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SUSTAINABLE URBAN DEVELOPMENT IN THE COASTAL AREA OF VOULIAGMENI IN ATTICA

Abstract:

Coastal urban areas face a number of environmental problems. They have implemented policies for solving these problems, which aimed at sustainable development and the general quality of life of residents. In the context of sustainable development of urban centers, the European Policy has exercised great influence through European projects and other actions.

This research refers to the coastal urban area of Vouliagmeni in Attica region. Specifically, companies, tourism development, projects and actions that have been carried out for the sustainable development of the area as well as the measures of environmental protection are investigated. To conduct this study a method of personal interviews with the local authorities and an in situ research took place.

The results showed that Vouliagmeni has considerable natural resources as well as a number of economic and environmental problems. As a result, the natural resources threatened by degradation. The major economic problems that the country has faced over the past few years, have affected to some extent the projects and actions of local authorities, which aimed at the coastal area management, at further development and general protection. The adjustment of the local community to new economic situation is necessary to ensure the sustainable development of the area.

Keywords:

Environmental management, coastal urban area, Vouliagmeni

1. Introduction

In 1992, the importance of sustainable urban management at a local level was recognized at the World Summit where the Local Agenda 21 was established. In accordance with the provisions of the Agenda 21, all municipalities were invited to prepare strategies for the sustainable development of their areas (UNESG, 2002).

During this effort, the EU has been led to finance many projects and actions at local and regional levels through the Community Support Frameworks. At the same time, it has published a various directives both for the creation of development plans and for addressing different environmental problems that urban areas face. These actions include the Green Paper on the urban environment in the European Union in 1990, the report on sustainable cities in 1996, the EU directive for a program for the urban environment in the European Union (CEC, 1997), the Thematic Strategy for the urban environment, the Sixth action Program for the environment (OJEC, 2002) and others.

The quality of the natural environment plays an important role in development, by attracting both residential and entrepreneurial activities.

Vouliagmeni is an area that, as will be shown below, has been developed due to the valuable natural resources that it has. However, the general economic crisis that has existed in the country in the recent years, the large foreign debt as well as unemployment, are pushing for greater development and utilization of local resources. The area is called to face the new economic and environmental challenges in the context of Sustainable Development.

2. Methodology

Initially, the survey focuses on land uses, tourism development, projects and works that have taken place in the area. Then, a research in situ in order to record the current situation and identify the environmental problem, as well as, a method of personal interviews with the responsible staff of the Municipality took place. The creation of maps was accomplished with the help of Geographical information systems software. Topographic diagrams and land uses are used as sources of Cartographic data. Finally, an evaluation of the situation took place and measures for the sustainable development of the area are proposed.

3. Cases studies – District area of Vouliagmeni

The area of Vouliagmeni is located at the southeastern boundary of the Basin of Athens, 20 km from the center of Athens. Vouliagmeni is limited both by the coast of the Saronic Gulf and the mountains of Hymettus (Figure 1). The key factors that shape the climate are, the combination of the hills and the coastline, the existence of pine groves all the way down to the beach and large open green spaces. The presence of Hymettus gives to Vouliagmeni certain climatic conditions such as low rainfall and creates prevailing wind directions. Vouliagmeni Lake, the waters of which have curative properties as well as the

alternating horizontal and vertical ground undulations, give to the landscape an important peculiarity.

Figure 1: Research area



Source: Own adjustment based on Ministry of Environmental Energy and Climate Change data

In ancient times, the area of Vouliagmeni belonged to the Municipality of Alai of Aixoni. The municipality took its name from the alais = Alykais (salt basins) that were in the area. The area was a place of worship of Apollo Zoster. It is underlined that the municipality had once included the part of Voula where there was a salt lake belonging to the Voula Hellenic organization Tourism. Later, the area got its name from the sinking of Vouliagmeni Lake.

Initially, Vouliagmeni has been a natural area with good climatic conditions. The area had pine trees and was a refuge of many birds, making it, addition to a tourist area, a hunting area. The area of Megalo Cavouri before 1926 was inaccessible to all visitors except hunters (Koutsyiannis, 1984).

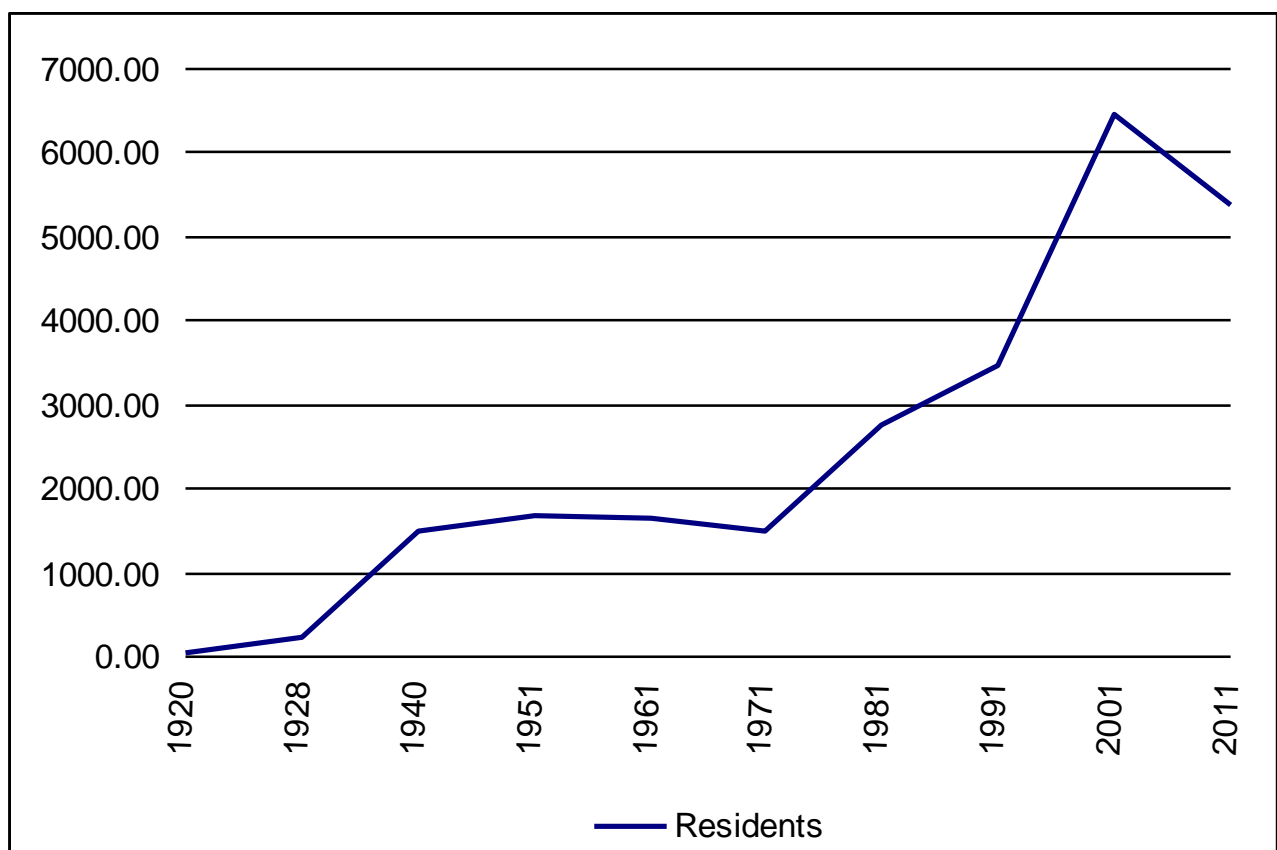
In the early 70s, the population growth of the Athens area resulted in search for new residential housing areas. The area of Vouliagmeni was one of those areas. Vouliagmeni

had begun to develop as a vacation residential area and as an area with high quality hotel accommodations, due to its proximity to the capital and the good climatic conditions.

Then, tourism development caused the concentration of population providing tourism services. Taking into account that the basin of Attica had been under heavy pressure from building and population growth, the result was the transformation of Vouliagmeni from a tourism settlements area to a permanent residence area

The area of Vouliagmeni initially shows a population growth during the period 1928-1951. Then, it follows a small decline of population in the decades of the 50s and 60s. In the time period 1971-2001 it shows a significant increase in population, as opposed to the last decade that shows a drop of 16.78%. (Figure 2). One reason that has contributed to the delay of the residential development of permanent residence was the lack of basic infrastructure during the 70s.

Figure 2: Population growth in Vouliagmeni (1920-2011)



Source: HSAG, 2012

3.1 Economic elements – Enterprises

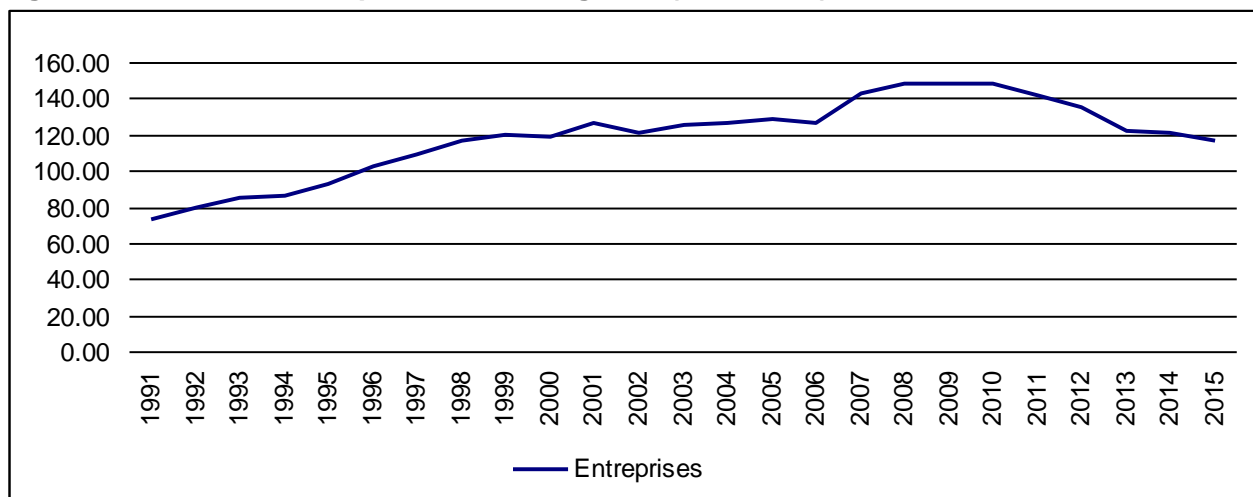
In the area the employment of residents is mainly in the tertiary sector. In 1969, the area of Vouliagmeni collects 12.5% of tourist beds of the Attica coast.

With regard to the production sectors, during the period 1971-2001 the employment in the primary sector is at a very low level, from 2.35% in 1971 to 1.69% in 2001. The employment in the secondary sector shows a gradual decrease from 22.35% in 1971, to 11.99% in 2001. In contrast, employment in the tertiary sector shows an increase from 71.76% in 1971 to 75.14% in 1991. Then, it was followed by a decrease, reaching at 70.94% in 2001. An increase in unemployment was observed from 1.94% in 1981 to 7.74% in 2001 (HSAG, 2002).

The tertiary sector outweighs the other two production sectors. The development of tourist accommodation and tourist activities in the area due to both good climatic conditions and the extent of beaches that the area has, has contributed to this effect.

The area of Vouliagmeni has a small number of enterprises. During the last decades 1991-2008 the number of enterprises shows a slight increase and stability during the period 2009-2010. Reversely, from 2011 and after, the number of enterprises follows a slight downward trend due to the economic recession of the country (Figure 3).

Figure 3: Number of enterprises in Vouliagmeni (1991-2015)



Source: Industrial Chamber of Greece, 2016

The largest number of enterprises refers to wholesale and retail trade. At the same time the sector of trade representatives, the vehicle trade, vehicle and motorcycle maintenance and trade vehicle parts are at very low level.

3.2 Projects

In the area there are no new major development projects. The projects that have been carried up to date, are, the opening of Vouliagmeni - Sounion Avenue, the creation of the popular beach of Hellenic Tourism Organization at the main beach of the Bay, the beach of Lemos Astir, sports facilities, Vouliagmeni marinas and finally the construction of two big hotel units.

3.3 Redevelopment works

In the area infrastructure works such as walkways, playgrounds, parks and aesthetic upgrade projects in public spaces have been constructed.

3.4 Road works-transport

Vouliagmeni is connected to the center of Athens by Poseidon Avenue, that in the area of Vouliagmeni is renamed Athena Avenue, and crosses all the coastal zone of Vouliagmeni. The Kavouri - Leto Apollo Avenue connects the center with the area of Astir Palace.

The area is served by 5 bus lines, which include 35 stops and connect Vouliagmeni to the center of Athens and the surrounding areas (AUTO, 2009).

3.5 Sporting Facilities

Sports facilities in the area include a football field and 3 tennis courts. In the area of Vouliagmeni Bay, the Nautical Club that includes swimming, with swimming classes, water polo, sailing, rowing, water skiing, underwater activities and sport fishing is also present (<http://www.nokv.gr>).

The municipal district of Vouliagmeni was announced an Olympic City by the Athens 2004 Olympic Games Global Impact, where the events of Triathlon, individual time trial cycling, and Paralympic Cycling were held in 2004.

3.6 School infrastructures

In the area there are 4 schools units consisting of, 1 kindergarden, 1 elementary school, and 2 high schools.

3.7 Other services

In the area, there are restaurants, entertainment venues, shops, a police department, a yacht club, an orphanage, a port police station, a marina, banks, a shopping center and others.

3.8 Open space - Green

In the area there are several open and green spaces. Specifically, urban green is found on the streets and on main roads, in squares and in parks. Also, green is found in the yards of private spaces and balconies. The green space includes trees, shrubs and herbaceous plants. In addition to that, forests of pine trees, bushes and shrubs exist in non constructed lots. The area is a haven for birds (doves, sparrows, and other) and for some animals such as turtles, and others.

3.9 Tourism

Vouliagmeni presents a remarkable hotel potential of 1370 rooms and 2596 beds. The majority of accommodation is high quality (four and five stars hotels).

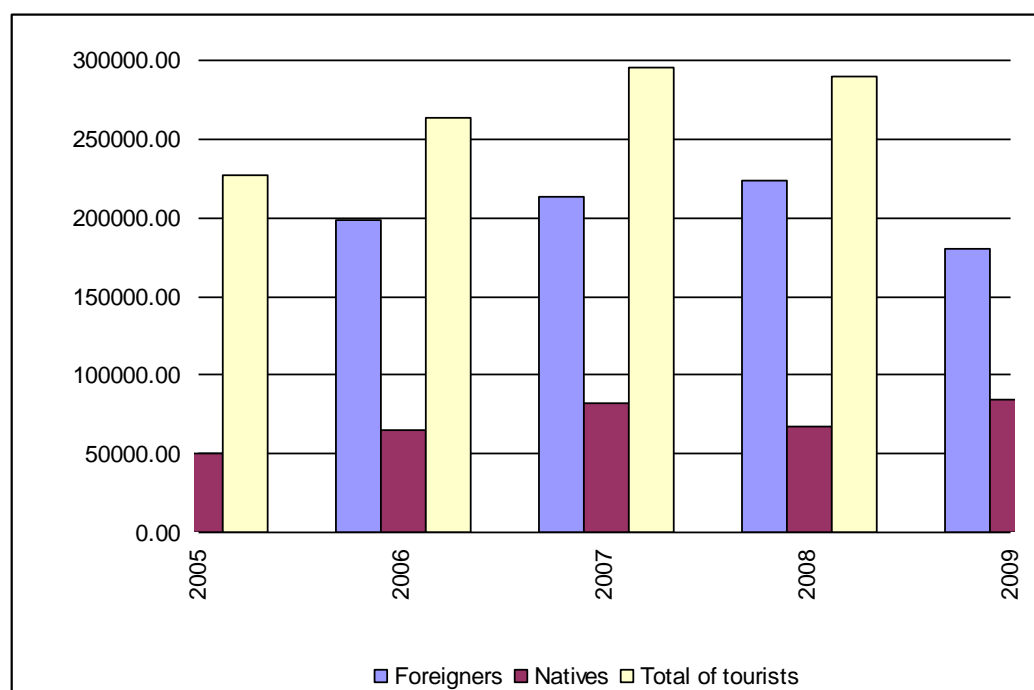
Table 1: Hotel potential in the area of Vouliagmeni

	Class				Total
	D	C	B	A	
Vouliagmeni					
Hotel units	1	1	4	6	12
Rooms	38	72	302	958	1370
Beds	73	134	579	1810	2596
Rental rooms	2				2
Rooms	26				26
Beds	51				51

Source: HSAG, 2015

The Vouliagmeni area has a high number of arrivals and overnight stays. In particular, tourist arrivals which were 89773 in 2005 went up to 134757 in 2009. A similar increase has been reported in tourist overnight stays where a 226740 in 2005 increased to 263796 in 2009 (Figure 4). The majority percentages of the tourists are foreigners.

Figure 4: Number of overnight stays in Vouliagmeni from 2005 to 2009



Source: HSAG, 2010

3.10 Land uses

The area of Vouliagmeni is a general residential area for tourism and resort (Figure 5). The main human activities at Vouliagmeni are: Sports and leisure activities, shops and tourism activities.

Taking into account the areas of land use it is found that the largest percentage is covered by mountains 30.22%, followed by green spaces with (19.55%), which increased to 6.64% with the addition of the spaces that have been protected by the municipality. This is followed by urban blocks (19.78%), open spaces (4.31%), beaches (0.81%), sports facilities (0.66%), roads (17.64%), a cemetery (0.20%) and Vouliagmeni lake (0.16%) (Table 2).

Table 2: Land uses in the area of Vouliagmeni

District of Vouliagmeni		
Land uses	Area (square meters)	%
Building Square	1035890.083	19.78
Green area	1022771.999	19.55
Vouliagmeni lake	8284.650	0.16
Sports facilities	33682.063	0.66
Open area - parking	225321.852	4.31
Hill	1581272.310	30.22
Cemetery	10635.000	0.20
Green area which includes a temporary green character (without any protection status).	347642.558	6.64
Beaches	42528.809	0.81
Roads	923175.96	17.64
Total	5232530.00	100.00

* In the above calculations the areas of the islands, which belong to the District of Vouliagmeni, are not included

Source: Our data processing is based on data from the Geographical Information Systems

Figure 5: Land uses in Vouliagmeni

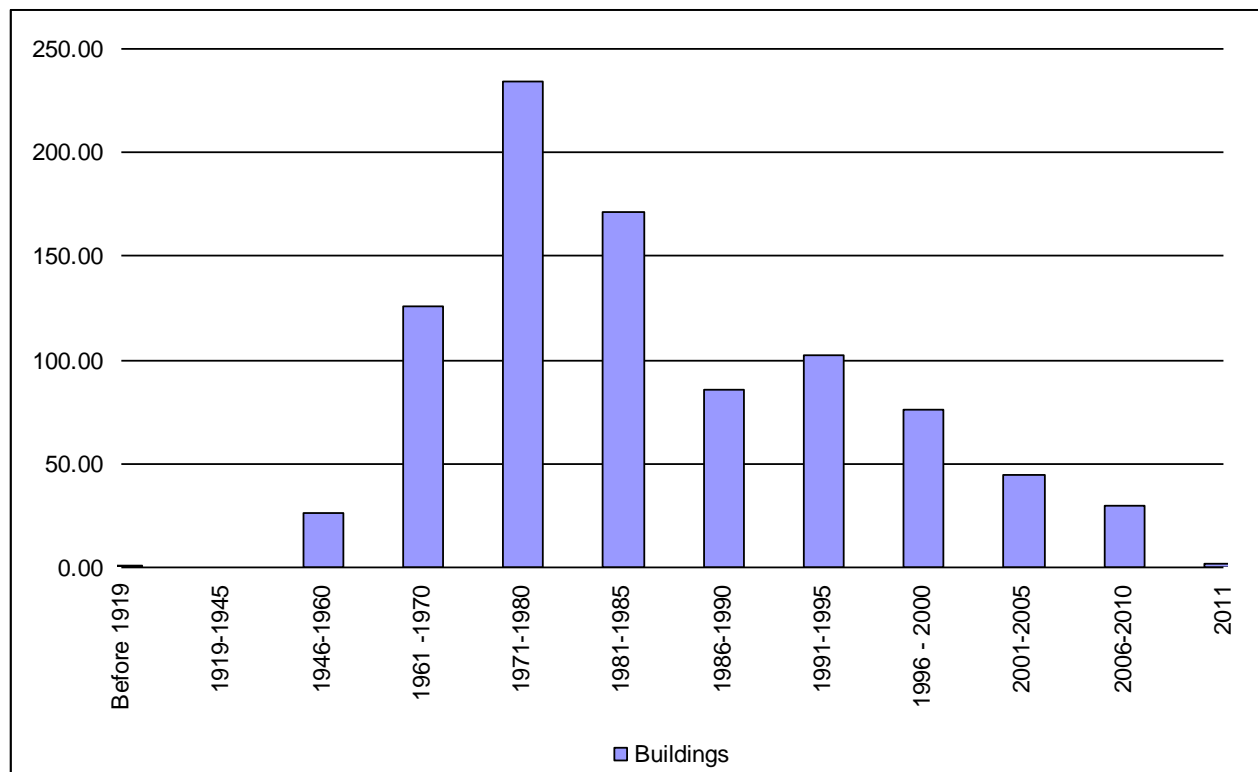


Source: Our data processing is based on data from the Geographical Information Systems

3.11 Building activities

According to the statistical data of the Hellenic Statistical Authority (HSAG), it is found that Vouliagmeni presented significant building activity during the time period 1946-1980. This was followed by a sharp drop in building activity until 1990. During the period 1991-1995 building activity presented a slight increase, followed by a gradual decrease until 2011 (Figure 6).

Figure 6: Number of building activities in Vouliagmeni area from 1920 to 2012



Source: HSAG, 2013

In 1970 a spatial regulatory study or the development of the area and for setting the conditions and building restrictions, was carried out by the National Technical University (Aravantinos et al, 19710). Then, in 1985 a General Urban Plan was drafted in order to achieve both a better social and economic function as well as the protection of the natural environment in Vouliagmeni (MEPW, 1985), which was finally adopted in 1997 (OJHR, 1997). According to the General Urban Plan the land uses are: a residential area, a general residential area, parkings, an urban center, open spaces, urban green spaces, schools units, nurseries, tourist facilities, major and minor roads.

In 2005 Presidential Decree was issued that adjusted the land uses of the coastline of Attica. According to that Presidential Decree (OJHR, 2004) for the area of Vouliagmeni, there are various protected areas such as: a) landscape rehabilitation areas, flora and fauna. B) Area of protection of natural and archaeological evidence and of reforming

existing tourist uses at the area of Asteras Vouliagmeni c) Free beaches for swimming d) organized beaches, f) area outside building plan g) the marina.

Specifically Vouliagmeni Lake has been identified:

- As an area of outstanding beauty with Decision G403 / 23043 / 31.03.1981 Ministry of Culture (OJHR, 1981).
- As an area of special historic interest in accordance with the decision of the Ministers of Agriculture and Environment (OJHR, 419).
- As a natural monument to be maintained along with the identification of protection areas for the lake and it's surrounding areas (OJHR, 2003).

4. Results and Discussion

The results of personal interviews have showed that the area of Vouliagmeni faces various problems such as:

4.1 Environmental problems

- Noise pollution from car traffic on either side of the Athens – Sounio avenue. These problems are increased mainly during the summer season, where the beaches of Vouliagmeni not only attract a great number of tourists from neighboring municipalities but also attract visitors from all the basin of Attica.
- The Athens Sounion avenue disrupts the urban and the natural unity of the local space.
- Residential pressures: the creation of the new highway (bypass road from pigadakia to Varkiza) has increased the pressure for the expansion of the local settlement into the pine-clad slopes of the hills. Thus, the pressures for conversion of fine open spaces into residential areas come into conflict with tourist activities and the quality of life of Vouliagmeni's residents.
- Ownership: Large areas in Vouliagmeni belong to different authorities, (Management Organisation and Management of Church Property (ODDEP), municipality, private owners, Greek State (Ministry of Agriculture, Ministry of Finance), which complicates the implementation of an integrated management. This has a result in increasing the risk for further expansion of the building activities at the expense of natural resources in the area.
- With regard to the management of solid waste, it is transported to the station of Voula and then transferred to the Sanitary Landfill in the area of Liosia. In the area there is no specific recycling program apart from isolated cases of individuals who have placed recycling bins at specific points.
- Regarding waste water, Vouliagmeni does not face water pollution problems from 2000 and after due to the completion of the sewerage system project. Thus, waste

water is forwarded through pumping to the Akrokeramo of Keratsini (first processing) and then driven by two underwater pipelines to the island of Psyttalia for further processing.

4.2 Measures to deal with the problems

- Construction projects for connecting the beach front with the urban fabric.
- Measures to address the noise and traffic problems (drafting traffic study).
- Awareness of citizens for active participation in cleanliness and developing recycling programs.
- Actions to reduce waste transport costs.
- Application of Presidential decree 2004 for land use and building regulations.
- Measures to protect natural resources and increase the protection zones.
- Protection of coastal and marine area from pollution. This requires regular pollution controls and other additional measures that have to do with the proper management of liquid and solid waste.
- Expansion of protection zones and determination of new building regulations in areas that receive high pressures for settlement development.

4.3 Investments in the area of Vouliagmeni

In the recent years, it is found that the works which have been carried out in the area of Vouliagmeni, are presented in the following tables (3, 4).

Table 3: Financial Support for projects in the area of Vouliagmeni

Approved projects in National Strategic Reference Framework (NSRF) 2007-2013	Area of Vouliagmeni Budget (euro)
Forest project	1,049,948
Infrastructure of the information society in education	15,800
Regenerations	969,99
Infrastructure - School Construction	2,524,091
Total	3,686,838

Source: MFIST, 2015

The financing of projects and actions of local bodies for the management of the coastal area has been affected by the economic crisis that the country has been experiencing in recent years. Infrastructure projects have a priority to ensure sustainable development.

Thus, in the Municipality program for the area of Vouliagmeni sewerage projects worth 230,000 euros have been included. Other projects refer to repairs of schools units, construction - repair of pavements, road works (construction and repair of roads) and projects to maintain and repair permanent sports facilities.

Table 4: Financial support for projects in Municipality Vari-Voula-Vouliagmeni (2007-2013)

Approved projects (16 projects and 169 Financial support)	Municipality of Vari-Voula-Vouliagmeni
Human resource development	1,204,168
Environmental actions	5,728,683
Education and lifelong Learning	7,175,323
Energy	699,933
Entrepreneurship	18,033,441
Research and Technology	7,217,254
Health and Social Care	518,847
Digital convergence	242,599
Total	40,820,248

Source: MFIST, 2015

The major economic problems that country has been facing in recent years, have affected to some extent the projects and actions of local authorities, which aim at the coastal area management, its further development and general protection. The adjustment of the local community to the new economic situation is necessary in order to ensure the sustainable development of the area.

5. Conclusions

The factors that have played an important role in the development of the coastal urban area of Vouliagmeni, are: natural capacity, accessibility and travel time, building regulations, climatic conditions and the degradation of neighboring areas.

Nowadays, the strong presence of green areas has increased the inhabitants' quality of life. However, the economic motives to reduce the green in areas that have not been built yet, is threatening the quality of life of the residents and the alteration of the physiognomy of Vouliagmeni. The intensity of land use degrades the natural resources of the area that play an important role in attracting tourists. In fact, in the area of Vouliagmeni, the intensity of land use is increasing at the risk of losing the advantages that the area has.

Therefore, the expansion of protection zones and new restrictions on building are necessary.

Since, Vouliagmeni is a coastal residential area, planning for the protection of natural resources in the urban environment should not only follow the directives for a sustainable urban development, but must also follow general directions towards an integrated coastal zone management.

A mild management of natural resources, in combination with the expansion of protected areas and new restrictions, will both protect the area from degradation and keep it on the list of areas with high standard of living.

Nowadays the area has a need to protect its natural resources, due to the pressures of residential development against the natural environment.

Also, in dealing with the new economic and environmental challenges, the country has been facing in recent years, the actions of the competent authorities are not enough and the active participation of citizens and their adaptation to the new economic situation is required.

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