

SETTING THE GROUNDS FOR THE GREEN INFRASTRUCTURE IN THE METROPOLITAN AREAS OF ATHENS AND THESSALONIKI: THE ROLE OF GREEN SPACE

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ABSTRACT

Green Infrastructure (G.I.) is a *sine qua non* in contemporary planning. Green spaces can play a vital role in serving as grounds for developing G.I. and promoting environmental, social and economic benefits.

In Athens and Thessaloniki (the only metropolitan areas in Greece) there has been no Green Infrastructure planning. However, existing and prospective green spaces can play a catalyzing role in the development of a Green Infrastructure. In fact, even though inadequate and insufficiently dispersed, urban green spaces present great potentials for embedding the features of “green”, “connectivity”, “multi-functionality” and “accessibility”, which are key to G.I. planning. The concept of Green Infrastructure has long been embedded in policy documents, such as the Master Plans of both metropolitan areas. And even if the G.I. term is not clearly stated in either Master Plans, there is a clear goal for the designing and networking of green spaces, to provide leisure opportunities and other functions, as well as accessibility to all citizens.

Keywords: Athens; environmental planning; Greece; Green Infrastructure; green spaces; Thessaloniki

Introduction

Green Infrastructure

The Green Infrastructure concept gained momentum in planning theory and practice after the 1990s, initially in the United States and then in the European Union (Naumann et al. 2011; Lennon 2015). According to the EC (COM/2013/0249 final), Green Infrastructure is defined as:

“A strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services. It incorporates green spaces (or blue if aquatic systems are concerned) and other physical features in terrestrial and marine areas. On land, Green Infrastructure is present in rural and urban settings.”

Although Green Infrastructure is a new term, some scholars believe that it is not a new idea. They think that Green Infrastructure planning goes back to the 19th century, when green areas were designed to offer recreation opportunities to urban populations, as well as to resolve public health and flooding problems (Benedict and McMahon 2002; Mell 2008). Others (Amati and Taylor 2010; Thomas and Littlewood 2010) think that Green Infrastructure is connected to the long-established green belt concept (originally found in the UK planning system), or that it was embedded for the first time in the famous 1947 Finger Plan of Copenhagen. According to other scholars however, the G.I. concept is related to a more recent concern: that of habitat fragmentation observed in natural ecosystems (Sandström 2008; Karhu 2011).

Regardless of the concept’s origin, Green Infrastructure is not only a tool, addressing environmental theory. It is also a planning tool, concerning socio-economic

policy (Wright 2011). However, as Kambites and Owen (2006) argue, translation of “Green Infrastructure thinking” into “Green Infrastructure planning” (i.e. turning the G.I. concept into planning implementations), requires a certain (planning) framework, with the key aspects being: the planning scale, the G.I. components, the features embedded and the functions provided.

Regarding the planning scale, Green infrastructure can be designed at very different scales as many scholars argue, ranging from the urban and local level to a pan-regional scale (City Parks Forum 2003; Benedict and McMahon 2006; Mell 2010; Laforteza et al. 2013). Despite this wide range however, preferences exist. The City Parks Forum (2003), for example, suggest that Green Infrastructure should be debated on a larger scale due to the benefits of climatic and landscape resource management. The use of a transboundary scale is also supported by De Sousa (2003), Selman and Knight (2006) and Kambites and Owen (2006). Laforteza et al. (2013) on the other hand, support another option, also adopted in the present paper, that the city region scale, including the urban conurbation along with its adjacent wild-land urban interface, appears to be the most suitable scale for planning Green Infrastructure.

Regarding the G.I. components, these are mainly two (Benedict and McMahon 2002): the “hubs” and the “links”. Hubs constitute “anchors” for the services that the GI concept supports and includes reserves, parks and open spaces, residual lands, forests and farmlands, woodland, outdoor sports facilities, allotments, urban farms, etc. as well as all other types of urban open spaces (Benedict and McMahon 2006; Davis et al. 2015 etc.). At the regional (landscape) scale, “hubs” may also include protected areas and restoration zones (Naumann et al.

2011). Links on the other hand, constitute the connections between “hubs” and may include green corridors and green belts (Williamson 2003), taking also advantage of several networks (“grey” or not), such as hydrology, transportation, energy (Rouse and Bunster-Ossa 2013) or aquatic elements (Abbot 2012).

Regarding the features with which Green Infrastructure is mainly associated, Wright (2011) identifies the underlying features “connectivity”, “multi-functionality” and “green” as the core ideas of Green Infrastructure, with the notion of connectivity (networks) highlighted the most. Indeed, Jongman and Pungetti (2004), Opdam et al. (2006) and Silva et al. (2010) describe Green Infrastructure as “ecological networks” primarily related to landscape ecology. Little (1990) and Fàbos (2004), put the emphasis on recreation and leisure (“greenway networks”), with the attribute “multi-functionality” also mentioned by Thomas and Littlewood (2010), Rouse and Bunster-Ossa (2013) etc. “Connectivity”, as a general feature, is stressed by Kambites and Owen (2006), whilst the feature “green” is emphasized by Rayner et al. (2010) and Williams et al. (2010). Other attributes characterizing G.I. in the literature are: “accessibility”, “interdisciplinarity”, “inclusiveness” “resilience”, “social cohesion”, “territorial cohesion”, etc. (Benedict and McMahon 2006; Kambites and Owen 2006; Naumann et al. 2011; Lovell and Taylor 2013).

Developing G.I. can be beneficial for a city or a landscape in many ways. According to the literature, Green Infrastructure can contribute to: climate change adaptation, landscape protection (Kambites and Owen 2006), ecological conservation (Marcucci and Jordan 2013), recreation and education facilitation (Erickson 2006; Mell 2010), aesthetic enhancement (Pincetl 2013), social and economic revitalization (Thomas and Littlewood 2010), regeneration and urban growth (Mell 2010), storm water management (Abbot 2012), urban runoff mitigation and heat island reduction (Newell et al. 2012).

Given the above benefits, the current paper aims to discuss issues of Green Infrastructure planning in Athens and Thessaloniki, which constitute the two metropolitan areas of Greece; i.e. vast built-up areas that lack of open spaces, in which the need to embed the G.I. concept in to their planning is much higher, so that climate change effects as well as the fragmentation of the natural ecosystem are addressed. The ultimate scope of this paper is to discuss the problems and perspectives of using existing green spaces for the development of G.I. in the two metropolitan areas taking into consideration the current economic conditions and the permanent threat of urban sprawl and climate change.

Urban green spaces and their role in Green Infrastructure planning

According to the U.N. WHO (World Health Organization), urban green spaces are “any vegetated areas of land or water within or adjoining an urban area”, such as parks,

sports fields, woods and natural meadows, wetlands or other ecosystems. According to Swanwick et al. (2003), “green space” consists of predominantly permeable “soft” surfaces, such as soil, grass, shrubs, trees and water. The term urban green space is often used interchangeably with “open space”, giving rise to confusion. According to the United States Environmental Protection Agency (EPA), “open space” is defined as “any open piece of land that is undeveloped (has no buildings or other built structures) and is accessible to the public”. As such, “open spaces” include: green space, schoolyards, playgrounds, public seating areas, public plazas, vacant lots etc.

Depending on their location, urban green spaces may be divided into two elementary types: a) green spaces within a city and b) green spaces found in continuity or in the vicinity of a city that usually include areas of forest or other types of vegetation. Whereas green spaces in a city are physically constrained due to the limitations of the urban environment, green spaces in the surroundings, because of their size, provide a significant proportion of a city’s population access to green space and therefore they are often of supra-local importance. As several scholars argue (Beriatos 2002; Allen 2003), green spaces in the surroundings of a city serve as “green walls” [for the (environmental) protection and shielding of a city]. Thus they are as important as those within the city, not only in the case of small or medium-sized towns but mostly in the case of large urban centers and particularly the metropolises, where usually the need for green spaces is much greater.

Green space coverage and allocation differ significantly among urban areas. There is a set of factors that determines the differences between cities, which are usually related to (Fuller and Gaston 2009): (i) the history of city planning (e.g. cities with extended medieval cores, planned or organically developed areas); (ii) the productive model of a city (for example industrial or tourist-led city); (iii) institutional and social parameters that are related to land ownership; (iv) unforeseen events, such as earthquakes or other natural or man-made disasters that made possible major urban planning interventions; as well as (v) environmental conditions (climate type, land terrain, water existence). Whereas the majority of cities in northern and northwestern Europe have been characterized by an increased per capita green space allocation, cities in the south and east of Europe lag behind to a large degree in terms of the per capita green space coverage. Greek cities, characterized by a very compact urban form, have the lowest green space availability per inhabitant, ranging between 2 and 10 square meters per capita (Fuller and Gaston 2009).

Green spaces within a city and in its surroundings constitute a key parameter in Green Infrastructure planning. They constitute crucial “hubs” that are by nature designed to include the feature “green” (which is of prime importance to G.I.). They also serve as air-cleaning filters, improve the microclimate, foster biological diversi-

ty, mitigate city noises and other nuisances, reduce the risk of floods, serve as leisure and recreation venues for social interaction, contribute to upgrading the urban landscape, and also function as gathering areas in case of natural disasters and emergencies (Benedict and McMahon 2002; Gill et al. 2007).

In short, urban green spaces, inside the city and in its surrounding area, existing and prospective, play a significant role in the environmental planning and management and are a significant factor for enhancing the quality of life in a city. However, in an era of unprecedented urban sprawl and climate change, green spaces have to be not only physically designed but also functionally incorporated into urban uses and functions, to provide more environmental, social and economic benefits to the city. In other words, urban green spaces should be properly and adequately planned, in order to serve the development of G.I. in a city or urban agglomeration.

The Case Studies of Athens and Thessaloniki

Methodological framework

The present section deals with the metropolitan areas of Athens and Thessaloniki, for which a two-fold analysis is given. Firstly, the current situation and adequacy of green spaces is presented and secondly, the environmental planning philosophy (as expressed in their Master Plans) is described and then discussed in terms of embedding the G.I. concept.

Green spaces, which are *de facto* designed to embed the feature “green”, are evaluated in terms of adequacy and dispersion, as well as for embedding important features of the G.I. concept, such as “multi-functionality”, “connectivity” and “accessibility”. Master Plans also need to embed the same key G.I. features, having the following context:

- “**green**”: referring not only to vegetation but to the blue (aquatic) element as well and to a highly ecological dimension (Lafortezza et al. 2013);
- “**networking**”/“**connectivity**”: which is about the interlinking of green spaces (and other “hubs”) in a functional and physical way (Davies et al. 2015), to ensure biodiversity, ecosystem services, adaptation to climate change, green economy, human health, social cohesion, etc.;
- “**multi-functionality**”: referring to recreation and leisure, education, exercise, economic development, mobility, health and human well-being (Mell 2010);
- “**accessibility**”: having to do with the unimpeded access of all citizens – privileged and non-privileged, disabled or not (Ross 2000) to green spaces and the benefits they offer.

The analysis of both case studies builds upon already existing (though fragmented) research studies on the green spaces in the two metropolitan areas (elaborated for the Ministry of the Environment and other compe-

tent Institutions). The originality of the research lies in the fact that so far, no research on the incorporation of G.I. in planning exists in Greece. Currently, there is little literature on G.I. in this country and it mainly discusses a few cases and the implementation perspectives at the neighbourhood scale (Karanikola et al. 2016; Makropoulou and Gospodini 2016; Salata and Yiannakou 2016). Both cases (Athens and Thessaloniki) were chosen as they are the only metropolitan areas in Greece, i.e. they are urban agglomerations for which there is high priority for embedding the concept of G.I. due to the vast built up areas, which have resulted in extreme fragmentation of the natural ecosystem.

Key information on the green spaces in Athens

Athens is the capital of Greece. It is located in the central continental part of the country (Attica Region). Its metropolitan area has 3.8 million inhabitants, corresponding to almost 40% of the country’s population and covers an area of 3,808 km².

The Athens urban agglomeration sprawls across the central plain of Attica and is surrounded by four mountains (Egaleo, Parnitha, Penteli and Himittos). The significance of these mountains as natural barriers against urban sprawl and as areas providing significant amounts of green was first recognized in the 1960s. It was then that Mount Parnitha was designated as a “Natural Park” and most of the other mountains as “Landscapes of Outstanding Natural Beauty”. Since then, Protected Areas in the surroundings of Athens have grown significantly both in size and number, forming a continuous green buffer zone around the Athens Basin (Beriatis 2004). In addition to environmental legislation, protection of the suburban green and surrounding space became more feasible when three ‘Zones for Urban Control’¹, were designated in the early 1990s. This means that even at that time, efforts to protect the capital’s suburban natural space did not only concentrate on the “green” feature but also on safeguarding and development of multiple functions and economic activities, such as agriculture, leisure, etc. Despite this, Athens’ suburban green spaces are constantly under threat of fire and urban sprawl. It is worth noting that between 1987 and 2007, 18,418 km² of suburban forest was converted to other types of coverage (such as built-up areas), while the fire of 2009 in northern Attica destroyed another 20,521 km² of land that was mainly covered with forest (WWF Hellas 2007, 2009).

On the other hand, green spaces within the city began to be created in the 19th century, initially to serve aesthetic purposes (Papageorgiou-Venetas 2016). Later, in the 20th century, green spaces in Athens kept increasing, either as part of urban planning implementations or of

1 ‘Zones for Urban Control’ are applicable to only rural or suburban areas and impose building regulations to halt urban sprawl. The three ‘Zones for Urban Control’ that were implemented in the rural space of Athens, in the late 1990s served to protect the suburban green space, as a secondary objective.

more strategic projects and Plans, having in mind that Athens was gradually turning into a metropolitan city, with particular urban, economic, social and environmental needs.

Considered to be of particular importance for the Athens urban agglomeration are the metropolitan parks, i.e. extended green spaces of supra local importance, found within the urban agglomeration (such as Tritsis Park, Goudi Park etc). Although overall measurements of the size of these parks do not exist, it should be mentioned that most of them were created in the early 2000s, as part of the “Attica S.O.S.” project that was launched in 1994 (Master Plan Agency 2002), aiming to set the basis for the formation of a green “grid”² in the metropolis and ultimately reach the standard of 5 m² green space/inhabitant (that was set in the 1980s). “Attica S.O.S.” was the last project to be launched for the urban greening of Athens (also as a result of the ongoing economic recession) to provide extensive green and multi-functional spaces.

Today, even if a standard and complete analysis of the existing green spaces in Athens was undertaken (to have full and comparative data), there is no doubt that the metropolitan area lags behind in terms of green spaces. According to estimates based on the urban planning standards and the size of the metropolitan area, green spaces in the Athens Basin should amount to 35 km² (NTUA 2011). However, in the densely built-up metropolitan area in Athens, the reality is considerably different. Green spaces in the Municipality of Athens (i.e. the urban historical core of the city), hardly cover 0.4 km², which correspond to 2.8–3% of the municipality’s surface area. This means that each citizen in the Athens Municipality has access to only 2–2.5 m² of green space. At the same time, even if all open spaces (i.e. abandoned and underused spaces) in the same area were converted to green, this value would only increase to 3.84 m² per inhabitant (Belavilas et al. 2012). A singular opportunity was missed when Athens became the host city for the Olympic Games in 2004. Excessive needs for sports facilities and arenas resulted in the permanent loss of large areas of open space, many of which were designated to become green space. This loss is estimated to correspond to as much as 1.23 m² of green spaces per inhabitant in the urban agglomeration (Belavilas and Vatavali 2009). Further to issues of adequacy, green spaces within the Athens metropolis are also unequally allocated. The proportion of green space is significantly lower in the urban core and the western part of the metropolis, as opposed to the suburban areas in the northern and southern parts (Belavilas and Vatavali 2009), where the more prosperous middle and upper classes of Athens’ population reside.

To sum up, despite the fact that in Athens many green spaces of all sizes exist (especially metropolitan parks),

2 “Attica S.O.S.” project was launched in order to facilitate the implementation of the first Master Plan of Athens, especially in respect to its environmental goals.

the “green” element does not prevail within the urban agglomeration, nor is it equally dispersed, so that all metropolitans have access to it. In fact, development of green spaces within the city were constrained by a set of historical and political factors, resulting in habitat fragmentation (between the urban green and the natural ecosystem at the periphery), loss of biodiversity and a severe lack of spaces that would also offer opportunities for recreation, leisure and education. Suburban green on the other hand, even though it could compensate for this loss (due to its size and network formation), is constantly under threat from fire and (until recently) urban sprawl.

Key information on the green spaces in Thessaloniki

Thessaloniki, is the second largest city in Greece. Situated in the northern part of the country (Region of Central Macedonia), the metropolitan area of Thessaloniki has almost 1 million inhabitants and covers an area of approximately 400 km².

The northern part of the metropolitan area in Thessaloniki is surrounded by an extensive forest-park called Sheikh-Shou. It is an artificial suburban forest whose afforestation began by planting pine trees in an area of 0.04 km², right after the liberation of Thessaloniki in 1912. Since then a series of enactments (starting in the 1920s) resulted in a significant expansion of this suburban forest-park that by the 1990s covered up to 30 km². Due to its importance and size, in 1984 it was protected as ‘Landscape of Outstanding Natural Beauty’ and in 1994 it was designated as a ‘Zone of Absolute Protection’ (Stergiadis 2002). However, a fire in 1997 destroyed nearly 55% of the forest (Papastavrou 2002), resulting in continuous and ongoing efforts for its reforestation.

Apart from this forest-park, the network of suburban green spaces of Thessaloniki is complemented by the wetlands of the Axios River located on the western side and a large manmade Environmental Park in the east. The former was designated a “Natural Park” in 2009, while the latter serves as a recreation area covering a total area of 0.08 km². Another important “green” element in the suburban zone is the artificial Canal (total length of 8.3 km) that was constructed in the 1960s to prevent floods caused by rainwater run-offs coming down from Sheikh-Shou forest-park. From the beginning, it was designated a green zone to enrich the city’s urban green. Today, an ongoing project for the readjustment of the canal’s course is still the priority of the green zone (Master Plan Agency of Thessaloniki 2007).

The urban green spaces in Thessaloniki began to be formed in the late 19th century for aesthetic reasons, starting from the historic center of the city (Karadi-mou-Gerolympou 1995). Green spaces in Thessaloniki continued to flourish during the 20th century, having this time, however, a more ecological dimension. In Thessaloniki the amount of green space per capita is set at 8 m² (which is also the national standard that the Official Gazette No 285Δ/2004 sets for all Greek cities). As in

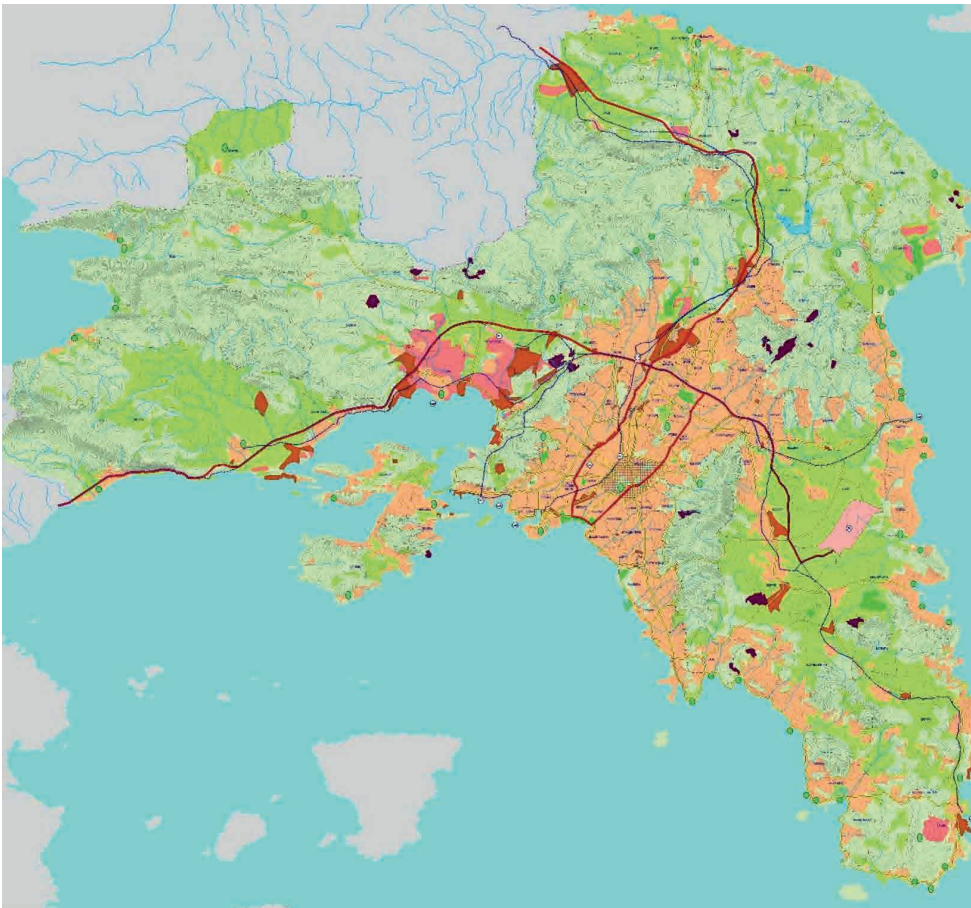


Fig. 1 Green spaces in the urban agglomeration and the peri-urban zone of Athens.
Source: Master Plan Agency of Athens (2002).

the case of Athens, in Thessaloniki too, responsibility for the achievement of this standard lies in urban planning implementations. In the recent past, of vital importance for the greening of Thessaloniki proved to be not only the enactment of the Master Plan but also the designation of the metropolis as “the cultural capital of Europe” in 1997. Back then, a series of projects were launched, which aimed to enhance and upgrade both the natural and the built-up environment of the city (Thoidou and Foutakis 2006; Karadimou-Gerolymou 2014). And even though most of these projects ended up providing green “city shots” (instead of extensive green spaces), at least they managed to offer better “accessibility” for the citizens to the urban green areas (given the dispersion of these green spaces) and some kind of “multi-functionality” (given also the cultural dimension of these urban regeneration projects).

The only available data on the green spaces in the metropolitan area of Thessaloniki are in a study conducted for the Master Plan Agency of Thessaloniki, which, however was not published. According to this study (conducted in 2006), in the metropolitan area of Thessaloniki the green spaces that are provisioned by spatial planning is 5.69 km² in the urban agglomeration, and 1.54 km² in the suburban zone. This means that, if suburban green is taken into account, green spaces in the metropoli-

tan area of Thessaloniki account for 7.23 m² per capita, which is very close to the national standard (8 m² per capita). Indeed, the deficit in green spaces is estimated to be 13,600 m² of the total surface of the metropolitan area, which corresponds to only 16 m² per 1,000 inhabitants. Regarding the allocation of green spaces, the area is particularly low in the urban agglomeration (5.08 m² per inhabitant) and extremely high (31.22 m² per inhabitant) in the peri-urban zone, due to the presence there of forests and other natural or semi-natural ecosystems. In addition, green spaces are unequally dispersed within the urban agglomeration, varying from 0.8 m² per inhabitant in the western districts to 30.62 m² per inhabitant in the eastern districts, which reflects the socio-economic differences between the western and eastern parts of the city (Master Plan Agency of Thessaloniki 2006).

To conclude, suburban green space in Thessaloniki was planned with consistency, in order to form a green buffer zone for the city (embedding the “connectivity” feature in this suburban zone at least) and in terms of promoting “multi-functionality” and leisure opportunities. On the other hand, green spaces within the city, even though they tend to correspond to the national standards, are unequally dispersed, whilst their small size can hardly serve the “multi-functionality” feature. In total, despite the planning inefficiencies (due to historical and

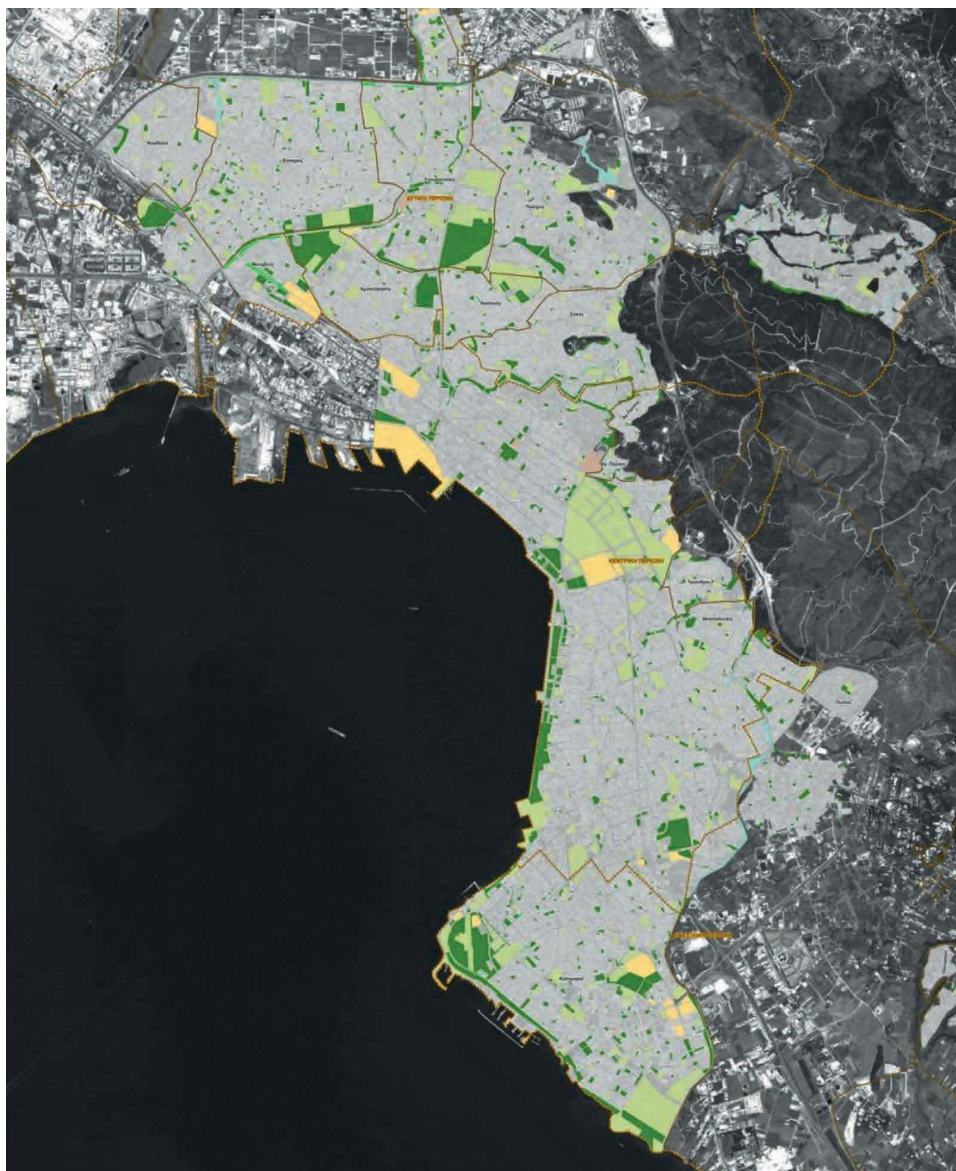


Fig. 2 Green spaces in the urban agglomeration of Thessaloniki.
Source: Master Plan Agency of Thessaloniki (2006).

policy factors), Thessaloniki is notable for a better embedding of the feature “green” compared to Athens, and for providing easier access to green spaces for its citizens (due to their dispersion).

Green planning and the G.I. concept in the master plans for Athens and Thessaloniki

Even though attempts to adopt a Master Plan in Athens and Thessaloniki started in the 1960s, it was only in 1985 (by laws 1515 and 1561) that such Plans were approved for the first time. An important detail of these first Master Plans is that they were both complemented by an Action Plan for the Environment and that in both cases a special Agency was established for the implementation of the Master Plans³.

³ In 2014, both Master Plan Agencies were abolished (and absorbed by the Hellenic Ministry for the Environment).

Taking fully into consideration the peculiarities of the period in which they were launched and the special features of the two metropolises, the Master Plans focused on smog and air pollution in the case of Athens, and marine pollution in the Thermaikos Gulf in the case of Thessaloniki. Beyond this differentiation, overall philosophy in both Master Plans remained the same regarding the environmental policy and planning, giving priority to: the ecological reconstruction of urban areas, a reduction in air and soil pollution, the protection of the peri-urban agricultural land and the natural ecosystems (forests, mountains, wetlands etc.). As these first Master Plans were enacted in the 1980s (i.e. at a time well before the first use of the term G.I.) when the philosophy of the environmental policy was simple and focused on tackling the urgent and growing ecological problems, such as air, soil and water pollution, which both metropolitan areas were facing. The feature ‘green’ was the only element

of the GI concept that was given importance mainly in terms of its protection and enhancement. Despite the fact that ‘Green Infrastructure’ as a term was not used in the first Master Plans, subconsciously, it was implied as an ultimate environmental vision for urban development through the achievement of an upgraded environmental and ecological network for natural or artificial, urban and suburban, ecosystems.

In the 2000s, i.e. approximately 15 years after the enactment of both Master Plans, efforts were made to revise them. This time, environmental planning and “green” were prioritized even more. In view of the revision, both Agencies assigned special projects entitled ‘Strategic and Operational Plan for the Upgrade of Green Spaces’, one for Athens and a second for Thessaloniki. Although these studies were never completed, they are considered to have provided insights for incorporating the Green Infrastructure concept, since the upgrade in the natural environment, provision of leisure opportunities, along with the physical networking of green spaces, have constituted core-planning directions.

In 2014, both revised Master Plans were introduced to the Hellenic Parliament for their enactment. However, only the one for Athens was approved (by L.4277/2014). Despite this fact, the new versions of the Master Plans

had a common philosophy and guidelines for the urban environment and green spaces, focusing on the following goals:

- qualitative and quantitative upgrade of green spaces;
- development of a continuous network of urban green spaces, including Protected Areas and natural ecosystems located in the suburban and peri-urban areas;
- inclusion of open spaces and areas of cultural and historical importance (archaeological sites, monuments, etc.) in this green network;
- protection and wise management of the urban landscape and natural landscapes;
- wise management and planning for the protection of water resources and water surfaces.

To conclude, the recently reformed metropolitan Master Plans encompass in a more advanced way, the concept of Green Infrastructure, despite the fact that the term is not clearly stated. In fact, the Master Plan for Thessaloniki uses the term only once, whereas the Master Plan for Athens paraphrases it as “green grid”. Although this tactic seems superficially to be a divergence from the relevant European strategy, actually, the underlying policy conforms to the goals set by the Green Infrastructure policy. Prevailing features in both Master Plans are once again “green” and “connectivity”, whilst features of “mul-

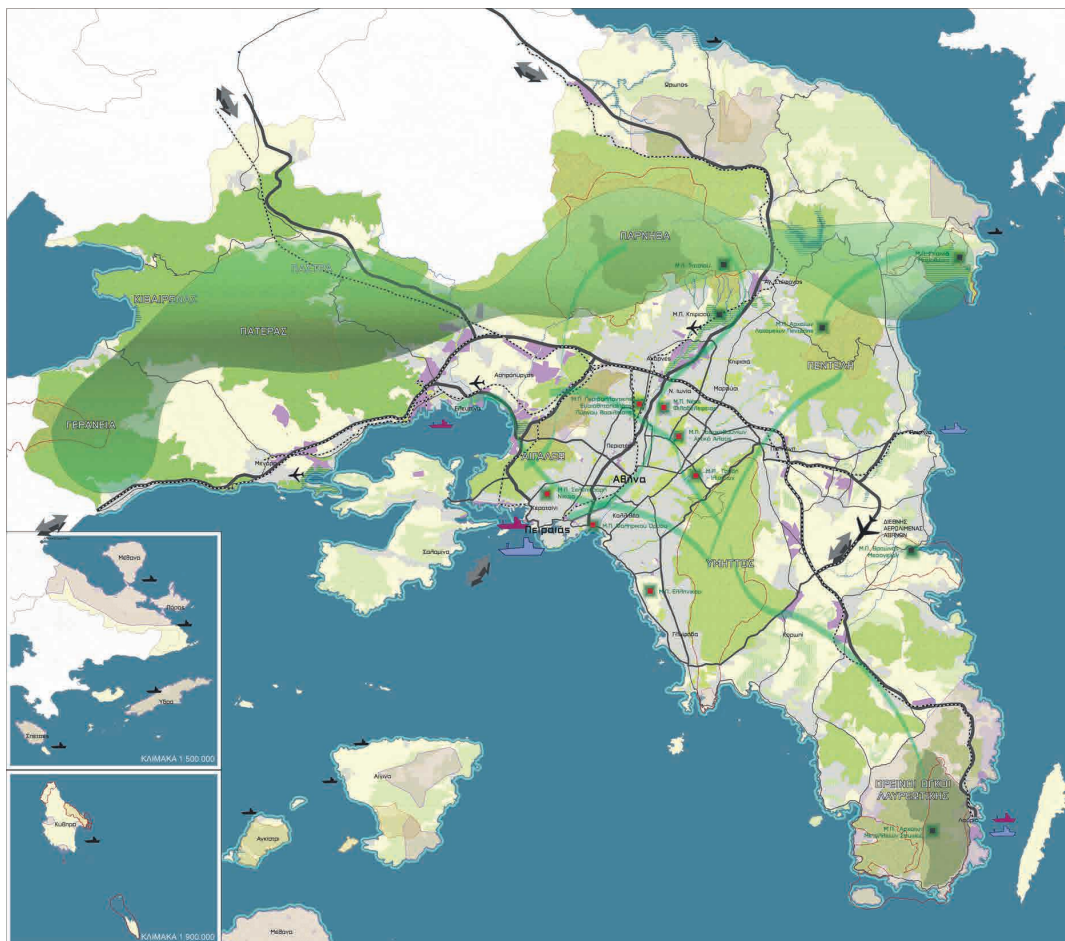


Fig. 3 The vision for a green “grid” in the Athens metropolitan area. Source: Official Gazette 156/A/2014 (New Master Plan of Athens).

tifunctionality” and “accessibility” are indirectly supported. Indeed, the primary objective of both Master Plans is the development of a continuous network of green spaces of every type and scale, including Protected Areas and natural ecosystems, located either in the urban or in the suburban and peri-urban areas that have multiple functions, dictated by detailed spatial plans. At the same time, important difference from the past (i.e. the Master Plans of the 1980s) is that the blue (aquatic) element has prevailed, given the coastal location of both metropolises.

Evaluation and Discussion

Green Infrastructure is both a planning concept and a tool, aiming to strengthen social and economic revitalization (Thomas and Littlewood 2010) and to enhance the ecological profile of an area (Sandström 2002). Green Infrastructure may address a plethora of goals of economic and social policy, i.e. beyond strict environmental enhancement (Mell 2008). Although some scholars argue that the role of Green Infrastructure in planning is to deliver sustainability “by presenting a new way to address the old problem of reconciling environmental protection with growth” (Owens and Cowell 2011), planning of Green Infrastructure has become a high priority in contemporary planning endeavours.

In Greece, which is a country with a relatively short tradition in environmental planning and management of green spaces, the concept of Green Infrastructure is present in the current planning efforts. This is a fact in the cases of Athens and Thessaloniki and is evaluated in the present paper, both in terms of their environmental planning philosophy and their green spaces. The analysis was mainly based on fragmented data (since there are no studies that provide a full analysis of the urban green spaces in metropolitan areas of Greece). Despite this fact, important conclusions were reached regarding the potentiality and ability of green spaces in both metropolitan areas, to set the grounds for the development of Green Infrastructure in the future. These conclusions are presented below.

“Green”

In Greece, development of green spaces for ecological purposes prevailed after the 1960s. Since then, urban green space has become a priority and a core type of land use in all Greek cities and metropolises. According to the existing data (presented in the analysis), there is a great variety of different sized green spaces in Athens and Thessaloniki. However, green space coverage in both cases lags behind the national standard (i.e. 8 m² of green per inhabitant). This lack is estimated by both case studies to be much higher in the case of Athens and much higher in the central districts and the deprived areas. Regarding sub-urban green, although it can compensate for this lack within the cities, it is constantly under threat of

fire and of uncontrolled urban development. And despite the fact that both metropolitan areas are located in the coastal zone, the aquatic (“blue”) element has played an important role mostly in policy documents (i.e. the Master Plans) and rarely in practice.

The ongoing economic recession in Greece has a contradictory role in the quantitative upgrade of green spaces. On the one hand, it halts the creation of new green spaces, since municipalities do not have the funds to create new urban green spaces according to the enacted spatial plans. On the other hand, the economic recession puts a hold on building activity and uncontrolled urban sprawl, safeguarding the (remaining) suburban green areas and open spaces within the urban core.

“Connectivity”

“Connectivity” has long been identified as a planning goal of environmental and green planning in both metropolitan areas of Greece. However, networking of green spaces became feasible only in the peri-urban zone of both metropolises. Regarding green space within the urban agglomerations, certain planning externalities in both metropolitan areas failed to meet the standard of green space and this undermined most of the efforts to set the grounds for the creation of linkages (and new hubs) between urban green and the peripheral natural ecosystem.

“Multi-functionality”

“Multi-functionality” is a usual goal in most green and environmental planning projects, at all scales. In fact, according to the existing national planning legislation (Official Gazette 285D/2004), green spaces, a compulsory type of land use within the cities, are conceptualized as a system of open spaces of various sizes. They may be covered, fully or partially, by vegetation and are designed to serve different functions such as recreation and leisure, sports, social gatherings, playground for children etc.

In the cases of Athens and Thessaloniki, “multi-functionality” was achieved mainly in the sub-urban green spaces, due to their size. Multi-functionality also characterizes green parks of metropolitan importance in Athens and it is less apparent in the case of green spaces within the city of Thessaloniki.

“Accessibility”

“Accessibility” is another feature that, although rarely expressed in writing, has long been a key planning goal in both metropolitan areas, although not always referring to access by disabled citizens. It was usually interwoven in efforts to achieve dispersion of green spaces (“hubs”) and so facilitate the access of all citizens to the green hubs and links, addressing the goals of social cohesion and territorial justice. Dispersion of green spaces in both metropolitan areas varies considerably. Usually, in the historic centers and the deprived areas, the access is quite limited due to the lack of green surface areas. On the other hand,

access to sub-urban green space and metropolitan parks could be better designed to the benefit all citizens.

Given the above evaluation, it is concluded that although the existing green spaces in Athens and Thessaloniki face certain challenges, they can play an important role in the development of Green Infrastructure, on condition that: (i) the proposed (by Urban Plans) new green spaces will be realized (taking into account the national standard of 8 m² per capita), (ii) other G.I. elements (i.e. hubs and links) will be considered, especially the “blue/aquatic” ones (given the coastal character of both metropolises), (iii) more effort will be put into green planning to embed extra functions, (iv) the peri-urban green areas (and the Protected Areas) will be better surveyed and protected against urban sprawl and (v) accessibility will also focus on the facilitation of access for both the non-privileged and disabled citizens, by developing the necessary urban and transport infrastructure, such as pedestrian zones or public transport that will allow all groups of people to have access to these areas.

However, developing G.I. in Athens and Thessaloniki is not only a matter of planning. Natural disasters constitute a constant threat and can cause important alterations in the peri-urban green space of both metropolitan areas, whilst the current fiscal recession puts an extra burden on implementing all kinds of Plans (spatial, environmental, etc.). Especially in the cases of Athens and Thessaloniki, the conversion of valuable and extended open spaces into built-up areas has become an option (and a threat), which is always under discussion, since using land for construction can provide the state valuable and much-needed revenue.

To conclude, it is of utmost importance that Greek cities and metropolitan areas take advantage of their green spaces in order to “build” a Green Infrastructure, both at the urban and landscape scales. This is especially important for the metropolises of Athens and Thessaloniki, since their size has long contributed to the fragmentation of nature and the loss of biodiversity, resulting in more socio-economic losses.

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