

# The Agricultural Landscape of Sahel Bizertin: A Heritage in Peril



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**Abstract** The present work focuses on illustrating the environmental consequences of the development of urbanization on the agrarian landscape of the Tunisian coast. It will be initially to show how this landscape is singular and evaluate in a second time the impact of rapid urbanization on the transformation of coastal agricultural space. Until they become a territory coveted by vacationers. The small towns of the sahel Bizertin have evolved in a very slow way because they are enclosed between the sea on the one hand and hills or mountain of one other. That developed an original form of appropriation of farmlands in the form of small plots of land dedicated to the cultivation of cereals, the arboriculture, the truck farming and the small breeding. The originality of this system comes on the one hand, to its vicinity with the mouth Oued Medjerda, the country's most important waterway but with a peasant genius that has developed a natural environment whose formation and evolution are a unique case in Tunisia. This is necessary to know, a culture that has largely contributed to shaping the landscape of this region, which, in view of its practices, will have given this region a character and an identity. These singular landscapes today suffer from the new pressure exerted on the land by the vacationers who chose this area as a new seaside place. The resulting pressure of urbanization will only aggravate the deterioration of this agrarian system and therefore cause degradation of the coastal landscape in the region. We are now entitled to ask about its future. It will then be necessary, inevitably, to de-encrypt this mixed landscape to identify the values and to determine the management strategies and its conservation and to find the means of adapting it to contexts in permanent evolution.

**Keywords** Agrarian system · Singular landscapes · Identity · Patrimonial · Gattayas · Urbanization

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## 1 Introduction

The knowledge of landscapes as a value has become very distinctive and topical in the last decades. The landscape with harmonious and consistent relations between human activity and preserved nature is an essential competitive advantage. A recognisable outstanding landscape presents above all the identity of a certain area at different levels. The treatment of the landscape also depends on the attitude of society towards it, thus influencing the state and image of landscapes and the quality of our life [1].

The recognition of the agrarian landscapes of the Bizerte Sahel region must be reflected in its characteristic climatic conditions, its ecosystems and its typical vegetation. The climate and the terrain influence the diversity of the coastal landscapes. Geological diversity and diversity of landforms create a wide variety of land use, spatial orientation, and hydrology. In the Bizerte Sahel agriculture has largely contributed to shaping the landscape of Ghar El Melh [2]. Through its practices, it has given this region, known for its agrarian landscapes, a character and an identity. This region, today, its farmland is declining, especially on the banks of the lagoon. This regression leads to a decrease in agricultural surfaces and an irreversible change in its exceptional landscape [3].

The chapter aims to show the singularity of agrarian landscapes of the Sahel of Bizerte and to evaluate the landscape and environmental consequences of the development of the resort in the countryside.

## 2 The Sahel Bizertin: A New Contemporary Resort Area

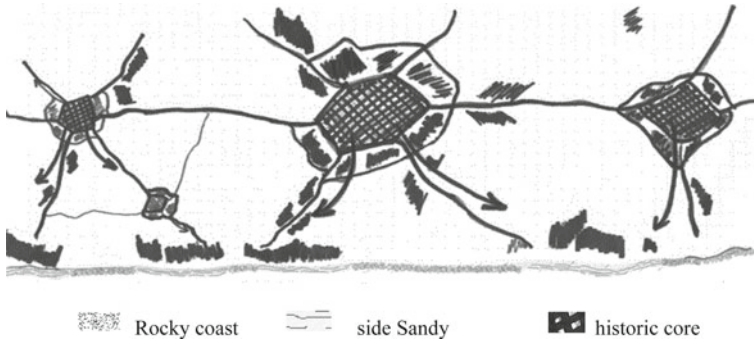
### 2.1 *Presentation of the Site*

The Sahel of Bizerte is located about 60 km north of the capital Tunis.

It is a coastline stretching over 36 km, ranging from Ghar el Melh to Cap Zebib and passing through RAF-RAF, Renin, Ras Jebel and Chott Memi (Bani Ata) and Metline (Fig. 1).

The region lies at the end of the Atlas mountain range, offering a variety of landscapes: Lagoon Coast to Ghar El Melh followed by fine sand beaches and rocky shores to the south, all bordering a narrow strip limited by a mountainous terrain to the north [4]. The coastline of the Sahel of Bizerte is a unit of remarkable landscapes scarred by the know-how of peasants of Andalusian origin. The landscape is marked by a rocky spur and especially by the oued Medjerda, who created a Lake enclosed by an arrow natural [4]. The artificial boom, drawn by the peasants, delimits a lagoon which each acre of land is cultivated uniquely. This natural site and rural landscapes, reflecting the Andalusian traditions are currently threatened by the phenomenon of development of the secondary residence and that of the orbiting of the cities of the Northeast small and medium at 30–40 and 60–70 km from Tunis [5]. This chapter





**Fig. 2** Schematic representation of the urban development of the four localities of the Sahel bizertin

region shows that homes appear—feel there where there is a sandy coast and go where there appears a rocky coast (Fig. 2).

In the Middle, the town of Ras Jebel, growing in the direction of the sea to the Chott Memi Beach, left the city of Raf–Raf with development of two seaside districts: one at Raf–Raf Beach and the other at Ain Martin, who joined the seaside neighborhood of Sounine. Finally on the right, the city of Metline who also sees the birth of a seaside neighborhood through a sandy coast. Seaside urbanization expands to the time near the beaches avoiding the cliffs and rocky coasts.

If this phenomenon of the resort is spontaneous, that the reorganization of the entire region of Bizerte in metropolization of greater Tunis area is programmed. As the master plan for development of the National territory: “The central objective is firstly to succeed the metropolization” and the master plan for and use planning of the great Tunis (SDAT), which says “metropolisation would defer on peripheral cities some of the growth and public investment”.

### 3 The Traditional Agricultural Landscapes of the Sahel Bizertin (Identity)

The Sahel of Bizerte is rich in heritage and landscape identity reflecting the evolution of the human occupation of the territory. The heritage value of the landscape is mainly due to the time some. It gives an account of the mode of development of that time which based on various elements: the fragmented agricultural rural, village, the port and the fortresses kernels Street frame. Land of the permanent agricultural zone on the edge of the lagoon and the terraces watching, even today, the Andalusian cutting originated at the beginning of the seventeenth century [13]. Farmland, the ranks and upgrades make a frame adapted to the morphology and geography ground on which is based the development of smaller village centers. Gradually, small communities formed leading to the creation of municipalities.

To study the singularity of this agricultural system and the landscapes that result, we choose two localities based on the administrative page discovered:

- The community of Ras **Jebal**: In this community, the choosing place the Raf–Raf city.
- The community of **Ghar El Melh** who the city of Ghar El Melh will be a support of analyse.

### ***3.1 The Gattays of Ghar El Melh***

Ghar El Melh, formerly known as Porto Farina, is a coastal north of the Tunisia, living the fishing, agriculture and known for its historic site and its beach village. It is located at the bottom of the lagoon bearing his name [3]. The lagoon is a body of water of 30 km<sup>2</sup>. It consists of the basin of Ghar El Melh, Sebkheth El Ouafi and Sebkheth Sidi Ali El Mekki isolated by a coastal boom and relayed by marshy Islands. Powered by the flooding of the oued Medjerda, the large body of water is dominated, on the side North by the jbel Ennadhour. Two arrows bound the central part of the lagoon: an artificial to the West and the other natural East. Between the Lake and the mountains spread agricultural land. These small parcels receive different cultures: grain, arboriculture, gardening and small livestock. Enclosed between the sea on the one hand and the mountain on the other hand, the city extends about 500 m wide. These two natural limits are that the land has a very high value. What has also developed an original form of appropriation of farmland and worked in different ways by farmers.

Thanks to the patient work of amendment of the salty soils and freshwater runoff collection (Fig. 3). The slopes are landscaped terraces of arboreal culture. The edges of the lagoon grown in gardens market gardeners, while on the arrow artificial, formed by a daily intake of baskets of Earth, residents, Andalusian origin, won a polder protected hedgerows of Palms where the crops are protected by media carefully aligned reeds. This old complementarity between agricultural and fishing association shows a remarkable ability to organize the space.

The originality of this system is on the one hand, its proximity to the mouth of the Wadi Medjerda, the largest rivers of the country and on the other hand, the peasant genius who was able to highlight a natural mid-rise whose training and evolution are a case unique in Tunisia [14].

Installation of the Andalusians in the region at the beginning of the seventeenth century and later decline and shutdown of the race are the origin of a very intensive earned both local operation on the mountain and the sea. “The Andalusian science of gardening” more enriched in the nineteenth century in contact with Maltese immigrants who developed the construction of terraces of cultures and continued to expand arable land at the expense of the lagoon of Ghar El Melh and the old arrow Edhrea and El Gattaya [15]. Very low, the banks of the lagoon of Ghar El Melh are almost all bordered by marshy spaces sometimes very extensive. It is especially the north-eastern sector of the lagoon that attracts the most attention with the gardening system

**Fig. 3** Carefully worked agricultural parcels, today threatened with disappearance at the urging of the cottagers on land to build

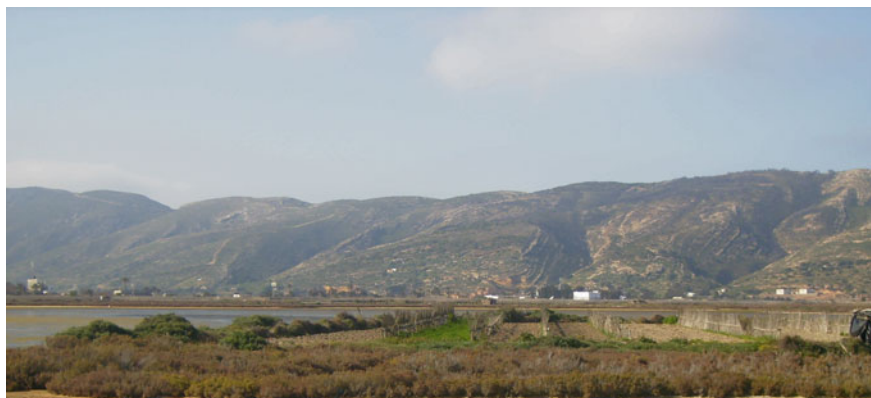


that there is practiced: a multitude of tiny farms, gardens very carefully soul swum called the Gattayas (Fig. 4).

The Gattayas show today a unique knowledge to the ecosystem of Ghar El Melh. These spaces of culture attest to an old tradition, which operates a deep knowledge of the behaviour of the freshwater in the coastal and marine environment for agricultural purposes. The surface of farms is conquered with contributions of land spread and regularized to a carefully calculated altitude. The obtained soil must have a thickness such that the roots of the plants that are growing can escape salt water but benefit



**Fig. 4** The singularity of the place: the lagoon in gardens by fishermen-peasants, March 2016



**Fig. 5** Aerial view of the organization of the Gattayas

from the movement of fresh water from the water table. Located a few Decimeters of depth, this tablecloth is subjected to a vertical swinging in connection with the variations in the level of the Lake as a result of a semi-diurnal tide and 20 cm of amplitude. Cultivated plants benefit of moisture from the ground or even naturally irrigated, down, twice a day.

This “meticulous gardening”, on the edge of the lagoon, is at the origin of a unique landscape of gardens, tiny, very neat and sometimes lost in the middle of the marshes [10]. Farmers cultivate all types of vegetables on nearly 8885 hectares in total. Also, the borders of Lake and coastal belts was filled and covered sand desalinise and fertilising elements including organic fertilisers; These new lands gained at the expense of the sea have been subsequently used as gardens (Fig. 5). V. Guerin, who visited the city in 1860, maintains us “these rich and laughing orchardsextending on the edge of the Lake and at the foot of the mountain, and even the coastal belts, gardens planted of olive trees, fig trees, almond trees and several other trees” [16].

### ***3.2 The Planted Terraces of Raf–Raf and the Mixed Cultures of Sounine***

The site occupied by the city of Raf–Raf is characterized by a topography that is diverse, including hills and narrow Plains. The historic core of the town occupies a slope of a hill overlooking the sea unlike the other localities of bizertin Sahel that turns its back to the sea. The traditional Center of the city is connected to Headquarters Raf–Raf Beach by an old road that goes down to the sea and following a steep slope. This topography is, according to Mourad Ben Jaloun, one of the factors that don’t have much favored the development of human installation on the seafront, despite the existence of a former group of habitation in the area called Dhar-Ayed [3]. The reason also according to Pierre Signoles abreast than Tunisian ancient cities are often



**Fig. 6** The sides worked in terraces to Raf Raf to Sahel Bizertin

little fertile land. In this way and since the slopes leading down to the sea were very fertile, they were reserved for agricultural activities.

Raf–Raf is characterized by precarious of terroirs specializing in viticulture. She is known for its Muscat grapes produced by of extensive vineyards planted in terraces (Fig. 6). These vineyards, which have Mediterranean fame, formed a Crown around the historical core of the city extending to the shore of the sea [17]. This culture on the terrace was probably developed by Andalusian immigrants [18].

Between the Lake and the mountains stretch—transversely from the ground—dependent agricultural land in the city. Plots are parallel to the contour lines structures and receive diversified cultures: gardening, arboriculture, grain and small livestock. The action continues to man since the eighteenth century, to extend surfaces cultivated at the expense of the mountain, has shaped the landscape around the town. Thus, the land was torn off in the mountains, by his side terraced landscaping, creating cultures in floor performed by built-in stone retaining walls. These cultures extend up to a level high enough on the side and are mostly arboreal plantations.

The Bay of Raf Raf is made of reliefs low and scenery to the fields sometimes open, sometimes closed, but always carefully and intensely cultivated. Agriculture benefits from the presence of a shallow water table and several hillside dams. Gardens all around each town are trussed intensive cultures both dry (olive trees, almond trees, fig trees, ...) and irrigated (gardening). However, each region natural conditions allowed a certain specialization of terroirs: potatoes in Ghar el Melh, olive trees in El Alia, citrus Sounine and vines of the table to Raf raf (Figs. 7 and 8).





**Fig. 7** The Bay of Raf Raf carefully and intensely cultivated



**Fig. 8** The Sahel bizertin gardens: the cutting geometry of small plots cultivated with care. *Picture* The Atlas of Tunisia

#### **4 Deterioration of the Agrarian System and Degradation of the Coastal Landscape Generated**

This specific agricultural territory becomes part of the area of Metropolitan solidarity of Tunis where the farmer controls less and less agricultural activity and where the nibbling of the agricultural space is achieved through the diversion of land to the urban speculation more remunerative [19]. Among the problems of the villagers in the Sahel of Bizerte, the estate subdivision of parcels is a challenge illustrated by the report of the size of the population to the agricultural land, in Ghar El Melh, for example, each has only 0.5 ha. If this little island of land has still to be divided

between the heirs, it is clear that the new generation leaves the land. Urban expansion is especially carried out at the expense of farmland by permanent snacking. Also, development of land speculation resulted in the expansion of abandoned land. Small farmers who hold the microparcelles, especially in close to the beach, to abandon their activities pending a lucrative sale.

Today several agricultural parcels are missing and have been replaced by homes. Cultures in terraces leading down to a long fringe of the beach are coming out say despite the situation of this space outside the municipal scope. These very steep inaccessible terraces to the classic mechanization were long worked by hand. Today, there are few farmers who maintain these terraces manually. The spatial expansion of the resort, which now continues at a high pace, generates more and more environmental problems (Ministry of Equipment, Housing and Territorial Development/DGAT/Urbaconsult-URAM-BRAMMAH [20], study of the Master Plan of Greater Tunis, final report, January (the source is in French)). This growth has touched all side that has experienced an accelerated development concentrated on the coastal strip, which led to profound changes in the landscape and a nibble of farmland. This damage is amplified by the advance of second homes. The extension is done on fertile farmland to urbanization. One of the major problems in this region also concerns the excessive fragmentation of properties related to the dominance of private ownership. Although agricultural land often remains the property of the same family, the excessive land fragmentation causes many problems in agricultural activity in the region of the regulatory construction.

## 5 Discussion

Farmers in the Sahel of Biezrte suffer today the new pressure exerted on their land by beachgoers who chose this location as a new seaside place. The pressure of urbanization resulting will worsen the situation of the deterioration of the agrarian system and therefore cause the degradation of the coastal landscape in the region. Today, we are entitled to wonder about its future. Urban sprawl throughout the Sahel of Bizerte especially carried out at the expense of farmland by permanent snacking. Also, development of land speculation resulted in the expansion of abandoned land. Small farmers who hold the can, especially in close to the beach, to abandon their activities pending a lucrative sale. The locality of Ghar El Melh knows in the summer an increase considered-able in the number of its inhabitants more than 30,000 people flowing daily to the seaside neighborhood according to local estimates. The important extension of 1' built-up area is 1' origin of the pollution of the environment and including the beach and the forest. Also, groundwater from shallow waters suffers from over-exploitation of renewable resources [6]. The I-safe have been adopted in the planning regulations, which are added to older protections on the coast, to those of the so-called national law "law coastline" as well as the protection of a large part of Sidi Ali El Mekki in respect of sensitive areas. Despite these measures, the construction of secondary residence continues and local authorities resign themselves

to let. The extension of the urbanization in Ghar El Melh and regression of coastal farmland translates a urban duplication and a linear stretch of beachfront buildings. This phenomenon tends to the standardization of coastal landscapes and causes an intensification of coastal space that is gaining more and more the hinterland. Indeed, the proliferation of homes does not grow only Ghar El Melh. In nearby locations, the phenomenon began since the years eighty. A Raf–Raf, the precarious balance that characterized the operating system has been broken following the demise of the terroirs specializing in viticulture. The extension of the resorts is still spontaneously resulting in serious degradation of the quality of public space. Thus, urban expansion on the coast occurred also at the expense of farmland, which pushed many farmers, who hold the microparcelles to abandon their activities pending a lucrative sale. The consequences of no action to preserve the sustainability of natural resources and sustainability of regional agriculture would be serious as well at the local level, regional and national levels. The projection of the current trend shows that the degradation of soils, of vegetation cover in hydro infrastructure and availability reduction of irrigation water would be such as production systems can no longer continue to exist and farms can no longer withstand the regression of the ac-agricultural activities and because of the decline in their income. Thus, the situation in the medium and long term would be characterized by a worsening of the risk of non-sustainability of farming with inevitable repercussions at economic and social level.

## 6 Conclusions

Throughout this article, we have shown that the interest of the agricultural landscapes of the Sahel of Bizerte is not limited to the fact that they offer a remarkable aesthetic beauty. We have also been able to show that the key to the preservation of an agrobiodiversity an overall meaning and present a valuable cultural heritage, but they also provide sustainable multiple solutions related to work, to food and to the well-being of farmers.

Although in most countries of the world, modernity has been characterized by process of cultural homogenization and economic, in many rural areas specific cultural groups are still associated with a geographical context and social in which there are special forms of agriculture. Dynamic conservation of these sites and their cultural identity may be the starting point for territorial development and social and cultural renewal.

Agriculture in small towns can participate today in the construction of a sustainable city if it ensures “good, healthy, sufficient and sustainable food” [21] and it participates in improving the environment. Life as well as adaptation to climate change through the practice of ecological principles and can thus become a technical solution that reduces the effect of “heat islands” [22]. The generalization of the

concept of sustainable city can thus generate an update of the city-agriculture links which must imperatively involve the local communities [23].

### Recommendations

It is essential today to involve the local community in local government. With the new direction taken by the Tunisian government in 2018, promoting decentralization, it is necessary to involve the population for a participatory approach.

The local government to support by the participation of the population can prove the solution for the future and the safeguarding of the agricultural lands of Ghar El Melh.

### References

1. Nicolas S and al (2014) Heritage to the rescue of family farmers? *Mediterranean lighting revue tiers monde* 2014/4 (n° 220), 137–158. <https://doi.org/10.3917/rtm.220.0139>
2. Oueslati A (2010) Beaches and urbanization in Tunisia: avatars of the twentieth century experience to the uncertainties of the future. *Mediterranean Geogr Rev Mediterranean Countries* 115:103–116 (the source is in French)
3. Gafsi SA (2008) In: El Melh G (ed) *Heritage development and cultural promotion agency, Tunis* (the source is in French)
4. Jallel A (2008) *The landscape atlas of Tunisia* (the source is in French)
5. Hbib D (2010), “Interface Logic and Globalization: Levers of the” Emerging Metropolitan Region “of Tunis. In: Dlala H (ed) *Globalization and urban change. CPU, Tunis*, pp 7–36 (the source is in French)
6. Oueslati A (2017) Urbanization, tourism development and erosion of beaches in the southern shores of the Mediterranean. In: *Proceedings of the 3rd symposium space of action, space in action: The Mediterranean at the invitation of geography: [http://www.wadi.unifi.it/Oueslati\\_2017.pdf](http://www.wadi.unifi.it/Oueslati_2017.pdf)* (the source is in French)
7. Oueslati A, Labidi O, Elamri TH (2015) *Atlas of the vulnerability of the Tunisian coast to sea level rise. APAL- UNDP*, 67 p
8. Oueslati A, Ouadii El Aroui O, Sahtout N (2015) On the great vulnerability of the lido of the lagoon complex of Ghar El Melh and its wetlands (northern Tunisia): erosion, risk of maritimization and threats to the original Ramli terroir. *Rev Médit*
9. Amor M (1994) Tunisian coastal towns and the peripheral agricultural area. In: *Review of the association of Tunisian geographers*, n° 12 and 13, pp 28–30 (the source is in French)
10. Victor G (1862) *Archaeological trip in the Regency of Tunis*. H. Plon, Paris, T. 2, and François Bournand, *Tunisia and Tunisians*, by Paris: A. Taffin-Lefort, 1893 (the source is in French)
11. APAL-UNDP (2012) *Study of the vulnerability map of the Tunisian coast due to climate change. Final report Phase I*, 402 p (the source is in French)
12. APAL-UNDP (2012) *Study of the vulnerability map of the Tunisian coast due to climate change. Final Report Phase II*, 189 p. *Encyclopedia Universalis Dictionary* (the source is in French)
13. Paul S (1998) *Tunis: history of a city*, Paris: L'Harmattan (the source is in French)
14. Saadaoui A, Djelloul N. *Ghar el Melh: a Tunisian port city of the seventeenth century*. *Africa XV*. 200 (the source is in French)
15. Ameer O, Charfi F, Baccar F (2006) The lower valley of Oued Majerda and the Ghar El Melh lagoon. In: *International Meeting INCO-CT-2005–015226. Tunis; December 6–7–8–9* (the source is in French)

16. Mourad BJ (1996) Raf-Raf: new spatial dynamics of a small town in the Bizerte Sahel. *Tunisian J Geogr* 30 (the source is in French)
17. Angles S (1996) Les aspects récents de la viticulture tunisienne. In: Le Gars C, Roudié P, de Lemps AH (eds) *Des vignobles et des vins à travers le monde, colloque tenu à Bordeaux les 1, 2 et 3 octobre 1992*. Presses Universitaire de Bordeaux, p 596
18. Hbib D (2007) *Metropolisation and Territorial Recomposition of Northeastern Tunisia*. Cybergeo 410 (the source is in French)
19. Hbib D (1999) New industrial littorality in Tunisia, globalization and spatial planning. *Geogr Space* 28(1):49–58 (the source is in French)
20. Ministry of Equipment, Housing and Territorial Development/DGAT/Urbaconsult-URAM-BRAMMAH (2010) *Study of the Master Plan of Greater Tunis, final report, January* (the source is in French)
21. Giuseppe S et al. (2015) *Nourishing the planet, energy for life*. Official catalog. Editions Electa, Expo Milan 2015
22. Marry S (under the direction) (2018) *Sustainable territories from research to design*, parenthesis editions, 223 p
23. Françoise J (2018) *Public farmland and urban development: the case of public lands in Lausanne*, Rural studies [Online], 2012018, posted on January 01, 2020. <http://journals.openedition.org/etudesrurales/12336>. <https://doi.org/10.4000/etudesrurales.12336>