

Littoralization and Urbanization

Sousse Scale, Tunisia





Analysis of Threats and Enabling Factors for Sustainable Tourism at Pilot Scale

Littoralization and Urbanization Sousse scale, Tunisia



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OVERVIEW

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REVIEW

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List of abbreviations

ANPE: National Agency for Environment Protection

APAL: Coastal Protection and Planning Agency

CATU: Land Use and Urban Planning Code

DPM: Maritime public domain

EIA: Environmental Impact Assessments

INS: National Institute of Statistics

ONAS: National Sanitation Office

ONTT: Tunisian National Tourist Office

OTEDD: Tunisian Observatory of Environment and Sustainable Development

PAU: Urban Development Plans

PAUs: Planned Areas of Urbanization

PDUI: Integrated Urban Development PROJECT

PNUD: United Nations Development Program

SECO: State Secretariat for Economic Affairs

UTP: Urban Transport Plan

Abstract

The Sousse-Monastir coastline, which is part of the eastern coast of Tunisia, is the seat of increased urbanization and tourist activity that have led to its weakening and the decline of its coast line in most of this sector. Indeed, it has experienced a significant expansion of urban and industrial areas (Sousse Sud), an intensification of the construction of hotel units (Dkhila) and port arrangements that have largely contributed to its degradation.

Massive urbanization and the intense occupation of tourist facilities has caused the almost complete destruction of the coastline, with a restriction of the width of the beaches to less than 10 meters in some places (compared to 20 to 100 meters further north of the Grand Sousse region). Urbanization has sometimes extended to the dependencies of natural spaces and the Maritime Public Domain (DPM) and has thus led to the destruction of the Danube cordons, the imbalance of coastal systems and the depletion of beaches.

In addition, the beaches, mainly that of Boujaâfar, are over-exploited during the summer season and exceed their maximum accommodation capacity. The beaches also face a problem of pollution due to accumulated waste, which leads to a deterioration in the quality of sea water.

The spread of urbanization on the coasts combined with the DPM invasion created an imbalance between proportions in protected sites and artificialized territories. This significantly reduces the attractiveness of the city. Finally, the algal explosion at the level of some seaside sites creates more and more healthy bathing conditions and helps to reduce the attractiveness of the beaches.

These limitations call for a fresh approach to the creation of a new, sustainable tourism industry that integrated the blue economy industries. By utilizing marine and coastal resources sustainably for economic growth, better lifestyles and employment opportunities, and healthy marine and coastal ecosystems, the blue economy presents a chance for sustainable development and wealth creation for Tunisia in general and Sousse in particular.

I. Introduction

In this report we will concentrate on coastal urbanization in relation to tourism growth in the region of Sousse, which is our pilot area.

Thanks to its privileged geographical position and its relief essentially made up of plains, Sousse is an attractive and dynamic city, oriented to the outside and generating jobs. All these advantages earned it the nickname of “Pearl of the Sahel”. Sousse’s second urban tour to tourism attracts significant migratory flows and many services activities.

Sousse shows population growth above average National: 1.6% per year against 1.2% for the whole country. If this proves its attractiveness, high population growth also creates new urban challenges, notably in terms of infrastructure and housing construction, and a tendency to intensify the city’s economic activities, which have the effects on its environment (*Atlas numérique*, 2021).

In Tunisia’s Sousse-Skanes-Monastir region, tourism grew quickly in the 1970s, with more than one-third of visitors coming from abroad. This has had a significant impact on employment, resulting in the creation of approximately 7,000 new jobs in the hotel sector and several positions that are indirectly tied to tourism. Young and local-born individuals make up the majority of the workforce. Even though tourism is primarily urban, there are rural development projects, particularly in northern Sousse, which are anticipated to generate issues for farmers owing to competition for land and water resources.

The urban dynamics that came along with the growth of mass tourism in the Sousse region had an effect on the city’s ability to develop sustainably. The environmental fragility of the region has increased as a result of population growth and the global warming phenomenon.

The population of the Sousse Governorate has more than doubled in the last 30 years. Inhabitants increased from 322,4191 in 1984 to 674,971 in 2014, a growth of 52.22%. This increase was primarily made possible by the rapid population development in the cities of Sousse (which saw an increase of more than 63.34%) and Grand Sousse (which had an increase of 53.95%).

Grand Sousse’s population made up 92.35% of the Governorate’s population in 2019. Although Msaken has more over 100,000 persons at the start of 2019 in terms of delegation, the most populous urban area remains Sousse, which had 247,493 residents.

The Grand Sousse can be divided into 4 sets at the municipal level and according to the NIS’s projections for 2019.

- a central pole made up of the four delegations that make up the city of Sousse.
- two emerging poles, one to the southwest, Msaken, and the other to the northwest, Kalaa Kébira, are far from the main pole.

- a group of intermediate cities, several of which are close to the main pole, including Kalaa Sghira and Hammam Sousse.
- a collection of villages with fewer than 15,000 residents that are positioned somewhat away from the main pole.

This report will cover the following parts:

- Characteristics of Urbanization and Littoralization.
- Impacts of Urbanization and littoralization on ecosystem, tourism and territory.
- Future trends in urbanization and littoralization.
- Impacts of urbanization and littoralization on the coastal/maritime environment.

II. Characteristics of Urbanization and Littoralization

II.1. Urban characteristics of Sousse and tourism development diversified morphology

The city of Sousse was the historical capital of the Tunisian Sahel area and nicknamed the “pearl of the sahel”.

The trend towards urbanization and coastal development in Sousse is characterized by a rapid growth of urban areas, particularly along the coast. This evolution is largely driven by tourism development and the economic appeal of the coastal region. Here are some key points regarding this trend in Sousse:

Coastal Urbanization: The coastal areas of Sousse have experienced intensive urbanization due to the increasing demand for tourist and residential infrastructure close to the sea. Hotels, tourist complexes, residences, and other facilities have proliferated along the coastline.

Resource Pressure: Urbanization and coastal development have exerted significant pressure on natural resources and land. Lands that were once used for agriculture or conservation have been converted into urban developments.

Natural Environment: The expansion of urban areas along the coast can impact sensitive marine and coastal ecosystems. Coastal construction can lead to the loss of natural habitats and degradation of beach areas.

Coastal Management: Coastal development necessitates careful coastal management to avoid overexploitation, pollution, and erosion. Preservation and protection measures for coastal areas are necessary to maintain the ecological integrity of marine environments.

Spatial Planning: Well-planned and regulated spatial planning is essential to guide sustainable urban development. This may involve the establishment of conservation zones, protection of green spaces, and limitations on construction along the beachfront.

Social Impacts: The concentration of urbanization in coastal areas can have social impacts, including the cost of living, cultural diversity, and access to affordable housing for local populations.

Sustainable Tourism: Developing a sustainable tourism approach can help balance the demand for tourist facilities with the need to preserve coastal ecosystems and minimize negative environmental impacts.

In summary, the trend towards urbanization and coastal development in Sousse reflects the challenges and opportunities associated with economic growth and the tourism industry. Prudent planning and careful resource management are necessary to preserve the natural environment, maintain residents' quality of life, and ensure the sustainable development of the region.

According to the 2014 census, it has 221,530 inhabitants and governs, as the capital, a region of 675,000 inhabitants. It has a reasonably varied economic fabric: industry, services, fishing, tourism. This last sector has evolved from a few urban hotels in the colonial capital to a seaside tourist region consisting of a series of hotels. In 1979, the integrated resort of El Kantaoui was built, which provides a new tourism and leisure centrality in relation to the city of Sousse. It is a little city organized around its major equipment of animation, the marina.

The analysis of changes in the urban makeup of tourist places is part of the tourism regeneration paradigm. In the case of the city of Sousse, in addition to the development of real estate in place of derelict hotels, we are witnessing the regeneration of tourism activity through the introduction of new products: luxury urban tourism, health tourism, home-stay tourism, and so on.

In the Sousse governorate there are four popular tourist zones: Sousse-ville, Hammam-Sousse, El-Kantaoui, Chott-Mariem-Hergla, and Yasmin-Hammamet. In other words, 11.32% of all national tourism units were made up of tourist facilities in 2017. In 2017, there were 96 units total, including 71 hotels. The number of beds available climbed from 39,013 in 2016 to 39,401 in 2017, accounting for 16.81% of the country's total reception capacity.

There are two marinas in the governorate of Sousse: one in Yasmin Hammamet and one in port el-Kantaoui. Additionally, it contains 113 travel agencies, 58 classed restaurants, 2 ecological villages, and 2 rural tourist entertainment centers.

Grand Sousse has a fairly large and developed hotel infrastructure with a large reception capacity and diverse leisure and entertainment facilities. The tourist area Sousse-Kantaoui⁷⁰ accounts for 12.5% of the total number of establishments in Tunisia. The total number of hotel

units in 2018 is 67 units, of which 64 are ranked against 76 unities in 2010 and have 34,206 beds in 2018 compared to 35,448 in 2010.

The accommodation capacity of the Sousse-kantaoui area has grown over time to be in second place, with the tourist area Nabeul-Hammamet (17% of the national total in 2018), after that of Djerba-Zarzis (23.4% of the total national in 2018). In 2018, the tourist area of Sousse is also in second place after the touristic area of Djerba-Zarzis in terms of number of overnight stays with a growth rate of 19.6% compared to 2017. In 2019, the region of Sousse increased by 16.2% in terms of number of nights but to a lesser extent compared to the most attractive regions, namely

Yasmine-Hammamet, with a progression of 20.5% and Monastir-Skanes (+19.6%)

The hotel units of the Grand Sousse⁷¹ are distributed between the tourist areas of Sousse Medina (39 units in 2018 versus 48 in 2010), Sousse Kantaoui (25 units during 2018 and 2010) and Chott Mariem and Hergla (3 units between 2018 and 2010).

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One of the most important tourist destinations in the nation is the Governorate of Sousse. It has benefited from the execution of numerous diverse and sizable tourism projects in the last years. The city of Sousse's natural, historical, and urban features have helped the area become a major tourist destination.

Four tourism hotspots can be found in the governorate of Sousse: Sousse City, Hammam-Sousse, El-Kantaoui, Chott-Mariem-Hergla, and Yasmin-Hammamet. In 2017, there were 96 units of tourist facilities, including 71 hotels that were classified, or 11.32% of all national tourist units. The number of beds available climbed from 39,013 in 2016 to 39401 in 2017, or 16.81% of the total capacity available nationwide.

Two recreational ports may be found in the governorate of Sousse: one in el-Kantaoui and one in Yasmin Hammamet. Additionally, it contains 113 travel agencies, 58 categorized restaurants, 2 ecological villages, and 2 rural tourist entertainment centers. Due to the 20,400 employment it has generated, the tourist industry is quite significant to the local economy.

The following is a ranking of Sousse hotels (Table 1): 28 hotels are rated four stars, 14 are three stars, 17 are two stars, and 6 are one star. 15 tourist apartments, 2 guesthouses, 6 family pensions, and a tourist village are among these hotels.

The following is how beds are allocated among the various tourist facilities:

Table 1. Distribution of reception capacities of different tourist units according to type Unity.(Mohamed Hellal, 2017)

Unity		5 *	4 *	3 *	2 *	1 *	Apart	Host House	Village Vacation	Family Pension	Other
Sousse	Nbre	6	28	14	17	6	15	2	1	6	1
	Capacity	4842	17740	8197	3518	956	2844	14	1000	170	120
National level	Nbre	59	153	154	127	74	45	35	10	56	7
	Capacity	30081	80816	62366	25403	6825	6886	295	6099	3592	1175
Contribution of the Governorate	Nbre	10.71	18.30	9.09	13.39	8.11	33.33	5.71	10	10.71	14.29
	Capacity	16.10	21.95	13.14	13.85	14.01	41.30	4.75	16.40	4.73	10.21

29.17% of all hotels are luxury hotels in the class 4* category. 6.25 percent of all hotels fall within category 5*. Hotels with two stars are given the second spot. Apartments for tourists make up between 17.71% and 15.6% of total tourist lodging. Last but not least, 14.58% of all hotels are 3* hotels (Table 2).

Table 2. Distribution of the Sousse's tourism sites : Capacity for reception in 2016. (Ministry of tourism, 2016)

Tourist zone	Tourist units	
	Nbre	Capacity
Sousse Medina	42	18,430
Sousse Kantaoui	26	15,467
Chott Mariem	3	1,049
Yasmine El Hammamet	22	9,456
Total	93	44,402

The highest reception capacity is in the tourism area of Sousse-Medina. Despite the natural and historical potential of the region, Chott Mariem-Hergla's involvement is quite low and does not reach 2% (3 hotels) (Figure 1).

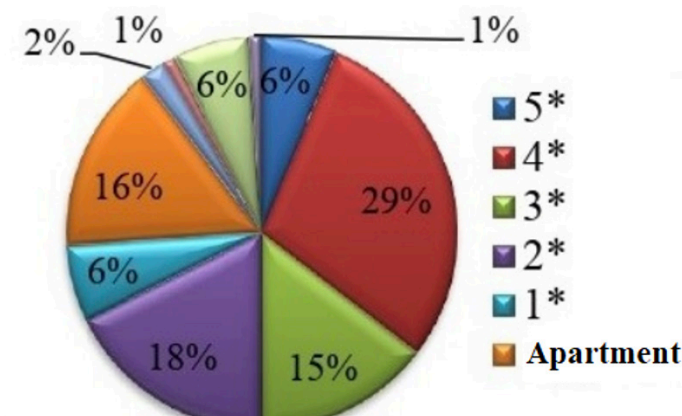


Figure 1. Distribution of tourist facilities by type in the Governorate of Sousse (2017)
(Atlas, 2021)

The city of Sousse exhibits several urban characteristics that contribute to its tourism development. Here are some key points:

- **Historic Medina:** Sousse boasts a well-preserved ancient Medina, which is a UNESCO World Heritage site. The narrow winding streets, traditional architecture, and historic landmarks attract tourists interested in exploring the city's cultural heritage.
- **Beach Tourism:** Sousse is famous for its stunning beaches and waterfront promenades. The sandy shores and clear blue waters draw tourists seeking relaxation, water sports, and seaside activities.
- **Tourism Infrastructure:** The city has developed a robust tourism infrastructure with a range of hotels, resorts, restaurants, and entertainment venues to cater to visitors' needs.
- **Souks and Markets:** Sousse's markets and souks offer a lively and colorful shopping experience. Tourists can find local handicrafts, textiles, spices, and other traditional items here, making it a popular attraction for shopping enthusiasts.
- **Archaeological Sites:** Aside from the Medina, Sousse is home to various archaeological sites and ruins, such as the Roman amphitheater, which further enhances its appeal to history buffs and cultural tourists.
- **Festivals and Events:** The city hosts various festivals and events throughout the year, celebrating its cultural heritage, music, and arts. These events contribute to attracting tourists and creating a lively atmosphere.
- **Transportation Connectivity:** Sousse has good transportation links, including an international airport, making it easily accessible to domestic and international tourists.

- Nightlife: The city offers a vibrant nightlife with a variety of bars, clubs, and entertainment options, appealing to younger tourists and those seeking a lively evening scene.
- Tourism Promotion: Tunisian authorities have actively promoted tourism in Sousse, ensuring it remains a popular destination in the region. Marketing campaigns, international travel fairs, and collaborations with tour operators help attract tourists from various countries.

There are two planned tourist zone in Sousse (Figure 2):

- The tourist area of Essalloum: situated in front of Bouficha, between Hammamet-South and Hergla. The space is 600 acres, and it can accommodate 25,000 beds, according to estimates. Hotels, a golf course, a cultural center, a conference center, and entertainment venues are all part of the program.
- The tourist area of Hergla: The 450 ha Hergla tourist area is projected to be a tourist destination and is situated in a coastal woodland zone between Essalloum and Sousse-Nord. It is expected to have 10,000 beds available. A recreational port is part of the planning strategy for this potential tourist destination.

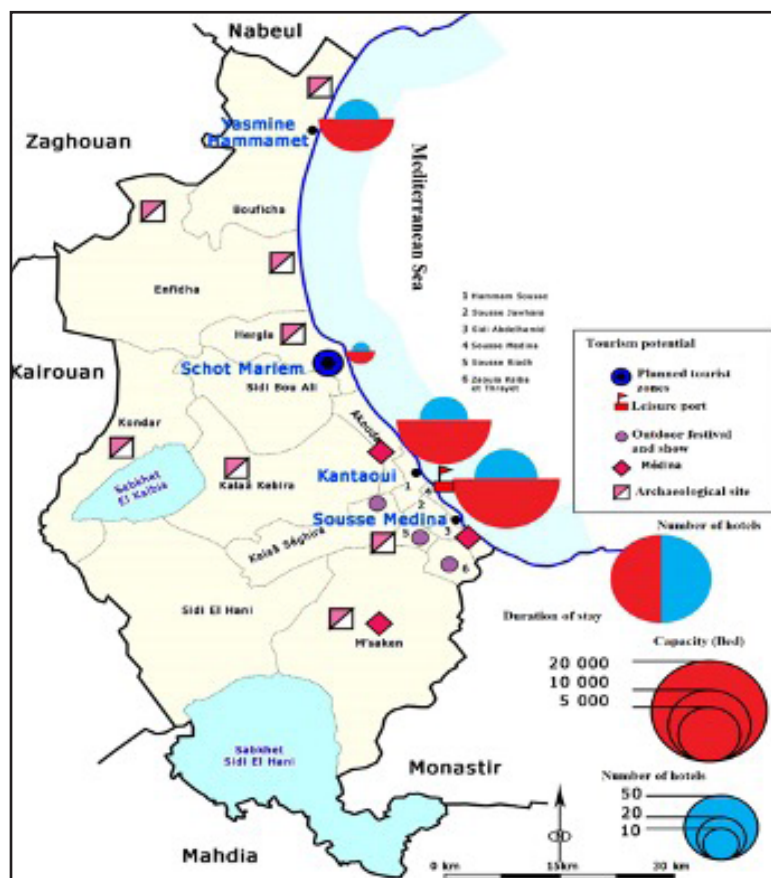


Figure 2. Areas and potentialities of the governorate of Sousse (Atlas, 2021)

In 2019, the Sousse Governorate took the first place among Tunisian tourist destinations, welcoming 76% of visitors to the region. In fact, the number of tourists who visited the region of Sousse, from 20 to 31 December 2022, amounted to 50,988 from 50,716 in 2019, an increase of 0.5%.

The hotel units in Sousse-ville and El Kantaoui received 995,234 tourists in 2022 against 502 022 in 2021. Similarly, the region experienced an evolution in the number of nights of 161.5%, or 3,483,927 compared to 1,332,154 in 2021. The domestic market ranks first in terms of number of visitors (481,713), an increase of 28.5% compared to 2021.

Between 1st and 20th January 2023, the number of visitors flocking to the tourist areas of the Sousse Governorate, registered an increase of 99% compared to the same period of 2022. In fact, 33,818 tourists visited the region during that period, compared to only 16 995 last year.

Similarly, the region experienced an evolution in the number of nights of 162% to 102,747 nights against 39,333 during the same period of 2022.

The Tunisian domestic market rose to the top place in terms of number of visitors (15,958 people), an increase of 20% from last year.

The number of Algerian tourists also increased by 1000% compared to 2022. In fact, the hotels of Sousse-El Kantaoui welcomed 8 788 Algerian tourists during the first 20 days of January 2023, in addition to the presence of visitors from the classic markets (French, German, Italian) and others. (Source : Declaration of the Regional Tourism Commissioner) (Chaggar et al., 2018).

II.2. Tourism development and coastal urbanization

Tourism development and coastal urbanization have played a significant role in shaping the city of Sousse. As a popular tourist destination on the east coast of Tunisia, Sousse has experienced extensive growth in its tourism sector, leading to substantial changes in its coastal areas and urban landscape.

The first hotel in Sousse was the “Hotel Marhaba” (also known as “El Kantaoui Hotel”), which was established in 1967. It was built in the modern tourist resort area of Port El Kantaoui, a few kilometers north of the historic Medina of Sousse.

Here is a list of some other notable hotels in Sousse, arranged by date of establishment:

Hotel Marhaba (El Kantaoui Hotel) - 1967

Movenpick Resort & Marine Spa Sousse - 1972

El Mouradi Palace - 1973

Le Sultan Hotel - 1984

Riadh Palms Hotel - 1985

El Mouradi Club Kantaoui - 1985

El Mouradi Palm Marina - 1985

Sousse Palace Hotel - 1985

Marhaba Beach Hotel - 1989

Seabel Alhambra Beach Golf & Spa - 1997

Marhaba Salem Hotel - 2000

Marhaba Royal Salem Hotel - 2001

Sentido Rosa Beach Thalasso & Spa - 2003

Riadh Sousse Hotel - 2003

Houda Golf & Beach Club - 2004

Iberostar Selection Diar El Andalous - 2006

Movenpick Resort & Marine Spa Sousse - 2009 (Formerly El Mouradi Palace)

This is not an exhaustive list, and there are many more hotels and resorts in Sousse catering to tourists' diverse needs and preferences. The establishment dates may also be subject to change due to renovations or rebranding of existing properties (Hellal, 2017).

Sousse is renowned for its beautiful beaches, historical sites, and vibrant culture, making it an attractive location for domestic and international tourists. Over the years, the Tunisian government and private investors have focused on developing the city's tourism infrastructure to accommodate the increasing number of visitors.

Tourism-related projects have led to the construction of numerous hotels, resorts, restaurants, entertainment venues, and other facilities along the coastline. The tourism sector has created employment opportunities and stimulated economic growth in the region, contributing significantly to Sousse's economy.

Coastal urbanization in Sousse is mainly driven by the tourism industry. The development of tourist facilities and accommodations along the coast has led to the transformation of once-natural or agricultural areas into urbanized zones.

As the demand for tourist accommodation grew, hotels and resorts extended into previously undeveloped coastal areas. This has resulted in the conversion of agricultural land and natural habitats into built-up spaces, altering the coastal environment.

Coastal urbanization and tourism development have raised environmental concerns. The conversion of natural habitats into built-up areas can disrupt ecosystems and lead to habitat loss for local fauna and flora. Additionally, increased human activity on the beaches and in the sea can impact marine biodiversity and water quality.

Efforts have been made to address these environmental issues through sustainable tourism practices and coastal management plans. Initiatives such as beach cleanup programs, waste management, and biodiversity conservation projects aim to minimize the negative impacts of tourism and coastal urbanization on the environment.

The rapid growth of tourism and urbanization in Sousse has also brought cultural and social changes to the city. Traditional neighborhoods and local customs may be influenced or altered by the influx of tourists and the development of tourist-oriented facilities.

To maintain its cultural identity and authenticity, Sousse has sought to balance tourism development with preserving its historical sites, heritage, and local traditions.

In conclusion, tourism development and coastal urbanization have played a significant role in shaping Sousse, transforming it into a popular tourist destination. While these developments have brought economic benefits and job opportunities, they have also raised environmental and cultural challenges that require careful planning and sustainable practices to ensure the long-term prosperity of the city.

A direct result of the growth of tourism and the general dynamic it has promoted is an increase in employment and, as a result, a rise in the average income of the populace. Sousse has consequently developed into a desirable location for immigrants. (Boubakrir, 2020)

II.3. Focus of attraction for the migrant population

The region of Sousse is a point of interest for the migrant population from several governorates in the south and center of the country who are looking for jobs due to the region's economic success, which was mostly achieved through tourism.

In 2014, the governorate of Sousse recorded a positive migratory balance of 13496. But this rate does not take into account the existing disparities at delegation level. For example, the Sousse-Médina delegation recorded the highest negative rate in terms of domestic migratory balance (-15,471); namely: 3,881 incoming against 19,352 outgoing. The Sidi Bou-Ali, Kondar, Enfidha and Kalaâ-Kebira delegations also recorded a negative migratory balance, as opposed to the Sousse-Jawhara and Sousse Sidi Abdel-Hamid delegations, which recorded the highest positive migration balance, with 7,227 incomes and 4,897 exits, respectively. These figures reflect the degree of attractiveness of these delegations, given the economic growth and remarkable demographic developments they have experienced (Boubakrir, 2020)

The external migratory balance is estimated at (-1,305), knowing that the three delegations of Sousse - Medina, Hammam - Sousse and Hergla, have recorded a positive migration balance. In contrast, the delegations of Bouficha and M'Saken present a negative migratory balance: respectively (-8) and (-1,041) (Table3).

Table 3. External migration balance between 2009 and 2014 (Atlas numérique, 2021)

Délégation	2004-2014		
	The incoming	The outgoing	Migration balance
Sousse ville	563	132	431
Sousse Riadh	377	464	-87
Sousse Jawhara	611	695	-84
Sid Abdelhamid	113	223	-110
Hammam Sousse	452	227	225
Akouda	194	243	-49
Kalaâ Kébira	45	212	-167
Sidi Bou ali	12	104	-92
Hergla	69	35	34
Enfidha	79	163	-84
Bouficha	40	48	-8
Kondar	20	83	-63
Sidi el Hani	19	114	-95
M'Saken	520	1,561	-1,041
Kalaâ Séghira	96	200	-104
Zaouia/Ksiba	79	90	-11
Total	3,289	4,594	-1,305

The reasons for these internal and external migrations are varied. But work is the most important reason for external migration, since it results in a rate of 68.07%, against 73.38% nationally. Studies occupy the 2nd position with 16.64%, against 14.2% nationally. Sousse, which is mostly accounted for by the island's allure due to the job prospects provided by tourists (Figure 3).

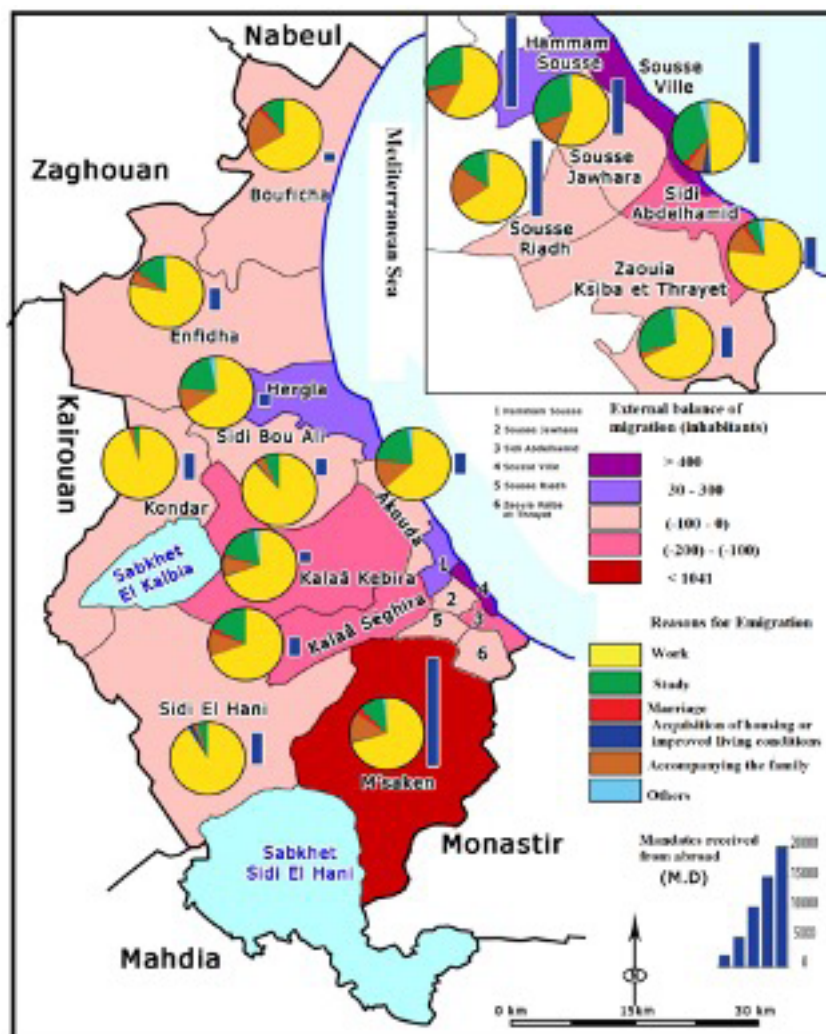


Figure 3. External migration and its reasons (Atlas, 2021)

The growth rate table (Table 4) shows that the majority of delegations recorded positive growth highs between 1994, 2004 and 2014.

Between 1994 and 2004:

- The delegation of Sousse Riadh recorded the highest growth rate: 4.34%. It is an attractive city, which owes its growth to the realization of numerous real estate projects and the establishment of socio-collective facilities, which have enabled the creation of an important socio-economic dynamic and generated a positive domestic migratory balance.
- The two delegations of Hammam Sousse and Kalaâ Séghira occupied the second position during the same decade, with a growth rate of more than 3%.

- 10 delegations recorded a lower growth rate than that recorded at the governorate level: 8 of them showed rates ranging from 2.5% (Akouda) to 0.66% (Sidi El Hani) and two others recorded negative growth rates: Sousse city (-0.58%) and Sousse Jawhara (-1.7%).

Between 2004 and 2014:

- The delegation of Sousse Jawhara recorded the highest rate (3.27%). Second is Kalaâ Séghira with a growth rate of 3.14%, followed by Akouda (2.98%).
- Other delegations recorded a growth rate of less than 2%. This is the case of Sidi Bou Ali (1.05%) and Sousse Ville (1.75%).
- The delegations of Kalaâ Séghira and Akouda recorded a high growth rate between 1994-2004 and 2004-2014, recording 3.14% and 2.9%, respectively.
- The Sousse Riadh delegation recorded a negative growth rate (-0.12%), as opposed to the 1994-2004 decade.

Table 4. Evolution of growth rate per delegation between 1994 and 2014 (%) (Atlas, 2021)

Delegation	1994-2004	2004-2014
Sousse ville	- 0.58	1.75
Sousse Riadh	4.34	- 0.12
Sousse Jawhara	-1.7	3.27
Sidi Abdelhamid	0	0
Hammam-Sousse	3.3	1.52
Akouda	2.5	2.98
Kalaâ Kebira	1.32	1.45
Sidi Bou Ali	1.59	1.05
Hergla	1.01	1.67
Enfidha	1.35	1.28
Bouficha	1.82	1.27
Kondar	1.5	1.54
Sidi el Hani	0.66	1.52
M'Saken	1.58	1.3
Kalaâ Séghira	3.2	3.14
Zaouia/Ksiba et Thrayet	0	0
Gouvernorat de Sousse	2.3	2.17
Région Centre Est	1.81	1.93
Territoire national	1.21	1.03

A certain degree of overcrowding in some areas of Sousse region and intense development pressure, notably in the housing sector, are both effects of the region's significant demographic boom. Despite being widespread, land demand is most sensitive in areas around the tourism area. (Boubakrir, 2020)

The development of the tourist zone in dependence on the coastal zone, which is by definition sensitive, as well as the spread of anarchic housing in the interior of the region has an impact on the region's eco-system.

We are going to witness a shift in the vocation of area. From a predominantly rural natural area, the area will become a real urban conurbation and an economic center major. It will undergo intense pressure on the area's natural, agricultural and urban. The new projects of Center East are of such magnitude that they will change the territorial landscape of the region. They have important needs in terms of space (land occupation), water needs, energy, in transport infrastructure. Without measures support, a real risk of urban "dystrophy" watches over the region and can slow down its economic influence and their social development. The initial projections predicted a land use of around 6000 ha this which induces significant pressure on soil resources and a conflict with agricultural use. (Hamrita et al., 2022).

The revision of the projections induces needs of between 1000 and 1400 ha of land to be urban use. These estimates greatly reduce the pressure on the soil and make it possible to remain within the limits of the new PAUs of the 4 existing municipalities Hergla, Bouficha, Enfidha). The Development Master Plan and the Plan of Urban Development are necessary but unfortunately insufficient. Indeed, the influx of populations in our region require the implementation a short-term urban coherence plan to define the reception areas and the facilities to be created (transport, water drinking water, waste treatment, etc.) as well as programs integrated housing adapted to the needs and solvency of new arrivals. The urbanization of the area must be established so as to create a phasing of the development to minimize pressure on land and resources and a staggering of public investments (infrastructure and equipment) (DGAT, 2011).

III. Impacts of urbanization and littoralization on ecosystem, tourism and territory

III.1. High attractiveness and difficulty in governing urbanization

Urbanization and coastal development have significant impacts on tourist areas, especially in the context of coastal destinations like Sousse. These impacts can have both positive and negative consequences on the tourist experience, the natural environment, and the long-term sustainability of these areas. Here's an analysis of the impacts generated by urbanization and coastal development and their effects on tourist areas:

- **Negative Impacts**

- **Alteration of Natural Landscapes:** Intensive urbanization along the coast can alter the natural landscapes that attract tourists. Panoramic sea views may be obstructed by buildings and infrastructure.
- **Destruction of Natural Habitats:** Converting natural spaces into urban zones can destroy natural habitats and disrupt local biodiversity, which can harm ecosystems and tourist appeal.
- **Pollution and Environmental Degradation:** Increased tourist numbers and infrastructure can lead to higher air, water, and waste pollution, endangering environmental quality and ecosystem health.
- **Pressure on Water Resources:** Urbanization and increased demand for drinking water, irrigation, and tourist activities can strain local water resources, especially in coastal areas prone to drought.

- **Positive Impacts**

- **Job Creation:** Urbanization and tourist development generate jobs in hospitality, dining, leisure, and services, which can stimulate the local economy.
- **Revenue Increase:** The influx of tourists leads to higher tourist revenue, which can be invested in local development projects and infrastructure improvements.
- **Diversification of Activities:** Urbanization can encourage diversification of tourist activities, such as festivals, cultural events, and recreational activities, offering more options to tourists.
- **Infrastructure Enhancement:** Urbanization can lead to improved basic infrastructure like roads, public transportation, and leisure facilities, enhancing accessibility and the appeal of destinations.

To mitigate the negative effects of urbanization and coastal development on tourist areas, a sustainable development approach is essential. This can involve:

- **Integrated Planning:** Incorporating environmental and social needs into urban planning to preserve natural spaces and ensure a quality tourist experience.
- **Regulations and Standards:** Implementing strict environmental regulations and standards to limit negative impacts and promote sustainable practices.
- **Waste Management:** Establishing efficient waste management systems to minimize pollution and environmental impacts.
- **Promotion of Sustainable Tourism:** Encouraging sustainable tourism practices, such as eco-friendly tourism, to reduce pressure on local resources.
- **Community Involvement:** Involving local communities in the planning and development process to ensure projects meet the needs and aspirations of residents.

In summary, the impacts of urbanization and coastal development on tourist areas in Sousse are complex and diverse. Careful and proactive management is necessary to maximize economic benefits while minimizing negative effects on the environment and the quality of the tourist experience.

The region of Sousse, with its rich history, beautiful beaches, and vibrant culture, possesses high attractiveness as a tourist destination. This allure has led to significant urbanization and development in the area. However, governing this urbanization process can be challenging due to various factors. Here are some key points regarding the high attractiveness and difficulty in governing urbanization in the Sousse region:

- **High Attractiveness**

- **Tourism Potential:** Sousse is renowned for its historical sites, including the UNESCO-listed Medina, Roman ruins, and medieval landmarks. The presence of beautiful beaches and a Mediterranean coastline adds to its allure as a coastal tourist destination.
- **Economic Opportunities:** The growth of the tourism sector brings significant economic benefits, creating job opportunities and stimulating local businesses and industries.
- **Cultural Heritage:** The region's cultural heritage and authenticity attract tourists interested in exploring the city's traditional lifestyle, crafts, and festivals.

- **Urbanization Challenges**

- **Environmental Concerns:** Rapid urbanization and increased tourist activities can exert pressure on the environment, leading to issues like habitat destruction, waste generation, and pollution.
- **Infrastructure Strain:** The influx of tourists requires adequate infrastructure, including transportation, water supply, waste management, and public services. Balancing these needs with maintaining the region's cultural identity and local way of life is essential.

- **Land Use Conflicts:** The demand for land for tourism and urban development may conflict with the preservation of agricultural lands and natural habitats. Balancing the needs of different sectors can be a complex task for urban planners and policymakers.
- **Legal and Regulatory Issues:** Ensuring effective and enforceable regulations to control urban growth and development while considering the interests of various stakeholders can be challenging.
- **Governance and Planning:** Integrated Planning: An integrated approach to urban planning that considers environmental, social, and economic factors is essential to manage urbanization effectively.
- **Sustainable Tourism:** Adopting sustainable tourism practices can help minimize negative environmental impacts and ensure the long-term viability of the tourism sector.
- **Stakeholder Engagement:** Involving various stakeholders, including local communities, businesses, and environmental organizations, in the decision-making process is crucial to achieve balanced and inclusive urban development.
- **Monitoring and Enforcement:** Regular monitoring and strict enforcement of regulations are necessary to manage urbanization in a controlled and sustainable manner.

In conclusion, the Sousse region's high attractiveness as a tourist destination has led to significant urbanization, bringing economic benefits and opportunities. However, governing this urbanization process presents challenges related to environmental protection, infrastructure development, land use conflicts, and effective planning and regulation. Addressing these challenges requires a holistic and participatory approach to ensure the region's sustainable and harmonious development for both residents and visitors.

III.2. Impact of urbanization on the ecosystem

Despite its appeal as a tourist destination, Sousse also faces challenges related to sustainability, preserving its cultural heritage, and managing environmental impacts. Balancing tourism development with the preservation of local identity and authenticity is crucial for the long-term success of the city's tourism industry.

Urbanization in Sousse has had several significant impacts on the ecosystem of the region. As the city experienced rapid population growth and increased urban development, various environmental changes have occurred, affecting both natural habitats and biodiversity. Some of the key impacts of urbanization on the ecosystem in Sousse are as follows (JLASSI et al., 2020):

- **Habitat Loss:** Urban expansion has led to the conversion of natural habitats, such as forests, wetlands, and coastal areas, into built-up spaces, roads, and infrastructure. This has resulted in habitat fragmentation and loss, displacing native plant and animal species.
- **Biodiversity Decline:** The loss of natural habitats and the fragmentation of ecosystems have contributed to a decline in biodiversity. Many species of plants and animals that once thrived in the region may struggle to survive or become endangered due to the loss of suitable habitats.
- **Pollution:** Urban areas generate various types of pollution, including air and water pollution. Increased vehicular traffic, industrial activities, and waste generation can lead to higher levels of pollutants, adversely affecting both terrestrial and marine ecosystems.
- **Water Quality:** The urbanization of Sousse has impacted the quality of coastal waters due to increased runoff from impervious surfaces, carrying pollutants and sediment into the sea. This can harm marine life and degrade water quality.
- **Climate Effects:** Urban areas, with their high density of buildings and concrete surfaces, can create “urban heat islands,” where temperatures are higher than surrounding rural areas. This can alter local weather patterns and exacerbate the effects of heatwaves.
- **Loss of Green Spaces:** Urbanization often results in the removal of green spaces like parks and gardens, which provide essential ecosystem services, such as carbon sequestration and storm water management.
- **Increased Waste Generation:** The growing urban population leads to a higher volume of waste generation. Improper waste disposal can contaminate the environment, including soil and water bodies.
- **Coastal Erosion:** The development of coastal areas for tourism and urban expansion can disturb natural coastal processes, leading to erosion and shoreline degradation.

III.3. Saturation of the tourism sector and loss of comparative competitiveness

After a period of rapid economic expansion fueled by the expansion of the tourism industry, the region of Sousse is today confronted with a number of difficulties that are all related to the issue of sustainability on both the socioeconomic and environmental levels in general and the saturation of the tourism sector in particularity.

The saturation of the tourism sector in Sousse refers to a point where the industry reaches its maximum capacity or experiences a decline in its ability to attract new visitors or sustain growth. When a destination becomes saturated with tourists and accommodation facilities, it may lead to several challenges, including the loss of comparative competitiveness.

Here are some key factors related to the saturation of the tourism sector in Sousse and its impact on comparative competitiveness:

- **Overcrowding:** As the number of tourists increases, popular tourist attractions and beaches may become overcrowded, leading to a less enjoyable experience for visitors and affecting the quality of the destination.
- **Price Pressure:** With more hotels and resorts in the market, competition intensifies, leading to price pressure on accommodation, food, and other services. This can negatively impact the revenue potential for tourism businesses.
- **Deterioration of Infrastructure:** A high number of tourists can put strain on local infrastructure, including transportation, waste management, and water supply, leading to deterioration and increased maintenance costs.
- **Environmental Impacts:** Mass tourism can have significant environmental impacts, including increased waste generation, pollution, and pressure on natural resources such as water and energy.
- **Decline in Authenticity:** As destinations become heavily developed to cater to tourists, there is a risk of losing the unique local charm and cultural authenticity that initially attracted visitors.
- **Seasonal Dependence:** The tourism sector may become heavily reliant on specific seasons or events, leading to a lack of diversification and vulnerability to fluctuations in demand.
- **Shift in Market Demand:** As new destinations emerge or preferences change, Sousse may face challenges in maintaining its competitiveness in the global tourism market.

It is very important to note that after numerous crises, mass beach tourism is still an insecure industry. The local economic system and urban areas in the location of our study, Sousse-Kantaoui, are clearly affected by the COVID-19-related health crisis that is currently roiling the region as well as prior political and security crises. (Hellal , 2021b).

The crisis has had a big impact on the tourism industry in addition to other industries like crafts and trade. We observe the closing of shops for craft companies or changes in their functions in the various tourist destinations in Sousse, including the medina, the city center, the cornice district, and all along the tourist road to reach El Kantaoui.

We observe two successful developments of urban luxury hotels at the level of the tourist sub-area of Sousse: Mövenpick and Marriot. The first hotel replaces the club Jawhra, which was entirely dismantled, and the second is the outcome of the hotel El Hana Beach's thorough renovation. Utilizing their urban position, these two worldwide companies are attempting to promote business stays and presenting seminars in venues prepared for such events (Dhia, 2017).

Other hotels are also transformed into Foyers similar to the "Roserie" brand. As a result, the "Panorama" hotel, which is set back from the shoreline and positioned in a very urban location, has changed its purpose to become Panorama medical. It is a

contemporary building with medical offices that collaborate with the clinic Essalem, which is situated across the street and a short distance from the academic hospital Farhat Hached (Figure 4).



Figure 4. The Panorama Hotel (a) before and (b) after conversion to a medical project (Essouaid, 2018)

In recent years, health tourism has emerged as a specialty industry in Sousse, taking use of the city's infrastructure and medical expertise. Additionally, we are seeing the emergence of specialized companies that create and promote pre-made and even tailored packages for these kinds of medical stays, including things like air tickets, airport reception, leisure activities and excursions, full-service medical treatment, etc.

Health tourism could emerge as a solution to the mass tourism crisis and help to rebuild the superstructure, particularly the abandoned tourist attractions. For this reason, abandoned hotels that have a flexible structure and are located in urban areas can be turned into clinics. In addition, Sousse, which already has two university hospitals, currently has seven private clinics.

To address the saturation and loss of comparative competitiveness, destination management strategies should focus on sustainable tourism development:

- **Diversification:** Expanding tourism offerings beyond the traditional sun and beach model to include cultural, adventure, and eco-tourism can attract a wider range of travelers and reduce dependence on seasonal demand.
- **Quality Over Quantity:** Focusing on providing high-quality services and experiences can attract discerning travelers and help maintain higher prices.
- **Sustainable Development:** Implementing eco-friendly practices and responsible tourism initiatives can mitigate the environmental impacts of mass tourism.
- **Market Research:** Continuous market research and understanding changing consumer preferences can help identify emerging trends and adapt marketing strategies accordingly.

- **Stakeholder Collaboration:** Engaging with local communities, businesses, and government entities to align interests and foster a sense of ownership in the sustainable development of the tourism sector.

By adopting sustainable practices and fostering collaboration, Sousse can manage the saturation of the tourism sector while preserving its appeal and competitiveness as a preferred destination for travelers.

III.4. Risks of sea pollution and climate change

The Sousse-Monastir coastline, which is part of the eastern coast of Tunisia, is the seat of increased urbanization and tourist activity that have led to its weakening and the decline of its coast line in most of this sector. Indeed, it has experienced a significant expansion of urban and industrial areas (Sousse Sud), an intensification of the construction of hotel units (Dkhila) and port arrangements that have largely contributed to its degradation.

Massive urbanization and the intense occupation of tourist facilities has caused the almost complete destruction of the coastline, with a restriction of the width of the beaches to less than 10 meters in some places (compared to 20 to 100 meters further north of the Grand Sousse region).

Urbanization has sometimes extended to the dependencies of natural spaces and the Maritime Public Domain and has thus led to the destruction of the Danube cordons, the imbalance of coastal systems and the depletion of beaches. In addition, the beaches, mainly that of Boujaâfar, are over-exploited during the summer season and exceed their maximum accommodation capacity. They only offer an area of 4m² per summer while the Tunisian standard sets it at double. The beaches also face a problem of pollution due to accumulated waste, which leads to a deterioration in the quality of sea water.

The spread of urbanization on the coasts combined with the DPM invasion created an imbalance between proportions in protected sites and artificialized territories. This significantly reduces the attractiveness of the city. Residents and tourists are lacking places to relax. Finally, the algal explosion at the level of some seaside sites creates more and more healthy bathing conditions and helps to reduce the attractiveness of the beaches.

The high concentration of urbanization on the coastal façade, making it difficult to arrange and install stations and purification equipment (land availability,...). For example:

- In the Chott Meriem area the sanitation problem is a consequence of the very large difference between the volume of effluents in summer (very strong beach point) and winter on the one hand,
- The fragility of the marine environment and the difficulty of finding the land reserve to eventually implant a STEP there on the other hand, leading to imagining connections to the peripheral sites.
- The existence of anarchic occupations in some neighborhoods

- The problem of rainwater, which requires a separate, specific and adapted sewerage to the local context, which is not the case on the whole territory.

On the other hand, wastewater treated by the ONAS does not always find the right way out. For example, the Oued Hallouf is currently a drainage channel for treated wastewater from the Sousse Sud treatment plant. This same stream is prone to the flooding of raw waste water from pumping stations, especially during periods of heavy rains and travels through the city of El Matar receiving large amounts of household and animal waste. The oued Hallouf is directed to the sea at the level of the Gaied Souassi beach, causing pollution making the beach unfit for swimming. A problem of water stagnation, carrying bad smells, is observed at the lower course of the oued.

In addition, the rainwater network suffers for its part from malfunctioning problems, in terms of its maintenance, healing and cleaning. During rainfall, all the pollutants collected at the network level are sent to the sea.

It should also be noted that the problem of water scarcity, in fact the over-exploitation of the different waters of the Sahel, is responsible for increasing the degree of salinity of the waters, and sometimes the intrusion of sea water, so that water resources become increasingly inexhaustible. This problem especially affects waters near wetlands. (Sidi El - Hani, Kelbia, etc.). Deep freatic wells are under significant pressure; a problem that has taken alarming proportions especially after 2011, due to the increase in the number of clandestine wells.

Also, climate change is one of the major environmental problems affecting the entire country and Sousse. In fact, the majority of studies that have dealt with this subject have demonstrated that the southern Mediterranean area is most affected and it will become increasingly sensitive. The main effects of these phenomena are rising temperatures, decreasing average precipitation and rising sea level.

III.5. The effect of urbanization on the territorial system

Urbanization, driven primarily by tourism development and population growth, has transformed the region's spatial organization, land use patterns, and overall territorial dynamics. Here are some key effects of urbanization on the territorial system in Sousse: (Ministry of tourism, 2016)

- **Land Use Changes:** Urbanization has led to the conversion of agricultural lands, natural habitats, and open spaces into built-up areas, such as residential neighborhoods, commercial zones, and tourism facilities. This change in land use has altered the landscape and disrupted the balance between urban and rural areas.
- **Urban Sprawl:** The expansion of urban areas has often occurred in a scattered and unplanned manner, resulting in urban sprawl. This phenomenon leads to low-density development, increased infrastructure costs, and fragmented ecosystems.

- **Transport Infrastructure:** Urbanization has necessitated the development of transport infrastructure, including roads, highways, and public transportation systems. This can lead to changes in traffic patterns and the spatial organization of the region.
- **Environmental Impact:** The rapid urbanization has put pressure on the environment, leading to issues such as habitat loss, soil degradation, and increased pollution, particularly in coastal and sensitive ecological areas.
- **Socioeconomic Disparities:** Urbanization can exacerbate socioeconomic disparities, with wealthier neighborhoods often concentrated in urban centers while lower-income communities reside in peripheral areas with limited access to services and amenities.
- **Heritage and Cultural Preservation:** As urban areas expand, there may be challenges in preserving the region's cultural heritage and historic sites, especially in the face of modern development.
- **Urban Services and Infrastructure:** Meeting the demands of a growing urban population requires adequate urban services and infrastructure, such as water supply, sewage, waste management, and healthcare facilities.
- **Land Use Conflicts:** The competition for land between urban development, agriculture, and conservation can lead to conflicts over land use and create challenges for urban planners and policymakers.

To manage the effects of urbanization on the territorial system in Sousse, strategic planning and sustainable development practices are essential:(MILIL, 2016)

- **Integrated Urban Planning:** Adopting integrated and comprehensive urban planning approaches that consider social, economic, and environmental factors can help guide urban growth in a more sustainable manner.
- **Sustainable Urban Design:** Emphasizing compact and mixed-use urban design can reduce urban sprawl, minimize the ecological footprint, and promote walkability and public transportation.
- **Green and Blue Infrastructure:** Protecting and enhancing green spaces, parks, and coastal zones can provide ecological benefits, improve residents' quality of life, and preserve natural habitats.
- **Community Engagement:** Involving local communities in the planning and decision-making processes ensures that their voices are heard, and their needs and concerns are considered.
- **Smart Growth Strategies:** Implementing smart growth principles, such as infill development, transit-oriented development, and brownfield redevelopment, can optimize land use and resource utilization.

By balancing urbanization with sustainability, Sousse can foster a more balanced territorial system that supports economic development, preserves the environment, and enhances the overall well-being of its residents and visitors.

IV. Future trends in urbanization and littoralization

IV.1. Demographic dynamics

According to the National Institute of Statistics (INS), in 2014, the Grand Sousse was characterized by 2 large population groups. On the one hand, the delegation of Msaken, which has more than 100,000 inhabitants and which brings together the 2 municipalities of Messaadine and Msakén (with the peripheral localities). The city of Sousse, composed of the 3 delegations of Soussa Medina, Sousse Jawhara and Sousse Sidi Abdelhamid and part of the delegation of Sousse Riadh (amputated from the Ezzouhour sector). In 2014, the municipality of Sousse had 221715 inhabitants, or more than 35% of the total population of Grand Sousse (Table 5).

Table 5. Demography indicators of the population by delegation in the Governorate of Sousse (Atlas, 2021).

Delegation	Male Population	Female Population	Total Population	Number of households	Illiteracy rate (10 years and more)	unemployment rate
Sousse City	17,632	17,656	35,288	10,542	8.36	9.53
Sousse Jawhara	43,080	43,437	86,517	24,033	7.45	13.92
Sousse Sidi Abdelhamid	26,746	26,041	52,787	12,969	13.99	18.77
Sousse Riadh	33,114	31,418	64,532	16,868	6.92	19.37
Zaouiet-Ksibet-Thrayet	16,384	15,920	32,304	12,969	14.9	8.88
Hammam Sousse	21,359	21,332	42,691	12,516	8.43	13.03
Kalaa Sghira	19,200	18,597	37,797	9,430	12.86	12.02
Akouda	17,475	17,019	34,494	8,604	10.27	10.83
Kalaa Kébira	30,141	28,991	59,132	14,229	17.7	15.32
Msaken	47,447	49,778	97,225	14,229	27.48	9.76
Hergla	4,714	4,629	9,343	2,287	17.07	21.25
Sidi Bou Ali	9,930	9,763	19,693	4,868	19.13	13.22
Enfidha	24,799	24,536	49,335	10,763	21.11	25.43
Bouficha	13,484	13,279	26,763	6,194	21.94	19.27
Sidi El Hani	6,520	6,985	13,505	2,986	27.48	12.3
Kondar	6,847	6,718	13,565	2,834	28.17	18.59
GOVERNORATE of SOUSSE	338,872	336,099	674,971	171,114	13.44	11.47

VI.2. Prospects for urbanization of the Sousse region

The legal frameworks related to urbanization and coastal developments in Sousse are essential for regulating and guiding sustainable urban and coastal development. These legal frameworks aim to preserve the environment, ensure efficient use of resources, and enhance the quality of life for residents. Here's an overview of the relevant legal frameworks in Sousse concerning urbanization and coastal development: (Tunisian Ministry of Equipment, 2006)

IV.2.1. National and Regional Legislation

Land Use and Urban Planning Code (CATU): It establishes rules and procedures for urban planning, land management, and land use. It may include specific provisions for coastal areas.

Coastal Protection Law (2004): This law aims to protect coastal areas by regulating construction and development activities in these sensitive zones.

Urban Development Plans (PAU): These plans, approved by local authorities, define urbanization guidelines and construction standards for each area of the city, including coastal zones.

IV.2.2. Environmental Regulations

Environmental Protection Law (1991): This law establishes principles for environmental and natural resource protection, and may include specific provisions for coastal areas and marine ecosystems.

Environmental Impact Assessments (EIA): Development projects, especially those in coastal areas, may require EIAs to assess their potential impacts on the environment.

IV.2.3. Building and Land Use Standards

Specific building and land use standards dictate building heights, population densities, areas reserved for conservation and green space, and minimum distances from the coast.

IV.2.4. Regulatory and Enforcement Bodies

Ministry of Equipment, Housing, and Territorial Development: Responsible for developing national land use and urban planning policies.

Coastal Protection and Development Agency (APAL): Responsible for ensuring the implementation of the coastal protection law and regulating coastal activities.

Local Authorities: Local and municipal governments play a crucial role in enforcing regulations and urbanization plans at the city level.

In summary, the legal frameworks related to urbanization and coastal development in Sousse encompass laws, regulations, and specific plans designed to guide sustainable urban and coastal growth, preserve the environment, and maintain the quality of life for residents and visitors. Effective enforcement of these frameworks requires cooperation among governmental agencies, local authorities, and private sector stakeholders to ensure balanced and responsible growth.

A little more than three years ago, the State Secretariat for Economic Affairs (SECO) of the Swiss Confederation and the municipality of Sousse jointly launched the Integrated Urban Development Programme (PDU) of the city of Sousse to assist the latter in putting its policy on urban planning, mobility, sustainable energy management, and the creation of cutting-edge Geographic Information Systems (GIS) into practice.

The following studies have been conducted in the four distinct parts of this program:

Urban planning includes the following:

- An update to the urban development plan (UDP)
- A strategy for public areas

Mobility: A Greater Sousse Urban Transport Plan (UTP) for 2030

- An ECS for Traffic and Parking

Energy: An assessment of the municipal assets' energy use

Geographical Information

V. Impacts of urbanization and littoralization on the coastal/maritime environment

V.1. Impact of urbanization on the region of Sousse ecosystem

Massive urbanization and the intense occupation of tourist facilities has caused the almost complete destruction of the coastline, with a restriction of the width of the beaches to less than 10 meters in some places (compared to 20 to 100 meters further north of the Grand Sousse region).

The Sousse-Monastir coastline, which is part of the eastern coast of Tunisia, is the seat of increased urbanization and tourist activity that have led to its weakening and the decline of its coast line in most of this sector. Indeed, it has experienced a significant expansion of urban and industrial areas (Sousse Sud), an intensification of the construction of hotel units (Dkhila) and port arrangements that have largely contributed to its degradation (Widz et al., 2020).

Urbanization has sometimes extended to the dependencies of natural spaces and the Maritime Public Domain and has thus led to the destruction of the Danube cordons, the imbalance of coastal systems and the depletion of beaches. In addition, the beaches, mainly that of Boujaâfar, are over-exploited during the summer season and exceed their maximum accommodation capacity. They only offer an area of 4m² per summer while the Tunisian standard sets it at double. The beaches also face a problem of pollution due to accumulated waste, which leads to a deterioration in the quality of sea water (Thèse de Doctorat , Houimli, 2008)

V.2. Over-exploitation of beaches

Tourism has intensified the use of the seafront by installing the various equipment and exerts a noticeable pressure on the beach. In addition, some beaches, such as the one in Boujaâfar, are frequented during the summer period. The frequency of this central beach exceeds its maximum capacity. It offers a space of 4m²/stift, whereas the Tunisian standard sets this value at 8m/stift. This phenomenon is usually accompanied by an increase in discharges of all kinds that accentuate signs of coastal instability (Essouaid et al., 2017).

A major artificialization on a limited territory and invasion of the Maritime Public Domain (DPM); 31% of the building of the municipality of Sousse is concentrated on a 1 km strip of coastline, however this band represents only 17.7% of the communal territory. In addition, the southern part of the coastline of the city of Sousse has been the subject of anarchic urbanization. Buildings and housing have proliferated heavily down the border dune, thus exceeding the limits of the DPM.



Figure 5. Over-exploitation of Sousse beaches

VI. Conclusion

Among the coastal areas of eastern Tunisia, Sousse is distinguished by the advantages and constraints of its insularity. This region has, in common with the eastern coast of Tunisia, the age and the intensification of the development of local resources, but differs from it in the fragility of the region ecosystem in the face of increasingly intense development activities. The limited resources of a small island space and the increased density of people and activities based on the exploitation of the resources of the coastal ecosystem are the main constraints on the sustainable development of Sousse.

We are about to witness a significant transformation in the character of the area. From its predominantly rural and natural state, the region will undergo a major shift towards becoming a bustling urban conurbation and a significant economic hub. However, this transition will subject the area to intense pressure on its natural, agricultural, and urban resources. Without appropriate supportive measures, there is a real risk of urban “dystrophy” looming over the region, which could impede its economic growth and hinder social development. Initial projections estimated a land use of around 6,000 hectares, which would exert significant pressure on soil resources and create conflicts with agricultural use. To address this, revising the projections indicates a reduced need of between 1,000 and 1,400 hectares of land for urban use. These adjustments help alleviate pressure on the soil and allow the region to stay within the limits of the new PAUs (Planned Areas of Urbanization) of the existing municipalities (Hergla, Bouficha, Enfidha). (Hellal et al., 2023)

While the Development Master Plan and the Urban Development Plan are necessary, they alone are insufficient to cater to the influx of populations in our region. It calls for the implementation of a short-term urban coherence plan that defines suitable reception areas and the necessary facilities to be developed, such as transportation, drinking water supply, waste treatment, etc. Additionally, integrated housing programs that cater to the needs and financial capacity of the newcomers are crucial.

To ensure sustainable urbanization, a phased approach to development is essential. This will help minimize pressure on land and resources and allow for a gradual and strategic allocation of public investments in infrastructure and amenities. Haut du formulaire

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