Greece - New potential for earthen heritage

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SUMMARY

Greece is a country of earthen architecture. Earthen Heritage is met all around the country. Buildings, often abandoned, hence in good condition, are an ignored treasure. For decades, the irrational urbanization has led to mitigation of agricultural areas. In addition, the major current financial crisis has significantly slowed the domestic construction market. The rehabilitation of the housing stock could be an alternative to overuse of land and a restarting source of responsible local development activity. In order to reconsider urban planning, it is inevitable to involve municipalities in the implementation of recovery and conservation projects. Actually, the Italian “Associazione Internazionale Città della Terra Cruda”, active since 2001, works on safeguarding earthen heritage by directly involving municipalities in various projects. Experienced for more than ten years, the Association now seeks to integrate other European cities to its network to share its knowledge. The city of Karditsa joined the Association in 2015 in order to be accompanied in its first project for conservation and development of Earthen Architecture including the creation of a “Centre for Documentation of Earthen Architecture” for research and professional training.

INTRODUCTION

Greece is a country of earthen architecture. Evidence of earthen structures is met all around the country. Such witness of traditional culture of earthen architecture was alive from the ancient times, adopted by all social classes and covered several different uses (residencies, storage, public buildings etc). The variety of these structures still stable even in highly seismic areas, reveal high levelled art of construction and the existence of experienced workforce. Apart from several abandoned settlements built on earth met in Northern Greece, earthen houses are still inhabited in many urban centres and villages. Karditsa, a city of central Greece, and the surrounding area are a significant example.

Despite the reach past of the country, culture of earthen architecture is ignored in Greece. Expertise of building with earth has been forgotten for more than 50 years. Furthermore, current legislation is not helpful. It is focused on concrete and stone structures, and has no special provisions for restoration or construction of modern earthen buildings.

The interest on Greek earthen heritage has been awakened during the last decade by several individual organisations, but is not supported by the state’s authorities. Recently, the city of Karditsa showed a real interest for the conservation of its earthen heritage. This interest and the actions that follow it constitute the first attempt to involve local authorities into the conservation and valorisation of earthen heritage. Since no similar experience has been acquired in the rest of the country since now, the city has turned for advice to international organisations. This is a promising and challenging potential for the dissemination of culture of earthen architecture in national level and for further development of the area of Karditsa in a sustainable way.

1. CULTURE OF EARTHEN CONSTRUCTION IN GREECE: KARDITSA EXAMPLE

1.1. Greece, land of adobes

Greece is a Mediterranean country sharing with the neighbouring ones a particular climate that unifies the scenery and lifestyle as well as common history, based on the essential
fact that the Mediterranean itself is an ancient crossroad "for many millennia while flocking to it [...] men, beasts of burden, cars, merchandise, ships, ideas, religions, arts of living ..." (Fernand Braudel, 1985). From these two components obvious similarities derive in the Mediterranean traditional way of construction. The dominant building materials were stone and earth. Stone is often, and for a long time, considered to be nobler and gradually earth was erased from the collective consciousness. However, earth building techniques, particularly the brick moulding technique, adobe, is (or was) part of the dominant construction techniques for all types of buildings throughout the eastern zone. Greece is no exception. One finds evidence of the use of adobe from the Neolithic Period (protohistoric period that witnessed the development of livestock, agriculture and therefore the development of settlements) (Poursoulis, 2009).

Due to its geographical location, the country received the influence of many civilizations for thousands of years, perhaps more than any other Mediterranean country. From this mixture of influences and expertise, a real constructive culture of adobe was born that is attested in a large part of Greek territory, where earth is more available than stone (Fig. 1 and 2).
In Greece the culture of adobe construction techniques was thus widespread until the mid-20th century. Adobe was called “πλιθίες” (plithies). It is interesting that around the whole country a wide variety of types of buildings constructed with raw earth materials are found, that share similar building systems.

The substructure of these buildings is systematically made of stone with a varying height from region to region. The masonry consists of adobes and hosts a wall tie (chainage) (“klapes” in Greek) every 1,00-1,50m in height (Fig. 3). The structure is occasionally strengthened on top by a larger wall tie, although such structures are not always present. On the ground floor the thickness of the walls is usually 45 cm and decreases in the upper floors with a fitting of brick-laying (Fig. 4). Sometimes a technique lighter than adobe is used for the upper floors: "τσατμάς" (tsatmas) or "Μπαγδάτη" (bagdati), are two filling techniques, formed by a wooden frame filled with earth or brick, common mainly in northern Greece (Fig. 5). Generally, traditional adobe buildings are covered with a protective coating. While techniques vary depending on the area and even from one house to another within the same village, the following characteristics are often observed:
- First layer of plaster (thickness: 2-3 cm): earthen plaster reinforced with fibers of shortlengthed straw or animal hair, depending on the available material.
- Second layer of plaster (thickness: 1-2 cm): lime/sand plaster reinforced with fibers of shortlengthed straw or animal hair depending on the available material.
- Finishing layer: lime milk

Fig. 3 - An example of horizontal wall tie on an earthen Greek house: the «klapes».

Fig. 4 - Typical cross-section of Greek adobe houses.
Although culture of earthen construction in Greece is so common, it is completely ignored. Greece is profoundly thought as the country of stone structures and it is difficult to change this belief, since the majority of extant significant monuments of ancient times and modern touristic resorts appealing to open public are made of stone. However, the assessment of earthen construction heritage of the country could help to reaffirm local identity in some areas away from the main touristic paths. In order to increase the awareness of this heritage, a form of interactive map inventory was initiated by “Piliko Non-Profit Organization” and “Plinthos Laboratory” (Grigoriadou E., Manousogiannaki G, Oiry C, 2015), (Fig.6).

1.2. Earthen heritage of the Municipality of Karditsa, testimony of a forgotten construction culture

In the center of Greece, there is the Region of Thessaly (Fig. 7). Vast plain surrounded by mountains is one of the main agricultural areas of the country. It is mostly a fertile land, with soil composed of sand, silt and clay without significant rock formations except from the mountainous peripheral areas. The climate alternates between very cold winters and
extremely hot summers. According to Raphael Orgelot (2009), four out of seven archaeological sites from the Neolithic period have revealed the presence of mud bricks on sites located in Thessaly. Since this period, the construction with adobe apparently had not stopped until the mid-twentieth century. The region thus offers today a wide variety of residencies with adobes.

The city of Karditsa and its surroundings are no exception to this rule. The Regional District of Karditsa is located in the southwestern part of Thessaly. It covers an area of 2,636 million hectares and has about 130,000 inhabitants. The climate is continental. Southwards and westwards, the hills of Thessaly form the first foothills of the Massif Pindes where Lake Plastira is situated. Wandering around the area, it is easily revealed that the use of earth as a building material was not confined to a social class, a particular urban or rural context. Raw earth was indeed the main building material of the province of Karditsa. The result is a wide variety of construction types depending on the level of life of people, their activities and comfort. The common point of these earthen constructions is the use of the building system that is found all around Greece: thick adobe walls on stone ground floors belted by horizontal wall tie every 1,00-1,50m.

One of the types commonly found in the villages and in the city centre of Karditsa is that of the rectangular house with two levels. It is often accompanied by storage spaces adjoining the main house. These houses are linked to a more rural than urban culture. Where the owners were relatively affluent, many decorative details, balconies and porches are often found. The houses listed on one of the main streets of Karditsa (Fanariou St.) date back to the 30s. Smaller houses with a single level are also quite numerous. They also possess a front porch or front steps. The visible facades are systematically covered with thick coating.
of lime sometimes coloured on the lower part. The roofs are hipped, these homes are free-standing. Structures with simple shapes in horizontal plan, square or "L", obtain often small extensions made of earthen, bricks or cement blocks. Construction culture of the plains has certainly shifted to the most isolated areas in the hills around Lake Plastira, 800 meters above sea level. Here the buildings are smaller but construction details mentioned above are still present. In villages in height, over 900 meters above sea level, stone houses and adobe barns are met. Their bases extend up to 1m / 1,5m for protection from snow, much more common in winter than in the plain. They may also have some frontages made of wattle and daub (Fig. 8).

Fig. 8 – Different typologies of earthen buildings in the province of Karditsa.

Construction culture of adobe was therefore undeniably part of the local identity of the area from the city of Karditsa. But since the 60s and the arrival of concrete, this culture has been completely forgotten.

2 EXISTING LEGISLATION AND CURRENT SITUATION IN THE CITY OF KARDITSA

2.1. Current legislation

No regulations on earth building have ever been established in Greece. However, the strength of earthen construction through time testifies the adoption of practices by workers that follow the rules of the knowledge and practice of seismically protected structures:
1. diaphragmatic function
2. tiers
3. protection of openings with wooden elements
4. equitable or growing mass distribution from the upper to the lower floor (common choice of light construction in the upper floors – wattle & daub)
5. limited height of earthen construction. The height does not exceed normally two floors (ground floor and first floor)

The design of new earthen structures in which earthen parts acts as bearing component is not allowed in Greece. The engineers in Greece are obliged to use the EC6 and EC8 according to the provisions of Greek Seismic Code (EAK2000), that do not allow the transfer of loads on elements of raw earth because of the seismicity of the country. Alternatively, one can use earthen techniques as infill in a bearing structure of another material (metal, wood, reinforced concrete).

Concerning the restoration of existing earthen structures, KANEPE (KANEPE, 2013) provides the loads and analysis while but the reinforcement and checking of the model acquire certified experimental data that are not easily available.

2.2. Current situation in the city of Karditsa

Nowadays, the city of Karditsa is mainly composed of 2- or 3-storey concrete residential structures aged forty years approximately. However, older, not destroyed, residencies are also found. The majority of them are made of earth. Along and around Fanariou Street, the major axis leading from the central square to west edge of the city, a fair number of such houses is found (Fig. 9). Preliminary research on the area (Oiry C, 2014) shows that 10% of the urban area is covered by adobe houses, 40% of them abandoned. The adobe houses in use are inhabited by elderly people. This is explained by the fact that the production of adobes bricks was arrested in the 60s. Since the residents of earthen houses mainly prefer to live in a new concrete building, major deterioration of earthen heritage is mentioned: 8% of homes are demolished, 37% are in a very bad condition (structural damage: weakened roof, framework or earthen masonry), while only 26% note no visible structural degradations (falling plaster or tile / very damaged wooden framework etc.). These high percentages attest the vulnerability of this heritage and contribute in the degradation of its image. If immediate act is not taken, this process will lead to destruction and culture of earthen architecture will be forgotten.
3 INTEGRATING AN INTERNATIONAL NETWORK – STRATEGIC ISSUE OF KARDITSA

Karditsa is not a tourist town. However, it benefits from the presence of Lake Plastira and surrounding mountains, pleasant and attractive place that locals regularly visit. It has also retained a strong cultural identity (traditional dance and music) that includes well on the earthen architectural heritage presented above. The adobe houses of Karditsa must be preserved and restored for their architectural, historical, ecological interest but also for touristic reasons.

In fact, examples from abroad show that it is possible to integrate the earthen heritage in local sustainable development system which is based in particular on the introduction of a fair tourism in non-coastal Mediterranean areas. However, to author’s knowledge, no such initiative has been taken by any Municipality in Greece. Karditsa has therefore approached “Associazione Internazionale Città della Terra Cruda”, an Italian international association helping cities that wish to implement this type of projects.

Associazione Internazionale Città della Terra Cruda was founded in 2001 in Sardinia. The participating municipalities promoting local sustainable development valuing the culture of raw land, its heritage and values related to it. This association (Associazione Internazionale Città della Terra Cruda, 2001) is a network that facilitates contacts and exchanges between municipalities. It assists municipalities to value, protect and promote earthen heritage in different actions, such as:

- collaboration with municipalities for urban planning and development plan integrating sustainable development approaches,
- technical assistance to municipalities in the field of participation in calls for regional, national and European projects,
- technical assistance to architects, engineers during the construction of earthen architecture structures,
- technical assistance to companies specialized in the production of earthen building materials. Organization of earthen architecture workshops for students and professional architects and engineers.
- Training program for designers, businesses. Teaching laboratory organization.

Concerning the city of Karditsa, the question that arises is: how could Italian experience be transferred to Greece? The association responds with “mutuality”: learning from others, exchanging and sharing of the benefits. Thus, Karditsa’s challenge is to live up to expectations that several Italian municipalities have already reached, such as the cultural awareness on earthen architecture of local population, the efficient training of local artisans concerning the restoration of buildings with earthen materials/techniques, the effective co-operation with homeowners.

One of the elements that are of most interest in the town of Karditsa is the issue of tourism development. The city is particularly interested in Sardinian event of the "della città delle itinerario turistico earth cruda" that decries as a tourist offer experimental type that allows the visitor to experience the daily activities of the place. [...] The route, in addition to encouraging the host community, has to rediscover its own cultural roots and promote hospitality intends to enhance the cultural and landscape heritage and local products starting with the restoration and reuse of traditional earthen houses (Associazione Internazionale Città della Terra Cruda, 2015).

The entry of the Municipality of Karditsa in the network was formalized in September 2015. In late November 2015, the Greek municipality is due to participate for the first time in the meeting attended by the municipalities of the “Associazione Internazionale Città della Terra Cruda in Villacilo, Sardinia in order to present the aforementioned issues concerning the city, the region of Thessaly and Greece. This meeting will also enable understanding and discussing with Italian participants, potential projects that could be initiated in the city Karditsa. In anticipation of this work, a project for the establishment a “Center of the earth” in Karditsa, on the pattern of CEDTerra of Casalincontrada, was initiated to accommodate future lessons, workshops and training sessions.

4. CENTER FOR DOCUMENTATION OF EARTHEN ARCHITECTURE IN KARDITSA

The city of Karditsa is an important urban centre in the Region of Thessaly and central Greece in general, that hosts several institutions that could support the creation of a Documentation Centre of Earthen Architecture for research and professional training. The central location of the city contributes in activating people not only on local but also on national level.

Such institutions already interested in supporting this new project are:

4. Non profit organization «Pilikó» , Chania, Greece
The center could carry out activities such as:

a. recording and study of traditional architecture of Raw earthen continental Greece
b. research on application of clay and other natural materials in the building industry
c. preparation of professionals in the construction industry through workshops, seminars and other educational activities.
d. promotion of the earthen construction through exhibitions, conferences etc.

The Center could have a significant role on national and international level by exchanging information on earth and disseminating the Greek experience in using earth as a building material in combination with other existing or under development natural materials.

The principal aim would be the creation and main documentation of new economies based on earthen Architecture.

5. CONCLUSION

All these initiatives around the city of Karditsa serve two major objectives. Firstly, the use of earth as building material in a region where earth was the core of building culture for thousands of years and up until the last 50 years is revaluated. The second objective, and possibly the most important given the current situation, is the use of this cultural upgrade as a springboard for developing new economic dynamics respecting local identities, ecology and people in a country where these aspects have been neglected. Thus, the establishment of Greek center for research and experimentation for building with natural materials and tourism development initiatives with the support of the “Associazione delle città della terra cruda” could be the first real actions that link earth as a building material with local development in Greece.

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