Urban Parks and Sustainable Development – The Case Study of Portimão City, Portugal

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Abstract: Following the industrial revolution with its massive urbanisation in the 19th century and the continued explosive growth of urban areas and the decline of nature throughout the 20th century, the alienation between people and the nature was increased. The urban park movement had objective to increase life quality in the modern city. The last years we have seen an increasing interest across Europe in the development of nature in cities. The case study of the City Park of Portimão will be presented and examined with emblematic similar projects that marked the urban park movement in the last decades. The Cental Park of New York, the Amsterdamse Bos, Parc, the André-Citröen and the City Park of Porto are discussed with objective to study how the Urban green space contributes to ecological, social and economic sustainability.

Key-Words: Industrial revolution, Urban Park, Quality of life, Sustainable city, Landscape design.

1 Introduction - The Urban Park Movement

Urban parks are an important part of the complex urban ecosystem network and provide significant ecosystem services. It benefits urban communities environmentally, aesthetically, recreationally and economically. The urban park movement [4, 17] had objective to increase the city life quality of the industrial revolution era (19th century) [5, 16]. The planning of parks was closely related to urban and garden design. The movement started in England [1, 8], creating public city parks like the Victoria Park which is considered the first urban park of history [16], while according to some authors the Birkenhead Park was the first urban park constructed exclusively with public money [22]. Public parks supported by municipal governments date from the 1840s in Britain and the 1850s in the United States and Canada. Initially urban parks were not public and used from a privileged part of the population [7, 10].

Following the industrial revolution with its massive urbanisation in the 19th century and the continued explosive growth of urban areas and the decline of nature throughout the 20th century, the alienation between people and the nature was increased. Urban parks, open space and related human health issues are a critical component of any state, regional, and local infrastructure plan. Urban parks promote the core values at stake in building public infrastructure: providing children the simple joys of playing in the park; improving health and recreation; equal access to public resources; democratic participation in deciding the future of the community; economic vitality for all with increased property values, local jobs, small business contracts, and affordable housing; spiritual values in protecting people and the earth; the environmental benefits of clean air, water, and ground; and sustainable regional planning.

The last years we have seen a tide of interest sweeping across Europe in the development of nature in cities, and an increasing amount of landscape development in urban areas has involved the use of ‘naturalistic’ styles. In the beginning of the urban park movement designers had as objective the representation of rural landscapes like in the central park in New York, but without any attempt to re-establish ecological functions [26]. Later in Amsterdamse Bos park design evolutes in a mode to adapt ecological functions [22] and afterwards, urban park design adopted the formal design principles taking into consideration ecological criteria (Park André-Citröen). Presently the movement adopted the environmental education function like it is presented in the City Park of Porto.

In future the urban parks is expected that except form, ecological function and environmental education should consider the characteristics of the place as a source of inspiration and the role of the

those spaces in sustainable development of the modern city. The planning and management of urban parks is meaningful to urban sustainable development [23]. Urban Parks have significant ecological, social and economic functions, thus, the future social implications of new lifestyles, values, attitudes to nature and sustainability will lead to higher demands for urban parks [25].

City people access parks for recreation and to experience nature. Greenspace has significant ecosystem services, which are defined as "the benefits human population derives, directly or indirectly, from ecosystem functions" [6]. It can sequester carbon dioxide emissions and produce oxygen [11], purify air and water, regulate micro-climate, reduce noise [3], protect soil and water [12], maintain biodiversity [18], and have recreational, cultural and social values [21]. Additionally, public parks, natural areas and golf courses can have a statistically significant effect on the sale price of houses in close proximity to those resources [2, 13].

Urban green space contributes to ecological sustainability. A functional network of green space is important for the maintenance of the ecological aspect of a sustainable urban landscape. Landscape connectivity should be promoted with the development of greenways and use of autochthonous species, adapted to local condition, with low maintenance cost, self-sufficient and sustainable [7]. In the present work it will be presented the case study of the Portimão City Park.

2 Methodology

The methodology was developed for the "Vale do Barranco do Rodrigo" area, located in the periphery of the Portimão city in south Portugal. Figure 1 shows the methodology diagram that is based in the holistic concept of landscape as a resource [19, 9, 14, 20, 24, 27]. In the first phase it was studied the origin of urban parks, analysed the evolution of urban park design and described the expected future of the movement.

In the second phase was collected and analysed information about the different components of the landscape (geology, geomorphology, soil, relief, flora and cultural heritage). Then it was taken into consideration the existing territory constrains (urban plans and administrative servitudes). Afterwards, a synthesis of the above information provided the biophysical sensitivity, the visual quality and the opportunities and treats of the study area. The biophysical sensitivity was used to assess the vulnerability degree of the landscape towards impacts of natural or anthropogenic origin. Visual quality was used to evaluate the scenic value, cultural character and the landscape capacity to absorb change. High quality landscapes usually present more sensitivity and low visual absorption capability [15]. From the above information was created the anteproject of the Portimão Urban Park as an attractive and multifunctional space that promotes sustainable development.

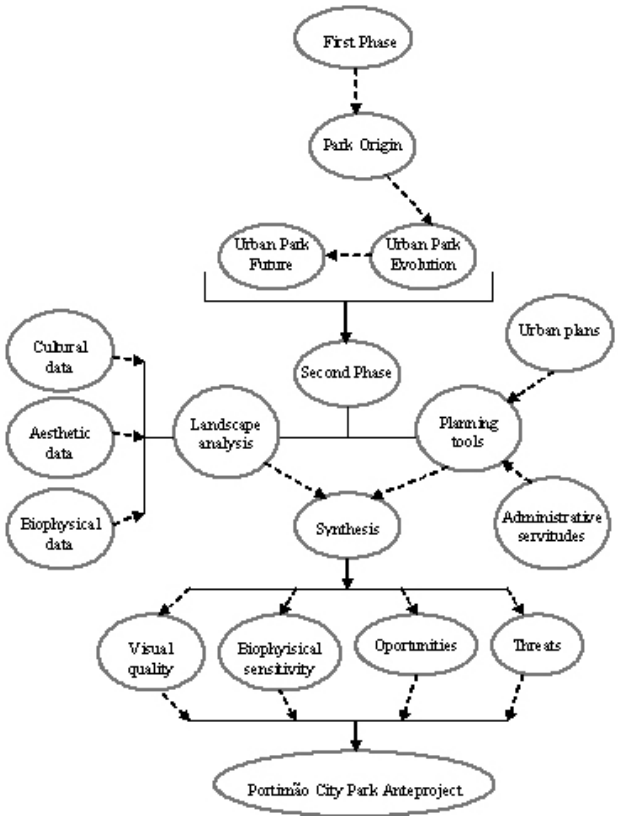

Figure 1 – Methodology diagram

3 Case study - Urban Park of Portimão

Vale do Barranco do Rodrigo is located in Portimão, Algarve, which is characterized from a Mediterranean climate and beautiful landscapes. Algarve is the southern region of Portugal with a 22% of land occupied by forest and 38% by uncultivated maquis and gariques. In Algarve the main species are *Citrus* spp, *Quercus suber, Quercus ilex, Seratonea siliqua*, and *Pinus pinaster.*

The population is characterized by a decreasing and scattered distribution in the mountainous areas and concentrated in costal zones. Tourism is the main activity and farmer population is continuously aging. Algarve boasts a rich and diversified natural heritage. Phoenicians, Greeks and Romans left in Algarve the most enduring signs of an important human presence predating the Arab conquests. The five centuries of Muslim presence left its legacy in

the landscape, but the 1249 Christian conquest confirmed the identity of the region and founded the departure point for the discoveries of the new ways to India.

The Portimão city park represents an exceptional opportunity to establish a best practice example of sustainable urban development. Objective of the urban park Project was to create an economically sustainable project that will take into consideration the environment and cultural heritage of the place and will be socially acceptable. Thus, we respected the exigencies imposed from the local authorities, we created interest points that attract and serve the population; we use autochthonous plants and materials adapted to the surrounding landscape and we ask the people what they expect to see in that space.

As a result the design and Project concept assent in the idea of "Urban Nature Symbiosis" (figure 2). From one side the park needs the city to exist and the city needs the ecological and social benefits arising from the park. The park was designed as a place of pedagogic and leisure activities and as an ecological space that the introduction of animal and vegetation species permit micro-climatic regularization and atmospheric purification.

Figure 2 – Representation of the present study concept of park and the modern city.

The idea of symbiosis was based in the fact that the urban park movement surged as solution of the industrial city environmental problems, which was represented as a tree (park) emerging from the city structure. Taking into consideration the pretended development, the tree roots represent the cyclable network which is the principal formation of the project, following the secondary configuration of trails and walkways represented from the branches. Purpose of the above structures was also to give access and to connect the functional areas like the constructed elements and vegetation.

The Master plan was the first step in realising the long-term vision for the park (figure 3). We had as objective to establish functional conections with the surrounding area in a way to facilitate access to the park by different means (foot, bicycle or car) and connect it in a coherent mode to the city.

In terms of form we opted to use naturalized lines in similarity with the Amsterdamse Bos park of the modern period. The principal structure systematizes the whole park creating its skeleton. Cycleways have five meters width and with exercise stations associated. This cycleway network is also linked to the city network through neighbouring suburbs.

In functional terms the park presents a great diversity of spaces many of which equipped. The defined areas where strategically located to obtain a symbiosis between form and function. With objective to create a multifunctional space we introduced three distinct typologies for functional areas: leisure, education and ecology.

The vision, guiding the park's future development, is to transform the park into a vibrant, diverse and multi-functional community. The park environmental education area will be a concept for a leisure, living, working and learning community in which student life and learning processes are part of the structure of the community. As the strategy will be implemented the park will become progressively a centre for education and training, receiving students from all schools and universities of the region.

The purpose of the park access strategy is to provide an understanding of the range of disabilities that need to be addressed to allow people with disabilities to be appropriately assisted to operate independently, equitably and with dignity. On average, 20% of the total Portuguese population has a disability (Portuguese Institute of Statistics 2003) which means that they have specific requirements to access events and facilities. This percentage is similar in many countries. A disability can affect a person's capacity to communicate, interact with others, learn or move about independently. A disability can be permanent or episodic. Purpose of the park is to assist people with mobility, vision, hearing or intellectual disabilities to make use of the environment.

Other objectives of the present project were to preserve the natural environment, enhance

biodiversity and protect ecosystems that could serve as refugee for many species threatened from urban expansion and intensive agriculture activities. Thus, we opted to preserve large, bio-diverse and relatively untouched ecosystems and to use minimum number of infrastructures and constructed elements.

In this mode it was introduced only small structures associated with the park functions. Except those it is planned also the construction of an organic recycling unit for the park leftovers that will be used from the park as bio composts resulting in reduced soil contamination from greenspace maintenance and favour sustainability. For the green structure it was chosen a contrast between filled and unfilled space using small stands and disperse vegetation. It was chosen autochthonous species that are well adapted to the region and provide a Mediterranean image to the space which permit better adjustment with the surrounding landscape.

Figure 3 – Master Plan of the City Park of Portimão.

4 Conclusions

In the context of this study, the role of urban parks as provider of social services and their importance for city sustainability has been addressed. The current Portimão City Park Master Plan encourages a broad range of recreational, leisure and public uses that utilise the available facilities and infrastructure and add to the unique qualities of the park for visitors, workers and residents. Cultural, educational and environmentally orientated uses are also envisaged. In our approach to best practice sustainability we strive to balance economic, environmental and social factors in a way that will ensure resource conservation and protection of the environment now and for future generations.

Compared with others' work, the proposal for the park of Portimão is more conceptual and multidimensional. It is planned at the regional, city and neighbourhood levels. It takes into account ecological principles but also the needs of people for greenspace and recreation. However, there are still some limitations in our study. The park plan is conceptual and not elaborated in detail. Some works such as the selection of plant species and establishment of management measures still need to be studied and designed. The use of renewable energy for park equipments should be considered.

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