The Oasis of Gabes in Tunisia: An Endangered Authenticity

Khaoula Lassoued
PhD student, Horticulture Landscape and Environment Unit, Higher Agronomic Institute of Chott Mariem – Sousse University, Susa – Tunisia

&
Hichem Rejeb
Professor and director of Horticulture Landscape and Environment Research Unit, Higher Agronomic Institute of Chott Mariem – Sousse University, Susa – Tunisia

Abstract
Along the Mediterranean coast, oases exist only on the shores of the Gulf of Gabes in Tunisia, which, with mountains and deserts, of the Tunisian South. This form of intensive oasis organization allowed the settlement of populations in these arid areas. These coastal oases, with their geographic and agricultural characteristics, the landscapes they offered and the economic and social role they played that even exceeded the Southern region, represent an ecological heritage of great and universal national value enriched by the cultural contributions, which represent the architectural and urban legacy of many civilizations. Unfortunately, they are for some decades rapidly changing. Located on a coast increasingly attractive, alongside the growing cities, these areas are drawn into accelerated urbanization dynamics that have subjected them to increasingly varied pressures, even contradictory, accelerating their degradation and abandonment. In fact, the oasis of Gabes which counted at the end of the sixties around 1050 hectares has now only 700 hectares and has lost a third of its area at a rate of 10 hectares lost per year. The objective of this work is to understand the context in which these environments have evolved and address the many problems threatening. Then it aims at assessing the current state of the oases and the constraints they face (uncontrolled construction, the oasis habitat degradation, fragmentation, abandonment, etc.). Finally, this article suggests some principles for intervention to save the environment of this oasis.

Keywords: coastal oasis, urban pressure, degradation, cultural heritage, landscaped common interest.

INTRODUCTION
The oases of Gabes occupy an area of about 7000 ha. This is the largest set of coastal oases on the Mediterranean. It is the largest oasis in the area and it is greatly enriched by the contributions of the natural and cultural legacy of many civilizations. These agro-systems created for thousands of years have experienced long periods of glory before the penetration of modern urbanization. Particularly, with the complex socio-economic system, the oasis appears as an ambivalent space, attracting as bearer of wealth and amenities, but also marked by strong natural and anthropogenic stresses generating rivalries, conflicts and risk (Donadieu and Rejeb, 2011). Since the installation of the Tunisian Chemical Group in the city of Gabes, the park has seen a gradual decline due to competition in the distribution on land and water between agriculture, industry and the urban sector; which caused a spatial and urban decay and outstanding socio-cultural and economic crisis in the region. Thus, the rapid urbanization of these areas has negatively influenced the originality of the oasis and the cultural landscapes and has resulted in the depreciation and decay of this heritage. In this study, we will attempt to understand the context in which the oasis landscape has evolved in the urban area of Gabes. We will also try to evaluate the causes of the changes sweeping the oasis.

MATERIALS AND METHODS
1. THE STUDY SITE
Located at the entrance of the Tunisian Southeast region, the city of Gabes oasis is known by its marine oasis along the Gulf of Gabes. Among the 48 governorate oases, we will focus on this oasis in particular:
The oasis of Gabes city, which is an ancient oasis (at least before the first century AD). It is one of the few coastal oases, and also an urban periphery oasis, part of the metropolitan area of Gabes.

**Figure 1.** The location of Gabes city

This vast oasis is composed of three oases, whose boundaries are defined by the irrigation networks serving them: Jara is the oasis at the further east side, Menzel is centrally located and Chenini is in the southwest of the area.

**Figure 2.** The location of the city of Gabes compared to oasis

2. **GENERAL CHARACTERISTICS OF THE OASIS:**

The oasis is often seen as "a human form of adaptation to face severe constraints imposed by the arid desert environments" (Ben Chrifa, 1990), namely low precipitation and high evapotranspiration. This form of adaptation is reflected in the dense and layered character of vegetation. Indeed, the oasis system is an agro forestry system. The palm occupies the upper stratum, arboriculture is the second floor of the agricultural construction of oases and ground crops characterize the lower part.

The oases in Tunisia are classified according to their geographical position. Thus, coastal oases occupy 17% of the surface of Tunisian oases, while continental oases occupy the rest (83% of oasis areas). They specialize in the production of Deglet Nour dates (Kassah 1996). Oases differ also according to their seniority: 10% of Tunisian oases are called modern areas planted in the early twentieth century, in the South West, 90% of them are traditional (Lasram, 1990). The oasis of Gabes belongs to the second category as its development goes back at least to the 1st century AD (as stated in the Museum of Arts and Traditions of Gabes).
3. **METHODS**

To carry out this research, a study of the specificities of the study site was essential. For this purpose, decided to conduct:

(i) an inventory and field observations to develop a database on the oasis and its evolution;

(ii) an analysis of the spatial organization based on spatial documentation staggered (aerial photographs, Gabes maps of 1928 and 1942, spatial representations, slide shows, photos, urban development plans 1972 ...) using GIS software (ArcGIS: geographic information system). The exploitation of materials can account for landscape organization and its evolution in map form;

(iii) discussions and interviews with regional and local services involved in the study area (spatial planning, agriculture, industry, environment, etc.);

(iv) interviews with local people about their customs, their knowledge and opinions about the means of preservation and sustainable management of the oasis. All this allows us to make the interpretation of data field, the analysis of landscape structures and those of the changes in these oases.

**RESULTS**

1. **THE OASIS AND THE CITY IN GABES: A-balanced traditional organization**

Previously, almost all of the population of Gabes was farming. Until the sixties, the water flowed abundantly in the oases. Water springs upstream of Chenini feeding the main ‘wadis’ (water channels) of the region. Water was equitably shared in an irrigation canal network which ensured its delivery to the interior of the parcel.
The date palm is fundamental in the functioning of the oasis society. As the basis of oasis agro-ecosystem, it created a microclimate favorable to life in the oasis and the development of many cultures. The farmers also cultivated many fruit trees like peaches, plums, pomegranates, grapes, apricots, figs, mulberries, apples, pears and even bananas. The vegetable crops were also very present with the cultivation of tomatoes, lettuce, garlic, onion, zucchini, squash and chili ... and grain or forage crops (wheat, barley, rye, alfalfa, ...) and industrial crops (henna, tobacco ...). Pomegrenades known as those "between two wadis" were deemed to be the best of Tunisia. They were exported to Tunis and Algeria with dates and grapes.

According to the work done on the maps of 1928 and 1942 using the ArcGIS software, we were able to deduce that the oasis was closely integrated with the city of Gabes. So it also had a residential function. Farmers lived in the plots and extended family cohabiting on the same property. The old town of Gabes did not touch the oasis during its enlargement which did not happen at the expense of the oasis.

Farmers were accustomed to use all the materials they got from oasis to build their homes and furnish them (palm trunks to cover roofs and manufacture doors, fins to the fences and the various utility items: baskets, hats, mats, etc ..). Thus, their activities were limited almost to farm life and what it brought. This city has witnessed several civilizations which succeeded on its soil and whose footprints remain visible to this day, hence its architecture reflects the influence of these successive civilizations that have always drawn their materials from natural products.

**2. THE CURRENT STATE OF THE OASIS**

While working on the urban development plan of the city of Gabes of the year 1972 (Regional Service of Equipment and Territory of Gabes, 1972) with ArcGIS software, we were able to deduce that the city has always kept the same balance and harmony even in relation to the oasis (it did not touch the oasis except in a few meeting places between the city and the oasis) without causing enormous damage.

Since independence, the education policy has opened up new opportunities for the children of farmers. Meanwhile, the women's liberation policies implemented since independence has led to profound
changes in the organization of the family. The children wanted to install their homes in a separate housing units from the parent and each boasts his share of land. So, many areas of the oasis fell from agricultural land to become urban areas.

![Map of Gabes](image)

**Figure 7.** Urban Development Plan of the city of Gabes in 1972 processed by ArcGIS software

Our observations in recent years show that snacking of the oasis increases to urban areas from one year to another, the thing which led to its gradual deterioration and severe decrease in exploitable areas: the oasis of Gabes which counted at the end of the sixties 1050 ha has now only 700 ha, and has lost 1/3 of its area and the equivalent of 10 hectares lost per year which is a very alarming phenomenon (Regional Commission for Agricultural Development CRDA, 2015)

![Maps of Gabes](image)

**Figures 8 and 9.** Maps of Gabes in 2006 and in 2015 (Google Earth) handled by ArcGIS software
The degradation of this oasis through fragmentation has continued to grow, especially after the revolution of January 2011 when unlawful practices seemed to be tolerated.

Table 1. Dropout rate by delegation in the oases of Gabes governorate (CRDA, 2010)

<table>
<thead>
<tr>
<th>Delegations</th>
<th>Areas (Ha)</th>
<th>Discontinued Areas (Ha)</th>
<th>% Discontinued</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gabes city</td>
<td>569</td>
<td>124</td>
<td>21.8 %</td>
</tr>
<tr>
<td>Gabès South</td>
<td>923</td>
<td>100</td>
<td>11.0 %</td>
</tr>
<tr>
<td>Gabès West</td>
<td>344</td>
<td>75</td>
<td>21.8 %</td>
</tr>
<tr>
<td>Ghannouch</td>
<td>782</td>
<td>60</td>
<td>7.7 %</td>
</tr>
<tr>
<td>Metwia</td>
<td>540</td>
<td>150</td>
<td>27.8 %</td>
</tr>
<tr>
<td>ElHamma</td>
<td>1835</td>
<td>210</td>
<td>11.4 %</td>
</tr>
<tr>
<td>Mareth</td>
<td>2007</td>
<td>31</td>
<td>1.5 %</td>
</tr>
<tr>
<td>Total</td>
<td>7000</td>
<td>750</td>
<td>10.7 %</td>
</tr>
</tbody>
</table>

After analyzing the above table, we will look only to the city of Gabes and Gabes West oasis on which we are already working to conclude that the dropout rate in these oases is the highest (21.8%), it is almost twice the average rate (10.7%). This proves that these environments are very vulnerable and threatening. Yet, if we do not take the necessary measures to save them, they will disappear along with their rich heritage.

Figure 9. Gabes satellite photo showing the gradual shaving away of the oasis (Google Earth, 2010).

DISCUSSION

The oasis of Gabes, as almost every oasis in Tunisia, is now facing multiple problems that cause a real crisis as a result of an inappropriate development model, based primarily on:
• Very difficult climate conditions especially with the increasing drought and its impact on water availability, which is the heart of the oasis.
• Water resources are very limited and increasingly costly.
• A highly endangered biodiversity loss and a very archaic genetic plantation capital of low productivity.
• A rare labor, or even nonexistent, aging and very low-skilled.
• An almost missing coaching.
• Very stringent land structures and brutal urban pressure on cropland.
• A road infrastructure in poor condition (unmaintained and unpaved inner tracks).
• Increased air pollution, soil and water contribute to the enhancement of the biological impoverishment.
• Insurmountable difficulties in finding finance.
• The supply channels and the very anarchic marketing are not adequate to meet the challenges of modern economic developments both domestically and globally.

Figures 10 and 11. The progressive urbanization of the oasis

Already we can say that the causes of degradation of the oasis of Gabes can be classified into natural causes, human, legal, institutional and scientific as shown in Figure 12.

Main causes of degradation of the oasis of Gabes

Figure 12. Main causes of degradation of the oasis of Gabes
CONCLUSION

The degradation of the oasis of Gabes is also related to urbanization due to demographic pressures, uncontrolled construction, development of services and trade (shops, restaurants, service stations, etc.) and the loss of interest in agriculture in some areas, particularly those located in disadvantaged areas. Urbanization has even invaded agricultural land in which the state has made significant investments.

We can deduce that the Gabesians despite their attachment, turned their backs to the oasis. They unconsciously contributed to its neglect that there is little time devoted to this environmental wealth and an essential component of the cultural identity of the region.

The experience as well as the scientific studies on the oasis of Gabes tend to show that the observed decline phenomenon today is neither inevitable nor irreversible, provided it is approached from a dynamic angle that relies on appropriate scientific methods for backup and recovery of these resources.

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