

The role of terraces in the vertical development of the Amalfi Coast urban centers

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Abstract

The little centers of the Amalfi Coast have an inherent delicacy of their architectural, artistic and urban values, result of strenuous conquests over the centuries. Their development is purely vertical and not random, but it represents an architectural ideal that, with other qualities like geometry, symmetry, the variety of shapes and colors, has allowed the inclusion of the 40 km of Coastline in the UNESCO World Heritage List in 1997. The verticality is given by the agricultural terraces, which determined the shape and development of the coastal towns, far from any technical and stylistic coding.

The terraces are the result of constructive knowledges, traditional agricultural and hydraulic systems that, together with landscape and climatic conditions, created a system with high aesthetic quality and seamless integration with the nature. This paper traces the role that the terraces in the Amalfi Coast had in the evolution of towns and villages, hidden in valleys, ravines and hillsides overlooking the sea. Along with the features of identity and evolutionary aspects of the built environment, they become part of the eternal value of which the centers are keepers, result of a natural combination between architecture and nature, fusion of the town with the landscape of the sea and the mountain, in order to protect them as 'active memory' of places and territories.

Keywords: Preservation, Terraces, Protection, Landscapes, Amalfi.

Introduction. Natural scenography and spontaneous construction

The study of architecture in the Amalfi Coast, rich in high specificity cultural and historical value, considers particularities and evolutionary characters according to the many historic vicissitudes in which the territory was involved throughout the centuries, to the relations with the surrounding landscape and also to the conservation and restoration problems. The Amalfi Coast has been a meeting place and coexistence of civil and religious settlements, due to the geographical conditions of the area with narrow valleys, hillsides sloping down to the sea, conforming to all spiritual inclinations. No wonder, then, the presence of many hermit settlements throughout this territory, especially due to cultural and commercial link with the Byzantine world. In general, the architectural forms are strongly linked to coastal landscape features and geo-morphological characteristics of places, by making the art of thinking, designing and constructing buildings.

The natural, rural and urban environment of this coast has the privilege to have inspired many artists, poets and architects all over the world. Indeed, «The mountains, the hills, the tidy campaigns, the streets, squares and monuments [...] formed the background or subject to a very large part of artistic production that illustrated the cultural and social evolution of Western society and, in particular, what is striking is the continuity and intensity of the relationship between humans and the landscape» (Lugli, 1967).

Over the centuries many of these architectures were extended, albeit in small interventions at a time, with significant transformations. However, the relationship with the natural scenery has remained intact and also the difficult conditions related to the accessibility, which subtract to the enjoyment much of architectural artifacts, hiding them between hills and valleys. The harmonious fusion between buildings and rough shapes, the vertical growth, geographical loneliness are just some of the main features that have enabled the Amalfi Coast to be listed as a UNESCO World Heritage site (1997) as «living cultural landscape, [...] outstanding example of a Mediterranean landscape, with exceptional natural values by arising from its dramatic topography and history».

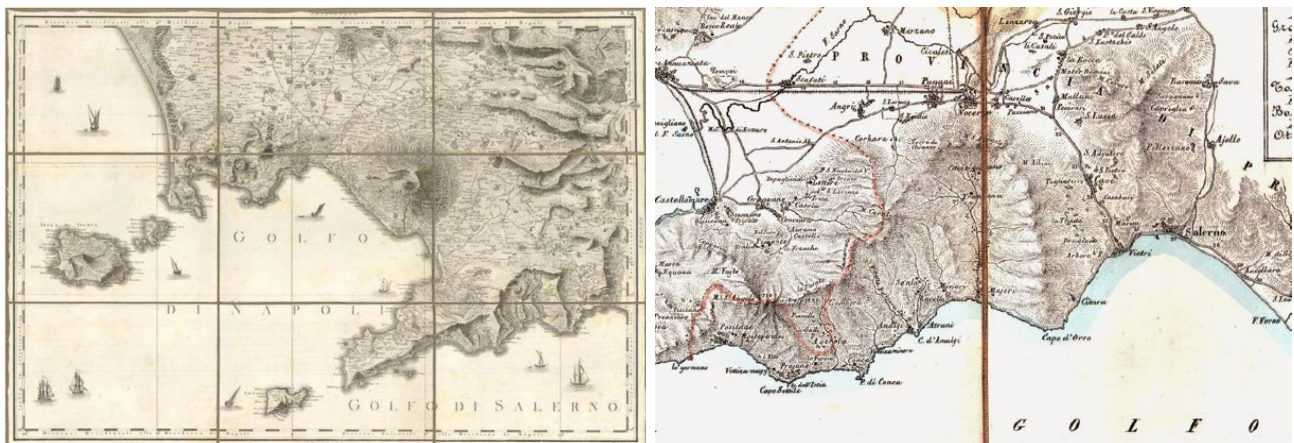


Fig.1. (left) *Atlante Geografico del Regno di Napoli*, Foglio n. 14 – 1794.

Fig.2. (right) *Provincia di Napoli e contorni*, Benedetto Marzolla – 1848.

The methodology used in this research consists of two phases: the first concerns the study of the main features of the landscape and of the coastal construction with particular reference to the role of terracing in the development of urban centers; the second one aims at identifying the main sources of decay and the ideas for the conservation of this particular form of architecture in order to preserve it.

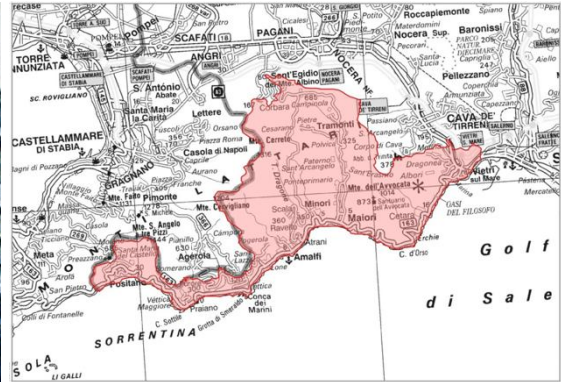


Fig.3. (left) *Amalfi*, F. Cassiano de Silvia – 1700.

Fig.4. (right) *Geographical area of the Amalfi Coast*.

The terracing system

According to the framework outlined by the “European Landscape Convention”, the landscape must be considered as a product of the interaction between the natural and anthropic components. The agricultural landscape is «the shape that man, because of his agricultural production activities, consciously and systematically, gives to the natural landscape» (Sereni, 1961).

In order to understand the terracing system, it is necessary to start from the agricultural aptitude of the territory, from working processing and from all systems and tools available. The terracing landscape is to be read and interpreted through the technical knowledge of the scholars and those of the native population, through the so-called “spontaneous culture of making”. It is obvious that natural events over time have changed or even deleted many places, making them different any time. However, the terraces remain until nowadays for the population’s tenacity and re-construction ability.

The terracing technique has ancient roots: The prehistoric alignments of stones, the famous gardens of the ancient Egypt, all the Mediterranean landscapes constructions that still today produce numerous benefits to crops, as a method of ‘passive architecture’ and climate control. This coastal territory is characterized by high rocky ridges and deep valleys, by soaring limestone cliffs and insurmountable overhangs. Inhabitants have tried to select the best cultivable areas, thanks to the terracing system, with chestnut, vineyards, and, above all, lemons trees.

The terracing is not only supporting walls, the ground in it, the crops, water works, but it’s a real complex traditional constructive technology, as a result of architectural, hydraulic and agricultural science, perfectly combined with the landscape features.

The elements that characterize the Amalfi Coast terracing system are:

- Stone walls called locally *macere*;
- Irrigation system;
- Hydraulic channels;
- Tanks of water called *peschiere*;
- Stairs connecting the various levels.

Dry-stone walls and, more generally, the terraces, represent a real ‘monument’ for the characteristics of the materials and the traditional implementation; they are the repositories of an ancient knowledge that reminds us how once the stones were worked, how the water was captured by rivers and what the techniques of cultivation and protection of the soil were. All the urban settlements of the Amalfi Coast countries were strongly influenced by complex environmental situations and by the need to reconcile the agricultural vocation with rocky and steep slopes. It required, inevitably, the human intervention in order to soften the harsher adversities and to make the most inaccessible areas livable and productive. In fact, according to ancient documents dating back to the 10th century, it is possible to verify that the long terracing process made possible the cultivation of the whole coastline. Even today, these terraces show the ancient wisdom of the peasants in transforming an inhospitable territory: On the one hand, by avoiding agricultural practices that involve deep downs; on the other one, by building dry-stone walls.

Over the centuries, the profile of the mountain has undergone many changes: The creation of dry-stone walls, an art from father to son, has made cultivable portions of lands blessed by the sun and mild climate. The state of efficiency of these terraces has a fundamental importance in the conservation of the delicate hydrogeological balance of the slopes.

Definitely, the most relevant geographical characters are:

- Soil quality. In Campania, from the geomorphologic point of view, by moving from the Tyrrhenian coast to the Adriatic Sea, it is possible to meet first limestone hillsides (Amalfi Coast); then, continuing inwards, the shapes are softened, and the rocks are by clay and tuff.
- Presence of water. The terraces were largely possible thanks to the presence of numerous and extensive waterways that branch throughout the whole territory. This condition is essential for the cultivation of lemons, whose trees need a considerable amount of water every day. The main source of irrigation is derived from various rivers in the area (the *Reginna* is one of the most important and rich river) that since the ancient times watered the whole peninsula. The organization of the terraces allowed the use of water by gravity routed, through the ladders and tanks, to the levels above. Each terrace was connected through an intricate system of irrigation canals fed by streams, springs and rain catchment tanks, called ‘*peschiere*’.
- Peri-urban or rural area. The terraces are located either in peri-urban and rural areas.
- Crop quality. Lemons (mostly), vineyards, olive groves, orchards, etc. In recent decades the percentage of land cultivated with lemon was significantly reduced.
- Agricultural organization. Small private properties (apart 5 large farms).
- Settlement type. Around the terraced areas there are the typical Amalfi houses, with vaults in masonry or wooden floor; they show a simple geometric system with square or rectangular plan and aggregative modules.
- Building materials. Local limestone, lapillus, majolica, cotto and wood.

The role of terracing in the Amalfi Coast. Strategies for conservation and recovery

The instrument at the base of the metamorphosis of the Amalfi Coast landscape was a long-term contract known as ‘*pastinato*’, whose existence is ascertained from the first half of the 10th century. This is, therefore, an agricultural contract that guaranteed the improvement and the extension of the cultivable areas, by modeling the landscape.

In fact, from the oldest age up to the mid-12th century, this has involved the transformation of the Amalfi countryside (Fiengo and Guerriero, 2001).

Thanks to the ‘pastinato’, the peasants began to build the terraces, using dry-stone walls, in order to avoid the instability of the slopes and improve the microclimate, by making crops that needed a higher temperature possible. With the construction of the terracing, «throughout the region there was a capillary and deep work of arrangement and branching of the hydraulic conduits necessary for irrigation, canalization of water, protection, conservation and renewal of the artifacts» (Id., 2001). A characteristic element of the terraces is the so-called ‘revote’, real and very wide tunnels, obtained in the wall of the ‘macere’, which were used to store agricultural tools. Another peculiar element is the ‘pergola’ that was built with young chestnut poles tied together. This element, by arab importation, strongly connotes the coastal landscape and for many centuries has allowed to make the most of the little available agricultural land, setting on arbor the tree crops and below this cultivation more horticultural.

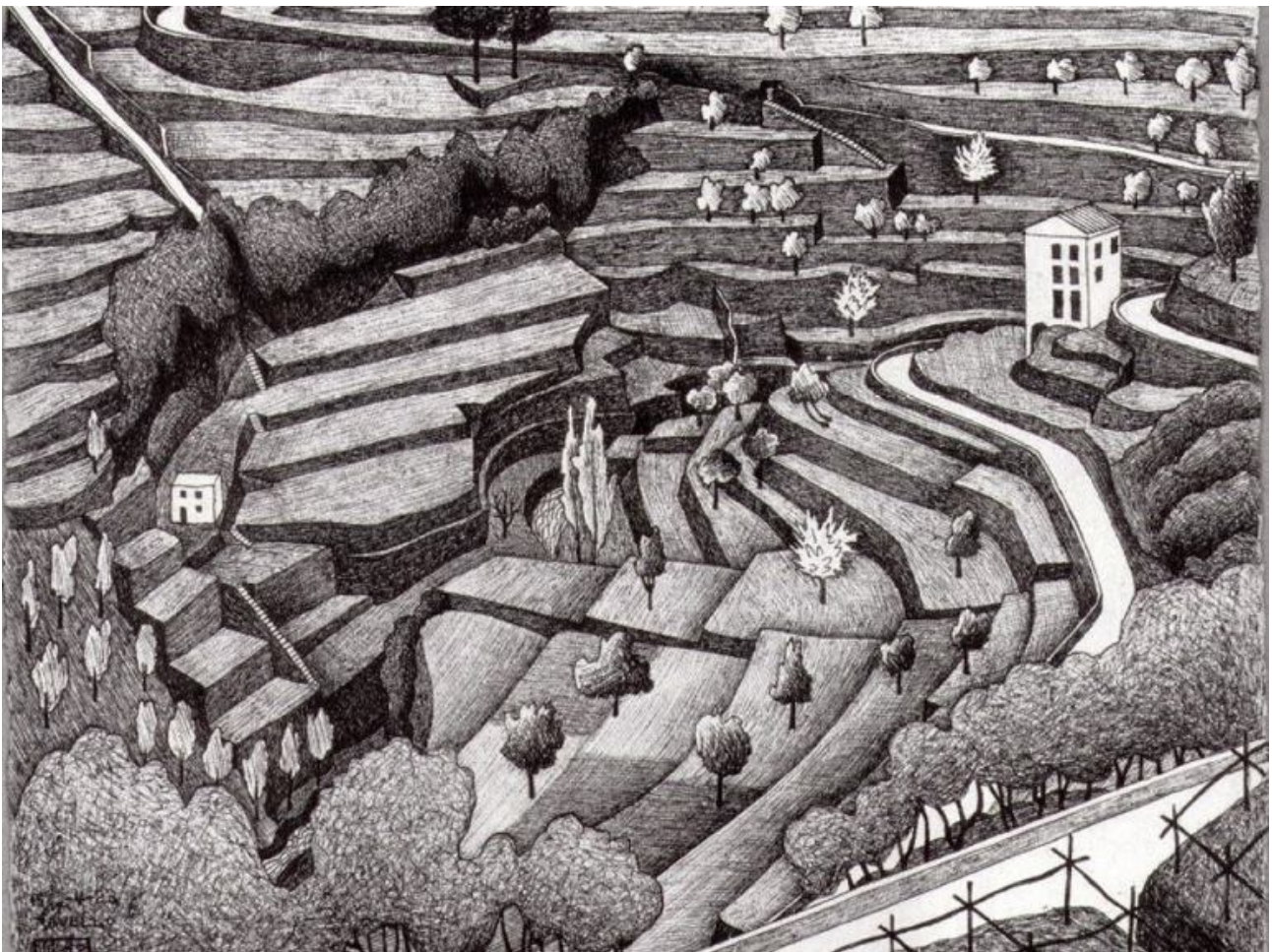


Fig.5. *Ravello and the Coast of Amalfi*, M. C. Escher – 1931.

The transformation of the primitive landscape of the Amalfi Coast in the extraordinary system of artificial terracing occurred mainly between the 12th and 13th centuries. In this period, in fact, the commercial prosperity that the Amalfitan Duchy made possible adequate investments aimed at increasing the cultivable areas of the territory and, at the same time, the population growth.

The state of efficiency of the terraces has a fundamental importance for the conservation of the delicate hydrogeological balance of the slopes, in fact the terraces are the most brilliant invention that has been made in order to stabilize the slope, to reduce the risk of landslides and to ensure that the soil retains moisture.

In the town of Vietri sul Mare, very close to Salerno, there are numerous terraced areas, both near the sea and inland, already appreciable from the steps of the Church of Santa Maria di Porto Salvo, in the small district of Marina.



Fig.6. *Examples of terracing in Vietri sul Mare.*

The landscape of Cetara, another important coastal center, is characterized by numerous terraces that have shaped the surrounding natural environment, becoming an «important element in the definition of one of the fundamental features of the panoramic image of the Amalfi Coast, a fundamental texture, that confers the typical morphological character of orderly alignment of the mountain shapes along the slope of their natural slope».



Fig.7. *Examples of terracing in Cetara.*

The terracing has adapted to the various local situations and, by depending on the initial slope, has allowed the construction of an agricultural land entirely ‘artificial’, in order to give rise to the establishment of flat agricultural areas and to the formation of land to accommodate the buildings.



Fig.8. *Examples of terracing in Maiori and example of connecting stairs between the terracing in Minori.*

This technique, although extremely simple is well known as “integrated technology” in the sense that, with just one action, it allows:

- The creation of green spaces otherwise not available;
- The control of rainwater in an efficient drainage system;
- The shaping of the rock bank and thus of additional useful protected space, incorporating the existing cavities into a more rational and efficient construction system.

The shape of the terraces follows the natural outline of the slope and their foundations rest on the limestone rock, ensuring good stability.

The oldest ‘macerine’ were built without resorting to the aid of binders, with local limestone stones, whose physical and mechanical characteristics of strength have allowed to obtain irregular and angular shaped ashlar, so as to be placed one on other, obtaining a structure resistant to the thrusts of the soil.

The general conditions of the places, such as the insolation, the degree of humidity ensured by the terraces themselves, the ventilation and above all the stratigraphic and chemical conditions of the volcanic rocks rich in metallic elements, have accelerated the development of the lemon groves as early as the 18th century.

The terraces are considered the most important system of landscape organization in the Mediterranean area and today are strongly threatened by the abandonment of traditional agricultural activities, by a wild tourism and, consequently, also by the increase in hydrogeological risk (ISPRA, 2013).

What immediately transpires, from the observation of the Amalfi Coast, is how much the landscape and the orographic conditions of the territory have strongly conditioned the evolution of the living space, in terms of aggregative logics and formal and material choices. This has also deeply affected the historical events of the Coast, assuming a fundamental role in social, political and commercial

development. In fact, it could be assumed that the main character of the Amalfi Coast resides precisely in the close interconnection between natural and anthropic space (Messina, 2012).

It is possible to identify three main characteristics, more or less common to the centers of the Amalfi Coast:

- Organicity between the inhabited area and the natural site;
- Verticality of the inhabited area;
- Closure unlike large urban areas.

Terracing has a decisive role in the design of the landscape and architecture, influencing the requirement of verticality. These centers, despite the difficulties of the territory, have not given up on the architectural types and artifacts indispensable for social, political and religious growth: Squares, streets, bridges, mills, town halls, churches, palaces, etc. All these urban architectures and infrastructures lie on steep slopes which gives them the particular image of “vertical towns” (Giordano, 2012).

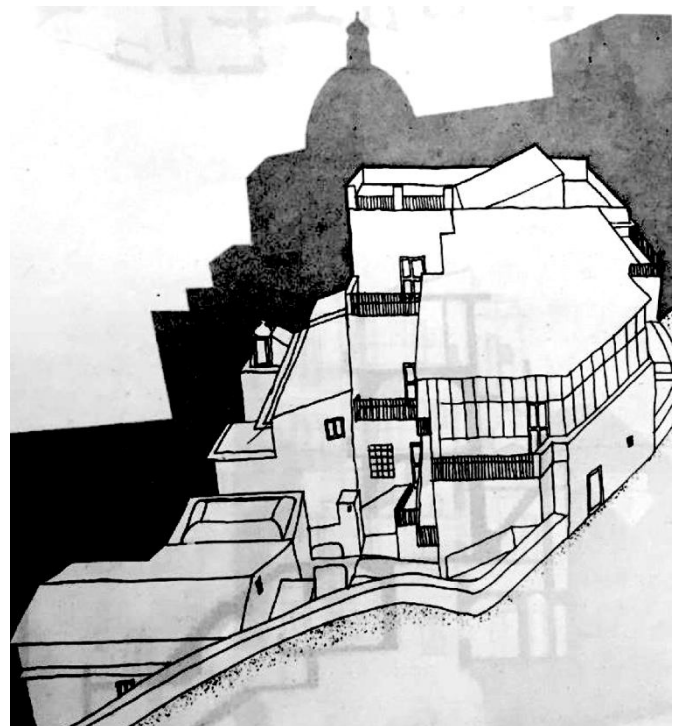
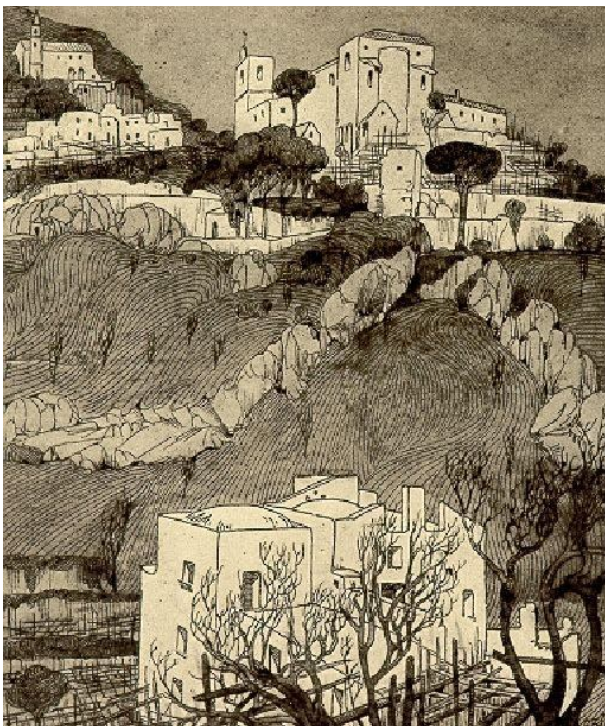


Fig.9. (left) Vertical conformation of urban agglomerations in Favai G. 1926. *Costa Amalfitana*. Roma.

Fig.10. (right) The building, the road and the vertical urban landscape in Sgrosso A. 1984. *La Struttura E L'Immagine: I Borghi Marinari Della Costiera Amalfitana*. Napoli: Società editrice napoletana.

The different architectural and infrastructural types “in overlapping”, connected to each other by various connecting elements, represent one of the most emblematic morphological and configurational data of the urban centers of the Amalfi Coast. This characteristic generates unusual urban scenarios, some examples of the “architectural-natural” configurations (Giordano, 2012), which can be analyzed according to the data of the verticality: The Amalfi Cathedral built on the

high staircase that surmounts the main square; the orographic encampment of the Castle of Maiori; the high wall of the residential buildings of the Torre Paradiso in Minori, etc.

Even the urban centers located in the upper part of the coast, such as Ravello and Scala, are characterized by a marked verticality of the building that here is enhanced by the scenic views of the two centers: The Ravello Cathedral, with panoramic views of Villa Rufolo on the Gulf of Salerno, can be considered one of the most emblematic vertical aggregations of the settlement system.

Crisis and Rebirth

The most significant crisis in the agricultural sector occurred in the years following the Second World War: Only a radical renewal would have averted the progressive abandonment and allowed the recovery of development prospects for agriculture. However, the abandonment of cultivated land and the shift of labor and resources to more profitable sectors, such as tourism, led to a worsening of the stability of the soil already affected by a precarious hydrological balance.

The degradation and abandonment of agriculture, also due to the depopulation of the families traditionally dedicated to this activity, has caused the emergence of decisive problems for the safety of these valuable crops. Currently, while the use of terraced agriculture is increasingly rare and limited to a few types of specialized crops (vineyard, olive grove), its contribution to the defense of the soil and to the control of the flow of water has become a priority. However, this function is strongly compromised because of a poor management or the abandonment of terraced structures.

Ultimately, the collapse of terraced systems and the ceasing of their protective function against soil erosion and in the control of water runoff triggers the start of a dangerous series of soil degradation processes (ALPTER, 2007).

The main forms of degradation of the terraces are:

- Collapse of the top elements of the wall due to surface water runoff;
- Translation of the base of the wall due to the push of the ground;
- Deformation or bulging of the wall due to the thrust of the ground;
- Wall collapse.

The maintenance actions consist in the cleaning of the walls from the infesting vegetation, in the restoration of drainage systems and the crowning of the dry-stone walls, in the inter-row cultivation of crops, and in some cases in the planting of shrub species. In the most unfavorable conditions, the necessary actions are the restoration of the stability of the walls themselves, with rebuilding and reconstruction of pre-existing artifacts that, due to higher costs, will have to be more targeted and localized. The absence of a constant maintenance of the dry-stone walls and of the relative drainage systems has often made the terraced slopes more susceptible to the triggering of phenomena of gravitational instability.

The main actions for the arrangement of terracing are:

- Cleaning of walls from infesting vegetation;
- Restoration of drainage systems and crowning of dry stone walls;
- Cultivation of crops with the typical vegetation of the place;
- Plant of native shrub / tree species for non-productive purposes of uncultivated terraced areas;

- Restoring the stability of the walls, with rebuilding and reconstruction of pre-existing artifacts, using traditional techniques and materials.

Conclusions

The study of the both natural and artificial elements that define the Amalfi centers does not constitute a simple theorization, but it intends to be an instrument of knowledge aimed at the conservation and protection of the built environment and the naturalistic one.

Any intervention on historical artifacts must have a deep knowledge base of the constructive organism, of the techniques, of the materials that presided over their formation, seeking a balance between conservation of historical, architectural and environmental values with the satisfaction of the new needs of the modern society. It is, therefore, necessary to avoid that the natural and anthropic changes of these centers lead to a cancellation of culture and local identity. In fact, the cultural diversity, thanks to the material and immaterial manifestations, is fundamental to the whole humanity.

The Amalfi coast is an excellent example of these delicate ecosystems: A group of small cultivated fields that characterize the landscape. The terrace becomes the protagonist of the spatial organization and the territory image. Its abandonment and degradation, today strongly advancing, would result in the loss of an inestimable cultural and landscape heritage.

The historical, cultural, environmental, geographical and ecological importance of the terracing system in the Amalfi Coast is such as to justify contributions aimed at maintaining these precious values, through a series of actions that consolidate and spread the local systems of organization and management of this territory, oriented to safeguard these areas of extraordinary interest in Europe.

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