



# Resilience and Preservation of Cultural Heritage After Natural Disasters: Case Study of City of Volos, Greece

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**Abstract.** Natural disasters and their interaction with cultural heritage are a global phenomenon that has come to the attention of the scientific community the last decade. Preventive measures and policies have been developed in order to protect the natural and cultural environment of the humanity. The current study aims at the identification of cultural heritage, its interaction with natural disasters and the up-to-dated developed policies for Volos city in Prefecture of Magnesia, in Greece. “The social and economic implications of a heritage at risk”, are corroborated by the example of the ‘50s earthquake at Magnesia Prefecture. The current research indicates that Greek policies are not well targeted, and they are without a vision. Additionally the preventive taken measures are not cost effective and the local community is not aware of the existing risk. Thus, in the current research are proposed a few non-constructive measures such as: (i) the creation of a local natural disaster and cultural heritage data-base, (ii) the enhancement of the public awareness concerning the natural disasters and its effect on cultural heritage and (iii) the promotion of cultural heritage and its value. Aiming at cultural resilience and sustainable development of the region, the proposed measures must also be supported by a strong legal framework.

**Keywords:** Cultural heritage · Cultural resilience · Preventive measures  
Sustainable communities · Greece · Prefecture of Magnesia · City of Volos

## 1 Tangible Cultural Heritage - Sustainable Communities

Nowadays, it has been recognized that heritage conservation can contribute significantly for developing sustainable communities, leading therefore to a sustainable future. The four main components of sustainable communities are: (i) the economic, (ii) cultural, (iii) social and (iv) environmental sensitivity, awareness and success. It is important to highlight that the conservation of cultural heritage have several positive impacts to the long-term community sustainability. Some of them are the increased property values, the development of heritage tourism, the reuse of buildings and structures and the enhancement of the local economy.

Natural disasters are one of the most common factors that are responsible for the destruction not only of the cultural buildings, but also of the disappear of local cultural communities. In the following sub-sections are discussed the connection between

natural disaster and cultural identity along with the policies that have been taken up-to-date for the cultural heritage protection and conservation [1, 2].

### 1.1 Natural Disasters and Cultural Identity

Cultural heritage expresses the history and the specificities of a community, having a catalytic impact on its economic prosperity, its coherence as well as on the formation of its national identity. More specifically, the cultural heritage's inseparable relationship with the environment is important as it defines, emerges and sets the purpose of its existence expressing the past, the present and the future. Any disturbance of this relationship from destabilizing factors, such as natural disasters, can affect directly and at a great extent the identity of cultural heritage [3].

The tendency of man to preserve the elements that have been bequeathed by his ancestors is an impulsive tendency expressed due to his need to connect with his natural environment and its cultural elements. Thus, changes to the balance of the relationship 'cultural heritage-nature', can lead to the disorientation of the local community, the displacement of its members from their point of reference, the devaluation of local community present and past as well as to the reduction of the chances of recovery.

The impacts of a natural disaster can be evident in the faults of a building structures, by altering its constant cultural elements which constitute factors that create the historical and cultural identity of the building structures [4]. Those can vary and can be multifaceted, influencing different aspects of life and are categorized into direct and indirect impacts. Being more specific, direct impacts of a natural disaster refer to material damage of measurable size, while the indirect refer to the perceived ones after the incident being of immeasurable size and recognized in the wider environment, after a reasonable time [5].

Therefore, the achievement of the restoration of a community, from all aspects, after natural disasters is an inherent need and can be partially achieved through the protection of its cultural heritage and the shaping of its new identity by assimilating the effects of dangerous natural phenomena. The use of existing and new cultural elements for the revival of a community is a direction of modern development strategy policies in an effort to maintain the cohesion of a society in times of crisis [6]. In the next subsection the policies that have been developed towards this direction, are discussed.

### 1.2 Policies for the Protection and Preservation of Cultural Heritage from Natural Disasters

Natural disasters so far are treated as individual and independent events. Particularly in European territory, addressing this issue varies from country to country as well as from one region to another. Most of the preventive measures that have been taken concern mainly International cultural elements that are scarce and of great significance.

According to the recent European Commission's report [7], lists and databases have been created in occasional cases, but they are not up to date or complete. Each country's action plans are used and updated in their theoretical context without put into practice due to lack of qualified staff and the formation of the appropriate bodies of

action. More specifically the EU's final remark has been: «*serious gap in the collective approach to creating and promoting fully effective resilience policies. Cultural heritage is persistently omitted, and this need must be addressed*» [7].

However, over the past decade great efforts have been made from some EU countries to implement a wider protection of the cultural elements of a community. The protection of the cultural elements of a community can contribute significantly to the development of sustainable communities and consequently of sustainable environments [7].

The most important policies that have been taken from the EU are: (i) the increase of funds from 5.3 million to 25 million of euros in 2019 to transform historic urban areas into hubs of social and cultural integration, (ii) the increase of funds to mitigate the impacts of climate change and natural hazards on cultural heritage and (iii) the development of international networks for cultural heritage innovation and intercultural diplomacy [8].

In the Greek territory the application of protection measures is non-existent and whatever action had been taken was the result of individual mobilization and sensitivity of the humans without a clear planning. Moreover, the lack of finance as well as of the comprehensive plans that for protecting any cultural heritage of natural disasters constitutes a fact [9].

Thus, the aim of the current research is to recognize the necessity of protecting the cultural heritage of city of Volos, located in Prefecture of Magnesia, in Greece, from natural disasters.

The main objectives are:

- To link the notions of durable cultural heritage - Durable society - Cultural identity - Sustainable development in the case of Volos city
- To identify the magnitude of natural disasters impacts on the cultural heritage of the Volos city
- To identify and suggest policies that can ensure Volos cultural heritage continuity.

## **2 Cultural Heritage and Natural Disasters: Case Study of Volos City, Greece**

### **2.1 Location of Volos City**

Volos is a city of Thessaly, built in Pagasitikos gulf, near the site of ancient Iolkos and on the foothills of the Pelion mountain in Greece (see Fig. 1). It is one of the largest cities including one of the most important ports of Greece. According to the 2011 census, the permanent population of the Municipality of Volos was 86,046 inhabitants,, which reaches the 125,248 inhabitants, when the inhabitants of the rural area are taken into consideration.

The area of Volos (ancient Magnesia) is among the first areas inhabited in Greece. The settlements discovered in the nearby villages of Sesklo and Dimini dated back to the 7<sup>th</sup> millennium BC, while the cultural presence in the area is still compelling as it is discussed in the following sub-section.



**Fig. 1.** Location of city of Volos, Prefecture of Magnesia, Greece [10].

## 2.2 The Most Important Cultural Heritage of Volos City

Prefecture of Magnesia owns a rich cultural heritage that reflects the region's history, myths and legends, the social changes and the economic influences of every age. The location of 99 important archaeological sites within the administrative unit of Magnesia, the 21 Monasteries and the number of religious buildings, the 24 Traditional Settlements of Pelion and the 300 buildings of architectural heritage in Volos, constitute a multifaceted cultural landscape capable of becoming a decisive factor in the region's sustainability [11].

The vulnerability of the above-mentioned rich heritage had been endangered in the past by varied natural phenomena, mainly by earthquakes and floods. Their inadequate infrastructure (resistant to natural phenomena) was another factor enhancing their vulnerability and, by extension threatening to alter the cultural identity of the place [12, 13]. Therefore, cultural heritage protection should be a primary concern for the local authorities and the local community.

The Ancient Theater of Demetriades is one of the characteristic examples of Hellenistic theaters, located west of the urban center of Volos, at the site of Dontia, within the boundaries of the walls of the ancient city, in Pagasses. Against the palace of the Macedonian kings where the hero of the Chiefs and Builders of the city of Demetrius was built. The use of the theater ends in the 4<sup>th</sup> century. A.D. and since then has been exposed to many natural and manual disasters. The theater was discovered in 1901, while in 2017 the building parts of the Roman technique, the orchestra, the hollow and the frescoes were revealed [14].

The areas of Dimini (4,800 BC) and Sesklo (6,800 BC) are considered to be two of the most important prehistoric settlements in Greece during the Neolithic period. Dimini was discovered by Lolling and Wolters in 1886, by the identification of the Mycenaean vaulted tomb. The excavations that followed brought into surface important findings about the region's culture and its evolution into the years. Sesklo was excavated by Tsunta revealing the Acropolis (Kastraki) and a variety of clay objects [15].

Finally the archaeological site on the hill of Goritsa is considered an authentic monument of the Hellenistic period. The buildings that were discovered are the city's footprints, strategically located by Kassander between 316–298 BC. and which was abandoned some years later. It is claimed that had lived between 3,000 and 3,500 inhabitants, building 400–500 houses according to the Hippodamian system. The Hippodamian system originates to the ancient Greek architect and it is an urban planning

concept that organizes the layout of cities and towns into a system of straight roads and streets intersecting each other at a 90° angle [16].

### 2.3 Natural Disasters Impacts on the Cultural Heritage of Volos City

The archaeological site of Goritsa it is located in the pine forest, so being in constant danger of a possible fire. A characteristic example is the 1994 fire which posed the archaeological site into a serious danger. Furthermore, the Goritsa hill's archaeological site due to the fact that up-to-date remains unprotected and exposed to natural phenomena, such as rain, is being flooded continuously on (see Fig. 2). The lack of the appropriate infrastructure, for flood and fire protection, in combination with the lack of public awareness and the negligence of local authorities, enhance the impacts of natural disasters [17].



**Fig. 2.** Archeological site on the hill of Goritsa in Volos, Prefecture of Magnesia, Greece (a) flooding and uncovered, (b) covered with panels [18].

In 2018, the archaeological service installed panels (see Fig. 2) for maintenance purposes, but since then has not been developed and specific project to protect the area. The historical city remains exposed to the weather, with the risk of flooding, fires and disintegration of materials over time.

In its turn, the City Hall (see Fig. 3) remained intact until 1970 when it suffered considerable damage after a great earthquake. From 1909 until the earthquake housed the services of the Municipality of Volos, while in 1939 it was donated by Maria Skerderanis to the general public. In the 1990, in its place a multi-storey building of dubious architectural value was built, covering any sign of cultural heritage (see Fig. 3).

### 2.4 Contemporary Policies and Projects on the Protection of Cultural Heritage from Natural Disasters in Volos City

According to the results of the current investigation, the Volos Structure Plan and the Volos Residential Environmental Protection Plan, the Volos General Urban Plan, the Urban Spatial Planning and Spatial Planning Scheme and the Strategic Development Plan of Magnesia are some of the recent projects considering the protection of the city.



**Fig. 3.** The ex City Hall of Volos City, Prefecture of Magnesia, Greece (left picture: before earthquake, right picture: today) [19].

The projects that have been implemented or are planned to be implemented are projects for the restoration of selected historic buildings or infrastructure projects. In 2005, the characteristics of the land using regulatory plans, according to which tourist concentrations, archaeological sites and traditional settlements were identified and reported officially (44357/2005-FEK:1502/B/1.11.2005). This can be said that is the first movement of recognizing the necessity of identifying all the historical sites all over the Greece.

In its turn the Sustainable Urban Development Plan of Volos is another project which is consisted of 27 sub-projects of 15 million euros worth value (funding from NSRF program). Some of the most important works are the reconstruction of the old Port Authority and the Panepistimiou Square (700,000 euros). The antiseismic construction of the Municipal Theater (NSRF - 2,200,000 euros) is considered another important project of the city in order to maintain its cultural heritage.

Additionally, within the framework of the Regional Operational Program of Thessaly, 2007–2013, the financing for the maintenance of the train of Pelion mountain was approved. It worths being mentioned that the train of Pelion was constructed in 1892 and was a creation of the father's greatest painter Giorio De Chirico that inspired him for many of his initial paintings.

However, all the above-mentioned projects concerned only the reconstruction and not the protection of natural disasters. The unique programme that has been developed concerning the protection of cultural heritage from natural disasters is the Eufofinet-Civil Protection Program (2011–2014). This aims to exploit the already well-proven good practices in the field of forest fires, in order to create a competent exchange network knowledge and response models at National and regional level.

### 3 Conclusions

In the case of city of Volos, many historical significant sites and buildings that are the cultural identity of the city have been identified. Some of the most important sites are the Goritsa hill, the ancient theater of Demetriades and others. According to the current research many of them more than once time have suffered by natural disasters, such as earthquake and floods. However, even after those impacts of natural phenomena the local authorities even today have not shown the appropriate attention.

Moreover, even recent natural phenomena, e.g. flooding of archeological sites, have not led to preventive measures even to a future project. This fact highlights the lack of the knowledge of the cultural heritage importance and at the same time the presence of a loose National legal framework concerning cultural heritage. For this reason it is suggested a project that all the historical sites and buildings will be recorded in a respective map. Moreover the creation of a database that will record every natural disaster from the past to the present for each site, respectively, would be very useful for the implementation of future projects in order Volos city's cultural heritage to be protected by natural phenomena.

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