



A COMPREHENSIVE APPROACH FOR THE REVITALIZATION OF HISTORICAL GARDENS: THE CASE STUDY OF ANTONIADIS IN ALEXANDRIA, EGYPT.

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ABSTRACT

Historical gardens are important touristic landscapes that have a great impact on the quality of life of the communities. Currently public gardens are neglected in Alexandria and there are no plans for designing new ones. The research is examining the case of Antoniadis garden, one of the most valuable historic gardens of the city. The methodology consists of the following stages: a theoretical review of the guidelines related to the following fields: sustainable landscape, garden design, garden tourism and the preservation of historic gardens. The Antoniadis Garden is analysed based on the criteria deduced from the literature review, the questionnaire and interviews. A SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis is developed to explain the potential, issues and challenges of Antoniadis. Finally, a framework that integrates all the above-mentioned guidelines and the SWOT analysis is developed to reach a comprehensive approach that can be implemented on similar cases with appropriate adaptation.

INDEX TERMS— Revitalization; Sustainability; Garden Tourism; Antoniadis, Alexandria.

1. INTRODUCTION

Effective use of green spaces provides a variety of environmental and social benefits, as well as economic returns on communities. Concerning the environmental aspects, Trees, for instance, act as filters for pollution and reduce infections of chronic diseases (Bradshaw, Hunt, Walmsley, 1995). Researchers also found that the cooling effect of green spaces can be felt up to 100 m away from the site (Forest Research, 2016). Concerning water management, the soil system and vegetation are highly permeable and capable of absorption of substantial rainfall that leads to reducing the volume and rate of run-off. On the other hand, green surfaces and biological systems enable the environment to become self-sustaining. Besides, green spaces encourage communities to grow their own food.

Regarding the social aspect, gardens have a significant impact on quality of life and wellbeing. Being in open-air green spaces relieve stress and encourage healthy activities and sports. These

areas also give a significant opportunity for people to interact with each other, increase people awareness of the importance of nature and biodiversity and enhance sustainable behaviors and enhance their sense of belonging. Besides, open green areas provide extraordinary opportunity for children and the youth to learn about nature.

Historic gardens comprise elements of cultural value increase sense of identity and pride of communities and encourage cultural activities. On the other hand, neglecting gardens and parks leads to anti-social behavior and vandalism.

As to the economic benefits of gardens, it is recognized that they increase property values of their surrounding if these green open spaces are well-managed and well-maintained. If they are renewed and developed, gardens also generate job opportunities and attract touristic activities and can host a great variety of events.



For all the above-mentioned social, environmental, and economic aspects, it is extremely important to restore deteriorated historical gardens. The aim of this paper is to formulate an integrating and comprehensive tool for helping decision-making processes in revitalizing historical gardens. This can be a useful framework for encouraging cross-disciplinary working, instead of conventional guidelines at the conceptual level that proves impossible to operationalize.

2. METHODOLOGY

To reach a comprehensive framework for the analysis of the historical garden of Antoniadi as a case study: an in-depth understanding of the different potentials and constraints of the garden was required. The information was collected using three means: firstly, the analysis of the principles of Sustainable Landscape and the design guidelines related to garden elements. Secondly, guidelines that concern the management of the garden to achieve garden tourism were identified and ICOMOS guidelines for preservation the historic garden were determined. The SWOT analysis of Antoniadi was developed based on the above-mentioned guidelines and integrated visitors' needs and degree of satisfaction as an essential aspect. In a broad sense, taking into consideration the well-being of the citizens with respect to future generations' needs and to environmental conservation is a crucial issue for achieving sustainability of cities. Therefore, the paper developed a structured survey questionnaire. The aim is to explore the different potentials of Antoniadi, to identify the reasons of its deterioration, the extent of deterioration, and the consequences on the garden value. The questionnaire was addressed to two main groups: the visitors and the employees of the gardens (administrators, gardeners, and so on).

The sample of the study is not totally representative of the population but it is an exploratory qualitative approach focusing on these two groups. The total number is 100 respondents. After that, it was possible to formulate realistic and applicable recommendations for the revitalization of the historical gardens similar to Antoniadi gardens.

3. PRINCIPLES OF SUSTAINABLE LANDSCAPE

Based on the various environmental, social, and economic benefits of gardens reviewed earlier, it is important to understand the principles of sustainable landscape. The landscape structure should support the ecological, social and economic process that required while maintaining the institutional requirements (Opdam et al., 2006; Antrop, 2006). Based on the review of selected studies elaborated by Thompson and Sorvig (2008), Klett and Cummins (2013) and El-Barmelgy (2013), the paper classified and compiled the principles of sustainable landscape under the four following pillars and specific principles:

- The Environmental dimension: includes keeping the site healthy, healing injured sites, supporting living adaptable materials, respecting the natural water patterns, supporting wildlife, and considering local climate.
- The Socio-cultural dimension: includes considering people

satisfaction and priorities, using lighting efficiently, enhancing soundscape and reducing noise through planning and accentuating the aesthetic values.

- The Economic dimension: includes considering the cost of energy and studying the economic feasibility and benefits by efficient management that protects natural assets.
- *The Institutional dimension*: involving all stakeholders in decision making, including the community with coordination and follow up, and applying integrated management.

4. DESIGN GUIDELINES RELATED TO GARDEN ELEMENTS

After this account of principles of sustainable landscape, it is essential to understand the design guidelines of gardens to deduce appropriate strategies. These guidelines are based on various reports and adapted to the Alexandrian context by the researchers (Planning-and-Development-Agency, May 2017). These guidelines concern:

- Spatial organization: how the activities are organized inside the garden and focus on the best relation between zones. The design should allow flexibility and safety for users to encourage social interaction.
- Circulation system: gardens should have well connected circulation system to provide effective means to accommodate all types of moving through the park including: walking, cycling, using vehicles, and parking facilities. The park must be provided with connected and clear pedestrian network. The material of paths and vehicles streets should be taken into consideration. Separation between walking, cycling, and vehicles lanes for the safety of users is required. All aspects of suitable movement for the people with special needs should be provided. Finally, the parking location and its capacity should be suitable to visitors' number.
- Public facilities: The service area of the facilities must be taken into consideration. All types of services such as restrooms, mini-markets, cafes, spas, gymnasium, and visitors' center must be provided according to visitors' needs and must be well-distributed throughout the garden's area.
- Landscape: Hard landscape elements like benches, fences, bins, playing equipment, signage, and lighting must be well designed as to reach the best relation between them, as well as the selection of suitable types, materials, heights, and their suitable distribution. Soft landscape elements such as trees, shrubs and lawn and their irrigation system should be taken into consideration, as well as their types and functions, smells and colors. The designer should be aware of the types of trees and shrubs; if they are deciduous or evergreen to reach to the best usage. A sustainable irrigation system must be used and it must reach to 100% of the green surface.
- Topography: the topography of the park should be reducing soil disturbance, the minimum slope of planted area should be 2%, and the hard court surface should be graded at 1%. Besides, the natural slopes of the landscape should be re-



spected.

5. GUIDELINES FOR GARDEN TOURISM

Pearce (1991) shows the following definition for tourist attraction 'A tourist attraction is a named site with a specific human or natural feature which is the focus of visitor and management attention' (Connell, 2002). Understanding the visitor attractions and determining its relation to the visitor experience can improve the garden as a recreo-touristic destination. The following guidelines of sustainable garden tourism include management and marketing strategies:

- Actors of management: engaging all the community councils and administrators and determining an appropriate management plan.
- Visitor information: recording all the visitor information including number, behavior, places of gathering, when they go there, their needs and the main problems. In short, it is about understanding the relation between the visitors and the garden.
- Public facilities: providing the facilities that cover visitors' needs and that are suitable for the garden content; how they are arranged inside the garden and their location.
- Education facilities: improving the research centers' functions and providing programs for all age categories to enhance their knowledge about nature and sustainability.
- Events: encouraging and supporting all types of events, entertainment, and educational activities that respect the content of the garden.
- Security and safety: protecting the garden and the sensitive sites, connecting spaces together visually, best distribution of the lighting system and avoiding dark spots, enhancing the safety factor, providing security cameras and security team (Benfield, 2013)
- Human resources: engaging the community with the garden and enhancing feeling of belonging and responsibility towards the garden, providing career opportunities and providing volunteering programs.
- Marketing methods: enhancing the use of local products inside the garden, providing marketing operations, increasing local economic contribution from tourism, and using all available media in advertising (Connell, 2002).

6. THE HISTORIC DIMENSION: ICOMOS GUIDELINES

The historic garden is an architectural composition whose constituents are primarily vegetal and therefore living, which means that they are perishable and renewable."(ICOMOS,1981). According to the International Council on Monuments and Sites (ICOMOS), historic gardens must be governed by specific rules, as specified in the Florence Charter of 1981. These guidelines can be summarized as the following:

- During maintenance or conservation of the historical garden, the whole garden with its features must be dealt simultaneously, as dealing with only one part would damage the

unity of all.

- Historical gardens need continuous maintenance as vegetal is its principal material so its preservation is in a variable condition and requires both immediate replacements if it is necessary and a long-term programme of periodic restoration.
- Any permanent or movable architectural, sculptural, or decorative features, which are within the garden components, must be removed or replaced only if it is essential and its date of replacement must be indicated.
- Any modification in the surrounding physical environment of the historic garden that will endanger the ecological balance must be forbidden and that includes all aspects of infrastructure facilities.
- The reconstruction works of the historical gardens must be occurred according to prior research to ensure that such work is scientifically executed. Before any particular work starts, the redevelopment project must be submitted to the experts for examination and approval.
- The historic garden is a peaceful place encouraging the human interactions, silence, and awareness of nature. The rules of using the historic garden in holding festivals must be clearly defined to let the festivals serve the enhancement of visual effect of the garden instead of damaging it.

7. THE DESCRIPTION OF ANTONIADIS GARDEN

7.1 Garden design analysis

- Location and history of Antoniadis Garden
Antoniadis Garden lies alongside the Mahmoudia Canal at the southern entrance of Alexandria in Smouha district. The garden has a strong historical identity. In 1860, Khedive Ismail asked Paul Richard to create the gardens following the French Garden's principles (Alexandria-Governorate, 2018). The gardens also have several historical design styles, they are: French style, Italian style, Andalusian style, Natural style, sunken style, and Greek and Roman style.

- Circulation system

- Entrances and Nozha complex main streets

The Antoniadis garden comprises 3 gates: the north entrance is the main one and it located on Albert Al-Awal Street. The second entrance is the South Gate which is a historical gate constructed by Mahmoud Mohamed Pasha in 1929. The third entrance is another North gate controlled by the Navy forces.

- Circulation network inside Antoniadis garden

Antoniadis garden has a connected pedestrian network and the cars' movement is restricted inside. The main problem in circulation is the absence of parking lots inside and outside the gardens.

- Spatial organization

Antoniadis constitutes as a part of the group of gardens that form the Nozha complex. The Nozha Park includes the Zoo garden, the Nozha garden, the children garden, and the Rose garden. Also according to the design styles of Antoniadis Garden, it is divided into 9 sections: Antoniadis Palace area, French garden, Italian garden, Royal Glasshouse garden, Pentagonal garden,



Elmashahr garden, English garden, Andalusia garden, and Forest area (Arafa, 2014).

- The historical components of the Gardens:

- The Antoniadi Palace

The palace is on the list of the heritage buildings with the number 1250 under class B in the city level according to the historic and touristic importance of the palace and the gardens (Awad, 2017). It consists of four levels, and the total area is 2,859 m². It was revitalized by the Center for Alexandria and Mediterranean Studies and the development works were finished in 17 May 2017 (M. Awad, personal interview, November 23, 2017).

- The Royal Glasshouse

The Royal Glasshouse is located on the western side of Antoniadi garden. The iron structure is particularly remarkable with its large span and large areas of glass (N. Ismaiel, personal interview, November 3, 2017)

- The Statues

The garden contains 17 statues carved from pure alabaster and marble that represents gods of Antiquity and other renowned historical figures. (Goneima, Al-Sheikh, & Abo-Sheleeb, 2001).

- The Antoniadi Stage

The stage consists of stage's theater and in a lower level there are the actors' rooms. The background of the stage displays Roman columns inspired from the Baalbak temple. (Goneima, Al-Sheikh, & Abo-Sheleeb, 2001).

- El-Mashahr Garden

El-Mashahr garden includes seven valuable statues representing several international historical characters and they are placed in a circular arrangement and it is not accessible for the visitors. Besides, the garden contains a collection of rare plants (Goneima, Al-Sheikh, & Abo-Sheleeb, 2001).

- Landscape:

- Hard landscape

Benches: There are two styles of benches in Antoniadi garden. One of them is made from alabaster and is a historical piece; the second style is made of wood and steel.

Signage: The garden has only three signs.

Lighting: In Antoniadi gardens there were several kinds of lighting fixtures. All of them are designed to suit the pedestrians scale.

- Soft landscape

Trees and shrubs: The Forest area is about 25,430 m², the trees were planted to be future plant nursery, (Arafa, 2014).

Irrigation and infrastructure: The irrigation system in Antoniadi is from the underground water by hoses. (N. Ismaiel, personal interview, November 3, 2017).

7.2 Garden tourism analysis

- Management

- Actors of management

Today, Antoniadi gardens are divided into two parts. The Antoniadi Palace and 8094 m² of the adjoining gardens are managed by The Alexandria and Mediterranean Basin Studies Center affiliated with the Bibliotheca of Alexandria. Additionally, the garden

and Antoniadi Palace are supervised by The Technical Committee for the Conservation of Heritage, affiliated with the Governorate of Alexandria, as the garden and its historical components are listed in the Heritage Catalogue of Alexandria. The Horticulture Research Institute affiliated with the Agricultural Ministry manages the rest of the garden. Hence, any development in the garden requires permission from these three administrations (N. Ismaiel, personal interview, November 3, 2017).

- Visitor information

A full study of the visitors' information was undertaken in the present research to understand their needs, their motivations, and challenges, and the relation between the visitors and the garden.

After analysis and recording visitor's results, it was found that the number of visitors is very limited in comparison with the international botanical and historic gardens as the garden in the highest year of visit records 245,430 visitors; while international botanical gardens record more than 600,000 visitors.

It is expected for Antoniadi garden to accommodate 1 million visitors per year, if the garden is maintained and renewed adequately with sufficient services (N. Ismaiel, personal interview, November 3, 2017).

Degree of satisfaction

Opening hours: Until 2017, the garden was open daily from 9 am to 5 pm, since the theft of a statue in Antoniadi garden, it closes at 2 pm and this considerably reduced the number of visitors (N. Ismaiel, personal interview, November 3, 2017). Most of people prefer to extend openings hours to 9 pm and even later especially during summers to enjoy open-air activities (concerts and events).

Climate: Respondents are very satisfied with weather conditions inside the garden. The only need was shelters and closed pergolas for rainy days.

Quality of the garden: Respondents rank the quality of the gardening according to the overall design, cleanness level, if the garden is suitable for their activities, their satisfaction about services, and if it suitable for all ages. They were also asked about the advantages and disadvantages. According to the questionnaire, it can be determined that the prevalent problems for the respondents are the following: uncleanliness level of the garden, lack of safety and security inside, and lack of services and maintenance. On the other hand, the greatest advantages of the garden are the variety of green spaces, and flowers, the large area of the garden, and the historical assets within the garden (Table 1)

According to the questionnaire, the reason of going to Antoniadi garden and the motivations of the respondents were as following: 30% of visitors go to the garden to enjoy green areas and relaxing, 16% of them prefer to bring their food to have lunch in green open space, 13% for walking, 12% go to play different games, and the other activities distributed in 16%. Regarding people's opinion on the garden services, 94% answered that services are inadequate and 6% answer that services are more or less adequate and no one answer that they are adequate. (Fig1).

Table 1: the visitors answers about the advantages and disadvantages of Antoniadi garden, source: the researchers



| Advantages | number | Disadvantages | number |
|----------------------------|--------|---------------------------------------|--------|
| Green place | 40 | Uncleanliness level | 54 |
| Large area | 32 | Lack of safety and security | 44 |
| Historical place | 22 | Lack of services | 34 |
| Garden location | 18 | Mismanagement | 32 |
| General design | 14 | Lack of maintenance | 30 |
| Open air area | 12 | Lack of plant specialists | 18 |
| Low entrance fees | 12 | Presence of homeless people | 14 |
| Suitable for all people | 12 | Insufficient seats | 10 |
| Contain rare plants | 8 | Insufficient entertainment activities | 8 |
| Attract investors | 6 | Insufficient public awareness | 8 |
| Historic statues | 6 | Paths are not clear | 6 |
| Opportunity for meditation | 6 | Insufficient artificial lighting | 6 |
| Opportunity for gathering | 4 | Insufficient signs | 4 |
| Quiet place | 4 | Lack of parking spaces | 4 |
| Open all the week | 4 | Lack of marketing strategies | 2 |
| Cultural place | 2 | Lack of family places | 2 |
| Educational place | 2 | Lack of labor forces | 2 |
| | | Insufficient budget | 2 |
| | | Inadequacy for all ages | 2 |
| | | Inadequate irrigation system | 2 |
| | | Abandoned grey (building and lands) | 2 |

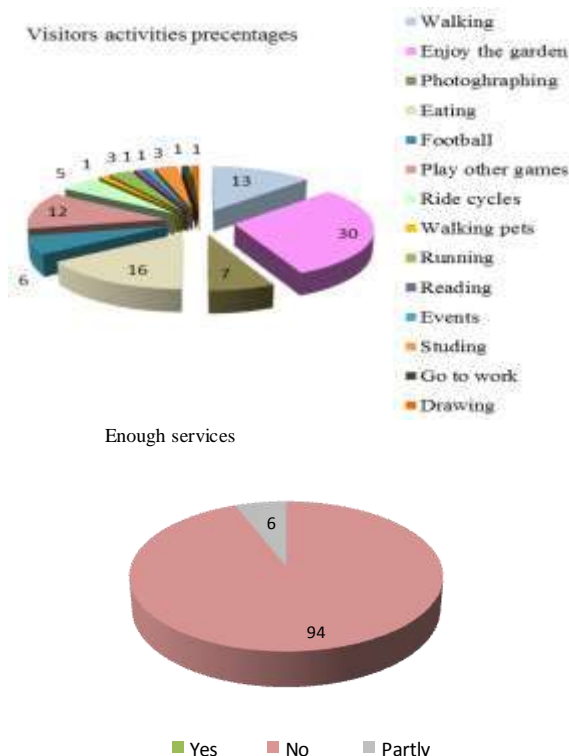


Fig. 1. shows the questionnaire answers about visitor activities and garden services, source: the researchers.

• Public facilities

There are several services common between the Nozha complex and Antoniadi's gardens. For a total of 110 acres there are five restrooms two mosques in a good condition, only one storage building, three buildings supposed to be mini markets. There are two kiosks, one of which is used as a mini market and the other one is closed.

• Education facilities

Internationally the number of children and adults who are educated in the garden is a major issue for the garden to be classified as a botanical one. Antoniadi's gardens include the Horticulture Research Institute which role is to preserve and enhance endangered plants. Unfortunately, it lacks the appropriate number of specialists and lacks funds. The last international educational expedition of Hanover University dates back to 2006.

• Events

Events and concerts inside the garden ended since 2008 when San Giovanni Hotel ended its contract of managing Antoniadi's stage. After this date, there were some concerts but they were neither well organized nor managed.



- Safety and security

The Antoniadis garden is fenced from all sides, which gives more security and makes it more manageable. On the other hand, there are no cameras or security team, so at night the place is very unsafe.

- Human resources

A successful management system is urgently needed to eradicate potential corruption of some employees. Moreover, the garden has only eleven employees in the whole area, the garden's administrators always ask for more human resources, but there is no response from local authorities.

- Marketing

- Marketing methods

Antoniadis garden lacks marketing plan and advertising. Current visitors know about the garden from their parents.

8. THE SWOT ANALYSIS

To propose an appropriate framework for the revitalization of historic gardens and understand the current situation of the Antoniadis garden, each component deducted from the above-mentioned guidelines was subject to a SWOT analysis. The analysis also included visitors' questionnaire and interviews, (table 2).



Table 2: SWOT analysis of the Antoniadis Garden components, source the researcher

| Component | Strength | Weakness | Opportunities | Threats |
|----------------------|--|---|--|---|
| Location | In the center of Alexandria. Near to Nozha airport. Easily accessible. Surrounded by main streets. Surrounded by several educational facilities. | Absence of night life and the place is unsecure at night. The surrounding streets are high ways and there is a lack of pedestrian footfall. . | The current development project of Mahmoudia Axis provides new residential and commercial areas nearby the garden and makes the district more vital. | Attract antisocial activities at night. Exposed to unsuitable investments surrounding the location. Unreasonable potential development nearby Antoniadis. |
| Spatial organization | Historic value and mixed-style design garden. Variety in cultural elements. Vital visiting experience. Strong place identity. | Lack of connection between garden design styles. No visual connection between zones. Visitors' feeling of being lost. Forest area is not designed and is abandoned. | If the different historical garden designs are integrated the spatial organization will be enhanced. Redesign of the English garden and the forest area will enhance the overall design and provide more activities for users. | There are random antisocial activities in abandoned area. Changes in spatial organization can endanger the ecological balance of the garden. |
| | | | | |
| Components | Strength | Weakness | Opportunities | Threats |

| | | | | |
|--------------------|---|---|---|---|
| Circulation system | Connected pedestrian paths. Cars' movement is limited inside the garden. | Lack of parking area inside or outside the garden. Lack of cycle lanes and emergency exits. No separation between service entrance and cars. Lack of consideration for people with special needs. Some stairs are broken. Sand is not a suitable material for paths. Pedestrian paths are deteriorated. | If special vehicles service are provided this will encourage different age groups and people with special needs to visit the garden. If the material of the path is improved the walkability will be increased and different age groups as well as people with special needs will visit the garden. If a service path for firefighting is provided the safety will be increased. If a maintenance and services road is provided services will be greatly improved. If parking space is effectively provided in suitable locations the number of visitors will increase. | Mismanagement in providing clear path will lead to an increasing feeling of being lost. Unsuitable current materials reduce the effectivity of the paths. |
| Antoniadis palace | Architectural value. Unique location in the garden. Large in scale. Recently renovated and developed (2017). Its function was replaced from residential to touristic venue. | Unused even after development. Lack of management plan. Sensitive place for nearby construction or development. As it is a listed building, there are restrictions on its use and its renewal. | Very suitable to be a cultural center or a museum. The façade can be used in sound and light performances. can be the main touristic destination for the garden. | Exposed to thefts. Exposed to vandalism. Inadequate renovation can damage the heritage architectural character. |
| Components | Strength | Weakness | Opportunities | Threats |



| | | | | | | | | | | | |
|-----------|--------------------|--|---|---|---|------------------|--|---|---|---|--|
| Component | Royal glasshouse | Place of historical value. Very good daylight inside the space. Unique design style. Large building in scale. Contains sculptured statues and fountains. Different floor patterns in the surrounded landscape. Visual contact with the rest of the garden. | <ul style="list-style-type: none">•Fragile building material.•Neglected fountain (with no water).•Deteriorated floor patterns.•Lack of surrounded services.•Mismanaged.•As it is a listed building, there are restrictions on its use and its renewal. | <ul style="list-style-type: none">•Attractive place for investment.•The place can be used as a photography hotspot.•Can be used for different activities, as long the conservation of the building is guaranteed. | <ul style="list-style-type: none">•Exposed to vandalism.•Could be used for inappropriate activities.•Neglected by managers. | Antoniadis stage | <ul style="list-style-type: none">•Cultural and historic value.•Accommodates 5000 people.•Open air stage.•Surrounded by green areas.•Beautiful historical stage background.•Near to the north gate of Antoniadis. | <ul style="list-style-type: none">•Need considerable budget for maintenance.•Fragile stage material.•Limited platform size.•Lack of lighting and sound system.•Absence of services areas.•Lack of parking areas.•Lack of management.•Unsuitable for usage during the whole year. | <ul style="list-style-type: none">•The stage can be used for concerts and events.•Appropriate for wedding parties if access and service entrances are provided.•Attractive for events investment as well as the conservation of green areas is guaranteed.•Multi use space.•Has the opportunity to be used during the whole day. | <ul style="list-style-type: none">•Exposed to be source of noise.•Events and activities must take place without prejudice to the conservation of the gardens and landscapes. | |
| | Statues | Artifact of historical and artistic value. Durable material. Varied collection. Introduce renowned figures of Alexandria to the public. | <ul style="list-style-type: none">•Lack of maintenance.•Lack of surveillance. | <ul style="list-style-type: none">•Touristic destination.•Destination for artists and students. | <ul style="list-style-type: none">•Exposed to vandalism, theft and erosion factors.•Need maintenance. | | Benches | <ul style="list-style-type: none">•Old benches are historical and valuable.•Most of garden sections have enough seats.•Old benches are fixed to the ground. | <ul style="list-style-type: none">•Bad condition of current benches.•Lack of benches along the paths.•In front of Mashahyr Garden, benches are distributed too close to each other.•Lack of benches laid out for gathering.•Some of the benches are made of nondurable material.•Some sections like English and Italian gardens have no benches at all.•Lack of shaded benches.•Most of benches are not accessible for people that reduced mobility. | <ul style="list-style-type: none">•Appropriate layout of well-designed benches encourage group gathering.•Benches can be treated with anti-graffiti coatings.•Trees provide shade that must be complemented by appropriate benches.•Benches produced of concrete often have interesting forms and can be integrated in the garden with appropriate finishing and surface protection. | <ul style="list-style-type: none">•Exposed to vandalism.•Exposed to weather changes.•Material properties make benches sometimes too cold or too hot. |
| | El Mashahyr Garden | <ul style="list-style-type: none">•Artistic pieces•Historical educational value•Durable material•Collection of rare plants | <ul style="list-style-type: none">•Lack of maintenance•Destroyed fences in some parts•Dormant grass•Plants are injured | <ul style="list-style-type: none">•Attractive touristic destination•If the garden introduced in an appropriate way to the visitors the educational value and public awareness will be increase | <ul style="list-style-type: none">•Exposed to vandalism•Exposed to thefts•Exposed to erosion factors | | | | | | |
| | Strength | Weakness | Opportunities | Threats | Components | Strength | | Weakness | Opportunities | Threats | |



| Component | | SWOT Analysis | | | | |
|-----------|--|--|---|--|---|--|
| | | Strength | Weakness | Opportunities | Threats | |
| Lighting | Signage | <ul style="list-style-type: none">Signs font is readable. | <ul style="list-style-type: none">Insufficient signage. Lack of information signs about the historical values of the gardens and its buildings.Lack of signs and maps explaining the master plan.Inside the garden signs are placed too high up for visitors to notice.Signs' size are not suitable.Lack of signs indicating plants' names.Lack of signs for instructions and directions.Lack of warning signs for pedestrian and vehicles crossings.Lack of directional signs for restrooms and services. | <ul style="list-style-type: none">Information signs for historical components can improve awareness of their value.Appropriate signage of different sections can increase awareness of its value and increase visitors.Clear instructions signage about directions, emergency exits and services can encourage visitors to stay longer, enjoy more, and come more often.Signs for vehicles' roads increase safety.Social media platforms can be used to promote the garden and give information about its value. | <ul style="list-style-type: none">Exposed to vandalism.Need continuous maintenance and renewal.Weather changes have damaging impact on signs materials. | |
| | Irrigation and infrastructure | <ul style="list-style-type: none">Unique historical design of light posts.Most of light fixtures height fit users. | <ul style="list-style-type: none">Lack of maintenance for existing light fixtures.Lack of adequate light fixtures for plants and trees.At night, the garden is completely dark as all of lights are switched off.Use of high energy consumption lamps.Insufficient lighting along pedestrian paths. | <ul style="list-style-type: none">The use of LED lighting for buildings (the Palace and the Royal Glasshouse) can significantly improve the visual interest and are energy-efficient light fixtures.The use of waterproof light fixtures can be useful for increasing visibility along paths. | <ul style="list-style-type: none">Light fixtures are exposed to vandalism.Insufficient lighting reduces visitor numbers at sunset and evening. | |
| | | SWOT Analysis | | | | |
| Component | Trees, shrubs and topography | | Irrigation and infrastructure | | Threats | |
| | Strength | Weakness | Opportunities | Threats | | |
| | <ul style="list-style-type: none">Important collection of rare plants and old trees and palms.Several types of flowers with different smells. | <ul style="list-style-type: none">Some trees have diseases and are not treated.Lots of rare plants types have disappeared.Lack of seasonally program for trees and palms pruning.Lack of technology for using seeds of rare plants and regenerate them. | <ul style="list-style-type: none">An existing irrigation system and wells covering all the garden. | <ul style="list-style-type: none">Large amount of wasted water.Water doesn't reach to the roots in some parts.Insufficient infrastructure pipes.Insufficient drainage system to create more services.The drainage and irrigation system are unsustainable. | <ul style="list-style-type: none">If efficient automatic irrigation system is used, the garden will be improved.Recycling systems to reuse grey water is an option that help in saving waterDrip irrigation reduces water consumption and runoff.Incentives for installation of rainwater harvesting devices can save great amount of water.Irrigation system that covers 100% of the landscape will improve the visual quality and guarantee the conservation of green areas.Irrigation system should include the complete twelve months. | <ul style="list-style-type: none">During pruning operations, some unskilled workers cut trees in inadequate way, which endanger the softscape.The garden elements must be preserved in accordance with the specific rules which can limit touristic activities. |



| | | | | |
|-------------------|--|---|--|---|
| Public facilities | There are restrooms, stores, and kiosks inside the garden. | All restrooms and stores are in a deteriorated state. Shortage of services for visitors. Lack of consideration for visitor's needs. | The English garden and the Forest area with total area 51600 m ² which are not listed in the Heritage Catalogue can be redeveloped and create different public facilities | Unsafe areas in abandoned buildings are not supervised by the administration. There are several illegal night activities. |
|-------------------|--|---|--|---|

9. FINAL PRINCIPLES AND RECOMMENDATIONS

After the earlier analysis and results, it was concluded that a comprehensive approach must be adopted to achieve the conservation of the Antoniadis gardens as a historic living monument, which can be developed to a touristic destination. This approach can be implemented to develop and maintain historic gardens, in general, but with appropriate adaptation. The recommendations are developed according to the following principles:

1. Developing management models that suits the unique nature and context of each public garden is crucial to ensure sustainability over time. The management of gardens encompasses a broad range of issues. Management models should be focusing on achieving balance between diminishing funding, protecting biodiversity and fulfilling people needs.
2. The appealing image of public gardens, which is one of the main motivations that attracts people, highly depends on the level of cleanliness of the place. This requires an effective and efficient waste collection system, and in the case of Antoniadis, not just the provision of the sufficient number of bins but new ways of law enforcement regarding offenders that drop litter or commit acts of vandalism.
3. The Historic areas of the public gardens are subjected to the rules of the Florence Charter in terms of conservation, maintenance, restoration, use, and development. Consequently, the administration of Antoniadis gardens should be managed by a special organization under the supervision of the Technical Committee for the Conservation of Heritage affiliated with the Governorate of Alexandria. This organization should have control over all aspects of the garden and its heritage buildings.
4. The Garden is public and is designed to provide a safe and user friendly environment. Even if Antoniadis garden has a great potential for development and touristic activities, it must remain affordable and accessible for all and some services can be fee-based but the access to open green areas should remain free of charge. The historical buildings' adaptive reuse should not be harmful for their heritage value. The Palace of Antoniadis, for example, can be reused as a cultural center, with a library, or a research center. The Royal Glasshouse can include a flower shop, a place for cultural and musical concerts. These activities will provide night life in the garden. Additionally, safety cameras should be located in high profile sites and clear sight lines across passive and active use areas should be maintained.
5. The Garden must be relevant to community needs and expectations and must provide equitable access to all. Equitable

access means that the garden environment is usable by all; including people with special needs, families with strollers and young children, the elderly and people with reduced mobility. Entrances must be enhanced and a reception plaza with a visitor center should be created. There should be a central core for the facilities. Besides, the visitor's trip inside the garden should be legible and the design should avoid user conflicts. The starting point of the planning process for development should be the visitors' needs and expectations and must not adversely impact the natural and heritage features of the garden. All stakeholders should cooperate; architects, botanists, agricultural engineers, economists, developers, and all the related fields with public participation of the community.

6. The Garden must be cost effective and adopt principles of sustainable landscapes. The revitalization of the Garden must include supporting living adaptable materials, respecting the natural water patterns, supporting wildlife, limiting the use of landscape elements and considering local climate. For example, the lighting system should be energy saving, the paths may contain energy producers, the bins must be recyclable ones and restrooms should consider recycling grey water. Concerning irrigation, paths should consider harvesting rain water courses for reusing in irrigation, and drip irrigation should be installed in some areas to promote water conservation and reduce maintenance costs.
7. Raising public awareness of the value of the Historic Garden as a living monument. An Antoniadis garden is part of the broader concept of cultural heritage but this concept is unknown to the public. The environmental values of Antoniadis gardens, for example, can be used as an educational resource. Hence, it is crucial to take action in two directions; the first is raising public awareness of the issue. The second is aiming at taking advantage of existing legal documents and secure their implementation regarding protection, conservation, restoration, and management procedures.
8. The continuous maintenance of the vegetal constituents of the garden must be secured. The natural landscape including trees, bushes, plants, and flowers are renewable. Hence, any work of maintenance, conservation, restoration, and reconstruction must be dealt with simultaneously. In Antoniadis gardens, an extensive development program is necessary for pruning and replanting new types, and the repair of the irrigation system.
9. The educational facilities should be developed in the Garden. The Administration should provide botanists, workers, and facilities to enhance the seed bank of the Horticulture Research Institute of Antoniadis. Educational trip and programs



should be set for all ages and make use of the ecological, historical, cultural and architectural values in the educational field.

10. A business plan is needed to guarantee the success of the revitalization and development plan of the Garden. The development plan must be consistent with the rules of the Florence Charter and the sustainable landscape principles. Attract successful developers and make the garden more vital and livable. For example; open cafes, restaurants, mini-shops and book shops can be developed in the Forest area of Antoniadis. Contracts should be clearly instructed with suitable benefits to the gardens and for a limited period to secure maintenance funds of the historical areas and preserve its value at the same time. The financial plan should be followed up periodically to develop immediate corrective actions in case of any problem. Finally, marketing is a main factor for a successful development plan; marketing should start simultaneously with the first step of development by advertising and encouraging volunteers.

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