

DEVELOPMENT OF A REGIONAL PARK FOR BETTER
PROTECTION AND MANAGEMENT
OF KERKENNAH'S ARCHIPELAGO ENVIRONMENT (TUNISIA)

FAIZA KHEBOUR ALLOUCHE*

Wafa Benelgacem**

Abstract

The engineering of regional Parks is an important approach for sustainable development and a new one in Tunisia. This article offers a management of a regional Park in the sabkha employed as a dump area and located in Kerkennah's Archipelago. This proposal is used as the key intervening factor between public and local practice to reconcile this area with his environment and it will create an integrated and interactive ecological and human habitat within an urban setting. Although, the idea of the proposed development involves the reconciliation of this space with its environment, taking into account the aspect of sustainable management of this particular site, four components are planned such us: an eco-museum, a sale exhibition and handicrafts center production, a halophilic garden and a water scene.

Keywords: Kerkennah's Archipelago, sabkha, environment, landscape, regional Park.

* Assistant Professor, ISA – IRESA - University of Sousse, Tunisia

** Engineer of LANDSCAPE ARCHITECTURE, ISA-Sousse, Tunisia

1. Introduction

Urban development and human pressures can destroy in a few year landscapes that nature and man have shaped over time. Landscapes are changing and losing their characteristics [1]. To halt and reverse this process, sustainable development that ensures the protection of natural heritage and local development are needed. Among the adopted strategies, Parks are cited. In fact, Parks are positive elements of the urban space that add economic, social, historic, and esthetic value to our cities and environment. Well-planned Park can promote the local economy and educate citizens about the environment. Surrounding landscapes, it gives a sense to the city [2]. Moreover, green spaces can facilitate sustainable urban environment by purifying air and water, filtering noise, and stabilizing the microclimate [3].

In recent years, the attention for regional Parks management projects has grown among national and regional governments in many countries. Thus, designing a Park from regional perspective is the subject to discuss in this paper. However, a well managed regional Park has two main benefits: economic progress and sustainable development. We discusses a proposal for sustainable development, that allows, converting a sabkha used as a discharge zone by the local population into a regional Park integrating economic, environmental and social issues on the local level. It aims to combine urbanity and nature and to integrate the site to study the local landscape [4].

Looking to the current situation of the site, a recovering and managing integrity with the local environment is needed. In another terms, if the discharge zone is not properly managed, the accumulation of wastes can give rise to serious environmental damage, and increase safety problems and health-care costs. As the sabkha is an important native ecosystem, the establishment of the regional Park must be also as an ecosystem in order to protect and maintain the natural environment. The present proposal management will give to the studied locality a strong identification through the combination of the local culture with the Park design. Therefore, the primary goals of this landscape planning proposition for the discharge zone are to restore and sustain the ecological integrity of the region's ecosystems, to halt the loss and to restore populations of all rare and endangered plant species occurring within the sabkha [5].

The reason behind the developed reflection in this paper is that regional Parks are established for the purpose of providing recreational opportunities while protecting natural, cultural and

landscape values (Office of environment & heritage). Parks aims to increase visitorship, attract the interest of potential clients and meet the needs of local residents. It should be noted that at the European level, the example of regional Parks has been selected by the French delegation in various international conferences in recent years. The philosophy of the creation of regional natural Parks in France was experienced in the Mediterranean basin, particularly in Morocco. Then at the "rendez-vous méditerranéen" on 17 and 18 May 2004 in Marseille, the creation of the regional Park Bouhachem in Morocco was decided as part of French-Moroccan cooperation [6].

2. Material and methods

2.1. Study area

The Kerkennah's archipelago is composed of 5 small islands (between 0.5 and 100 km²), the two biggest are Gharbi (48 km²) and Chergui (99 km²) where all population is located, and about 10 very small islands (less than 0.5 km²) located on the north east of Chergui (Figure. 1). The islands are very flat: the maximum altitude is only 13 m above the sea and the low land (less than 2.5m) represents more than 50 % of the islands. In the lower ground of the Kerkennah archipelago, salty and sterile areas called marine sabkha-are growing [7]. The precipitations, that are intense and sudden in the region, can cause floods directly in the sabkha. Runoff can also bring salt and other mineral particles. The water can arrive in the sabkha from runoff bringing salt with it. During the rainy seasons, storms can bring on marine flooding [8]. The soils of the islands are generally light and poor in organic matter, characterized by a calcareous crust. The population of the Kerkennah Islands, are amounted to 14 400 in 2004. The working population is estimated at about 4880 people distributed according the following sectors: agriculture (47%, 90% for fishing), the industry and buildings (19%) and services (34%) (INS-RGPH 1994-2004). These natural hydrosystems are especially characterized by halophytic and succulent vegetation and by well-adapted perennial species, such as *Chenopodiaceae: Atriplex spp., Suaeda spp., Salsola spp.* and *Salicornia spp.* [9]. Sabkhas in Kerkennah's archipelago were developed under certain environmental factors. These factors may be linked to climate, slope, soil, geologic or to Anthropogenic interferences [10].

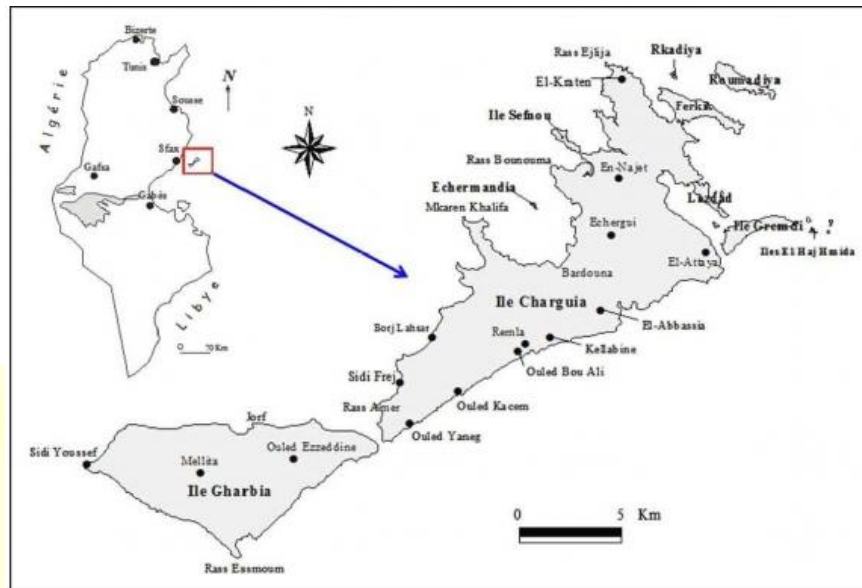


Figure 1 : Administratif location of Kerkennah Archipelago

The Study area belongs to the north-east of the kerkennah islands and belongs administratively to the Erramla locality. The site is a dried sabkha used as a discharge zone and exploited since 1984 by three localities: Kellebine, Erramla and Ouled Bouali. It is located about 1.5 km to the north of kellebine, 2.5 km to the northeast of Erramla and 2.8 km to the northwest of El-Abbassiya. It is accessible from the road RR 204 of kerkennah. The site covers an area of 3.5 ha and making a part of the state's fields. The Sabkha's surface, sheltered by halophilic vegetation (*Salicornia*), is enriched in sodium derived from a groundwater saline with a marine origin and forming salt marshes which attracts migratory birds (Figure 2).



Figure 2: The halophilic vegetation of the study area

Therefore, the waste is collected daily and deposited in the sabkha by the local population and light wastes such as plastic bags and paper are scattered because of the wind and could be found outside of landfill area, from where the negative impact on the landscape region. Furthermore, the site is almost devoid of vegetation except the halophytic vegetation due to the high salinity, such as: *Halocnemum strobilaceum*, *Salicornia Arabica*, *Atriplex inflata*, *Suaeda vera*, *Suaeda mollis*, *Arthrocnemum indicum*, *Juncus maritimus*, etc. [11]. The below figure shows the salt deposition (white color) scattered in the study site.

2.2. Concept of “Kerkennah Regional Park”

Regional Parks are areas of regional open space that are identified by planning procedures as having regionally significant conservation, landscape and recreation values. The concept of regional open space was first introduced in Western Australia by the Stephenson-Hepburn Report in 1955, which recommended that a statutory region plan be prepared for Perth which reserved private land required for future public purposes [12]. However, the approach of regional Parks differs from the one of national Parks at the protection level of nature. Regional Parks seek for the sustainable development of their territory while the purpose of national Parks is the protection of animal and plant species. There is a rural area with a rich and threatened heritage. It is the subject of a sustainable development project based on the protection and enhancement of the natural, cultural and landscape of its territory [13]. According to “la Maison du Parc naturel régional des Volcans d’Auvergne”, the main objectives of a regional Park are:

- To protect wealth and sustain the biodiversity of natural heritage;
- To control landscape evolution and improve the living environment;
- To preserve natural resources (including the water quality);
- To provide hospitality, education and information for the public;
- To contribute to the territory planning.

The Kerkennah regional Park will be a significant public open space located within an arid region of Sfax. It was originally designated. The design strategy for the Kerkennah Park proposes restoration on of an existing sabkha system. Using the environment as a tool of engagement, the Park will become a landscaped artery that connects the agglomerations, palms, wetland and sea. The proposed Kerkennah Park will create an integrated and interactive

ecological and human habitat within an urban setting. This is why five main objects to design this are considered, such as: community, education, recreation, landscape and heritage.

Since our study area suffers from the negative impact produced by local population, then, it needs to reveal its nature and landscape identity lost and it must escape from its past as a discharge area. The lack of relationship with what surrounds the sabkha highlights the paradox: a natural rejected site in an urban center (Erramla) and in front of the sea. View this landscape disfiguration, it is necessary to seek an arrangement that allows the sabkha to communicate with the surroundings area and then to educate not only the local population but the entire archipelago's population about the richness of their heritage. Following this environmental situation analysis, we propose a project design capable to reconcile the area with its environment, so the developed concept is called: "*sabkha designed to protect the environment*" that will restructure the denuded landscape and enhance the natural and traditional richness of the archipelago.

3. Results and discussion

A precaution must be taken by policies and public authorities for the good health of citizens and future generations. However, in order to integrate the area into the surrounding landscape, it is necessary to give it an added value by changing its vocation in terms of management [14]. So, the planning vision is based on the above regional Park objectives and contains four components: an eco-museum, a sale exhibition and handicrafts center production, a halophilic garden and a water scene (Figure 3). The design includes too, a paved walkway of 6 m width, which marks the heart of the plan. Around this central walkway, flowers, trees, secondary walkways and especially a halophilic garden are arranged. Therefore, it is necessary to mention that there are some technical issues that need to be taken into account before starting the management such: the plant palette of the proposed development should be made by plants that tolerate salinity; physical soil amendments are needed to improve its structure and its pH; deep plowing is planning to eliminate weeds and it is essential to bring permanent and qualified workers in the Park.



Figure 3: Ground plan of the proposed regional Park in Erramla locality

To achieve an equilibrium with the surrounding landscape, it is necessary to provide the needed services by the local population. The proposed management will offer a variety of experiences that inform, inspire and involve visitors by providing access to nature, recreation and learning experiences. Moreover, provision of educational and recreational opportunities is one of the primary purposes of the Park that benefits to individuals and communities. In this sense, the proposed development plan includes a playground for children with a parental space and recreation areas for the whole family. An eco-museum covering 476 m² is conceived and is located in a circular track. This cultural and ecological service will expose the rich fauna of Kerkennah islands. It will enhance the intellectual life of visitors by including a showroom which thematic panels introducing anatomy, lifestyle, and reproductive cycle of wintering, nesting, and sedentary birds. It includes also an audio-visual projection room of bird's life stories. The exhibition theme is also about aquatic ecosystems of the archipelago. Miniature ecosystem models and wildlife specimens are also proposed.

The regional Park will support the local economic activities and stimulate the socio-economic benefits that strengthen the local cultural and natural heritage [15]. A center for exhibition and sale of handicraft products covering 773 km² is proposed (Figure 4). With its circular shape, this place will expose the traditional practices of Kerkennah islands. The center is decorated with a water basin dressed with stones. The basin, with aquatic plants reflects the building as the surrounding vegetation. Street lights are also proposed to illuminate the space by night.



Figure4: The exhibition center and sale of handicrafts products in 3 Dimension

Visitors can also enjoy a guided tour in the museum of the Park, to learn about birds and marine wealth of the archipelago. Visitors can also learn about the traditional business of the archipelago (the crafts). Among the well known costumes in Kerkennah, we find 'Tarf' which is a native tapestry of the archipelago embroidered with brightly colored, predominantly the red color. And, we find also "Barnous", "Fouta" and "Melia". Furthermore, visitors can buy products on display which will help promote the local economy. Therefore, this management proposition will try to move towards better harmonization of environmental and recreational goals among the local landscape of Erramla. It will provide a wide range of values to the local community by contributing to the physical and an esthetic quality of urban settlements, to biodiversity, job opportunities, youth development, and public health.

The management will seek also for protecting and reminding the characteristic species of the studied area through the halophilic garden which highlights the natural environment and the ornamental potential of the site and exposes the characteristic vegetation of the sabkha (Figure

5). Nature in urban environment is source of positive feelings and beneficial services [16] and it can substantially improve the livability of land uses and city environment [17].

This component covering 2323.6 m² is recognized also for the beauty and diversity of its landscapes as we can contemplate the vegetation around the furnished walkways as well as the various components of the Park.

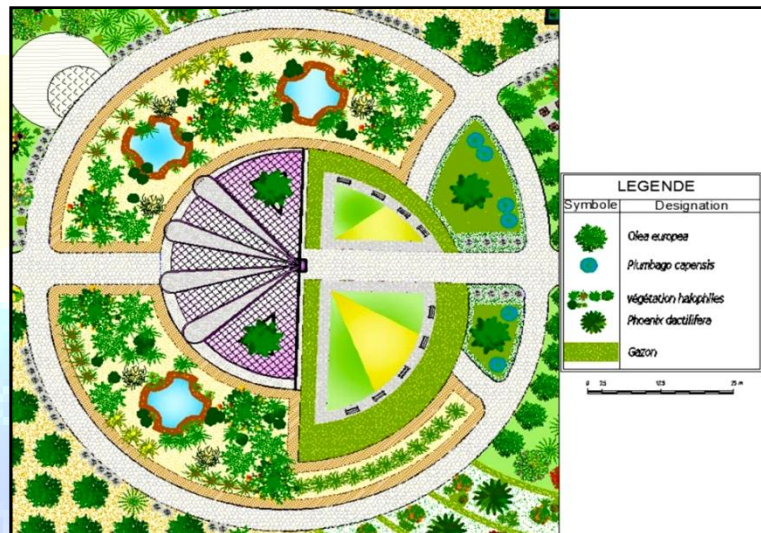


Figure 5: The halophilic garden in 2 Dimension

A relaxing place will be also a part of the plan: a scene of water with an area of 1256 m². Water is an element of identity. It adds life and color to the surrounding landscapes. The sound of water from a fountain could mask the street noise. It has a circular shape. The water scene will be designed as a fountain. It offers a spectacular view to the west of the site and it could be a source of relaxation for the visitor by hearing the sound of moving water.



Figure 3: The future scene of water in 3 Dimension

The Park will support a variety of healthy ecosystems that, in turn, support a diversity of flora and fauna. Biodiversity provides one of the defining values of the Park. It has the potential to be one of the primary attractions for visitors. That's why the plant palette used is varied and colorful while respecting climate and physicochemical soil conditions in the selection of plant species. Through the vegetation used in the proposed plan, we can find *Olea europaea*, *Callistemon laevis*, and *Phoenix canariensis* near the fountain; *Albizia julibrissi* and *Punica granatum* near the center for exhibition and sale of handicraft products; *Eucalyptus camaldulensis*, *Acacia cyanophylla*, and *Artemisia* near the eco-museum, etc.

Thus, the designed components of the regional Park will offer a variety of experiences that inform, involve and inspire visitors by providing access to nature, recreation and learning experiences. The Park is first and foremost a place of enjoyment; a resource for people to use and take pleasure from. It is also an area that can deliver positive benefits to a diverse range of individuals and communities. A Park must help people to improve their wellbeing. The diversity of the Park components will offer a high quality and regionally unique visitor destination to Erramla region. Visitors can make the visit enjoyable and memorable, invites return visits, and encourages a positive experience to be relayed to family and friends. Kerkennah regional Park will be a special place that offers visitors experiences they cannot find elsewhere. Moreover, the different landscape views of the Park are not just intended to users, but also to people living and

working nearby, as well as those traveling through. Heritage assets, and places, located throughout the Park are a reminder of its rich history and industrial heritage.

4. Conclusion

A fact, as the population is increasing especially in urban regions, the volume of wastes also increasing. This factor contributes to the degradation of local environmental quality. Therefore, to protect the environment, a sustainable development management is required. In that sense, Erramla locality was chosen as a case study. The local population produces masses of waste per day which is usually disposed of in the sabkha (study site). When it is dumped, it makes the locality dirty and pollutes the air and groundwater [18]. In similarly cases, regional Parks are a successful example of integrative and active management strategies. It is true that this management proposition is based on theoretical considerations, but it integrates the three components of sustainable development concept: economic development, social development, and environmental protection. The proposed regional Park will provide jobs and opportunities to generate revenue for local people (exhibition and sale center of handicrafts products). It will provide recreational (water scene) and educational (eco-museum) experiences for visitors. And, it will respect and recall the origin identify of the site (halophilic garden).

5. References

- [1] Liu. S., 2012, **Research on Landscape Design of Urban Park**, 4th International Conference on Computer Modeling and Simulation (ICCMS 2012), Hubei University of Technology, Wuhan, China.
- [2] Su. Z., 2003, **Development of GIS as an information management system: a case study for the Burden Center**. B. S., Tongji University.
- [3] Neema. M. N., and Ohgai. A., 2013. "Multitype green-space modeling for urban planning using GA and GIS" *Environment and Planning B: Planning and Design* 40(3), pp 447-473.

- [4] Jean-Louis Joseph., 2008, Fédération des Parcs naturels régionaux de France. La construction des politiques du paysage dans les Parcs naturels régionaux, n°15. <http://www.parcs-naturels-regionaux.fr>
- [5] Agence de Protection et d'Aménagement du Littoral. 2002. Etude de gestion de la zone sensible des îlots Nord-Est de Kerkennah, Phase I, Caractérisation du milieu naturel, Rapport définitif. 53 p.
- [6] Clain. J., 2005, Les parcs naturels régionaux : environnement et aménagement du territoire.. Mémoire de fin d'études, IEP de Lyon.
- [7] Etienne, L. Dahech, S., Beltrando, G. and Daoud, A., 2012. Dynamiques récentes des sebkhas de l'archipel des Kerkennah (Tunisie Centro-méridionale): apport de la télédétection. *Revue Télédétection*, 11 (1), pp 273-281.
- [8] Etienne. L, Beltrando. G and Daoud. A., 2013. Human Influences on Environmental Changes in The Kerkennah Archipelago (Tunisia) Since the 60's. 3rd International Geography Symposium - GEOMED. Symposium Proceedings, ISBN: 978-605-62253-8-3. pp 64-70.
- [9] Brown. G., 2006. The Sabkha vegetation of the United Arab Emirates. In: M. Ajmal Khan et al. (eds). *Sabkha Ecosystems: Volume II: West and Central Asia*.
- [10] Ashour. M.M., 2013. Sabkhas in Qatar peninsula: Landscape and Geodiversity. *Studies of integrated geography*. ISSN 2286-0177. ICCS, Spiru Haret University. Issue 1/2013, pp 10-35.
- [11] Achouri. E and Benbelgacem. W., 2011, Proposition d'un circuit écotouristique dans l'Archipel de Kerkennah. *Projet fin d'étude*, ISA CM, 78p.
- [12] Dooley. B., Bowra. T., Cluning. D., and Thompson. P, 2000, *Yellagonga Regional Park management plan 2003 – 2013*. Department of Conservation and Land Management, City of Joondalup and City of Wanneroo.
- [13] Direction régionale de l'environnement Picardie, 2005, *Park naturel régional*. Code de l'Environnement : art. L.333.1 à L.333-4 ; art. R.244-1 à R.244-16.

- [14] Djamel. B, 2014, Le site de l'ex décharge d'El Kerma sera transformé en parc d'attractions. Publié dans Le Quotidien d'Oran le 09/04/2014. Dordrecht: Springer. pp. 37-51. <http://www.lequotidien-oran.com/index.php?news=5196750>.
- [15] Janssen. J. 2009. Sustainable development and protected landscapes: the case of The Netherlands, *International Journal of Sustainable Development & World Ecology*, 16:1, pp 37-47, <http://dx.doi.org/10.1080/13504500902757981>
- [16] Chiesura. A., 2004, The role of urban Parks for the sustainable city. *Landscape and Urban Planning*. Volume 68, Issue 1, 15 May 2004, pp 129-138.
- [17] Neema. M. N., Khandoker. M. , Maniruzzaman, and Ohgai. A., 2013, Urban Greening Using an Intelligent Multi-Objective Location Modelling with Real Barriers: Towards a Sustainable City Planning. *Current Urban Studies* 2013. Vol.1, No.4, pp 75-86.
- [18] Abdul Jalil. M. , 2010, Sustainable Development in Malaysia: A Case Study on Household Waste Management. *Journal of Sustainable Development* Vol. 3, No. 3.