglomerations. In 2017, SONEDE ensured the drinking water supply of 95 per cent of the Tunisian population. This rate includes 100 per cent of the urban population and 93.6 per cent of the rural population. In total, the population served with drinking water by SONEDE is about 9.5 million.

2. The General Directorate of Rural Engineering and Water Exploitation (DGGREE) of the Ministry of Agriculture, Water Resources and Fisheries is responsible for implementing drinking water systems in scattered rural areas. The systems are managed by agricultural development groups (GDAs). There are approximately 1,572 drinking water GDAs and 131 mixed GDAs for drinking water supply and irrigation.[41] These groups benefit from support and supervision from Rural Engineering services during the initial set-up.

According to the 2015 WHO/UNICEF Joint Monitoring Programme, about 2 per cent of the Tunisian population (unserved) supply themselves from unprotected wells or sources, surface waters (e.g. rivers), or other unimproved sources of water (e.g. cistern or cart).

In rural areas, the national rate of drinking water supply is close to that in urban areas, except in the Governorates of Bizerte (85.8 per cent), Kef (89.5 per cent) and Kairouan (83.0 per cent) where it is less than 90 per cent due to the lack of local groundwater resources. Governorates that have the most rural areas are the least served by drinking water. In addition, the suffering of these regions increases during the periods of drought; in 2015-2018, for example, when SONEDE, DGGREE and GDAs faced many problems in providing drinking water.

2. Sanitation

The sanitation sector in Tunisia has developed significantly since the creation of ONAS in 1974. Indeed, ONAS, the main sanitation operator in Tunisia, has completed several study programmes and works to equip various Tunisian towns with sanitation networks and water treatment infrastructures.

(a) Urban areas

ONAS works in 176 communes out of a total of 350[42] across the Republic. According to the 2018 ONAS annual report, the sanitation coverage rate is 86.2 per cent.[43]

Table 10 Drinking water coverage in Tunisia, 2017

		2017		
		Population (million inhabitants)		
		Total	Served	Coverage rate[a]
Urban		7.83	7.83	100%
Rural	**SONEDE**	3.923	1.912	52.10%
	DGGREE		**1.523**	**41.50%**
	Total		3.672	93.60%
Total		**11.753**	**11.502**	**96.80%**

[a] Coverage rate (%) is calculated by establishing ratio between served population and total population. In Tunisia, a population is considered covered when it is located within 500m of the nearest water supply point, not 1km as set by WHO.

The 174 communes not covered by ONAS are generally small (fewer than 4,000 inhabitants) and have poor or no sanitation infrastructures. As a result, these households use septic tanks or cesspools.[44]

It is noted that the Government can request ONAS to construct sanitation infrastructure works outside the communes it covers.

(b) Sanitation in rural areas

ONAS's mandate does not include rural sanitation, and because governorate councils are not equipped to perform this activity, it appears there are no institutional provisions to govern rural sanitation. It was in this context that, as early as 1999, ONAS was tasked with conducting a strategic study to determine sanitation systems suited to rural areas and establishing a management mode to ensure the sustainability of the structures planned.

The study recommended a priority action plan involving 50 localities. A pilot project launched in 2001 resulted in sanitation systems in up to 26 localities with about 32,000 inhabitants in total.

According to the 2015 WHO/UNICEF Joint Monitoring Programme, about 92 per cent of the Tunisian population has access to improved sanitation; about 7 per cent of the population use unimproved sanitation facilities that range from shared toilets to pit latrines and wall-hung toilets.

When the place of residence is considered, strong disparities are found between urban and rural areas. In 2017, approximately 97 per cent of Tunisians living in urban areas used improved facilities, compared with 80 per cent of those living in rural areas.

To ensure sanitation services in rural areas and to remedy the noted institutional vacuum, it was decided during an interministerial council, dated 13 June 2016, that responsibility for rural sanitation would be assigned according to locality size, as described below.

- In localities where the population exceeds 3,000 inhabitants, sanitation services will be ensured by ONAS, who will collect sanitation tariffs;
- In localities where the population ranges between 1,000 and 3,000 inhabitants, responsibility for sanitation services should lie with regional councils and communes, under the lead of the Ministry of Local Affairs and Environment, with the participation of the private sector and technical assistance from ONAS;
- In localities with a population of fewer than 1,000 inhabitants, the population will be encouraged to use on-site sanitation systems with the support of CRDA. The Ministry of Agriculture, Water Resources and Fisheries has been invited to plan for the mechanisms required to help construct these infrastructures.

3. Relation between poverty and WASH services coverage in rural area

In order to understand the correlation between poverty and WASH services coverage in rural areas, maps showing the overlay of people without formal water access and the poverty map (map C)[45] were examined. In addition, the overlay of the map of unimproved sanitation and poverty (map D) was analysed. Results show that the absolute numbers of people without formal water services (through SONEDE or GDAs) are concentrated in two to three governorates, and that the single biggest number is concentrated in Kairouan, which is also one of the poorest governorates.

The legal texts (decrees and acts) required to enforce sanitation responsibilities in rural areas in Tunisia have not yet been enacted. It may be a better option to implement collective sanitation facilities in the case of some localities with fewer than 1,000 inhabitants but where habitat is grouped.

A significant number of people without formal water access is also concentrated in Kasserine, Sidbouzid, and Beja.

Map D shows that, in contrast to water, the number of people with unimproved sanitation is slightly more evenly distributed around different governorates, although still concentrated in the Centre-West region (Kasserine, Kairouan and Sidi Bouzid).

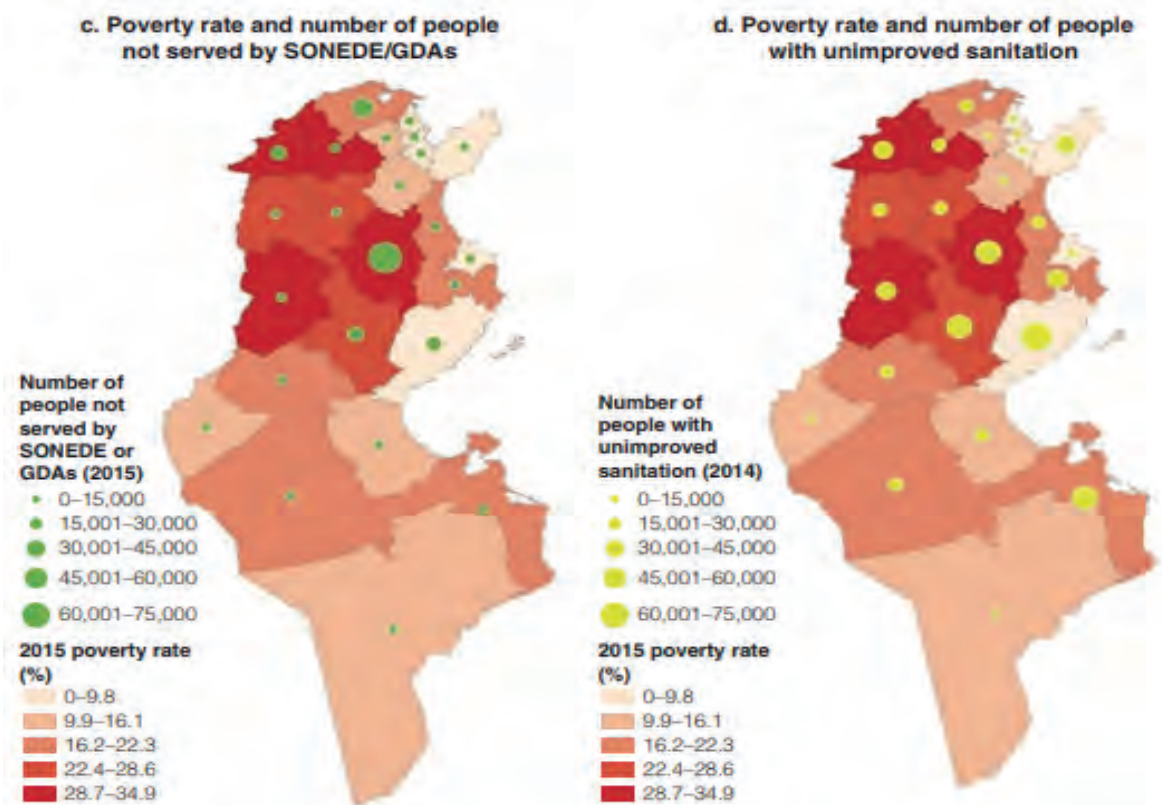
The South-East and Centre-West regions have the largest proportions of people using non-networked improved water services, which are predominantly local rainwater harvesting systems such as a majel. Open defecation and unimproved sanitation are concentrated in the three governorates in the Centre-West region,

Challenges in poverty and WASH service coverage are concentrated in certain parts of the country. The Centre-West and North-West regions have the greatest deficiencies in access to water, with the largest proportion and number of people using unimproved sources for drinking.

and these are also the regions with the lowest access to networked sanitation through piped sewerage and fairly high use of pit latrines.

Six governorates concentrated in the North-West and Centre-West regions face overlapping problems in access to WASH services and poverty: Béja, Jendouba, Kairouan, Kasserine, Le Kef and Siliana.[46]

Figure 12 Poverty rate/number of people not served by SONEDE (c), number of people with unimproved sanitation services (d)



Source: World Bank, "Tunisia WASH and Poverty Diagnostic" (2017).

I. Rural development in Tunisia

Rural development initiatives are relatively old in Tunisia. They took the form of ad hoc actions under the protectorate to combat unemployment at the beginning of independence and to become an integral part of the overall development policy.

This investment in rural development has been reflected over the long term by a marked improvement in living and working conditions. Various indicators show a clear improvement at the regional level and between regions (in education, health and poverty, for example).

However, rural areas suffer significant deficiencies according to other indicators, and the pressure on natural resources is worsening. This reflects the low degree of diversification in local rural economies, and hence the inability of agriculture alone to ensure the development of the rural environment.

Various forms of rural development in Tunisia, starting in the colonial period and continuing to the present day, are well-established. The first form is an administered rural development policy characterized by a top-down approach that aims, in the first instance, to ensure sufficient income for rural populations, and then, to develop infrastructure and research. This approach continued after independence but with greater allowance made for unemployment, which affected 4.5 per cent of the working population, despite the creation of a vast system of agricultural cooperatives.

1. The first rural development programme (1970-1982)[47]

The return to liberalism in 1970 neglected the farming sector to a certain degree and the disparities between towns and rural zones increased in spite rural development plans being tested. This rural development policy did not succeed in reducing imbalances

As presented below, poverty is primarily a rural phenomenon in Tunisia. This applies both for income poverty and human development indicators, such as stunting and health outcomes (maternal mortality, for example). Access to water, sanitation and hygiene services is inequitably distributed between urban and rural areas and among governorates. Poverty emerges as a strong predictor of differences in access to water, sanitation and hygiene services.

or halting the rural exodus. In fact, during this period of liberalization, there was a worsening of imbalances between regions and between sectors, and an underdevelopment of agriculture, which put into question this development model. This situation prompted public authorities to opt for a new model of development in which agriculture occupied a more important place for the first time, with a rural development policy and well-defined areas.

Through the knowledge accumulated from this rural development programme, the administration was able to develop a more coherent and comprehensive rural development strategy that took into account the complexity of development, the relationship between the development of the rural environment and that of the urban framework, and most importantly, the place of agriculture in relation to the development of rural areas.

2. The first generation of integrated rural development programmes (1984-1992)

The integrated rural development programme (PDRI) was the main form of intervention in rural areas in the period from 1984 to 1992 with a total of 190 projects. Each PDRI covered one or two territorial sectors and allowed for different development components of the zone, including the promotion of agriculture, handicrafts and even small services trades. They are the integrating element of the overall

development policy and make it possible to channel financial resources and create a certain synergy between the various stakeholders.

3. The second generation of integrated rural development programmes (1992-2002)

The PDRI had the following objectives:

- Improve agricultural production and productivity;
- Improve the income of beneficiaries;
- Promote rural women;
- Improve living conditions and strengthen basic infrastructure and community facilities.

Compared with the first-generation PDRI and taking into account the recommendations that followed the evaluation of the first-generation projects, the projects that make up the second-generation PDRI emphasize more integrated action and income generation, even though equipment and infrastructure remain the main components. These PDRI highlight the participation of beneficiaries in identifying development actions, and their financing and implementation. These plans targeted a larger intervention area and were characterized by better management of beneficiaries and better selection criteria.

4. The Integrated Urban Development Program (1995-2001)

Based on the results of a national survey in 1989, showing a high poverty rate in urban areas, the Integrated Urban Development Program (PDUI) was implemented during the period 1995-2001, including some specific cities with high demography and low socioeconomic indicators. The main objectives of the programme were to improve life conditions for citizens and create dynamic economic activities with appropriate individual projects.

Programme components, selection criteria of beneficiaries and the implementation process were the same as those used in previous rural integrated programmes. This programme covered 32 delegations in various governorates.

5. The Integrated Development Program

This Integrated Development Program (PDI) concerned the overall delegation, using the same process for selecting beneficiaries and project components.

This programme has been implemented in two phases. The first has been in progress in different regions for some time and includes 90 projects; the second started in 2018 and will cover 100 additional delegations.

J. Decentralization of governance system

The Tunisian constitution of 27 January 2014 opted for a decentralized republic. Article 14 obliges the State to implement and strengthen decentralization throughout the territory to promote the unity of the State. One of the major contributions of the constitution is to devote an entire chapter to “local authority”. Decentralization is neither simple administrative organization, nor pure territorial management by the State. It is, in fact, the recognition of a real local power, separate and different from central government and given strong autonomy. This major change occurred after the revolution of 2011, which led to constitutional and political change from the old regime. Since the revolution, Tunisia has taken several steps to devolve power from the highly centralized structures that had operated since independence in 1956, first to the new democratic central government and then from the executive to the parliament.

Today, Tunisia faces the crucial task of shifting power from the national to the local level. This decentralization of power has the potential to address long-standing issues of dramatic regional disparity in the health-care, employment and education sectors, as well as in poverty and infrastructure.

On 6 May 2018, municipal elections took place. The country's first democratic local elections were an important step in consolidating the country's democratic transition. By electing 7,200 local officials to represent 350 municipalities, Tunisians signalled their commitment to democracy. These elections represent only a first step in a much larger decentralization programme, the fate of which is uncertain. Elections will be meaningless without a strong legal framework for decentralization that clearly delineates power and responsibility between the national and local levels. This process is ongoing and will require the political will to implement decentralization at national and local levels.

1. Goals and benefits of decentralization

Globally, decentralization is believed to have several positive effects: from increasing government efficiency and reducing corruption to improving the relationship between citizens and the State.

Officials who are physically closer to the people and live among them can more easily identify their needs, leading to more efficient public services. This is a virtuous cycle in which better and more transparent service provision leads to higher tax collection rates, which in turn leads to more money in the coffers to provide even better services. As some scholars have noted: "Decentralization, and in particular devolution, will plausibly improve accountability and governance by bringing government closer to the people."[48]

Decentralization also offers the opportunity to experiment and try different policies. Because policy change is far easier at the local level, and needs and resources vary by municipality, decentralization can allow policymakers to evaluate what types of programmes and initiatives are most effective and where. Furthermore, national-level bureaucrats and politicians are often more risk-averse than their local-level counterparts. Thus, local governments can be more creative in developing policy solutions to local issues.

While not all creative solutions are successful, local officials may be more willing to try new ideas, which, if successful, could be replicated elsewhere.

This could introduce a new political class, outside the country's traditionally dominant political parties, one that could provide more opportunities for women and youth to enter politics.

Decentralization should also improve service delivery at the local level, where poor performance since the 2011 revolution has resulted in mistrust between citizens and the State as well as low tax revenues.

One of the key pillars of Tunisia's decentralization process is to correct regional disparities through the process of what the International Labor Organization calls "positive discrimination". This process is intended to provide for equitable (rather than equal) resource distribution – from State budget support to administrative and human resources – that will eventually level the playing field for all Tunisians, regardless of where they live.

Positive discrimination is enshrined in the 2014 constitution (in article 12) but is not a new concept in Tunisia. Tax incentives and investment bonuses for regional development have been in place since the 1970s.

The decentralization of the system of governance in Tunisia would most probably offer greater opportunities for the local entities and municipalities to find resources for funding their local development programmes and create a competitive environment, which should reduce inequalities and support entrepreneurial development.

2. The role of local civil society organizations in rural areas

Civil society is another key player in domestic reforms, decentralization, rural development and other policy changes. Tunisia has a rich history of civil society action at the national and local level. It was civil society that mediated and brokered the country out of crisis. Yet Tunisian civil society has been tightly regulated in the past, with its role limited mainly to charity work and assistance in basic service delivery.

Since 2011, considerably greater space has been opened for civil society to engage in politics. Whereas involvement in political consultation used to be reserved for social dialogue partners, today, every statement made in the Tunisian national political arena is scrutinized by an increasingly mature body of civil society organizations (CSOs) and special interest groups.

Unfortunately, this is not yet the case at local and regional levels. A territorial approach to sector and administrative reform would require local authorities to engage with citizens on a new basis. An organized civil society that can monitor and advocate locally will, therefore, be a key component of any territorial strategy. Today, only a limited number of Tunisian CSOs are equipped to take on the role of facilitator at the local level. Nonetheless, experimental forms of bottom-up facilitation involving Tunisian CSOs and the international community could provide important learning opportunities for local development. Transparency in decision-making, municipal communication, social dialogue and municipal investment planning at the local level are all structural entry points that could be approached regardless of progress on national reforms. Citizen participation in municipal affairs is not an end in itself, but given the tense relationships between local authorities and citizens in many places, sector initiatives could bring local authorities out of their isolation, and participation in local service delivery could build a level of trust. Water management, waste management and basic infrastructure projects concern large segments of the population and already fall within the purview of local authorities.

Initiatives that build a participatory local governance dynamic, even on a small scale, can break through the isolation, the climate of mistrust and the strong sense of marginalization existing in many of the less affluent regions. Working from the bottom up with citizens and local authorities could pave the way for larger-scale sector reform.

Many of these CSOs are playing an important role in rural development, raising funds and participating in the establishment of many local development plans with the rural population.

Many of them are working in entrepreneurial training and coaching of rural youth and women. Others are creating pressure and lobbying for the rights of female workers in farming activities.

Civil society must continue to guard the democratic process, but it has an even more important role to play at the local level to encourage and ingrain a culture of participatory democracy and participatory approach that involve different stakeholders.

2. Selection of Rural Community and Suggested Project Activities

2. Selection of Rural Community and Suggested Project Activities

A. Methodology

This second part of the baseline study focuses on the process to select a pilot rural community where most REGEND project activities are to be conducted; in particular, the pilot projects to be selected based on specific criteria already defined in the REGEND Project document.

The REGEND Project raises the importance of an integrated approach for the economic and social development of rural areas to improve the livelihoods of their populations. This can be achieved through better management of available natural resources, and the optimal use of small-scale renewable energy technologies.

A diagnosis/assessment was undertaken in selected rural communities to collect relevant qualitative and quantitative information regarding energy and development needs. In addition, interviews were conducted with key stakeholders and site visits made to identify the key issues to be addressed and the potential for the safe and sustainable use of renewable energy as a catalyst for rural development.

The analysis aided strategic planning by identifying strengths, weaknesses, opportunities, and threats (SWOT) that could affect the activities of REGEND. In this context, the assessment aimed to achieve the following:

1. Understand the major socioeconomic challenges, especially for rural women (main income sources, the potential of the region, principal economic activities).
2. Identify the biggest barriers to development in the selected rural community.
3. Prepare a list of activities based on small-scale renewable energies to be undertaken to promote the livelihood of the rural population.
4. Identify the type of assistance to be offered to the selected rural community and the agricultural professional structures (SMSA, GDA) in order to improve their economic situation and performance.
5. Assess the capacity needs at many levels (local administration, socio-professional structures, rural woman).

This assessment also suggests instruments and potential interventions to be considered in the framework of REGEND projects and other national initiatives, based on the observations and analysis made in the rural community. The key considerations include: how women's access to productive resources and the promotion of entrepreneurship in rural areas might be improved; how on the same line renewable energies might contribute to socioeconomic improvements in rural areas; what is needed for this pilot activity to succeed; and how to focus on less traditional sectors to create a new dynamic for employment in rural areas.

The study aims to identify potential national and key local stakeholders to be involved in this project and form part of the local facilitating team (LFT) to be established at the national/community level.

This work was carried out using the following methodology:

1. Set, validate and apply the selection criteria to identify the rural community that will most benefit from the project's activities.

These selection criteria were established and validated with the participation of the various stockholders.

2. The selection of two rural communities from a list of suggestions made by the Regional Development General Commission (CGDR) and based on multiple interviews with national stakeholders; in particular, representatives of the Ministry of Agriculture, Water Resources and Fisheries.
3. An extensive field survey and workshops were undertaken in the two rural communities (Chorbane, Mahdia) and (Maamoura, Nabeul) to collect, analyse and process data and information.

In this assessment, there was a special interest in analysing documents and reports on agricultural professional structures, and on the condition of rural women, their access to funding, and their control of funding resources (bank reports, micro-credit organization activity reports).

During this assessment phase, many interviews were conducted with leaders of targeted stakeholders, including SMSA, rural women's GDAs, NGOs, agriculture departments and farmers. Other activities included focus group consultations with rural women who are implementing small-scale projects, and a summarizing meeting attended by the mayor of the municipality and all relevant stakeholders.

B. Selecting a pilot rural community

In order to select the pilot rural community, a stakeholders meeting was organized in Tunis. Selection criteria were established and validated through a focus group meeting organized by ESCWA and ANME, with the involvement of key stakeholders, including CGDR.

To facilitate this selection process, CGDR shared a list of potential projects using small-scale renewable energy for rural development. This list was developed in collaboration with key stakeholders in the governorates, including the CRDA.

A first selection round applied the criteria agreed upon at the first meeting with the various stakeholders.

Those criteria were:

1. The regional development index of the proposed region.
2. The potential to enable small-scale renewable energy applications that could help improve the livelihoods of the rural population.
3. The existence of one or more socio-professional structures able to guarantee the sustainability of the project (SMSA, GDA, NGOs).
4. The existence of solid structures able to gather and unify rural women.
5. Accessibility to the rural community.
6. The security situation.
7. A budget dedicated to the pilot projects in the framework of the REGEND project.

More than three potential projects per governorate were shared by CGDR, focusing on the implementation of small-scale renewable energy to generate income in rural areas and especially for rural women in many fields. They included:

- Groundwater pumping for irrigation or drinking water (delegation Kalaa Sghira, Imada Sabaguine, Sousse);
- Rural electrification to facilitate the activities of rural women's GDAs, (Maamoura, Bouargoub, Dar Chaabane, Nabeul);
- Milk cooling on the farm (Akouda, Sousse; Chorbane Mahdia);
- Desalination using solar energies for irrigation (in Sidi Elhani, Sousse; Bekalta, Monastir).

Notes

Some project ideas were rejected because of the high estimated costs, which exceeded the project's budget and would need medium- to large-scale renewable energy applications.

Following meetings/interviews with project partners, such as CGDR, the General Directorate for Land Use, Planning and Conservation (DGACTA) and the Support Office for Rural Women (BAFR), recommendations were considered in the selection process, based on the good performance of some of the women's GDAs and SMSA.

Finally, two communities were selected for a field assessment, namely Chorbane, Mahdia, and Elmaamoura, Bni Khiar, Nabeul.

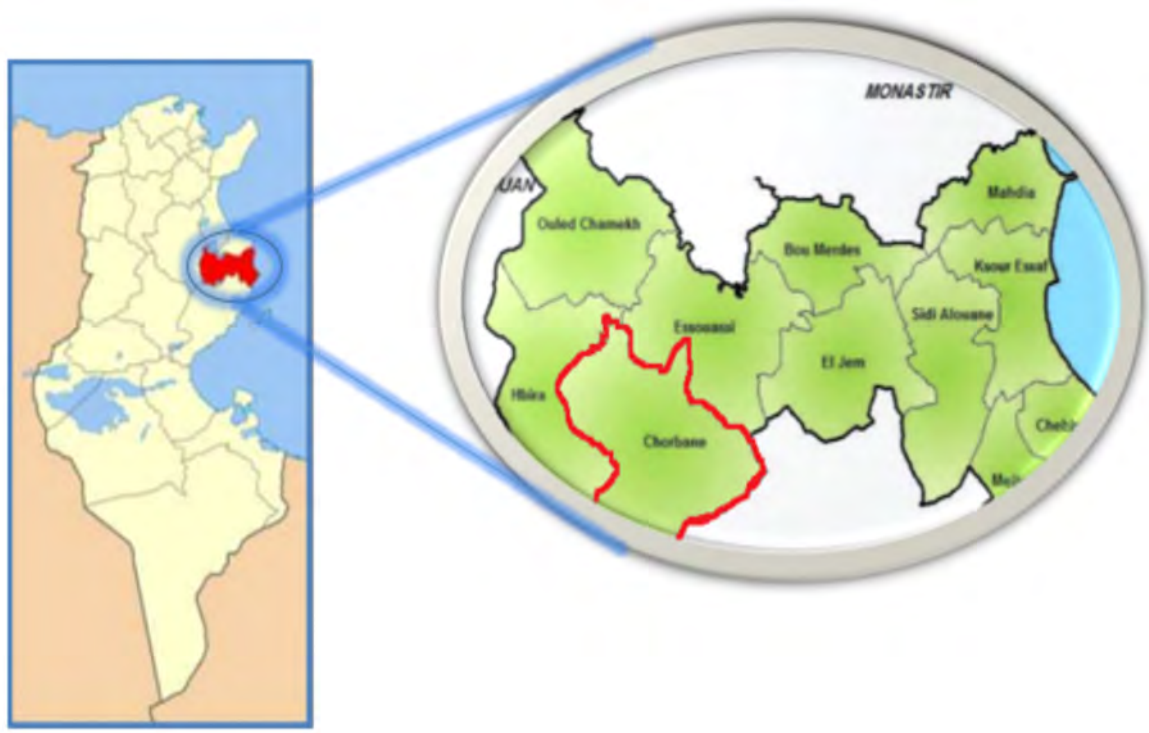
C. Assessment in Chorbane, Mahdia

1. Presentation of Chorbane

Chorbane is located in the heart of the Central-East region, in the Governorate of Mahdia, which opens on to the eastern basin of the Mediterranean, with a coastline of more than 75 km. It covers an area of 2,878 km^2, representing 1.9 per cent of the area of Tunisia.

As shown in figure 13, Chorbane is among the internal delegations (non-coastal) in Mahdia and composed of 10 sectors. The useful agricultural area covers about 38,107 ha, of which 93 per cent is arable (35,367 ha).[49]

Figure 13 Geographic position of Chorbane delegation



Source: Tunisia, Ministry of Development, Investment and International Cooperation, "Étude stratégique pour le développement du gouvernorat de Mahdia à l'horizon 2030" (Strategic study for the development of Mahdia governorate by 2030) (CGDR, 2018).

Table 11 Main socioeconomic indicators, Chorbane

Indicators	Chorbane	Mahdia
Population	25 585[a]	432 930
Literacy rate	**28.55**	22.14% Mahdia, 19.17% national
% Drinking water SONEDE	87.90	90.27
% Rural drinking water	84.88	94.41
% Electrification	99.70	99.90
% Rural electrification	99.78	99.80
% Sanitation	**6.04**	38.77
% Rurality	**78.00**	54.00
% Unemployment	**19.48**	12% Mahdia, 15% national
% Unemployment (young graduates)	**28.00**	21% Mahdia, 20% national
Regional development index	**178 (3rd scale) 2015**	

[a] Tunisia, Ministry of Development, Investment and International Cooperation, "Gouvernorat en chiffres, Mahdia" (Governorate in figures, Mahdia) (CGDR, 2017). Available at http://www.cgdr.nat.tn/upload/files/gouvchiffres/gech2017/Mahdia_2017%20fini.pdf.

The herd consists of 750 cattle, 35,600 sheep and goats. Mahdia is the second largest dairy basin in the country, with an average milk production of 100,000 tonnes per year.[50] Chorbane remains a fundamentally olive-growing region, with 24,350 ha of olive groves, including many organic olives.

The agricultural sector is the only pillar of the economy of Chorbane, and comprises olives, almonds, irrigated crops and livestock. The industrial sector is poorly represented, with only two clothing companies.

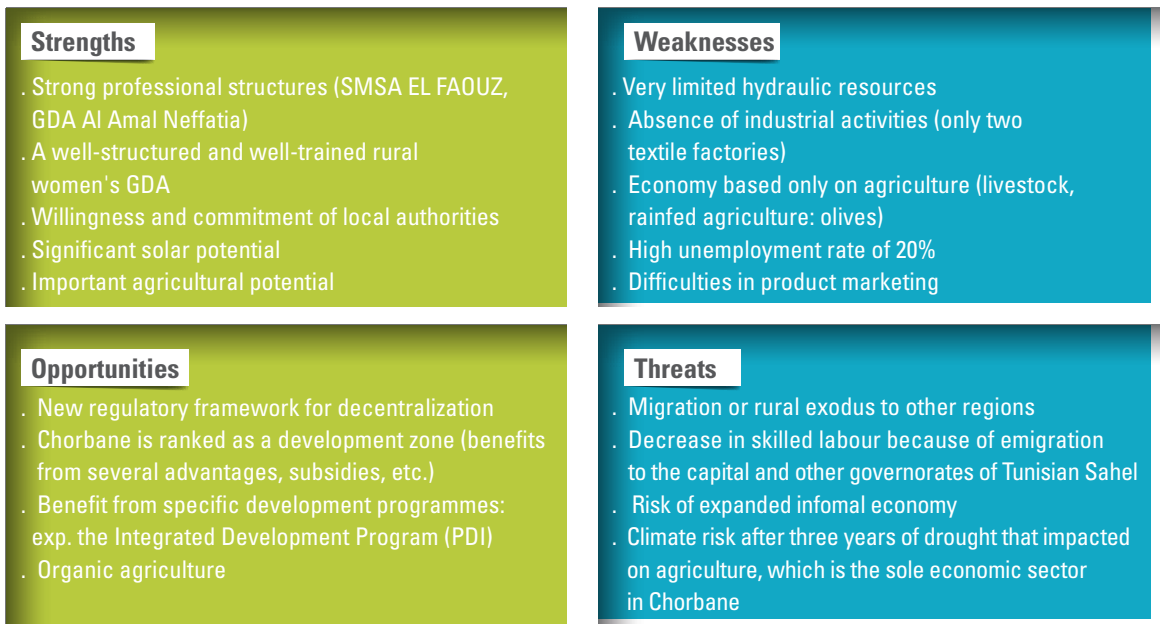
Chorbane, along with Hbira and Ouled Chamakh, also located in the interior zone, belong to the group of least developed delegations in Tunisia,[51] which shows the degree of intra-regional disparity in Mahdia. Within the same governorate, highly developed delegations are found on the coast and underdeveloped ones in the interior regions.

Table 11 shows the main socioeconomic indicators in Chorbane, characterized by a very high level of rurality and of poverty (both for urban and rural regions), along with a high rate of unemployment compared with the Governorate average, especially for young graduates (about one third).

2. SWOT analysis of Chorbane

It is important to identify the internal and external factors favourable and unfavourable to achieving the project's objectives.

Figure 14 SWOT analysis of Chorbane delegation



3. Agricultural professional structures in Chorbane

In Chorbane, four professional structures were found:

- SMSA, El Faouz;
- SMSA, Neffatia;
- Rural women's GDA Al Amal, Neffatia;
- 14 GDAs for drinking water and irrigation.

(a) SMSA El Faouz, Chorbane

Since its creation in 1991, this organization has met the basic needs of farmers in the region.

Launched with 100 members and 14,280 dinars of registered capital, it had more than 1,000 members with a share capital of 39,220 dinars by mid-2019. In addition, it possesses substantial land and other assets (a centre for milk collection, one organic oil mill, milk tanks, cars).

The creation of the cooperative was in response to the need for milk collection amid increasing production. The collection was provided by the cooperative. In 2017, the collected quantity of milk reached 6,535,149 litres compared with a mere 29,484 in 1994.[52]

The SMSA also played the role of livestock feed dealer in a completely landlocked area to enable herders to meet their herd's food needs in the face of increasingly scarce pastures. In parallel with this commercial function and based on the potential of its territory, the cooperative took the gamble to develop the main sectors of its region, to value its typical products and to provide a technical advisory service to farmers.

Beyond milk collection and marketing livestock feeds, the cooperative provides members with advice and coaching in managing their livestock. Recently, an engineer specializing in animal production has been recruited by the SMSA and made available to farmers to guide, advise and accompany them in their various farming strategies.

Figure 15 Illustrating SMSA activities, herders and milk collection

Source: Photographs from Chorbane, field visit 11-13 March 2019.

The SMSA El Faouz, Chorbane, owes its success to these men and women, members and leaders, who believed in the potential of their territory, worked hard, waited and survived despite limited financial means, thanks to a great deal of commitment and passion.

The activities of the SMSA El Faouz can be summarized as follows:

- Milk collection: licensed milk collection centres, each with a subsidiary store for feed supply;
- One-fuel outlets;
- Providing and selling intensive animal feed and other farming equipment;
- SMSA does not produce concentrate, but sells it;
- Agricultural machinery: tractors set for rent to help farmers in tillage operations;
- In 2017, in order to diversify its activities, the cooperative installed an organic mill for organic olive oil.

The SMSA has signed agreements with:

- BNA Bank and the dairy production company Vitalait;
- Zitouna Bank and the dairy production company Delice.

This tripartite agreement is part of a programme to support dairy farmers in the Governorates of Mahdia and Monastir. The aim is to develop and improve breeding conditions, increase productivity and preserve milk quality.

The originality of this partnership lies in the fact that the main actors in the dairy sector intend to provide support to farmers in the region in order to benefit from BNA investment or operating credits necessary for their dairy cattle breeding activities.

The funding provided by BNA/Zitouna to eligible breeders under favourable conditions targets the acquisition of full heifers and equipment as well as improvements to stables and any additional buildings.

The dairy sector

The dairy sector in Tunisia suffers from many constraints. Production cost at the farm level is increasing each year due to the need to import almost all inputs (mainly the concentrated fodder components, such as maize and soya, especially during drought periods, as in 2015-2018). This made the breeders sell the calves at an early age (weaning them after three months) in a continuous effort to sustain their small business.

This reality has made adopting new technologies crucial to sustaining this chain and prevent it imploding under rising pressure. Therefore, it is important to introduce and develop the process of cooling milk at the farm. This innovative technology could potentially be tested as part of this project.

SMSAs are entitled to provide all services necessary for the activity of its members, including:

1. Buying raw materials and inputs necessary for agriculture and fishing for the benefit of its members.
2. Conserving, processing, storing, packaging, transporting and selling agricultural, fisheries and aquaculture products derived from the activities of its members and within the limits of the actual needs of its members.

What is an SMSA?

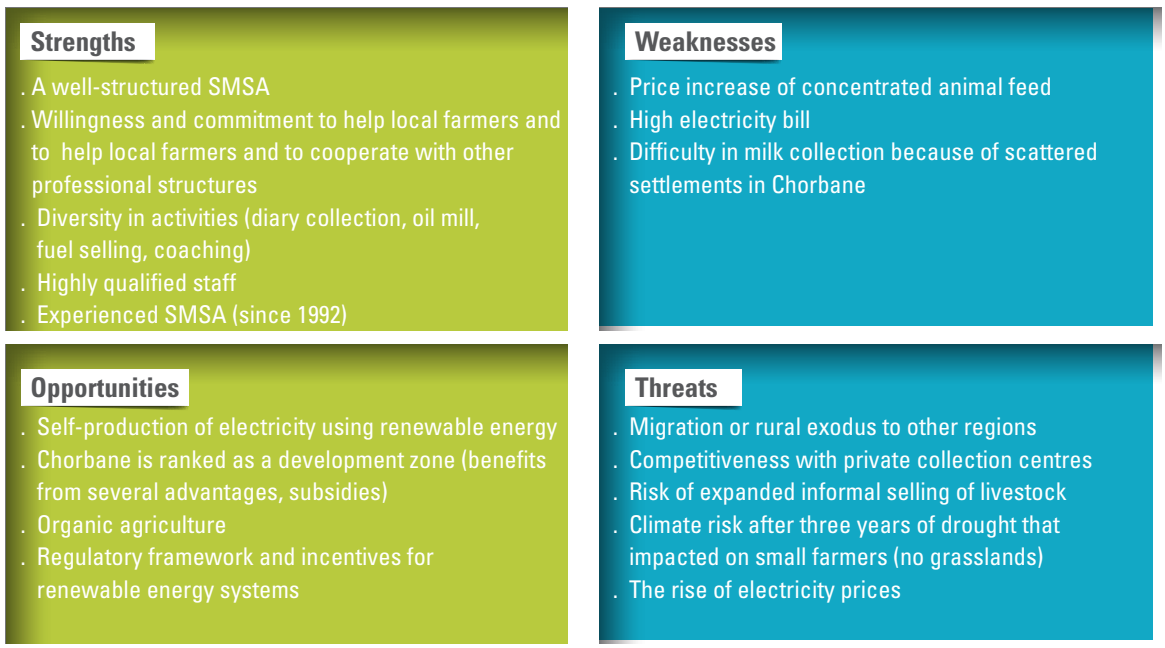
An SMSA is a social and solidarity-based enterprise under the Tunisian law[a] comprised of three major categories that constitute the backbone of the sector, namely cooperatives, mutual companies and associations. Each large family encompasses a diversity of specific forms. Through cooperation, a group of individuals can set up an entire economic and social system. The cooperative can meet most of the people's needs, including: production activities, service, the sharing of profits between members and the creation of banks, social security, cultural services, education, teaching, health.

SMSA, a company with variable capital and shareholders

The 2005 Act defines SMSAs as variable capital and shareholders corporations consisting of natural and/or legal persons engaged in farming, fishing or agricultural services in the company's area of operation. The form of equity and variable shareholders are a logical consequence of the principle of membership and free withdrawal, and the open doors that govern cooperative societies. SMSAs are also subject to the accounting regime of companies,[b] established in accordance with the procedures provided for by the law on the commercial register,[c] liquidated in accordance with CCS,[d] and subject to the prohibition of cumulation between the activity of production and the activity of the business of wholesale or retail distribution.

[a] Tunisia, Ministry of Development, Investment and International Cooperation, and UNDP, "Etude stratégique sur l'économie sociale et solidaire en Tunisie" (Strategic Study on the Social and Solidarity Economy in Tunisia) (Tunis, 2017); see also, Le projet de loi organique sur l'économie social et solidaire (Draft organic law on the social and solidarity economy). Available at http://www.legislation.tn.
[b] Article n°33 de la loi n°2005-94 du 18 octobre 2005 relative aux SMSA (Article number 33, from the Law number 2005-94 of October 18, 2005 related to SMSA). Available at: http://www.avfa.agrinet.tn/fr/ pdf_jort/decret21.pdf.
[c] Article n°6 de la loi n°2005-94 du 18 octobre 2005 relative aux SMSA (Article number 06, from the Law number 2005-94 of October 18, 2005 related to SMSA).
[d] Article n°48 de la loi n°2005-94 du 18 octobre 2005 relative aux SMSA (Article number 33, from the Law number 2005-94 of October 18th, 2005 related to SMSA).

Figure 16 SWOT analysis of SMSA El Faouz



3. Acquiring agricultural equipment, tools and equipment necessary for fisheries and aquaculture, and optimum management of the tools belonging to the members.
4. Storing and selling fuels for the benefit of members.
5. Coaching, monitoring and improving benefits.
6. The model statutes use an open formula allowing SMSA to "perform all activities aimed at promoting members".

Today in Tunisia, there are 316 SMSAs, of which 301 are basic and 15 central.[53]

(b) GDA rural women, Al Amal, Neffatia

A "rural woman" is defined as a woman who lives within a rural setting or environment where agriculture and agricultural production is the main activity. The woman in a rural area toils at arduous farming and agricultural activities and is responsible for performing domestic work that is constant and continues inside and outside of her home. Generally, this vast spectrum of arduous labour is considered as one of the constant and prevailing characteristics of the rural woman's life and the most important determining factor attributed to women living in different rural areas, where institutional facilities and services are absent.

This study shows that rural women need more training and capacity-building programmes, development interventions and opportunities to contribute to their economic empowerment.

Due to the absence of men, rural women in Chorbane have found themselves solely responsible for improving the living conditions of their families. In three cases among five interviews made with the members of the women's GDA, and in two cases in neighbouring governorates in Sfax, men were found to be working outside Chorbane; in one instance, the man was found to be working in Libya. Women manage the family's farming needs and find themselves having to make decisions and carry out tasks performed in the past by men. On the other hand, these conditions have also presented an opportunity for women

to assert themselves and prove their ability to perform as well as men. In parallel, the women's GDA has helped improve conditions for women not only on an economic level, but also on a social and personal level. It has played a role in building their personal capacities by using specific strategies that have helped foster and improve their levels of confidence and their ability to interact and influence social and cultural change in their communities.

Providing economic opportunities, capacity building and initiating income-generating projects should have a positive impact materially, financially and socially. As many women from the villages of Chorbane and Neffatia affirmed in interviews, such positive results have allowed them to be more daring and resilient, as well as more communicative with others. It has also helped to build their feelings of self-worth and a sense of their essence. The women also felt that the males in their families, particularly their husbands, showed them more interest and appreciation.

The women's GDA has played a significant role in training and guiding women prior to the implementation of their projects. Notably, however, the projects in Chorbane were of a farming nature, such as raising livestock and agricultural by-products; women were not able to invest in other economic domains.

- Name of women's GDA: Al Amal;
- Created: 2016;
- Membership: 50;
- Trainings: beekeeping, sheep farming, chicken farming, rabbit breeding, olive picking, extraction of essential oils from aromatic and medicinal plants.

The activities of the women's GDA can be summarized as follows:

i. Poultry farming

This activity consists of raising chickens for the purpose of farming meat, providing eggs for family food and sales. Poultry, mostly chickens, are farmed in low numbers (between 10 to 30 units).

Rural women exchange in rotation two incubators with a capacity of 120 eggs (49 rural women used only two incubators with a capacity of 120 eggs each). Waiting times exceed three months and only trained women are eligible to benefit from these incubators. In the best-case scenario, the success rate of chicken birth reaches 80 per cent.

Rural women raise farm chickens not only as a source of food, both for their meat and for their eggs, but also for income generation, especially during Ramadhan when the cost could exceed 25-30 dinars (about $10).[54]

ii. Rabbit breeding

Rabbit breeding is an important activity practised by the women's GDA in Chorbane. Rural women are trained in and practise rabbit breeding in a small building outside their houses. Rabbits are used for food and also for income generation where the sale price can exceed 20 dinars (about $7).

This activity takes a lot of time, money and responsibility.

iii. Beekeeping and honey production

A beekeeper keeps bees in order to collect their honey and other products that the hive produces (including beeswax, flower pollen, bee pollen and royal jelly).

In Chorbane, female beekeepers collect only honey, which is sold in the region and sometimes in some national commercial fairs with a price that varies between 35 and 45 dinars per kg (about $12-15 per kg). Unfortunately, because of the lack of equipment, training and coaching, those other products are not collected and commercialized.

iv. Extraction of essential oils from aromatic and medicinal plants (such as rosemary)

Women in Chorbane are also heavily involved in the aromatic and medicinal plants sector. They have a significant amount of indigenous knowledge and lifelong practical know-how about these plants, which grow in their local natural environment and offer real assets for the development of rural economies.

Often, the harvesting, distillation and marketing operations are carried out in a traditional way, which is not adapted to the innovations and requirements of the market. In addition, rural women are facing a marketing problem because of limited financial resources and other restrictions; lack of mobility makes it difficult to participate at national fairs, for example. The use of basic plastic bottles to market their products also limits their financial revenue.

v. Terroir products (harissa,[55] bssissa,[56] traditional couscous)

To promote this activity, women need a small crushing unit that is shared among GDA members. This small agro-food processing unit could be powered by solar PV energy but the women said they were unable to

Figure 17 Illustrating rural women's activities, Chorbane

Source: Photographs from Chorbane, field visit 11-13 March 2019.

carry out this proposed project using their own means and have expressed a need for support (technical, financial, training, assistance).

vi. Handicrafts

Rural women in Chorbane perform many handicraft activities, such as weaving traditional carpets (margoum) and clothes, and making pottery.

The products are marketed either in the local market or at regional fairs but with limited participation due to financial constraints. The Support Office for Rural Women (BAFR) at the Ministry of Agriculture assists them occasionally to participate in these regional and national fairs.

Barriers facing women's entrepreneurship in rural areas

Women's entrepreneurship is a major focus in development strategies and promoting gender. Unfortunately, women entrepreneurs in rural areas such as Chorbane often have limited access to marketing, capital, credit and technical knowledge networks, all of which are essential to improving the competitiveness of their businesses. To improve this situation, many activities are needed, including the following:

- Facilitating access to credit for small businesses;
- Providing technical training on marketing;
- Facilitating the transition of small and micro enterprises to a more open-market environment for women, and men, too;
- Providing women entrepreneurs with training cycles to improve their business management skills, especially on-the-job training. The priority is to remove barriers to women's entrepreneurship, promote inclusive financial services and be responsive to trade policies.

Figure 18 SWOT analysis of women's GDA

Strengths

. Women's engagement
. Numerous women were trained in several fields
. High number of adherents
. Very well-structured despite weak financial means
. Diversity of activities (farming, handicraft, terroir products, etc.)

Weaknesses

. Training concerns are one part of the value chain
. Difficulties in product marketing
. Lack of equipment (incubators, distillatory, grinder for rural women's GDA)
. The high cost of production due to the lack of equipment
. Lack of capacity building and coaching
. Financial access (microfinance)
. Very elementary packaging that does not enable the best marketing of products
. Lack of training in certain areas (access to financing, packaging techniques, marketing of products)

Opportunities

. New regulatory framework for women's social security
. Benefits from specific development programmes: the Integrated Development Program (PDI)
. Support from the Rural Women Support Office
. Possibility to collaborate and sign a support agreement with the SMSA El Faouz

Threats

. Migration or rural exodus to other regions
. Lack of financial support
. Lack of technical means and equipment (a small unit of joint production of local products, packing unit, etc.)

Women's entrepreneurship is further limited by:

- Low mobility of women, especially in rural communities;
- Social barriers limiting women's work in general;
- Lack of technical skills, diplomas and training required for all value chains;
- Underdeveloped female entrepreneurial thinking in rural areas.

(c) GDA drinking water, Al Maaty

Drinking water in rural areas is provided either by SONEDE or DGGREE through GDA drinking water. The GDA Al Maaty ensures the supply of drinking water for more than 348 families in Chorbane. Because of the topography, two pumping stations are necessary to ensure the supply, which implies a considerable increase in the cost of each cubic metre of water (currently the cost is 0.7 dinars (about $0.25 per m^3) compared with the standard price of SONEDE in urban areas (0.2 dinars or about $0.066 per m^3).

After reviewing the invoices provided by the GDA, it was clear that the share of energy in the cost of each cubic metre of water is 40 per cent.

Because of their socioeconomic situation, GDA members have on occasion been unable to pay their drinking water bill (in the summer months in particular), resulting in access being cut for several days. Schools are also connected to this network and can also suffer water cuts for days, even weeks.

The proposal is to self-produce their electricity needs by installing a small-scale PV pumping system connected to the grid. This transition to renewable energy will ensure a significant reduction in the cost of water supply.

Farming activities and water resources in Mahdia/Chorbane

Except for rain-fed agriculture (olives and almonds), other farming activities in Chorbane require irrigation (vegetables, fruit arboriculture). Due to water scarcity, there is only a small irrigated area in Chorbane.

Water resources situation in Mahdia/Chorbane

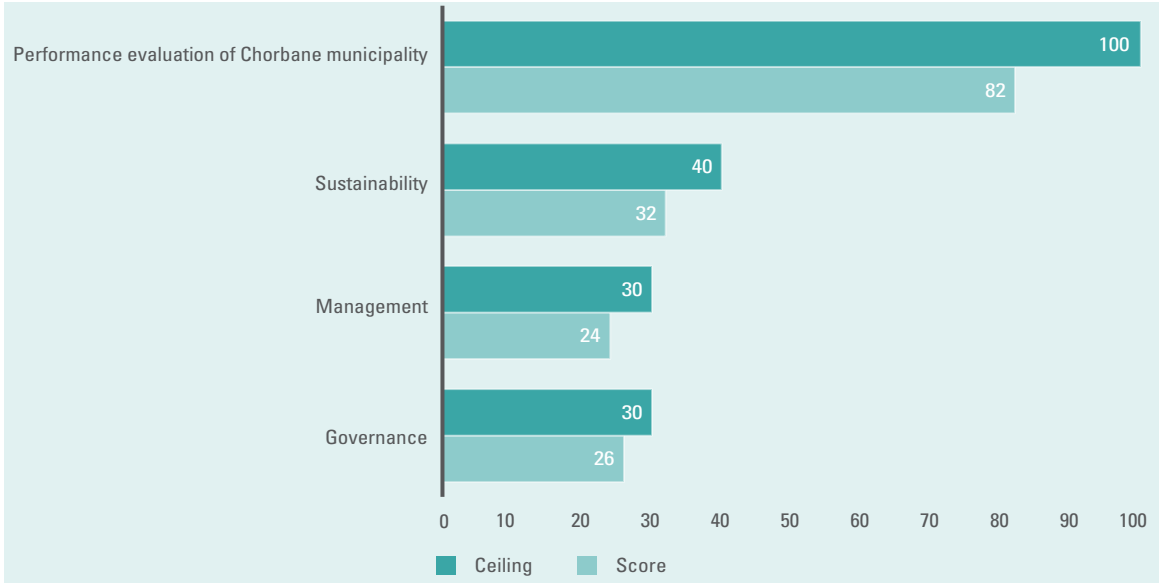
- Water scarcity: deficit water balance;
- High water salinity (between 2.5 grams per litre and 6 grams per litre);
- Absence of surface water resources except for some small lakes;
- Overexploitation of the water table at Mahdia, which reached 24.6 mm^3 in 2014 while the water table capacity is only 17 mm^3. An increased number of unauthorized wells in the region has contributed to this overexploitation, especially since 2011; 929 unauthorized wells were recorded between 2011 and 2014;
- Overexploitation of groundwater; in 2015, the rate of this exploitation reached 151 per cent;
- The current exploitation of 78 per cent of deep groundwater, which accelerates groundwater depletion and water quality degradation;[57]
- Water quality degradation because of increased salinity.

Based on this data, and in order to ensure sustainable development in the region, it was decided to exclude solar pumping projects in the farming sector from the suggested development activities.

4. Performance evaluation of Chorbane municipality

Tunisia has embarked on a process of decentralization aimed at bringing public authorities closer to the people and making them more responsive and accountable to citizens. This has resulted in an extension of powers to local municipalities, including increased budgetary responsibilities.

Figure 19 Evaluation of Chorbane municipality performance



Source: Performance Evaluation 2018. Available at www.collectiviteslocales.gov.tn/fr/evaluation-de-perfomances-2018/.

Chorbane municipality has shown strong interest in the project and to the application of small-scale renewable energies as a catalyst for rural development and improved livelihoods. The mayor of the municipality (currently a highly educated woman) is committed to implementing this project with all local stakeholders (Territorial Extension Unit, delegation, professional structures).

In order to assess the performance of the municipality of Chorbane, a local collectivities evaluation established under the Urban Development and Local Governance Program (UGIP) was used. Under this new system, the annual subsidy for each municipality is calculated using a transparent, objective and fair formula. The transfer of the subsidy is conditional on the performances of the municipalities and the minimum mandatory requirements (CMO).

To obtain all of their grants, municipalities are evaluated according to indicators that cover three areas: governance, good management and sustainability. They must attain a performance rating greater than or equal to 70 points out of 100 in the evaluation provided by the General Controller of Public Services. The municipality must also meet five CMOs. A municipality that has not met the minimum conditions will not receive its grant for the year in question.

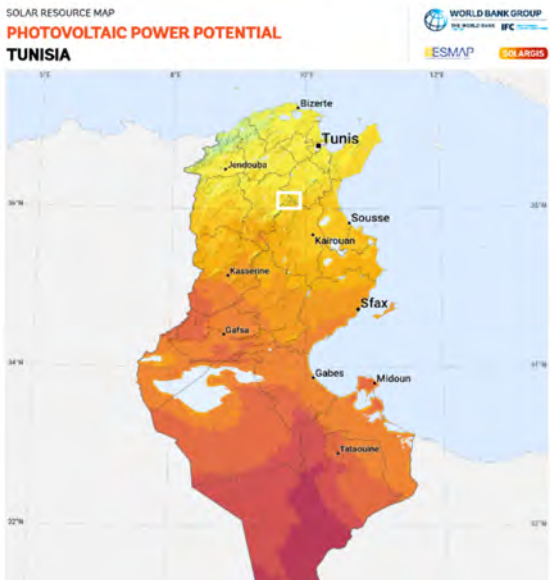
This evaluation from 2018 shows that Chorbane municipality is performing very well, with a performance rating of 82 out of 100. It could, therefore, be a solid and important partner at the local level.

5. Renewable energy potential in Chorbane

(a) Solar energy

Chorbane has good solar energy potential (figure 20) that could be used to generate electricity for many economic sectors and activities, agriculture in particular. This technology has become economically profitable due to a trend of decreasing costs year on year.

Figure 20 Tunisia PV power potential



Source: World Bank, "Solar resource maps of Tunisia", Solar resource data: Solargis. Available at https://solargis.com/maps-and-gis-data/download/tunisia/.

In order to use solar energy to improve livelihoods and generate income in Chorbane, a set of potential pilot projects were identified during this initial assessment, including:

- Self-production of electricity using renewable energies in the milk collection centre, SMSA El Faouz;
- Cooling tank powered by small-scale renewable energies and shared by many farmers for milk collection and storage;
- Solar pumping to improve access to drinking water;
- An agro-food mill and a small packaging unit using solar PV energy for rural women's GDA.

(b) Wind energy

According to the Tunisian Wind Atlas, Chorbane and Mahdia, in general, do not have good wind energy potential, this technology being more suited to large-scale renewable energy projects.

(c) Biomass

Despite the fact that the region has huge biomass potential from animal waste, this renewable energy resource was not considered in the suggested projects because it is a technology that requires rigorous and permanent monitoring and is, therefore, not suitable in the Chorbane context. However, it would be possible, in collaboration with a research unit/research centre, to operate a small biogas production unit for family use (cooking) on a pilot farm.

D. Assessment in Maamoura, Bni Khiar, Nabeul

1. Presentation of Bni Khiar and Maamoura

Bni Khiar is a delegation in Nabeul Governorate, as shown in figure 21. It is located 4 km north of Nabeul and includes three municipalities: Beni Khiar, Maamoura and Somaa. The region is an important hub for traditional textiles, embroidery industries and tourism.

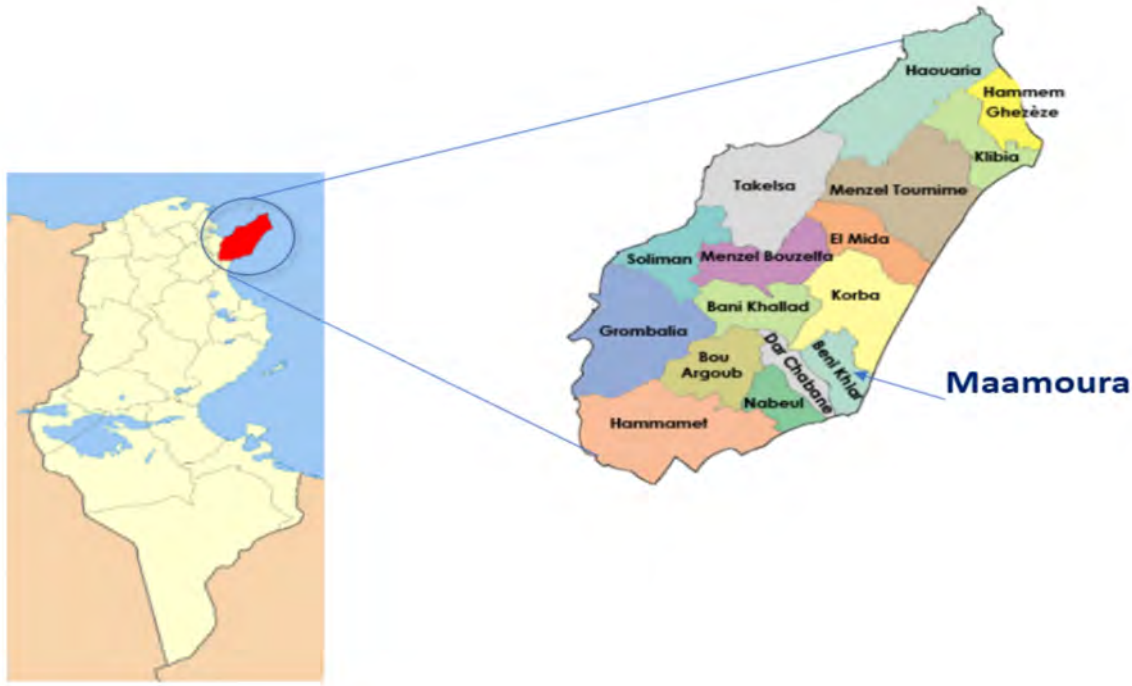
It has an active port, with an 84-strong fleet, and an industrial zone with steady activity, including 58 enterprises providing 2,889 jobs. The industrial activity is centered on several specialties, including pottery, the production of olive oil and the extraction of essential oils from the Ningxia and citrus flowers.

As shown in figure 21, Maamoura is among the coastal municipalities. The useful agricultural area in Bni Khiar covers about 8,855 ha.

The herd consists of 2,900 cattle and 5,100 sheep and goats. Bni Khiar, and Maamoura in particular, remain fundamentally an agricultural region, including many activities (olives, cereals, vegetables, citrus and fisheries).

The industrial sector is also well developed in Bni Khiar. Of those 58 industrial establishments, 15 are in the textile and clothing industry, 11 in the construction materials industry.[58]

Figure 21 Geographic position of Maamoura



Source: Author.

The region also has significant water potential, with one dam and three collinear lakes, which are used to irrigate an agricultural area of 1,540 ha.

Table 12 shows the main socioeconomic indicators in Bni Khiar. They are characterized by a very high level of electricity and drinking water connection (both for urban and rural regions), coupled with a very low rate of unemployment compared with the governorate average.

Table 12 Main socioeconomic indicators, Bni Khiar/Maamoura

Indicators	Bni Khiar	Maamoura
Population	28 669[a]	8 808
Literacy rate	11.06	(19.17% national)
% Drinking water SONEDE	98.70	
% Rural drinking water DGGREE + GDA	97.60	
Electrification	99.90	
Rural electrification	99.60	
% Sanitation	90.70	
% Unemployment	7.03	9.95 Nabeul, 15 national
% Unemployment (young graduates)	17.88	19 and 20 national
Regional development index	0.573 (ranking 32)[b]	

[a] Data collected from CGDR (Nabeul, January 2018).
[b] 2015.

2. SWOT analysis of Bni Khiar /Maamoura

Figure 22 SWOT analysis of Bni Khiar/Maamoura

3. Agricultural professional structures in Maamoura

In Maamoura, three agricultural professional structures were found.

(a) SMSA Maamoura

The main activities are milk collection, the sale of animal feeds and farmer assistance and coaching.

The SMSA has been facing many problems after its membership dropped considerably to only 25 farmers. This has been due to competition with other milk collection centres, an increase in the price of animal feeds as a result of the drought in recent years (2015-2018) and the depreciation of the Tunisian dinar.

(b) GDA rural women, Maamoura

A new women's GDA has been in place in Maamoura since March 2018. Called Al Zamnia and comprised of 12 members, its main activities are:

- Valuation of natural resources and terroir agricultural products (bssissa, couscous, roasted);
- Traditional agricultural products (strawberry and orange juice and jam);
- Traditional agricultural products extracted from vegetables (dry pepper, powder pepper tomatoes, dry tomatoes, harissa);
- Distillation of medicinal and aromatic plants and extraction of essential oils (cast).

The main obstacles it faces are the high cost of production due to the lack of necessary equipment (distillatory, crusher, packaging) and a lack of marketing and training.

Figure 23 Activities and products of GDA Al Zamnia, Maamoura

Figure 24 SWOT analysis of women's GDA, Al Zamnia

Strengths

- Engagement of women
- Very well structured despite weak financial means
- Local authority commitment
- University graduate members

Weaknesses

- As a new GDA, members are not trained
- Difficulties in product marketing
- Lack of equipment (incubators, distillatory, grinder)
- Low number of members
- Lack of training in certain aspects (access to financing, packaging techniques, marketing of products)

Opportunities

- New regulatory framework for women's social security
- Benefits from specific development programmes, such as the Integrated Development Program (PDI), and other NGO programmes, PAMPAT, etc.
- Support from the Rural Women Support Office
- Tourism in the Governorate of Nabeul could facilitate the marketing of GDA Products

Threats

- Many other rural GDAs in the region (Dar Chaabane)
- Lack of financial support
- Lack of technical means/equipment

Figure 25 Illustrating meeting of stakeholders, Maamoura municipality

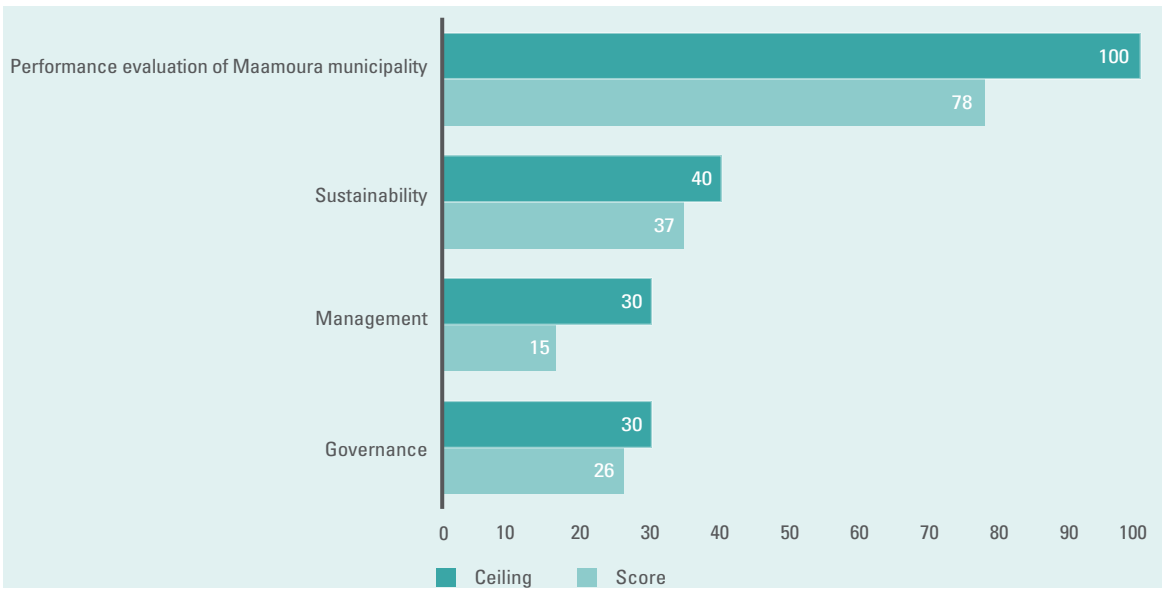
4. Performance evaluation of Maamoura municipality

Maamoura municipality has shown strong interest in the project and to applying small-scale renewable energies as a catalyst for rural development and to improve livelihoods. At a meeting, all stakeholders – these included officials from the municipality and the delegation of Bni Khiar, CGDR Nabeul, SMSA Maamoura and GDA rural women Al Zamnia – expressed their commitment to implementing this project in Maamoura.

In order to assess the performance of the municipality of Maamoura, a local collectivities evaluation, established under the Urban Development and Local Governance Program (UGIP), was applied.

The evaluation from 2018 concluded that Maamoura municipality is performing well, with a rating of 78 out of 100, and could be a reliable partner in implementing this project (figure 26).

Figure 26 Maamoura municipality evaluation



Source: Performance Evaluation 2018. Available at http://www.collectiviteslocales.gov.tn/fr/evaluation-de-perfomances-2018/.

E. Capacity-building assessment

During the assessment missions and interviews, the capacity-building needs of all stakeholders at the local community (SMSA, rural women's GDA, municipality, Territorial Unit for Agricultural Vulgarization (CTV), CRDA) and the national level were identified. Summarized in the table of the annex, they would be implemented with the support of different institutions working in rural areas, including United Nations agencies.

F. Suggestions for national and local facilitation teams

The study aimed to identify potential key national/local stakeholders to be part of the project's national/local facilitating teams (NFT and LFT).

The NFT will be involved in strategic decision-making and coordination of activities at the national level, the dissemination of project activities and verifying the coherence between such activities and national development strategies.

The LFT will help in the decision-making process – it was already consulted on the selection of project activities – and in implementing these activities at the local community level.

Upon the selection of the local community and in accordance with the outcomes of the focus group meeting in Tunis on 24 April 2019, it was agreed that ESCWA, and based on the REGEND project approved framework, will submit the scope of work of the LFT and NFT for the consideration of the ANME and other partners. This was agreed to ensure coherence and formalization of the process during the life time of the project duration.

The NFT will be composed of:

- National Agency for Energy Conservation, Ministry of Industry, Energy and Mines.
- Regional Development General Commission, Ministry of Development Investment and International Cooperation.
- Support Office for Rural Women, Ministry of Agriculture, Water Resources, and Fisheries.
- Agency for the Promotion of Agricultural Investment, Ministry of Agriculture, Water Resources, and Fisheries.

The LFT has members representing the following institutions:

- Representative of the Regional Directorate for Regional Development, Mahdia.
- Representative of the Municipality of Chorbane.
- Representatives of the Territorial Unit for Agricultural vulgarization in Chorbane.
- The local coordinator of rural women in Neffattia, Chorbane.
- Representative from GDA Rural Woman Al Amal, Chorbane.
- Representatives of SMSA El Faouz, Chorbane.
- Representative of the Local Union of Farmers.
- Representative of ANME.
- Representative of ESCWA.

Each member of the LFT will have to be nominated by its institution listed above.

G. Conclusion

As a result of the baseline study, which comprised a desk review, interviews and site visits, as well as a national focus group meeting supported by various stakeholders, Chorbane was selected as the local community for the project. The selection process was formalized during a coordination meeting in Chorbane chaired by the mayor of the municipality.

This report will help to disseminate information collected on the national and rural context, initiate the activities of the REGEND project in Chorbane and at national level and feed into the "Study on Gender Mainstreaming, Social Inclusion, Human Rights Processes and Outcomes of Access to Energy in Targeted Local Communities" initiated by the REGEND project as well.

Annex

1. Potential projects

Self-production of electricity using solar PV energy in the milk collection centre at SMSA

SMSA are collecting from farmers milk that is conserved in refrigerated tanks before being sold to private milk companies. The conservation step is an electricity-consuming operation.

The idea is to self-produce electricity using solar PV energy in the milk collection centre. Savings on the electricity bill will be used to support rural development and towards hiring a young technical operator to maintain the PV system.

2. Cooling at the farm. Cooling tanks powered by small-scale solar PV energy and shared by farmers for milk storage and collection

In the two regions, SMSAs ensure the collection of milk from farms. During summer, high temperatures and the long distances, drivers must travel to collect milk mean the milk stays on the farm without being cooled, the quality degrades and becomes unacceptable by the milk collection centre. This represents a great loss for farmers, many of whom abandoned this activity.

The storage of milk is a critical factor in dairy farming. Only by cooling the milk can the quality be maintained. Dairy farms rely on highly efficient cooling equipment to keep the milk at a constant temperature of about 4°C in tanks until it is collected for further processing.

Milk cooling tanks ensure accurate temperature control but require energy to function. Solar PV energy can be used to power the tanks.

This solution is tailored to meet the needs of both farmers and the collection centres.

Cooling tank

3. Solar pumping to improve access to drinking water

Drinking water in rural areas is provided either by SONEDE or DGGREE through GDA.

The energy cost in the total cost of producing each cubic metre of water is critical. Due to their often dire financial situation, there are instances when GDA members cannot pay their water bill, resulting in their access to drinking water being cut for several days.

The proposal is to self-produce the electricity needed for water pumping by installing a PV pumping system connected to the grid. This system will reduce the water price and thereby avoid cuts in water supply in these rural communities.

4. An agro-food mill and small packaging unit using solar PV energy for rural women's GDA

Low-quality packaging lowers the valuation of terroir products, honey and essential oils produced by rural women, and hinders an increase in sales of these items (see figures below).

Additionally, the women's GDA faces difficulties in milling agro-food products, such as bssissa, harissa and powder pepper, because they are obliged to use private milling characterized by low quality and high cost. The idea is for all members to share a milling device in order to preserve the quality and reduce the cost.

During interviews, GDA members in the two regions expressed an interest in sharing a small building – a depot or production unit – that could be provided by the municipality or the delegation. Here they could produce and preserve their terroir products, and also produce adequate packaging and labels. The building could also house the distillation equipment used in the extraction of essential oils from medicinal plants.

Small-scale solar energy would be used to provide electricity for this small production unit.

An example of a high-quality packaging system	Actual packaging
	

Capacity needs assessment

Capacity needs assessment							
SMSA	Packaging and labelling of organic olive oil	Renewable energies PV and biomass	Cooling in the farm	Diversifying agricultural activities	Maintenance of PV systems	Gender equality	Innovation in animal breeding field
GDA rural women	Packaging and labelling of terroir products, medicinal and aromatic products, honey	Training on the valorization of all beekeeping products (cosmetic products…)	Milk processing training (production of cheese, butter…)	e-marketing training	How to access funding (loans, micro credit…)	Marketing and entrepreneurship	Organic agriculture/ accreditation/ certifications
GDA rural women	Extraction of essential oils from medicinal plants	Improve the quality of their artisanal production					
	Note: training should be in a region close to women and of reasonable duration – all-day sessions or more than three days – to ensure the participation of all women (rural women have difficulty being mobilized for a long periods)						
Municipality	Renewable energies: awareness, technical, regulatory framework, economic issues, potential opportunities	Assistance in the development of participatory plans	Planification	Gender equality	Entrepreneurial development in rural areas, including the involvement of the private sector and financial institutions		
CTV	Renewable energies: awareness, technical, regulatory framework, economic issues, potential opportunities	Sustainable agriculture	Marketing of organic products	Entrepreneurship	Entrepreneurial development in rural areas including the involvement of the private sector and financial institutions	Gender equality	
CRDA	Renewable energies: awareness, technical, regulatory framework, economic issues, potential opportunities	Marketing of organic products	Entrepreneurship	Gender equality	Entrepreneurial development in rural areas, including the involvement of the private sector and financial institutions		
Other institutions at regional/ local level	Awareness campaign on renewable energies and applications in rural areas and at national level to disseminate the existing policy and investments mechanisms Awareness campaign will include public and private institutions						

Endnotes

1. Productive activities are usually defined as activities that have economic value in the marketplace. A more contemporary definition includes any activity that produces a valued good or service, even if it is not paid for.
2. Tunisia, Ministry of Agriculture, Water Resources and Fisheries, 2017.
3. National Institute of Statistics, 2018a.
4. National Institute of Statistics, 2016b.
5. Central Bank of Tunisia, 2017.
6. World Bank, Tunisia's Economic Outlook, 2017a.
7. World Bank, 2018a.
8. The HDI is a summary measure for assessing long-term progress in three basic dimensions of human development: a long and healthy life, access to knowledge and a decent standard of living.
9. Standard of living is measured by GNI per capita expressed in constant 2011 international dollars converted using purchasing power parity (PPP) conversion rates.
10. Central Bank of Tunisia, 2017.
11. The Gini index measures the extent to which the distribution of income or consumption expenditure among individuals or households within an economy deviates from a perfectly equal distribution.
12. Larbi, 2019.
13. Indicateur de Développement Régional: Méthodologie et résultats, 2018.
14. Ibid.
15. World Bank, 2017b.
16. National Institute of Statistics, 2019a.
17. Ayadi and others, 2005.
18. Gafrej, 2016.
19. Food and Agriculture Organization of the United Nations, 2018.
20. Amara and Hatem, 2018.
21. National Institute of Statistics, 2016a.
22. FAO, Rural Migration in Tunisia, 2018.
23. Ibid.
24. Ibid.
25. Boughzala and Tlili Hamdi, 2014.
26. National Institute of Statistics, 2016a.
27. National Institute of Statistics, 2019a.
28. Compensatory volume due to use of Tunisian land to transport natural gas from Algeria to Italy.
29. Société Tunisienne d'Eléctricité et de Gaz, 2016.
30. National Institute of Statistics, 2018b.
31. Agence Nationale pour la Maîtrise de l'Energie, 2012.
32. National Institute of Statistics, 2018b.
33. World Bank, 2004.
34. Corporation for International Cooperation GmbH and Agence Nationale pour la Maitrise de l'Energie, 2012.
35. From data collected during the interview with ANME, which is responsible for the PROSOL-ELEC programme.
36. Food and Agriculture Organization of the United Nations and Corporation for International Cooperation GmbH, 2018.
37. United Nations Industrial Development Organization,1994.
38. Agence Nationale pour la Maîtrise de l'Energie, Corporation for International Cooperation GmbH and ALCOR, 2010.
39. Tunisia, Ministry of Agriculture, Water Resources and Fisheries, 2017.
40. Office National de l'Assainisement, 2018.
41. Tunisia, Ministry of Agriculture, Water Resources and Fisheries, 2017.
42. Tunisia, Government Decree No. 2016-602 of 26 May 2016, amending the territorial limits of certain municipalities.
43. Office National de l'Assainisement, 2018.
44. World Bank, 2017b.
45. World Bank, 2018b.
46. World Bank, 2017b.
47. Elloumi, 2006.
48. Yerkes and Muasher, 2018.
49. Data collected from CTV Chorbane (Cellule Territoriale de Vulgarisation Agricole).
50. Data collected from CRDA Mahdia, data for 2015.
51. Boussida, Ben Rabah and Ben Salhine, 2018.
52. Annual accounting report provided by SMSA El Faouz for 2017.
53. Les sociétés mutuelles de services agricoles (SMSA) en Tunisie: Cadre juridique et Partenariat Public-SMSA, juillet 2018, https://www.iamm.ciheam.org/ress_doc/opac_css/doc_num.php?explnum_id=18219.
54. 1 dollar = approximately 3 Tunisian dinars (October 2019).
55. Harissa is a traditional food made after drying and grinding chilli.
56. Bssissa is wheat and barley flour to which spices, almonds, dates, chickpeas, sorghum and sugar are added to prepare purées and traditional drinks.
57. Tunisia, Ministry of Development, Investment and International Cooperation, 2018.
58. Data collected from CGDR (Nabeul, January 2018).

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