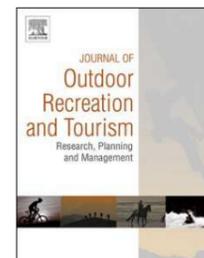




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Landscape character assessment, perception surveys of stakeholders and SWOT analysis: A holistic approach to historical public park management

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ABSTRACT

This paper investigated the use of landscape character assessment and perception surveys of stakeholders (i.e. employees, students and visitors) and SWOT analysis as a holistic approach to developing landscape management guidelines for historical public parks. The aim is to conserve and protect the historical and cultural heritage (landscape character) of historical public parks and address the stakeholder needs that do not threaten the park's historical and cultural heritage. The site selected for study is Syggrou Estate, a historical park located within the northern suburbs of Athens, Greece. Specific objectives of the study are to: (i) assess the historical, cultural, and natural importance of Syggrou Estate, (ii) determine the perceptions and needs of stakeholders, (iii) provide landscape management guidelines for historical public parks based on landscape character assessment, perception surveys and SWOT analysis. The results show that the most important aspects of Syggrou Estate are the forest and cultivations for the retention of the Estate's historical value. The three most popular development actions were to conserve the present crops, restore the basic infrastructure, and increase educational activities. This research is valuable for identifying and assessing landscape characteristics and enhancing landscape awareness for sustainable park management. It provides a consultation among experts and stakeholders regarding the park's development priorities and their associated landscape guidelines and supports practitioners on park management and any legislation regarding the protection and enhancement of parks history and biodiversity.

Management implications

This study aims to show a sustainable approach for appropriate management of historical parks based on a landscape character assessment and stakeholder's participation. The research supports the argument that successful management should be transparent, and governance should be shaped through dialogue and agreement among key stakeholders having in mind the primary aim to conserve and protect the historical and cultural heritage of public parks. The paper supports the necessity of formal evaluations which will better address national standards and needs such as:

- a) the protection and enhancement of the natural forest and cultivations,
- b) the continued recreational value and

- c) the information and education of local managers (farmers and gardeners).

This procedure aims at achieving a consensus among landscape architects and stakeholders regarding the park's development priorities and their associated landscape guidelines. The benefits from the combination of the above methods will support

- a) landscape and environmental protection,
- b) increase cooperation, collegiality, co-management,
- c) generate feeling of "ownership" of the management plan.

1. Introduction

Parks are landscapes of memory and valuable natural and cultural depositories (Woudstra & Fieldhouse, 2000) and as such, they play an

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important role in supporting biodiversity and people's wellbeing. Historical parks are designed to improve the urban environment in many ways, by raising the value of nearby properties, improving the air quality in urban areas, providing opportunities for exercise, and a place where people could relax and enjoy the view of trees and grass (Woudstra & Fieldhouse, 2000). According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), landscapes designed and created intentionally by man such as historical parks constitute a cultural landscape (WHC, 2017) UNESCO (WHC, 2017) defines "cultural heritage" as "sites: works of man or the combined works of nature and of man, and areas including archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological points of view".

The relationship of people with historic parks and their environment has been thoroughly analysed by researchers from physical and socio-economic and regional geographical aspects (Ackerman, 1963; Beltran, 2000; West & Brechin, 1991; Zube, 1986; Zube & Busch, 1990). A sense of belonging is interpreted by academics and public authorities as 'the sense of place' or 'local distinctiveness', and it has sometimes been misinterpreted by users since they like to think that places remain intact, 'unspoiled'. This relationship developed between nature and local people (community) are ecosystem services and constitute community livelihoods; major problems and trends can arise from the interchange between the community and the environment. Over time many well-designed parks have deteriorated due to a lack of maintenance, vandalism, poor-quality repairs, poor new design, poor location of new features, ill-informed planting, and the removal of existing features, including planting and bedding. The impacts of such changes may adversely affect the appearance and usage of the park. This is why, an important issue raised in the literature was the awareness of the need to involve local communities in the processes of park management (Ole' sniewicz et al., 2020; Mitchell et al., 2009; Takyi & Seidel, 2017).

This work aims to answer the common question about the sustainable approach for appropriate management (Luque-Martínez et al., 2019; Deng & Li, 2019) of historical parks and to apply a methodological framework for management guidelines (Canada's Historic Places, 2010) with the aid of landscape character assessment and stakeholder's participation. The basis for any (new) proposed design within historical public parks should be a profound understanding of the site and its connections with the surroundings, regarding its spatial, historical, environmental, and ecological qualities. Most new designs are poorly implemented due to a lack of understanding of the existing landscape. In general, the literature lacks descriptions of sustainable and comprehensive landscape management (Ole' sniewicz et al., 2020; Takyi & Seidel, 2017) regarding public parks and especially the historic ones.

For the proper management of historical (multifunctional) parks, it is important to consider these cultural landscapes as a series of 'overlays' in time and to protect them from losing their character due to vandalism, neglect, ignorance of understanding their function and value. So far, many methodologies and tools have been developed such as: the practice guidelines for the management of protected areas by the World Commission on Protected Areas (WCPA); the more model of the management planning process that is aimed specifically at landscapes titled the 'Recommended Brief to Applicants and Historic Landscape Consultants' by the British, Heritage Lottery Fund (Woudstra & Fieldhouse, 2000); the "Management Guidelines for World Heritage Sites" developed by the joint effort of the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM) and the International Council on Monuments and Sites (ICOMOS), under the auspices of the Cultural Heritage Division of UNESCO, and based on experience around the world, and headed the classification of cultural values with "identity value", that is "related to the emotional ties of society to specific objects or sites" (Fielden & Jokilehto, 1993, p. 18).

The basic steps for restoration and conservation have been thoroughly studied by several researchers (Lambert & Goodchild, 1991; Tsalikidis & Tamoutseli, 1998). The good understanding and

identification of the landscape character of historical parks, is an important parameter for conservation. Regarding the conservation guidelines of historical parks, there are three main distinguished phases (The Nature Conservancy, 2016; Woudstra & Fieldhouse, 2000): 1. The preliminary study, that involves understanding the landscape character-defining elements and how they contribute to the heritage value of the historic place (definition issues, searching the legal framework and available bibliography, setting criteria), 2. Documenting the landscape character-elements identified in the previous stage and supported by an overall assessment of their physical condition (landscape assessment of the current situation following landscape analysis principles, i.e. planting, phytopathology, soil, drainage, fauna, lighting, views, land use, archaeological interest, sociocultural impact, etc.), and 3. Planning, that involves recommending measures for protecting and maintaining elements, with an emphasis on recognized conservation methods and restoration criteria (general criteria, site-specific criteria, criteria in terms of feasibility, criteria in relevance to the future usage of the park) (Lambert & Goodchild, 1991; Tsalikidis & Tamoutseli, 1998). This work proposes a holistic approach that combines landscape character assessment (L.C.A.), -as a recognized tool for the classification and description of landscapes, to understand the evolution of its physical and cultural characteristics (Swanwick, 2002)- with perception surveys of stakeholders on the historical park's, strengths/weaknesses/opportunities/threats (SWOT analysis), qualitative traits, etc. LCA, is seen as central to the implementation of the European Landscape Convention and a very valuable tool for experts to evaluate a park's landscape character (Demir & Demirel, 2017; Hampshire County Council, 2012; Kolejka & Lipský, 2008).

The involvement of visitors in the management of urban public parks generates a relationship with the park authorities (Paraskevopoulou et al., 2020; Speller & Ravenscroft, 2005) and in historical parks, it can also raise awareness and promote their conservation (Bell, 2003). The use and visitor perceptions of green spaces have been studied by several authors (Holm et al., 2000; Tinsley et al., 2002; Jim & Chen, 2006; Woolley, 2006, p. 194; Özgüner, 2011; Gani, 2015; Vishal, 2016); while studies on the use and visitor perceptions of historical public parks and gardens are limited (Saeed, 2017).

Based on the above, the purpose of this paper is to develop landscape management guidelines for historical public parks based on a holistic approach that combines landscape character assessment with both perception surveys of stakeholders (i.e., management staff and visitors) and SWOT analysis, using the Syggrou Estate as a case study. More specific i. a methodological approach for sustainable park management is developed and ii. applied to Syggrou Estate, and subsequently iii. reviewed for both its potential to create an appropriate park management plan and iv. its applicability for other historic sites.

The aim is to conserve and protect the historical and cultural heritage (landscape character) of historical public parks and address stakeholders needs that do not threaten the park's historical and cultural heritage. Syggrou Estate was selected as a case study due to its historical, natural and social value for the north suburbs of Athens and among the few parks appreciated as a hub for education on agriculture. Especially, in Greece, landscape management of historic parks is at an infant stage. The research questions addressed for Syggrou Estate were "How can LCA, perception surveys of stakeholders and SWOT analysis be used to develop landscape management guidelines that will conserve and protect its historical and cultural heritage?" The applied holistic approach can possibly be adapted to other historical public parks.

2. Materials and methods

2.1. 2.1. Research area

Syggrou Estate, located within the municipality of Maroussi in Athens, Greece is ultimately an amazing complex area with multiple services recognized for its natural, historical, and cultural heritage and

important role in the people's quality of life (Institute of Agricultural Science, 2010). The particular park extends to the borders of the two neighbouring municipalities of Maroussi and Kifissia (Fig. 01). It is one of the few free green spaces within the city network of Athens's basin; 14.9 km from the centre of Athens (Syntagma square). It is accessible by local transport (metro, bus), and it is adjacent to Kifissias avenue, one of the main corridors linking the city of the Athens with the north suburbs. Syggrou Estate is located at the center of diverse tourist and recreational attractions, which are based at the neighbouring municipalities of Maroussi, Kifissia, and Penteli Mountain. More specifically, it is 7.5 Km away from the Olympic Athletic Center of Athens "Spiros Louis", 2.5 Km away from Goulandris Natural History Museum, 2.3 Km away from "Alsos Kifissias", 5 Km away from Athens Mall and Golden Hall shopping centres, 7.6 Km away from the National Observatory of Athens, 12.4 Km away from the Valanari Waterfall at Penteli Mountain, 10.9 Km away from Penteli Cave-Ancient Quarries. However, Syggrou Estate is the only big park of the area, with a smooth relief, offering a combination of natural and cultural activities. The management plan took into consideration this relationship with the surrounding tourist and recreational attractions.

Several statutory bodies make reference to Syggrou Estate, as: "forest", "historic place", "grove" and "park", that highlight its complex

dimension and multiple services. It was appreciated in the past for its crops and continues to be appreciated as a hub for education hosting the Institute of Agricultural Science, and School of Anavrita within the original grounds of the historic Villa Syggrou and private chapel of St. Andreas.

The first traces in the history of Syggrou Estate date from the pre-historic times, at the north area of the park, where Anavrita school is based nowadays. The area was mainly exploited during the Hellenistic times as part of the graveyard of the adjacent municipalities (Kifissia, Maroussi), where many tombstones were found and decorated the gardens and building facades. Some of these decorations are present today, such as one located at the entrance of the cellar close to the administration buildings of the Institute of Agricultural Science (Delasoulas et al., 2006). During the Hellenistic and Roman era, there are not any findings, probably because the area was unsettled and covered by a dense forest. Evidence of human presence dates back to the 9th century AD. However, there are not any findings during the Byzantine period either. During the Turkish Empire, the area is named "Anavrita" in relation to the gushing water, derived probably from a secondary pipe of Hadrian's aqueduct, crossing the Estate (Delasoulas et al., 2006; Palis, 2004). Since 1831, most of the forest-covered areas were sold to private owners and were transformed into agricultural farms. Syggrou Estate

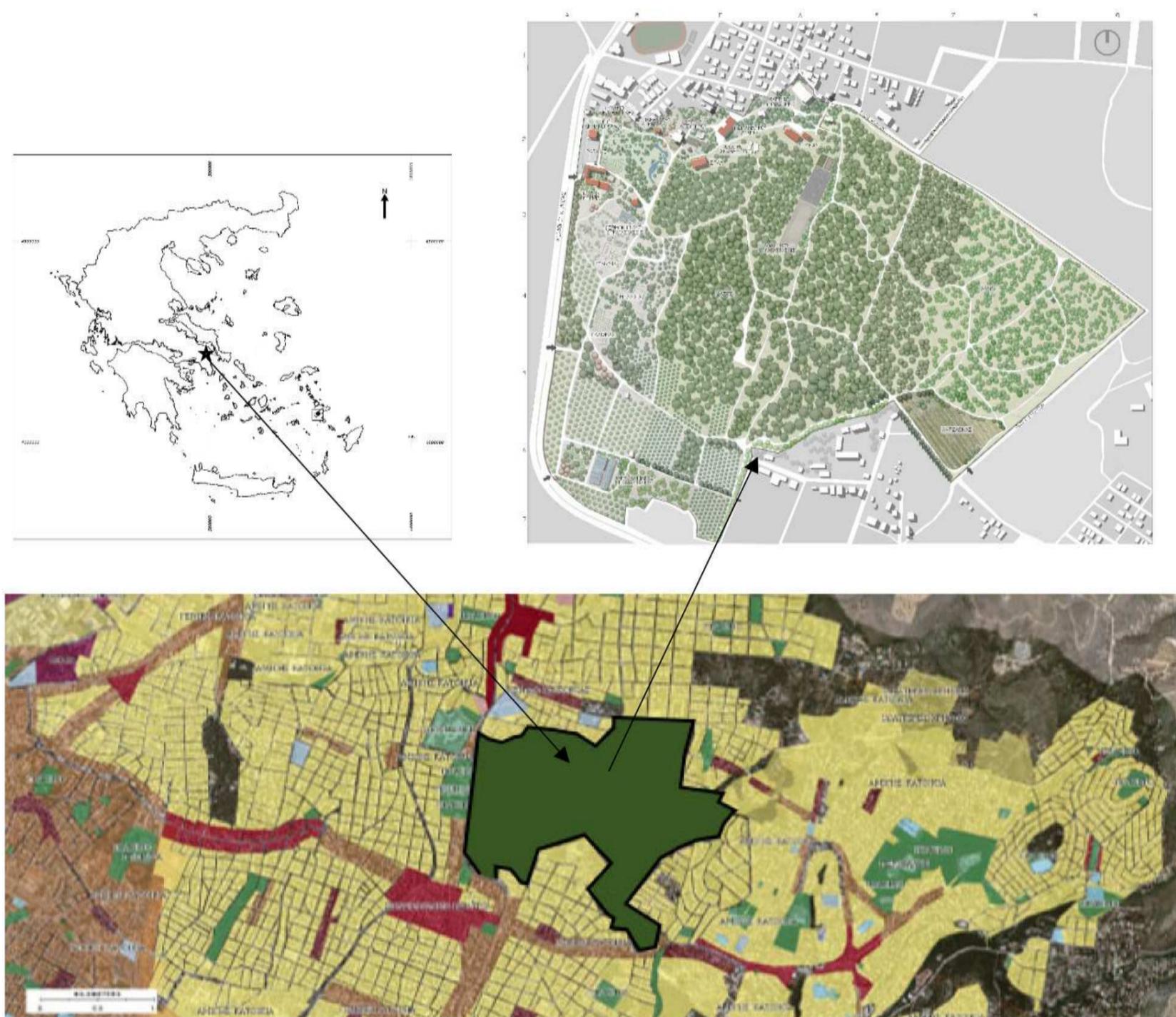


Fig. 1. Location of the study area and its relation to the surrounding municipalities and nearby green areas (green-colored patches) (source: <https://commons.wikimedia.org/wiki>, Institute of Agricultural Science, Geoportal of Ministry of Environment and Energy). (For interpretation of the references to color in this figure legend, the reader is referred to the Web version of this article.)

has changed owners till its last owner Andreas Syggros, who was inspired by King George A' and transformed the forest into a standard livestock unit, like the one at the Tatoi Royal Estate (Delasoulas et al., 2006; Palis, 2004). In 1880, Villa Syggrou was built by the Architect Ernest Tsiller, and resembles a tower or fortress, inspired by the eclectic style. The chapel of St Andrew was built on the west side of the Villa, surrounded by small gardens, an artificial lake, and a statue, remaining in a neglected stage till today. St. Andrew is a well-known neogothic orthodox chapel of the Syggrou Estate and the only one in Greece (Institute of Agricultural Science, 2010). Several buildings of the previous century's architectural style are found throughout the Estate, such as the building of the dairy farm, used nowadays for seminars and workshops, and the basement cellar close to the administration buildings of the Institute of Agricultural Science.

The Estate was famous those years for its agricultural and livestock products as well as for its innovative agricultural methods and related activities. However, its recreational character was also famous. The Estate had many buildings that included the worker's homes, stables, depots, olive mill, flour mill, cisterns and threshing floor; most of them are nowadays in a dilapidated condition. with important structural problems and need immediate restoration.

After Syggros' death, his wife, Iphigenia Syggrou, established the Royal Agricultural Academy; a school for gardening, poultry, apiculture, sericulture, livestock farming, and overall providing good education to farmers and gardeners (Delasoulas et al., 2006; Institute of Agricultural Science, 2010). According to the bequest of Iphigenia Syggrou (1921), Syggrou Estate is managed by the Academy that was succeeded by the Institute of Agricultural Science, established as a legal entity of public law and belonging to the Ministry of Agricultural Development and Food. Today, the Institute of Agricultural Science is responsible for protecting the historical and cultural heritage of Syggrou Estate that includes the pine forest, original cultivations, and buildings, and legally fulfilling Iphigenia's Syggrou bequest to provide agricultural and gardening education (Institute of Agricultural Science, 2010). The cultural and historical features of Syggrou Estate with appropriate management could potentially become a pole of tourist attraction. There is a stringent coherent protection policy for the Estate's natural environment and land uses. According to the Forest Service Act 1144/27-2-2003, 249 acres are characterized as forest and protected under Article 24, of the Greek Constitution and the present forest legislation. Syggrou Estate belongs to a network of green spaces in the peri-urban and suburban areas of Athens, as well as ecological routes, due to its natural extension with Penteli mountain (Ministry of Rural Development and Food, 1993).

During all these years many controversies develop with the Forestry Department about the characterization of the Estate as a forest or at least in its majority. Nowadays, it is an area mostly visited by citizens of the neighbouring municipalities of Maroussi, Kifissia, and Penteli. New recreational facilities such as the open-air theatre and sports fields, were built to fulfil the needs of the citizens. However, today, most of them are neglected, and a careful management plan is needed (Delasoulas et al., 2006; Palis, 2004).

The surface area of Syggrou Estate occupies 950 acres (345 ha) on the southwest facing foothills of mountain Penteli at an average altitude of approximately 273 m and ground inclination (slope) 5 %. A special geomorphological characteristic of the area is the mild relief and the slight morphological inclinations. The climate most of the year is semi-dry and the months with the greatest rainfall are January, December, and November. The warmer months are July and August with an average temperature of 25.7 °C, while the coldest months are January with an average temperature of 7.4 °C and December with an average temperature of 8.6 °C (Delasoulas et al., 2006).

The vegetation consists of a small variety of types (plant communities), creating a diverse mosaic, and combined with the ground relief and human activities, influence the area's landscape character. Towards the N-NE of the Estate, the pine forest dominates, while towards the S

the agricultural landscape character is more obvious. The pine forest is mainly composed of Aleppo pine (*Pinus halepensis*) and evergreen broad leaves (*Quercus coccifera*, *Erica arborea*, *Erica manipuliflora*, *Pistacia lentiscus*, *Cistus* sp.). Other species, occupying smaller or bigger areas are cypress (*Cupressus sempervirens*), olive tree (*Olea europaea*), carob tree (*Quercus siliqua*), poplar (*Populus* sp.), acacia tree (*Acacia* sp.), fig tree (*Ficus carica*), sour orange tree (*Citrus aurantium*), palm tree (*Phoenix canariensis*), pistachio tree (*Pistacia vera*) and lilac (*Syringa vulgaris*). Apart from the trees, there are a lot of shrubs such as *Ligustrum ovalifolium*, *Nerium oleander*, *Viburnum* sp., *Ramnus alaternus*, *Pyracantha coccinea*, *Laurus nobilis*, *Cotoneaster* sp., *Jasminum nudiflorum*, *Rosmarinus officinalis*, *Phillyrea media*, *Asparagus acutifolius*, and *Thymus vulgaris*. Regarding the cultivations, the most prominent ones are the vine (*Vitis vinifera*), the olive tree (*Olea europaea*), the apricot tree (*Prunus armeniaca*), the almond tree (*Prunus dulcis*), and the pistachio tree (*Pistacia vera*) (WWF, 2004).

The absence of big mammals is characteristic, since their presence hasn't been confirmed, although tracks of them have been found on the ground. Main mammal species include small rodents, badger, hare, hedgehog, weasel, and fox) (WWF, 2004).

2.2. Proposed holistic approach

The methodology applied is based on existing research regarding public park management with historical value (Abukari & Mwalyosi, 2018; Brown, 2012; Takyi & Seidel, 2017). The following methodological steps describe the parallel and reciprocating works of Landscape Character Assessment (LCA), Stakeholder's Perception survey and SWOT analysis, all concluding to propose the development of landscape management guidelines (Table 1):

Step 1: Define the purpose and scope of work. At this stage it was essential to determine the scale and detail of the LCA as well as to define the scope of the stakeholder's participation survey.

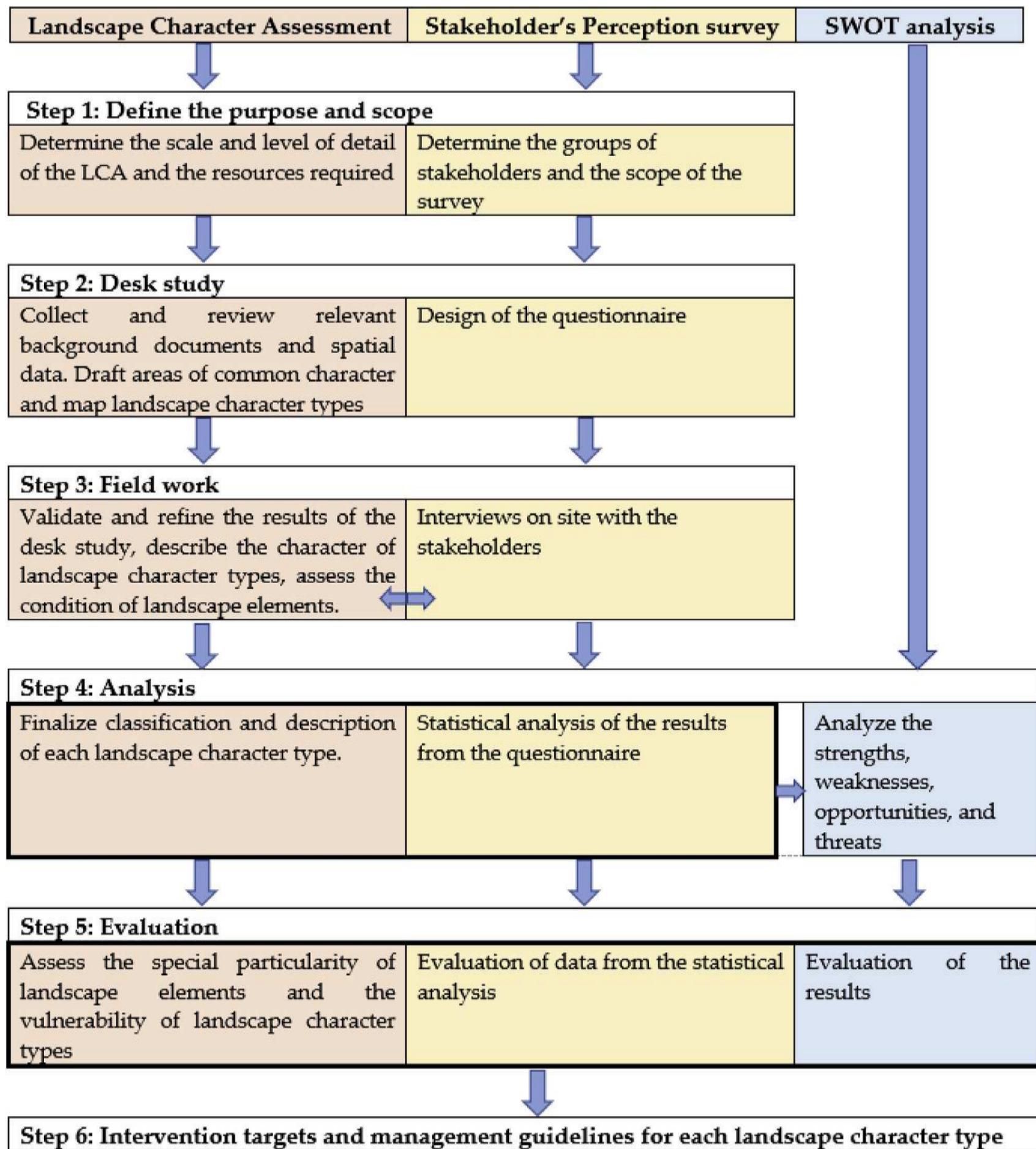
Step 2.: Desk study. A systematic review and collection of data was performed, regarding visual, physical, and cultural attributes, socioeconomic data, policies, and governance systems for the. More specifically the data collection includes detection – registration – collection – evaluation of data from the Institute of Agricultural Science. These data include historical information (e.g., postcard images, drawings, photographs, modern garden history reference works, contemporary publications), statistical quantitative information, and maps (ordnance survey maps, historic maps). Additionally, includes the determination of the exact legal framework that underpinned Syggrou Estate mostly on the level of the Greek forestry regulations, and local authority committee papers. The most characteristic landscape types were mapped, and the questionnaire survey was organized and defined.

Step 3: Field work. The aim of the fieldwork was to capture the special landscape characteristics (features, elements and patterns), to understand the on-site conditions, to collect and evaluate extra data (photos, plans, archives, etc.), and to determine stakeholder's needs and perceptions regarding the management of Syggrou Estate.

Step 4: Analysis. The Landscape character analysis was performed in order to finalise the classification and mapping of the landscape character types. A statistical analysis of the questionnaire's results was performed for the extraction of the final results. A strength, weakness, opportunities and threats (SWOT) analysis was undertaken, based on the data collected by the stakeholder's perception survey and the LCA. Strengths and weaknesses were identified for the urban context where the Syggrou Estate belongs, the perceptual and legal-administrative context, the natural environment, the buildings, the infrastructures, and the land uses. Opportunities and threats were mostly identified regarding the potential land uses, the existing infrastructures and landscape elements, the socio-economic environment, the promotional marketing of both the park, and its products.

Table 1

Methodological steps of proposed holistic approach (based on Landscape Character Assessment, Stakeholder’s Perception survey and SWOT analysis) for sustainable park management.



Step 5: Evaluation. Landscape evaluation per landscape character type was performed, presenting their individual particularities and vulnerabilities. The data from the stakeholder’s participation survey and SWOT analysis were evaluated, before their final presentation. *Step 6:* The results of the Landscape Character Assessment (LCA), Stakeholder’s Perception survey and SWOT analysis, in the context of conserving and protecting the historical and cultural heritage of Syggrou Estate, led to the development of intervention targets and landscape management guidelines for each landscape character type.

2.2.1. Landscape character assessment of Syggrou Estate

Landscape Character Assessment would play a vital role in analysing the morphological, functional and symbolic attributes of the Syggrou Estate landscape. All the natural elements (terrain, land cover, vegetation types) which are visible and mappable, were collected from the Institute of Agricultural Science and the regional Forest Service Buildings, infrastructures and prominent landscape elements were already mapped by the Institute of Agricultural Science and provided to the researchers. The mapping procedure was executed in a series of

interrelated and successive stages. All data were imported into GIS (Arc Map 10.7) in separate layers and georeferenced to the Greek natural grid EGSA 1987. The minimum mapping unit was 1 km². A series of spatial analyses were undertaken. Firstly, an identification of landform and slope inclination was performed on the contour map (contour interval 1m) and the first subdivision of landscape division units (LCTs) occurred. Then the land cover and vegetation types of maps were overlaid on the landform subdivision map and a second subdivision of LCTs occurred. Landscape characteristics and views from specific viewpoints were added, during our fieldwork visits. For each LCT subdivision in the GIS format, google earth photos were used as ancillary data. A final LCT Map was produced at a scale of 1:2,000, showing the different landscape character types of the Syggrou Estate.

The fieldwork process was organized to gain an overall impression of the visual character of the landscape, to record through photographs the characteristic features and human activities, as well as the level of vulnerability. Photos were taken from several viewpoints and corridors to capture the overall character, the landmarks to be preserved, the various landscape types as well as the condition of the park. Therefore, panoramic views were selected from the highest points, in order to evaluate the connection of the park with the surroundings; corridor views helped to understand visitor perceptions within the park and filtered views to explore the connections of the people with the natural environment (forest). To identify the key characteristics and activities that contribute to the local distinctiveness and sense of place and to gather information about the function and condition of the landscape, the researchers worked with the agronomists of the park, during their visits.

A landscape evaluation per landscape character type (LCT) was performed, by filling in a form, presenting the state of the landscape type (e.g., cultural, and natural characteristics, landform, landcover, views, structural patterns), and accompanied by photos and maps. Then, the landscape evaluation criteria were composed to show the particularities of the individual landscape types based on the architectural and natural elements, human activities hosted, symbolic and historical values. A rating score was performed per criterion following a five-point Likert scale (very high, high, medium, low, indifferent). Regarding vulnerability, threats were specified, the level of vulnerability was assessed (high/medium/low), and the mitigation measures were described. The vulnerability for each landscape character type is determined by the condition of its elements and futures as follows: 1. High, when in abandoned state with severe damages and need for immediate restoration or regeneration, 2. Medium, when in use with severe damages and need for maintenance, 3. Low, when in use state without noticeable damages and with regular maintenance.

2.2.2. Stakeholder's perception survey

The stakeholder's perception survey involved undertaking a questionnaire survey that consisted of 13 closed-ended questions, used to elicit information from the stakeholders (employees, students and visitors) on their perceptions of landscape management at Syggrou Estate and the pressures and threats acting on Syggrou Estate (Table 2). The management staff constituted of the Institute of Agricultural Science employees and the Institute of Agricultural Science teachers, students constituted of the Institute of Agricultural Science students, and Anavrita school pupils, and the visitors constituted of the general public. Interviews were conducted on weekdays (in the morning and in the afternoon) during November–December 2019, face-to-face for students, visitors and employees. Emailing was only sent upon request (pdf format) to (8) employees who were unavailable at the time of interview. The questionnaire was divided into three parts. The first part included questions regarding the visitors' profile (age, gender, etc.) while the second part included questions about the activities of the stakeholders inside the Estate and the third part included questions on the personal opinion of the stakeholders in terms of the better management and function of the Estate. It was made sure that the answers included

Table 2

Content of perception survey addressed to Syggrou Estate stakeholders.

Questions	Response Options
Participant details gender; age; location of residence; educational status	M/F; <18, 18–34, 35–44, 45–55, 55–64, >65 years; Kifissia municipality, Maroussi municipality, Penteli municipality, other; secondary education, higher education, master's degree, doctorate degree
Preferences regarding the park	
What hours do you visit-work within the Syggrou Estate?	Morning, Midday, Afternoon, Evening
How often do you visit Syggrou Estate during the week?	Never, 1–2 times, 3–4 times, 5 times or more
What is the duration of your stay in the park?	<1h, 1h–2h, 2h–4h, 4h–8h
Circle on the map, your most visited area inside the park?	on a given map freehand circling of most visited areas
What activities do you perform in the park?	Walk, Run, Walk with children, Walk with a pet, Play sports/games, Break/Rest, Picnic, Education, Work, Events, Other
How safe do you feel during your visit to Syggrou Estate?	1 = not at all safe, 2 = moderately safe, 3 = safe, 4 = very safe
What measures do you propose to improve the safety of the park?	Reinforcement of the fence, Management of existing entrances, Introduce more fire lookout towers, Lighting at selected points, Clearing the existing vegetation, Maintenance or new design of the fire safety network, Opening or improving the road network, Increase the number of observatories, Other
What actions do you consider necessary to improve the management of the Estate?	Pruning, Restoration of buildings, Route maintenance, Guarding and controlling access, New seating areas, Information signs, Care of existing crops, Increase educational activities, Restoration of infrastructures. Other
What would you immediately change at Syggrou Estate?	Comment Box Open Ended Question

multiple choices that conveyed the whole range of values, problems, and opinions that have periodically been expressed (data not shown). They have been selected so that the different opinions of the visitors could be presented. A list of options per question was presented to participants to check the one that expressed them. (Table 2). The perception survey was conducted on a sample of 80 questionnaires completed by the Syggrou Estate stakeholders (12 employees, 10 students, 58 visitors). On completion of the perception survey a descriptive analysis was done using Microsoft Excel 365. Charts were mainly used to compare the answers from questions among management staff and visitors.

3. Results

3.1. Landscape character assessment of Syggrou Estate

During the LCA fieldwork the following landscape character areas were identified: a) the forest character is dominant, due to its particular biodiversity, with native and adapted exotic plant species and endangered animal species, b) the cultural-historical character is represented strongly by the original Estate buildings and small structures (e.g. lake, theatre, cellar, statues, etc.) c) the agricultural character constitutes of crops with prominent traces of the past and important agricultural historical-cultural heritage value.

Considering additional data and following a series of GIS spatial analyses, the LCA identified eight Landscape Character types (LCT) (Fig. 2), as follows:

1. The Historical administration landscape type: The landscape is characterized by the historical buildings of the Syggrou Villa



Fig. 2. Plan depicting the Landscape types of Syggrou Estate based on the results of the Landscape Character Assessment.

identified by law as a historical monument of romantic architectural style, with neogothic and classical references- and St Andrew's chapel the only neogothic church in Greece. - Special mention should be also given to the small botanical garden of St Andrew's chapel and the lake. Nowadays, the Villa constitutes the administration building of the Estate. The main weaknesses identified are the abandonment of the historical gardens, the degraded lake, the absence of an irrigation system, the poor condition of the buildings, paths & infrastructures that need restoration. Overall, the level of vulnerability was assessed as medium. The main threat identified was the poor sanitary status of many old trees located near the buildings that are prone to fall.

2. The Educational landscape type: This area refers to the historically founded educational buildings of the Institute of Agricultural Science and School of Anavrta located within Syggrou Estate. Most of the buildings are surrounded by neglected small gardens of historical significance. This area is characterized by high symbolic and historic value and intense human activity. The main weaknesses identified are the poor condition of the buildings, paths and infrastructures that need immediate restoration, and the neglected historical gardens. As in the previous landscape type the overall level of vulnerability was assessed as medium.
3. Agricultural landscape type: This landscape type consists of cultivations such as olive, pistachio, and almond trees. Unfortunately, most of the cultivations are abandoned or dried. Landmark features, associated with the peak times of the cultivations constitute the cisterns, fountains, and ruins of agricultural buildings. The main weaknesses identified are the noise pollution due to the proximity to Kifissia's highway, the absence of an irrigation system and neglected irrigation tanks, and the poor condition of the buildings, paths and infrastructures that need immediate restoration. The level of vulnerability was determined high. The main threats identified were the dead fruit and nut trees that constitute indicative signs of the deteriorated agricultural landscape character which is under risk by natural forest succession.
4. Open areas without vegetation: Open areas without vegetations were determined as unsealed soil surfaces and non-urbanised land covered with slight or no vegetation, with visual openness and access for people and activities. There is a variety of open areas without

vegetations, from forest clearings to lost cultivated areas and threshing floors. These areas are important for the enhancement of biodiversity and recreational uses. Many of these are used nowadays for picnic and playing with the kids and dogs. Therefore, the level of vulnerability was assessed as medium. The main threats identified, are the forest succession of many open spaces and the gradual loss of agricultural elements.

5. Mature Pine Forest: Old pine trees dominate the forest with an understory of many evergreen shrubs consisting mainly of *Quercus coccifera*, *Erica arborea*, *Erica manipuliflora*, *Pistacia lentiscus*, and *Cistus* sp. Rows of cypresses form natural landmarks. Views are mostly deteriorated and enclosed. This particular type is characterized by intense human activity. The main weakness identified is the inefficient level of forest management constituting the area prone to fires. The level of vulnerability is high. The main threats determined are soil erosion due to gullies formed by the rain, and the poor sanitary status of many old trees that are prone to fall.
6. Young Pine Forest: Young pine trees dominate the forest with an understory of many evergreen shrubs consisting of *Quercus coccifera*, *Erica arborea*, *Erica manipuliflora*, *Pistacia lentiscus*, *Cistus* sp. Views are mostly open or panoramic. Special landmarks are natural and cultural elements with historic value. As in the previous case the main weakness identified is the inefficient level of forest management, constituting the area prone to fires. The level of vulnerability is high. Similarly, the main threats determined are soil erosion due to gullies formed by the rain, and the poor sanitary status of many old trees that are prone to fall.
7. Sport facilities landscape type: This area includes the sports terrain located close to schools and the sport centre. This particular type is characterized by intense human activity. All sports facilities and buildings are neglected, and their restoration is urgent. The level of vulnerability is high. Most of the sports fields are destroyed and the main sports centre needs a new roof and restoration of their electrical and mechanical equipment.
8. Cultural landscape type: This landscape type consists of several cultural landmarks, connected with the historical memory of the Syggrou Estate (e.g., the theatre, wine cellar, and sundial). The main weakness identified is the need for immediate restoration of the buildings, paths, and infrastructures. The level of vulnerability is

medium. Among the main threats are the abandoned cultural landmarks; most of them are in danger of collapsing.

Overall, the above landscape character types present a high historical and cultural or natural value (Administration historical, Educational, Agricultural, Mature and Young Pine Forests, Cultural), and some are characterized by a high-medium human activity (Open areas without vegetation, Sport facilities, Mature and Young Pine Forests). The level of vulnerability is high for most of the LCTs (Mature Pine Forest, Young Pine Forest, Agricultural and Sports facilities). Throughout Syggrou Estate, the most prominent weaknesses identified are: 1. the absence of a management plan, 2. the uncontrolled entry to the Syggrou Estate, 3. the lack of staff, 4. the lack of vegetation maintenance, 5. the lack of maintenance of the fire protection system, 6. the absence of basic facilities (W.C., first aid station, outdoor equipment, information points, etc), 7. the poor condition of the paths, and 8. vandalism. Among the main threats identified are: 1. the inefficient promotion of the Estate, 2. the lack or limited availability of government funding for carrying conservation-restoration studies and works, 3. the effects of climate change (e.g., extensive droughts and sudden heavy rainfalls can affect plant biodiversity). However, it seems that the only protection measure of Syggrou Estate’s landscape character, are the land use restrictions imposed by the bequest of Ifigeneia Syggrou and related legislation.

3.2. Stakeholder’s perception survey for Syggrou Estate

The profile of stakeholders who have answered the questionnaire are 45 % women and 55 % men. Regarding their level of education, 31.25 % are secondary education graduates whereas 68.75 % are tertiary education graduates. Distance to a public open green space from people’s home constitutes a decisive factor in the use of parks (Grahn & Stigsdotter, 2003). Most respondents (68.75 %) are citizens of the three neighbouring municipalities (Maroussi, Kifissia, Penteli) while the remaining 31.25 % are citizens of other municipalities. Additionally, the age of stakeholders was 20 % above 65 years, 13.75 % between 55 and 64 years, 26.25 % between 45 and 55 years, 22.50 % between 35 and 44 years, 10 % between 18 and 34 years and 7.5 % below 18 years.

Regarding the visiting/working hours within the Syggrou Estate, 36.15 % of the respondents visit/work in the morning, 21.54 % in the midday, 35.38 % in the afternoon and 6.92 % in the evening. However, many of the respondents, chose more than one answer for this question; therefore, were calculated considering the total number of answers. The following diagram (Fig. 3) presents the visiting/working hours during the day per stakeholder group (employees, students, visitors). Employees work at the premises during morning hours and similarly students. Visitors prefer to visit the Syggrou Estate mostly during the afternoon, which is in accordance with their profile and age.

Regarding respondent’s visitation frequency at Syggrou Estate most

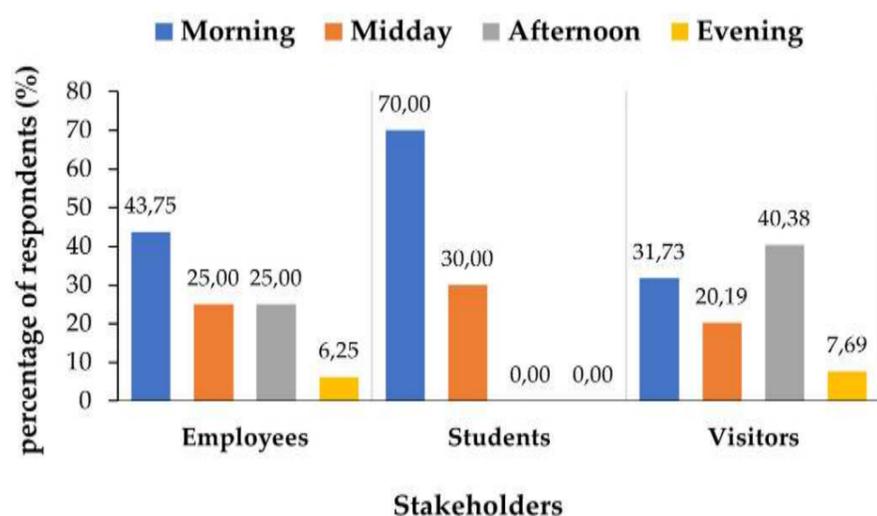


Fig. 3. Comparative answers regarding the visiting/working hours during the day per stakeholder group (visitors, employees, students) of the Syggrou Estate.

respondents visit 1–2 times per week (58.73 %); whereas 30.16 % visit the park 5 or more times per week (Fig. 4). Employees and students due to their obligation to work and study respectively visit the park 5 or more times per week. On the other hand, the majority of visitors that are not students or employees visit the Estate 1–2 times per week (Fig. 4). Similarly, to Daniel et al. (2012), Syggrou Estate visitors have the chance to experience the benefits of “natural” ecosystems, particularly urban residents who have limited contact with natural environments. Humans have the “innate tendency to focus on life and lifelike processes” (Wilson, 1984), and spending time outdoors in a natural environment is beneficial to human’s physical, mental and social wellbeing (Majors, 2019).

The qualities of space in a physical sense generate experiences that can be inviting and relaxing or unwelcoming and restrictive (Jürgen, 2014). The respondents were given the map of Syggrou Estate and were asked to mark with a circle, the area they tend to visit more frequently. The map produced, shows the visited areas as drawn by the stakeholders. No 1 refers to the whole Estate. Whereas no 2-no7 refer to particular marked areas of the site. Some of the marked areas overlapped with the eight LCTs identified during the landscape character assessment of Syggrou Estate. The frequency distribution of the selected areas most visited by respondents in relation to the eight LCTs can be seen in Fig. 5.

Based on Bourassa (1990), there are three modes of landscape aesthetics experience: biological, cultural, and personal; visitors of Syggrou Estate demonstrated all three landscape aesthetics experiences. In relation to the identified eight LCTs, the most popular visited areas were the Mature Pine Forest landscape type and the Open areas without vegetation. This is evident, since this is the only, coherent green space, easily accessible by most people and among the few in the region of Athens. It seems that the place is reverting to its initial state, as it was during the Hellenistic and Roman times and until 1831, where it was transformed to an agricultural farm. However, it is not reverting to the initial wild character, but mostly as a recreational forest, since over the years human use intervened with the natural process. Some studies state that people prefer dense vegetated areas such as forests, as they develop a greater sense of mystery (Herzog & Bryce, 2007) or possess high ecological values (Fuller et al., 2007). Furthermore, Kellert and Wilson (1995) state that humans have an innate affinity for the natural world.

The second most popular visited areas were both the educational landscape type and sport facilities landscape type, due to the presence of the educational buildings hosting lifelong training programs and the schools, the proximity to Kifissia Avenue and multiple entry points to the Syggrou Estate, as well as the proximity to the centrally located sports fields within Syggrou Estate. Lastly the Historical administration landscape type is the least visited area of the park, due to the restricted access inside Syggrou Vila and the lack of gardens that would possibly attract visitors. Although the agricultural landscape type occupies a quite large

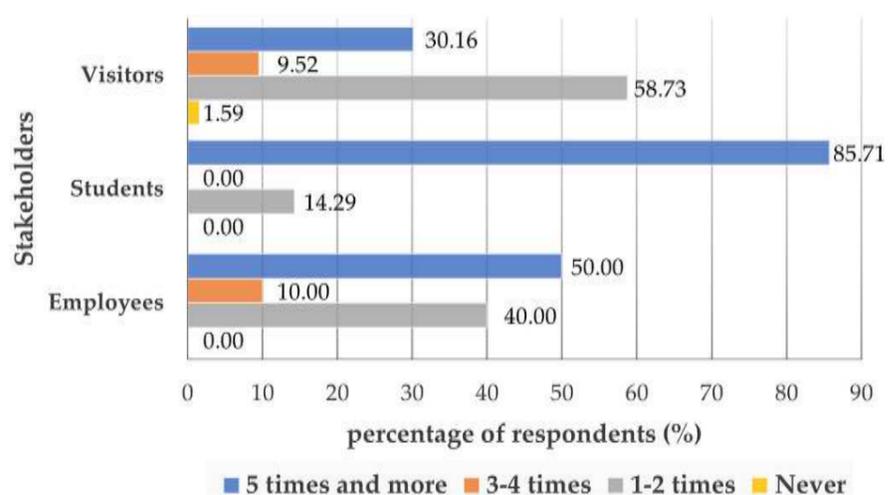


Fig. 4. Comparative answers of respondent’s visitation frequency at Syggrou Estate within a week.



Fig. 5. The respondent’s percentage frequency distribution of the most visited areas within the eight landscape types of Syggrou Estate.

area of Syggrou Estate, due to its abandonment, it does not attract visitor’s interest. As stated by other researchers the existence of paths, playgrounds, benches constitute important reasons for park visitation (Kabisch & Kraemer, 2020; Koon-kwai & Domroes, 2004). Also, the presence of animal collections (small zoo/aviary) in parks, attract visitors (Conway & Woudstra, 2000; Elliot & Fieldhouse, 2000; Bahriny & Bell, 2020). The latter was persistently recommended by the Board of Directors of the Institute of Agricultural Science, in order to highlight the park’s livestock history.

The most preferable activity among the responders was walking with 54,22 % (fitness walking, walking a pet, walking with children.). The above are in accordance with other studies showing that visitors like walking or jogging within a historical park (Paraskevopoulou et al., 2020). This is strengthened by the paths design, open views and good visibility and the overall accessibility which is quite high; as opposed by meandering paths with limited visibility, obstructing visitors from jogging (Paraskevopoulou et al., 2020). The second most preferable activity was sports (including running) and games with 16,84 %. Education and work showed the same percentage (6,84 %). Leisure activities held 12,1 % of respondents (Fig. 6). Although many of the respondents visit the park for cultural activities and physical exercise, they do not prefer the presence of organized facilities, since they are incompatible with the forest landscape character.

Regarding the perception of safety within Syggrou Estate, only 7,5 %

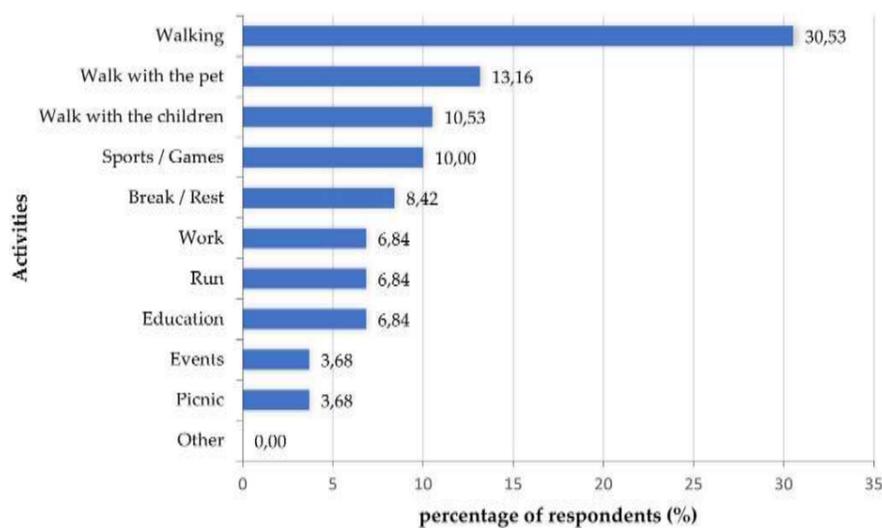


Fig. 6. Percentage of respondent’s activities at Syggrou Estate.

of the stakeholders considered it to be moderately safe, while 43,75 % considered it as safe and 48,75 % as very safe. The perception of safety relies mostly on recovering from the neglected state of Syggrou Estate’s natural and cultural capital and applying fire prevention measures. Regarding monitoring and controlling access to Syggrou Park, a relatively small percentage (10 %) of respondents insisted on taking measures.

Stakeholder’s perceptions and the realisation of the diversity among stakeholder’s perceptions are key in understanding landscapes (Butler & Berglund, 2014). The most popular measures proposed by both visitors and students for improving the safety of Syggrou Estate were clearing the existing vegetation (24,66 %), maintaining, or redesigning the fire protection system (17,49 %), and widening or improving the road network to facilitate the movement of fire trucks (14,80 %) (Fig. 7). On the other hand, the most popular measures proposed by the employees of Syggrou Estate were the maintenance or redesign of the fire protection system, the lighting at selected areas, the widening or improvement of the road network and the clearing of existing vegetation (Fig. 7). Well-lit and safe walking contribute to facilitating people’s physical activity and reducing potential injuries (St Leger, 2003).

In response to the question, which action do you think is essential for improving the function of Syggrou Estate, 21,30 % of respondents suggested pruning, 18,26 % maintenance of the existing cultivations and 13,48 % immediate restoration of basic infrastructures (Fig. 8). These results agree with Ismail et al. (2017) stating that park maintenance can promote the park’s ecological diversity and visual appeal desired by their users. In cases where budgets for maintaining green spaces are limited, appropriate promotion of citizen participation can be an economic way to enhance the park’s environmental quality as well as public health (Hartig, 1993).

The following figure (Fig. 9) presents the percentage of proposed development actions per stakeholder group (employees, visitors, students). The three most popular development actions among the visitors and students were pruning, maintenance of existing crops and restoration of basic infrastructures. On the other hand, the most popular development actions proposed by the employees, were to increase educational activities, restore the basic infrastructures, and restore the buildings. Therefore, based on the stakeholder’s answers it can be concluded that the most important management actions are to restore and preserve the existing natural and cultural capital in order to maintain and conserve its historical and cultural heritage.

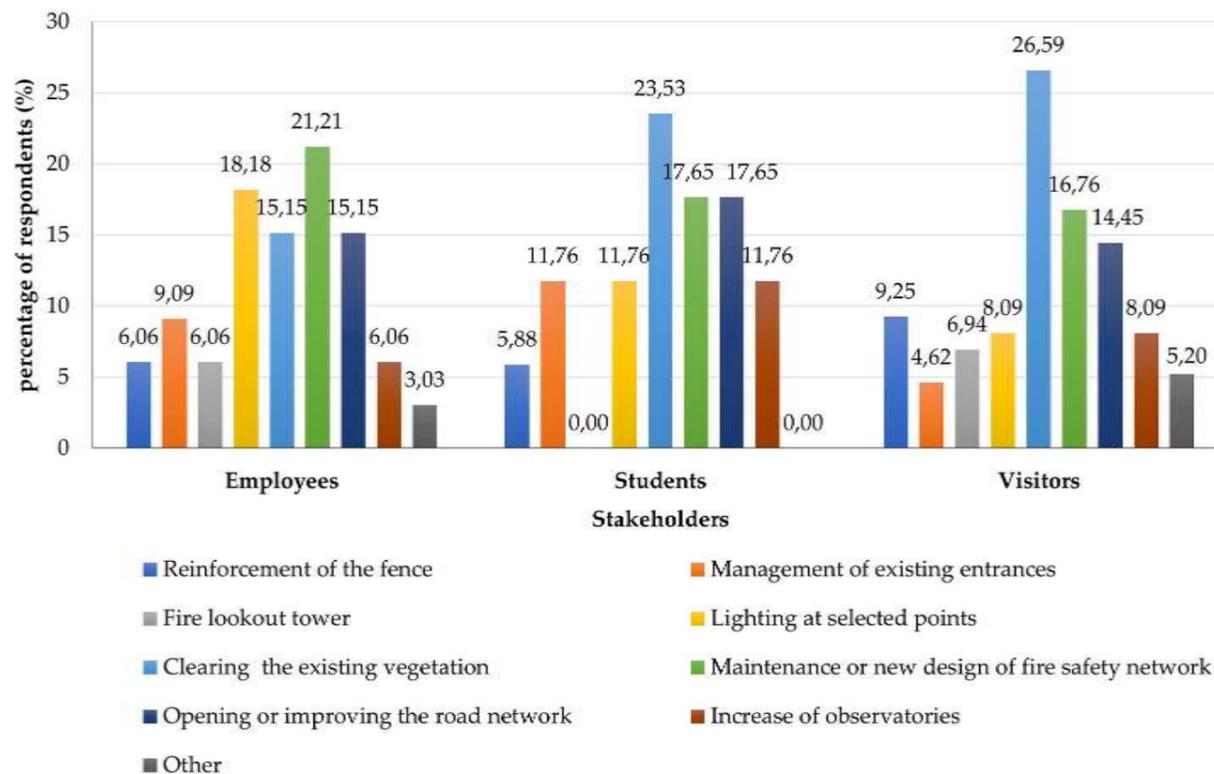


Fig. 7. Suggested improvements by respondents for improving the sense of safety and fire prevention at Syggrou Estate.

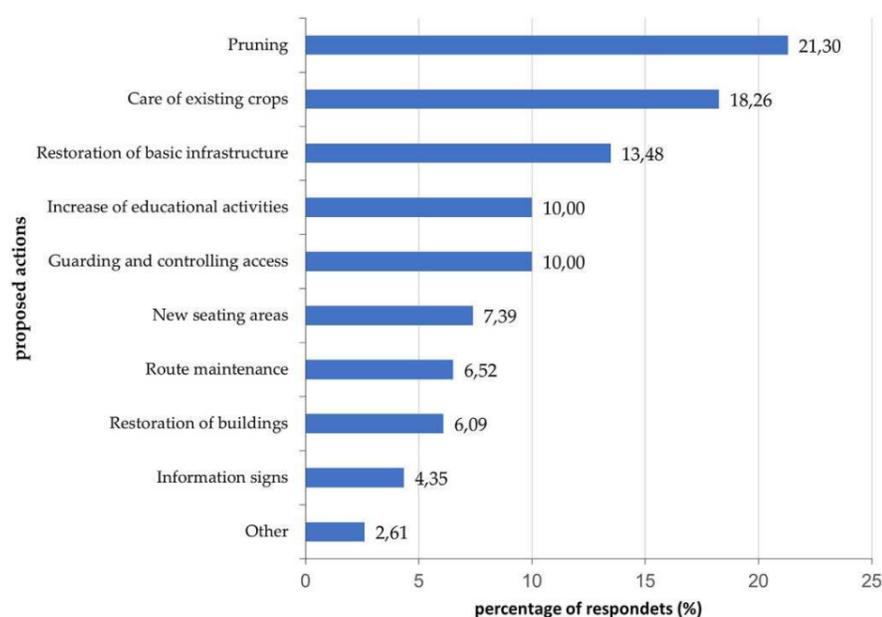


Fig. 8. Suggested development actions for Syggrou Estate by all stakeholders (employees, students, visitors).

When respondents were asked what they would change immediately at Syggrou Estate, most of them stated the park’s “cleanliness”. With regards to the buildings and infrastructures, respondents requested that the abandoned greenhouses are restored, the different uses organized and labelled better, and that lighting is provided at key points, as well as recycle- and waste-bins. This is in accordance with Lis et al. (2019), stating that basic attempts to increase the safety in historical parks include the maintenance of paths, lawns, and other forms that can facilitate movement, as well as the need for lighting, and monitoring in order to improve the overall condition of the park.

Regarding the cultivations, the respondents pointed out the need for their immediate care, such as pruning and the removal of self-seeded *Ailanthus altissima*. A general underestimation of the Syggrou Estate’s cultivations and agricultural education programs is observed, by the visitors, quite expected since everything is neglected.

In 2003, a similar study, organized by the World Wide Fund for Nature in Greece (WWF, 2004), asking respondents to identify the three most important characteristics and problems of Syggrou Estate found that the natural forest was the most valuable aspect identified, followed by the ecological value of the estate as well as the ease of access to the park by the respondents; the historical buildings, the Estate’s quality of

being an oxygen supplier and a place for hosting cultural activities and sports, also gathered a large percentage. Natural environments are generally preferred over many other environments (Kaplan & Kaplan, 1989); the current study as well as many other studies showed this. Kaplan and Austin (2004) showed the preference of people for the availability of forests among other forms of natural settings (manicured/landscaped areas, trees, gardens, mowed, areas, open fields, and wetlands). Employees showed a preference for the presence of naturalistic vegetation over mowed and groomed planted areas near their workplace (Kaplan, 2007). A study on public perceptions showed a preference for naturalistic landscapes over formal design of green spaces in urban areas within a city (Özgüner & Kendal, 2006). It is notable in the current study that “other” important characteristics identified included phrases such as “place of mind and body peace”, “place of wild nature and virgin environment”, “place that offers the opportunity to escape”, “aesthetic pleasure” as well as “an area for recreation, sports, cultural events and education”. Similarly, a survey on preferred neighbourhood features of rural fringe residents showed a preponderance of nature-related descriptions (Kaplan & Austin, 2004).

In recent years there has been an increasing interest to engage communities in the management of protected areas (UNESCO/ICCROM/ICOMOS/IUCN, 2013; Paraskevopoulou et al., 2020). Both, the International Union for Conservation of Nature (IUCN) and United Nations Educational, Scientific and Cultural Organization (UNESCO), refer to Andrian Philips’ paradigm (2003) in their management guidelines (Thomas & Middleton, 2003; UNESCO/ICCROM/ICOMOS/IUCN, 2013) highlighting on the importance to adopt a wider, more inclusive approach to protected area management and community engagement. Therefore, it is important, in many protected areas such as Syggrou Estate which have multiple objectives, to consider social preferences and values and potential conflicting opinions, along with the institutional structures and barriers and forms of knowledge (UNESCO/ICCROM/ICOMOS/IUCN, 2013). Lastly, conflicts between nature conservation and need for recreation can be dealt with in a targeted manner, if the content of nature conservation requirements and related prohibitions are conveyed to those seeking recreation (Reeh & Ströhlein, 2008). The combination of legal instruments with environmental education measures has been successfully applied in a local recreation area of Heidenheim, Germany that led to various voluntary commitments by regional sports and leisure groups (Reeh & Ströhlein, 2008). In the current study the combination of legal instruments with environmental education measures can also allow for long term recreational use of

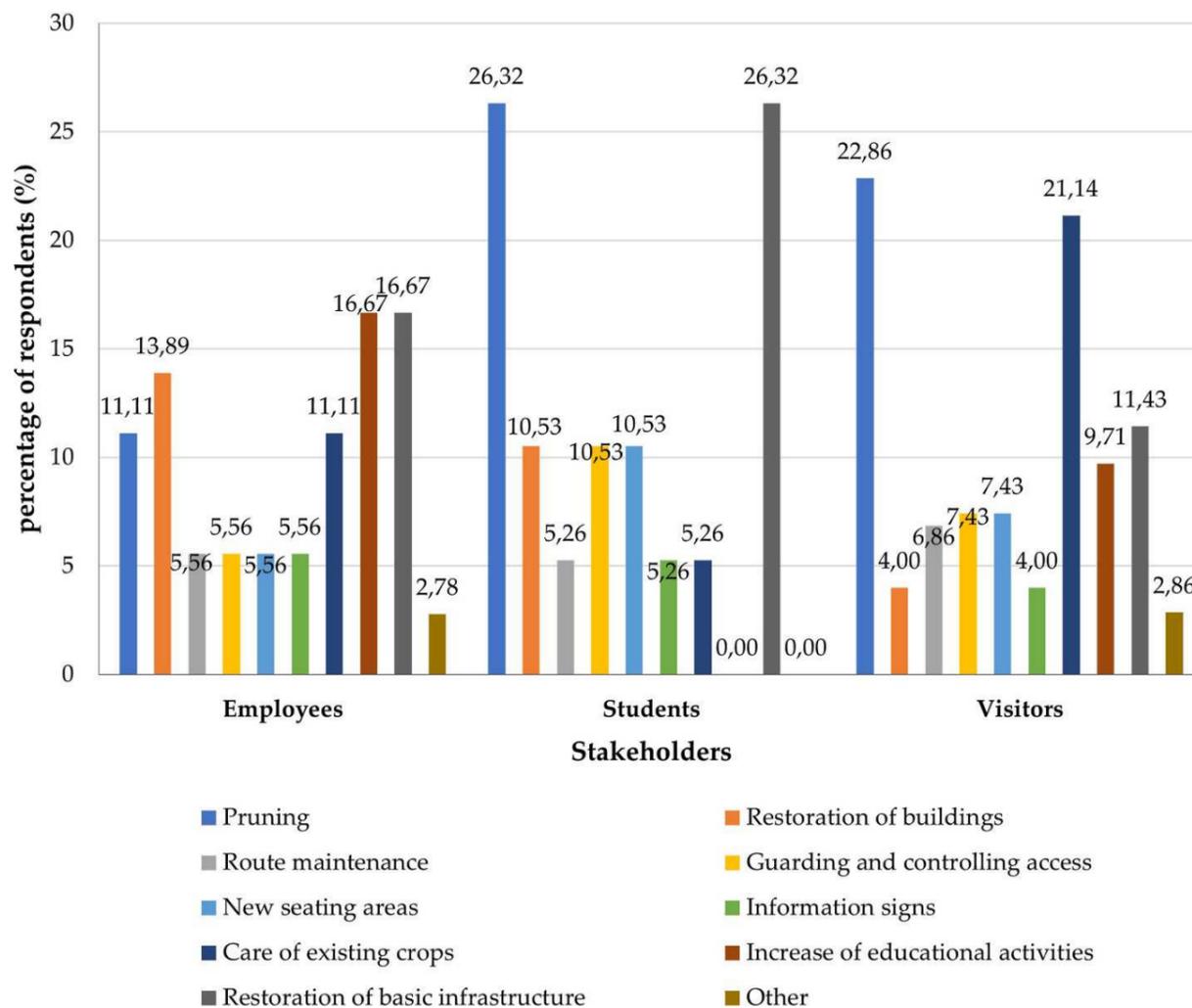


Fig. 9. Percentage of proposed development actions for Syggrou Estate per group of stakeholders.

Syggrou Estate while safeguarding nature conservation values.

3.3. SWOT analysis

The swot analysis was used as an ancillary tool for the management plan and the guidelines derived. The SWOT analysis outcomes (Table 3) showed that a) the main strengths include the natural value of the forest presence, the legal protection as defined by Iphigenia's Syggrou bequest, the location and ease of access and the architecture legacy, b) the main weaknesses are the absence of a management plan and the neglected state of the Estate's landscape and heritage, c) the main opportunities are the creation of Syggrou Estate's brand name, the exploitation of the Green Fund and the "Partnership Agreement of the Development Framework (2014–2020)", the promotion of Syggrou Estate's agricultural products, the organization of festivals and awareness raising environmental programs, d) the main threats include the lack of promotion of Syggrou Estate through activities and events, the limited budget of Syggrou Estate and availability of governmental financial support for conservation – restoration works, and the effects of climate change.

In relation to the answers obtained from the perception survey, the absence of a management plan, the lack of maintenance of the natural elements (forest, cultivations), as well as the urgent need for maintenance of both the infrastructures (roads, fire surveillance, irrigation systems, lighting) and buildings are the most important issues that need to be addressed.

3.4. Intervention targets and management guidelines

Considering the results from the landscape character assessment and the answers from the stakeholder's perception survey, the intervention targets and management guidelines were determined for the protection and effective utilization of the historical and cultural heritage of Syggrou Estate. Therefore, the proposed intervention targets were grouped as follows:

- The management target regards the management of Syggrou Estate's facilities in collaboration with the neighbouring municipalities and Athens Prefecture, as well as the restart of various events, such as sports events, concerts, etc.
- The educational target regards the enhancement, improvement, and development of agriculture services in life-long learning programs, in the fields of Floriculture and Agriculture, according to the principles of Landscape Architecture, Ecological Management and Sustainable Development.

As such, the basic aim of the management plan is to highlight the assets of the existing land uses of Syggrou Estate and to conserve/preserve the natural beauty of the forest. This was supported by a master plan (Gkoltsiou, 2018) illustrating the spatial composition of the various uses which will take place within the park (primary production, recreation, education, environmental protection and awareness, culture and sports, administration), the location of access points to the park, and the circulation network. The proposed development activities of the master plan aimed to balance the stakeholder's needs in compliance with the measures for the protection and conservation of the historical and cultural heritage of Syggrou Estate as identified by the LCA (Fig. 10).

More specifically, most activities are proposed at the agricultural, educational, and historical administrative landscape types, in order to revive the historical-agricultural legacy of Syggrou Estate and the cultural events in relation to the historic buildings. It is obvious that the cultural elements of Syggrou Estate (both tangible and intangible) need equal protection and careful restoration (e.g., restoration of the theatre for summer festivals, open to the public the historical gardens). Therefore, agricultural activities such as vine and olive harvest festivals, floriculture exhibitions, seasonal agriculture activities, temporary markets of biological products, usage of existing greenhouses for biological vegetable products, are proposed to take place at the old installations and buildings of the Agricultural landscape type. The educational activities will be placed either throughout the park, especially the environmental orientated ones, or the agricultural ones at the agricultural

Table 3
Main outcomes of the SWOT analysis.

Strengths	Weaknesses
<ul style="list-style-type: none"> • Estate is established as a legal entity of Public Law • Bequest's restrictions of land uses • Significant social and natural value • Prime location, among (3) municipalities • Accessible by public transportation & private vehicles • Complete internal road network and several parking areas • Accessible for human activities (walking, running, cycling, dog walking, volunteering environmental activities) • Open spaces within forest for recreation • Historical buildings of remarkable architecture (Krimpa building, cellar, theatre, cisterns) • Well preserved historical buildings (Villa Syggrou, neogothic St Andrews church) • Historical botanical garden of St Andrews Church 	<ul style="list-style-type: none"> • Absence of management plan • Unmonitored and uncontrolled entry • Noise pollution due to proximity to Kifissia's highway • Lack of staff • Lack of vegetation maintenance • Absence of irrigation system and neglect of cisterns and Villa's lake • Insufficient forest management, prone to fires • Reduction of wild fauna due to cultivation's abandonment • Buildings, trails & infrastructures need immediate restoration • Fire protection infrastructure needs maintenance • Absence of facilities and amenities • Path network in poor condition • Vandalism
Opportunities	Threats
<ul style="list-style-type: none"> • Development of the existing cycling and walking trails. • Creation of a dog park within the open areas • Restoration of the theatre for summer festivals. • Exploitation of the existing cultivations. • Creation of Estate Syggrou brand name. • Exploitation of Green Fund for studies and projects. • Integration into Partnership Agreement of the Development Framework (2014–2020), financing opportunities for projects. • Environmental awareness-raising through education. • Promotion of agricultural products • Open to public the old historical garden of Syggrou Villa • Usage of the former greenhouses for biological cultivation of vegetable products 	<ul style="list-style-type: none"> • Possible objections of the proposed management plan by different groups of people. • High risk of a forest fire. • Insufficient promotion of Syggrou Estate. • Limited or nonfinancial governmental support for undertaking conservation-restoration studies & works. • Climate change

landscape type.

Sports, play, and recreational activities are proposed to take place mostly at the Mature Pine Forest, since they present opportunities, for the development of cycling and walking routes, and environmental education programs to raise environmental awareness. This landscape type presents the highest level of visit and vulnerability and needs very careful consideration of landscape management. As a result, a series of landscape management guidelines were derived for each LCT (MET, 2011; Canada's Historic Places, 2010) (Table 4).

3.5. Research implications

The study showed that Syggrou Estates attracts visitors mainly from the three neighbouring municipalities (Maroussi, Kifissia, Penteli) including almost all ages mostly from the age of 35–65 years old. The respondents were mostly tertiary education graduates. Regarding the visiting/working hours the most frequent answer was in the afternoon which is in accordance with the respondent's profile and age. The majority of visitors who are not employees or students visit the Estate 1/2

times per week. As such the visitors have the chance to experience the benefits of natural ecosystems (forests), which is the area they tend to visit more (Kaplan & Kaplan, 1989). However, Syggrou Estate is not reverting to the initial wild character, but mostly as a recreational forest, since over the years human uses intervened with the natural process. The park has an extensive network of routes and paths which allows visitors to walk or jog. Path design, open areas and good visibility create a sense of safety to the visitors that is why they responded positively to the safety questions (St Leger, 2003).

Many of the respondents visit the park for cultural activities and physical exercises and they do not prefer the existence of organized facilities since they are incompatible with the natural character of the Estate. However, the natural, cultural capital of Syggrou Estate is in a neglected state, thus prone to fires; that is why most of the respondent's proposals focus on fire prevention. Regarding fire management, the most important guidelines focused on clearing the vegetation understory and supervising the fire hydrant network, cameras, and fire lookout towers. Whereas several researches focus on minimal-impact suppression techniques which do not unduly disturb natural or cultural values (such as limiting the use of heavy equipment or tree felling as response to fire) (Ontario Parks, 2009). Regarding monitoring and controlling access a small percentage of visitors insisted on taking measures. Another recommendation which is also common regarding the safety, or the park is limiting the type, range, and intensity of recreational activities and by controlling access to the park (Ontario Parks, 2009). Appropriate signs are also imperative as suggested in the guidelines, to be placed at the park boundary to inform about its status and permitted uses.

The most popular answers regarding the improvement of Syggrou Estate's functions focus on the agricultural preservation and maintenance.

The particular methodology presents the perceptions of stakeholders and the locations they choose to visit within the park that coincide with the eight LCTs (landscape character types) identified during the LCA. The SWOT analysis reveals strengths-weaknesses, opportunities-threats in relation to the cultural and natural capital of Syggrou Estate.

The LCA concluded to eight LCTs which present weaknesses and threats as described in the SWOT Analysis. It seems that most of Syggrou Estate's cultural or natural elements are in a medium level of vulnerability. However, there are landscape elements with high symbolic and historic value that need immediate restoration for the preservation of the landscape character.

The main management guidelines, drawn to meet contemporary visitors needs without threatening the cultural and natural value of historic parks such as Syggrou Estate, are:

- Supervision by gardening staff/employed personnel and establishment of a local stewardship group.
- Improvement of entrance visibility and control vehicle access through main entrance and within parking areas.
- Maintenance of historic building character by refurbishing their materials.
- Forest natural quality preservation, removal of exotic species and maintenance of clearings for recreation.
- Preservation and enhancement of cultural and traditional agricultural methods, creation of thematic gardens with reference to agricultural education.
- Coordination and renewal of the educational activities regarding the fields of agriculture and garden design. The particular research presents a holistic approach to historical park management with the aid of landscape character assessment, stakeholders perception survey and SWOT analysis. Managing a historic park by obtaining information from visitors seems somewhat risky, especially in cases where findings show that people's opinions might pose a threat to the park's history and cultural heritage. This is why is very important to gain the support of people and provide a good understanding of

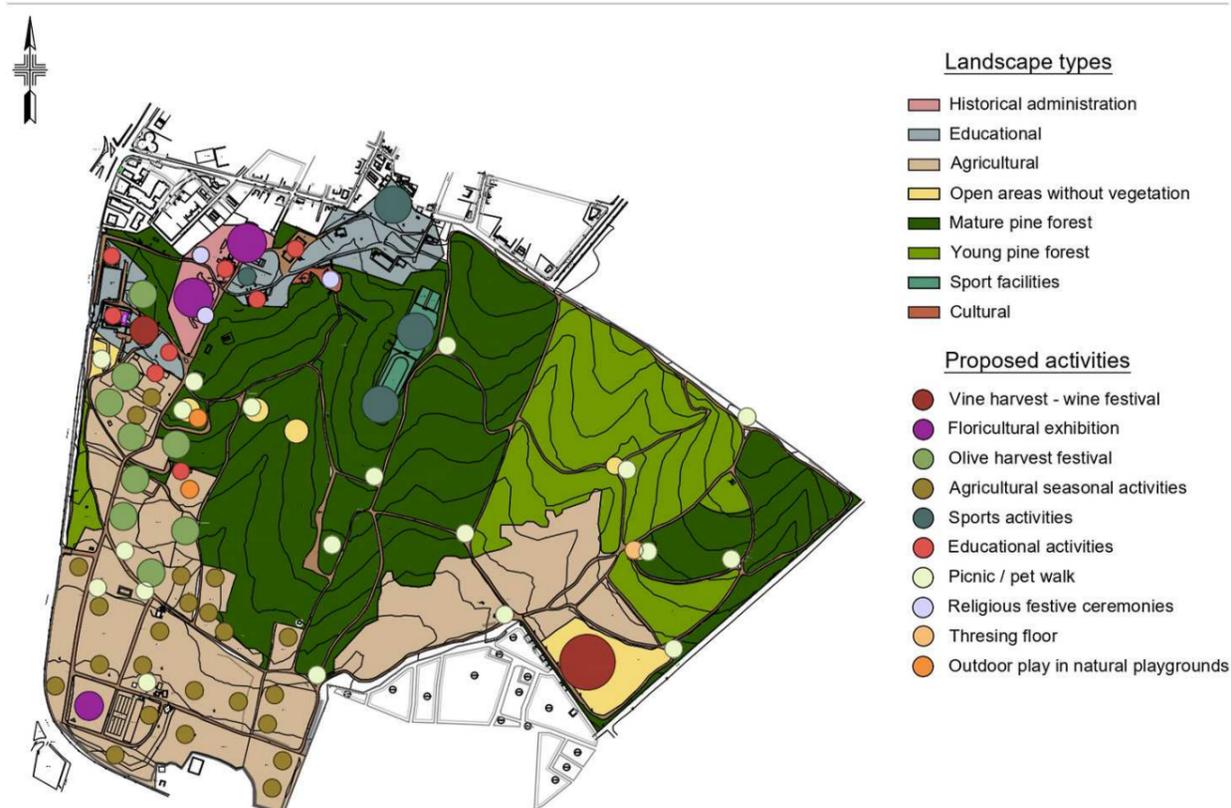


Fig. 10. Plan of Syggrou Estate illustrating the proposed development activities on landscape types map as resulted from the LCA.

the protected area values (UNESCO/ICCROM/ICOMOS/IUCN, 2013). Especially, this research supports the argument that successful management should be transparent, and governance is shaped through dialogue and agreement among key stakeholders having in mind the primary aim to conserve and protect the historical and cultural heritage of public parks (Mitchell et al., 2009). The interaction of people with their environment is crucial and should be guided by the original design (Mitchell et al., 2009). The understanding of landscape character is critical for the park's management and the basis for developing a shared vision (or mission) among key-stakeholders.

3.6. Implications for planning and management

This work aims to answer the common question about the sustainable approach for appropriate management (Luque-Martínez et al., 2019; Deng & Li, 2019) of historical parks and to apply a methodological framework for management guidelines (Canada's Historic Places, 2010) with the aid of landscape character assessment and stakeholder's participation.

This work proposes a holistic approach that combines landscape character assessment (L.C.A.), -as a recognized tool for the classification and description of landscapes, to understand the evolution of its physical and cultural characteristics (Swanwick, 2002)- with perception surveys of stakeholders on the historical park's, strengths/weaknesses/opportunities/threats (SWOT analysis), qualitative traits, etc. LCA, is seen as central to the implementation of the European Landscape Convention and a very valuable tool for experts to evaluate a park's landscape character (Demir & Demirel, 2017; Hampshire County Council, 2012; Kolečka & Lipský, 2008).

The case study is Syggrou Estate due to its historical, natural and social-value for the north suburbs of Athens and among the few parks appreciated its recreational character. Existing recreational facilities are neglected, and a careful management plan is needed (Delasoulas et al., 2006; Palis, 2004). However Syggrou Estate is not reverting to the initial wild character, but mostly as a recreational forest, since over the years human uses intervened with the natural process. The park has an extensive network of routes and paths which allows visitors to walk or jog. Many of the respondents visit the park for cultural activities and physical exercises and they do not prefer the existence of organized

facilities since they are incompatible with the natural character of the Estate.

The particular research supports the argument that successful management should be transparent, and governance is shaped through dialogue and agreement among key stakeholders having in mind the primary aim to conserve and protect the historical and cultural heritage of public parks (Mitchell et al., 2009).

Future research work is needed with other historical parks to inform further the proposed methodological framework. As landscape practitioners adopt the above methods, experiences will accumulate. A formal evaluation of such accumulated experience among practitioners will point to adjustments which will better address national standards and needs. The application of the proposed methodological framework to other parks will gather information and potentially lead to its upscaling.

In conclusion, the main aims of the management plan for the Syggrou Estate are: a) the protection and enhancement of the natural forest and cultivations, b) the continued recreation without organized facilities and c) the education of farmers and gardeners, according to the wish of the first owner of Syggrou Estate.

This procedure aims at achieving a consensus among landscape architects and stakeholders regarding the park's development priorities and their associated landscape guidelines. The application on a historical park such as the Syggrou Estate was important to i) identify individual areas, ii) consider any future development, iii) regulate land-use change such as forest succession, iv) preserve historic agricultural practices and landscapes, v) contribute towards historical park conservation, management strategies, vi) raise public awareness, vii) encourage and empower stakeholders to participate in decision-making processes. The broader benefits from the combination of the above methods will support a) landscape and environmental protection, b) increase cooperation, collegiality, co-management c) generate feeling of "ownership" of the management plan.

4. Conclusions

The Syggrou Estate was selected as a case due to its historical, natural, and social value for the north suburbs of Athens and among the few parks appreciated as a hub for education on agriculture. This is a multifunctional park with a valuable historical legacy regarding the agricultural education. Through the research, it was necessary to find a

Table 4
Proposed Landscape Management Guidelines for Syggrou Estate for each landscape character type.

Guidelines	Landscape Types							
	<i>Historical Administration</i>	<i>Educational</i>	<i>Agricultural</i>	<i>Open areas without vegetation</i>	<i>Mature Pine Forest</i>	<i>Young Pine Forest</i>	<i>Sport facilities</i>	<i>Cultural</i>
Security & Accessibility								
Supervision preferably by gardening staff or alternatively by specifically employed personnel or establish a local stewardship group for the park	X	X	X				X	X
Provide people of all ages, interests and abilities access to the historical places. Provide the highest level of access with the lowest level of impact.	X							X
Amend the network of routes to connect the various landscape types, habitats and proposed new types of vegetation, which would include plant species contributing to the area's biodiversity				X	X	X		
Signs to be placed (information signs, labels with the scientific and common name of both plants and birds, signs about the protection of endemic species		X		X	X	X		
Create a network of routes in the estate's cultivations area, to connect the various agricultural uses of the estate in an educational walk regarding agriculture. In these routes, it is essential to introduce labels and information signs.		X	X					
Planning and signposting of sports routes.					X	X	X	
Enhance visibility of Syggrou Estate's entrances, to facilitate visitor's access.	X	X	X		X	X		
Improve existing parking areas, to serve educational buses and cars.	X	X					X	X
Control unauthorized vehicle access within the park.	X	X	X	X	X	X	X	X
Buildings								
Maintain their character by reinforcing their structure and materials.	X	X	X					X
Demolish ruins which pose a public safety risk and do not have any historical and cultural value	X		X					
Promote the restoration of historical and cultural elements.	X							X
Forest								
Preserve the forest, according to the principles of Forestry Science (fire protection, prevention of illnesses, rainwater management, complementary plantings, etc.).					X	X		
Prune and renew the tree crowns to prevent branches from falling due to adverse weather conditions (strong winds, etc.)	X	X			X	X		
Maintain forest routes, fire zones, water tanks and fire lookout towers.			X		X	X		
Maintain the clearings/openings for recreation and visibility purposes.			X		X	X		
Maintain and enhance the views and scenery in specific areas.	X		X	X	X	X		X
Introduce gradual selective thinning of pine saplings near the historical buildings, and replacement by slow-burning species (evergreen broad leaf species).					X	X		
Create relaxing areas by taking into account their current usage, the scenery's special natural and cultural elements, the aesthetically pleasing viewpoints, the accessibility and the avoidance of disturbing the wild fauna.				X	X	X		X
Identification and removal of exotic species, such as the Ailanthus tree (<i>Ailanthus altissima</i>), is necessary.		X	X	X	X	X		
Introduce seasonal access restrictions during the fauna's breeding season.					X	X		
Plant broadleaf tree species at the perimeter of the sports fields and buildings for fire protection.	X	X					X	X
Gardens								
Create thematic gardens with reference to agricultural education.		X	X					
Maintain and restore the water features and place aquatic plants in selected water features, provided they do not obstruct the parallel function as a water tank used for firefighting.				X				X
Creation of arboretums (a) of certified biological genetic material and (b) of forestry species, in the existing agricultural area.		X	X					
Organic fertilisers to be obtained by the Syggrou Estate's waste, recycled in special compost production units and channelled to the Estate's needs.	X		X					

(continued on next page)

Table 4 (continued)

Guidelines	Landscape Types							
	Historical Administration	Educational	Agricultural	Open areas without vegetation	Mature Pine Forest	Young Pine Forest	Sport facilities	Cultural
Agriculture areas (Cultivation/Demonstrative husbandry)								
Restructuring the cultivation areas, as well as improving their condition			X					
Restoration of the green houses.			X					
Create an ecological centre, which would contribute to the revival and preservation of the agricultural legacy and at the same time serve as an activity centre, for recreation, education and direct contact with nature.		X	X					
Revival of traditional cultivation practices.		X	X					
Usage of up to date 'light' agricultural equipment, that minimise soil compaction and as a result soil degradation.			X					
Implement modern eco-friendly cultivation practices, (organic farming and integrated management, mulching).			X					
Expand new cultivations (aromatic plants, vegetables, etc.) in the existing agricultural area, which would provide a wide variety of species for the education of 'good farmers.		X	X					
Introduce seasonal access restrictions to protect agricultural crops.			X					
Special attention should be given to the right and mindful usage of water supplies, careful management of the soil fertility and protection of the environment.	X		X					
Archaeological- Cultural spaces								
Protect and preserve archaeological resources in place. Where there is potential for disturbing archaeological resources, take mitigation measures to limit damage and loss of information.								X
Do not create a false sense of historical development by adding elements from other historic places or other properties.	X		X					X
Do not remove, replace or substantially alter the intact or repairable character-defining elements	X	X	X					X
Conserve heritage value by adapting an approach calling for minimal intervention.		X		X				X
Maintain character-defining elements on an ongoing basis. Repair character-defining elements by reinforcing their materials using recognized conservation methods. Replace in kind any extensively deteriorated or missing parts of character-defining elements, where there are surviving prototypes.								X
Education								
Coordination and renewal of the educational activities regarding the fields of agriculture and garden design.	X	X	X					
Organise educational guided tours regarding the history of the area and its natural environment.	X	X						
Design educational routes of particular natural value by enhancing the vegetation, protecting the endemic species and increasing the area's biodiversity.					X	X		
Provide information to the general public about the educational programs Syggrou Estate offers, regarding agriculture, gardening, garden design and similar fields of study, with the aim to fulfil the owner's wish that Syggrou Estate constantly contributes to the education of 'good farmers and gardeners.	X		X					
Preserve the existing vineyard and promote it through the courses of the Institute of Agricultural Science. The harvest should constitute a highlight of the annual Syggrou Estate activities and it is suggested that a festival is organised during that period, for the promotion of agricultural products and other events.		X	X					
In the area where the old sheep farm was located, it is suggested that a small collection of farm animals is exhibited (chickens, goats), solely for demonstration and educational purposes.		X	X					
The traditional practices associated with the historic place and the interrelationship between the Estate's history, environment and communities should also be considered	X		X					X

common ground among the key stakeholders about the preservation and restoration of the landscape of this historic Estate and to conclude to the proposed management landscape guidelines. As such, we concluded that, special care must be taken regarding the management guidelines in order to comply with the protection of the historical park. Any proposals to meet contemporary visitor needs in historical parks are suggested herein.

In contrast to the general historic park management studies, this research gives emphasis to the historical and cultural heritage preservation of the landscape, through landscape character assessments and perception surveys of stakeholders and SWOT analysis. The above methods and results allowed the researchers to capture the particular landscape character of the Syggrou Estate.

From the LCA and the stakeholders' responses, it became evident that the most important aspects of the Syggrou Estate are the preservation of the natural forest and the conservation of the cultivations for the retention of the Estate's historical and cultural heritage.

The Syggrou Estate's visitors who participated in the perception survey are very sensitive towards the Syggrou Estate's ecological and historical value and are aware of the importance and need for the preservation of the natural forest, cultivations, and historic built elements within the Estate. Through the LCA, it became possible to identify the various landscape types, assess their value and level of vulnerability, based on specific criteria, to conclude to strategies and guidelines for the preservation of the forest, the regeneration of agriculture cultivations, enhancement of related experiential education, the restoration of the historic buildings and landmarks, and the enhancement of the diverse landscape division units of Syggrou Estate.

In conclusion, the main aims of the management plan for the Syggrou Estate are a) the protection and enhancement of the natural forest and cultivations, b) the continued recreation without organized facilities and c) the education of farmers and gardeners, according to the wish of the first owner of Syggrou Estate. The particular research approach justifies the need to consider social preferences and values and potential conflicting opinions, along with the institutional structures and barriers and forms of knowledge (UNESCO/ICCROM/ICOMOS/IUCN, 2013). Therefore, this procedure aims at achieving a consensus among landscape architects and stakeholders regarding the park's development priorities and their associated landscape guidelines.

The application on a historical park such as the Syggrou Estate was important to i) identify individual areas, ii) consider any future development, iii) regulate land-use change such as forest succession, iv) preserve historic agricultural practices and landscapes, v) contribute towards historical park conservation, management strategies, vi) raise public awareness, vii) encourage and empower stakeholders to participate in decision-making processes. The broader benefits from the combination of the above methods will support a) landscape and environmental protection, b) increase cooperation, collegiality, co-management c) generate feeling of "ownership" of the management plan.

Future research work is needed with other historical parks to inform further the proposed methodological framework. As landscape practitioners adopt the above methods, experiences will accumulate. A formal evaluation of such accumulated experiences among practitioners will point to adjustments which will better address national standards and needs. The application of the proposed methodological framework to other parks will gather information and potentially lead to its upscaling.

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CRedit authorship contribution statement

Aikaterini Gkoltsiou: Conceptualization, Methodology, Data curation, Writing – original draft, Writing – review & editing, Map

elaborations, Editing. **Angeliki Paraskevopoulou:** Data curation, Writing – original draft.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

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