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# THE LANDSCAPE OF THE AMALFI COAST: AN ENDANGERED PARADISE

## Abstract

Amalfi's landscape – a piece of those “sumptuous hanging gardens” which, according to Salvatore Quasimodo, “every man seeks constantly after the perfect places of childhood” - is formed by the juxtaposition of terraced agricultural patches overlooking the sea, and superimposed in an urban micro plot of small hamlets and scattered houses. This precious mosaic of cultivated areas by the sea has been included in the UNESCO World Heritage List since 1997 for its “*landscape richness, the result of both human intervention and the benevolent hand of nature, which makes it also a place full of charm where sea and mountains, passing through the wide open spaces for cultivation, merge in perfect harmony*”.

The crucial role of traditional agriculture, now in deep crisis, in the vital preservation of this landscape is therefore evident. This contribution describes the territory of the municipality of Amalfi and reports data from an historical and visual analysis, linked with a diachronic G.I.S. analysis of land use variations between 1950 and 2010, in order to assess the integrity and vulnerability of this endangered landscape.

**Keywords:** terraced landscape; Amalfi; agriculture; rural spaces; Mediterranean architecture.

## Introduction

Traditional rural landscapes are cultural landscapes that comes from one or more agricultural practices handed down over time from generation to generation. They have been defined as landscapes which evolved over centuries, until the fast and large-scale modern changes in ‘tabula rasa’ style started [1]. Some studies, in Italy, in the last twenty years, have attempted to develop a methodology to identify and describe the survivors of these traditional and historical landscapes [2]. This study is contextualised in this line of research and aims to identify the description and understanding of the traditional rural landscape of Amalfi Coast, linking historical data (paragraph 1), current land uses (par.2) and future scenarios (par.3). The analysis takes into account the area of Amalfi Municipality, but it can be extended to the entire Amalfitan Coast. This paper is extracted from a wider research work done in 2018 to enroll Amalfi in the Traditional Rural Landscapes National Register of the Italian Ministry of Agriculture and Forests.



Fig. 1. Amalfitan Agricultural System (photo credits: Valentino Anselmi).

## The rural landscape of the Amalfi Coast, a short story

Amalfi is one of the most striking examples of Mediterranean landscape [3] “with exceptional cultural and natural scenic values resulting from its dramatic topography and historical evolution” [4]. This landscape is a significant example of successful interaction between nature and man's work. Here, strips of wild vegetation coexist with the orderly architecture of the terracing planted with pergolas that form an architectural weave of tiny patches overhanging the sea and masterfully adapted to the orography.

In 1997 the UNESCO committee included Amalfi on the World Heritage List and in 2017 the Experts' Commission of the Italian Ministry of Agricultural, Food and Forestry Policies includes the territory of the Municipality of Amalfi in the National Register of Traditional Rural Landscapes [5].

The historical sources that narrate the evolution of the Amalfi landscape are numerous and cover a diachronic interval of almost two millennia. The first transformation of the Amalfi landscape began with the Imperial tourism, starting with Tiberius Villa in Capri, and continuing with the colonisation of the coast by Roman patricians looking for a retreat into the

wilderness. Stazio and Strabone both describe this wild nature as “divine”. Some authors have found a remarkable similarity between the Hesperides of the Pompeian frescoes and the fruits of the ‘sfusato Amalfitano’. This leads to the hypothesis that lemon trees were also widely used, as ornamental plants, in the gardens of the contemporary Roman villas of the Coast such as the Villa di Minori (1st century A.D.). However, in Roman times, citrus fruits remained limited to small delight gardens surrounded by a wild and divine nature. The first official mention of the presence of citrus in the Amalfi Coast dates back to 986 A.D. but the lemon remains a sporadic and ornamental presence in a mixed Mediterranean garden of fruit trees, vines and olive trees. In 12th century, Beniamino di Tudela describes Amalfi as “a land of vineyards and olive trees, gardens and orchards”. However, Amalfi's agriculture remained for centuries a subsistence activity, and marginal with respect to maritime trade. Only when the large capitals accumulated through the mercantile activities of the Maritime Republic were reinvested in the land does agricultural activity begin to flower. The discoveries of the Arabic and Salerno medical school date back to this period. This increased the demand for

citrus fruits, determining prices in a such a way to justify the investments needed to terracing dating back to 950-1025 AD. If it is true that citrus fruits were already present in situ, the agronomic science for their cultivation and the productive cultivars were imported from the Arab world, with which the Amalfi merchants had frequent contact. The first source mentioning a cetrarium dates back to 1194. It is a rental contract that sets very onerous conditions. This highlights the great profitability of the new agriculture. For three centuries Amalfi's agriculture gradually expanded. Citrus groves dominate but there are also olive groves, orchards, and rose gardens (for the production of rose essence). These features modified the structures of the landscape, society and economy of the Costiera through a virtuous co-evolutionary process. Since the twelfth century, this flourishing agriculture has been integrated with the chestnut groves silviculture with fruit purpose and wood purpose, which, as we shall see, is closely linked to citrus cultivation. With the alternation of periods of crisis and recovery, the structure of the coastal agriculture and its landscape remained substantially unchanged over the centuries until 1795. In this fateful year the British Navy makes the anti-scurvy prophylaxis with lemon juice mandatory for its fleet. This exponentially increases the demand for citrus fruits. An even wider horizon for Amalfi's agriculture began in 1832 when the U.S. market opened to Italy [6]. Throughout the nineteenth century the landscape gradually became more and more intensive. Coppice forests, vineyards, carob groves, olive groves, were destroyed to be replaced by cultivation of lemon trees. The bare rock was - with wonderful bravery- crushed using mines and pickaxes. Imposing dry stone walls were built and the terracing was filled with soil transported by hand from the valley or the overlooking hills. In a still partly wild landscape of the Amalfi coast, a scattered pattern of buildings suitable for growing lemon trees was created [7]. Matteo Camera, inspector of the province of Salerno, gives a detailed description of the Amalfi landscape in 1836. The report first of all highlights the impressive work of domestication of an adverse natural condition: "the soil appears fertile and abundant with orange trees, lemon trees, and a kind of large citron trees, called 'ponsiri' [...] orange trees, mulberry trees and many other different plants [...], it seems to recognize a small town of Persia, where each house is located in the middle of an enchanted garden". The whole scene appears between "the peaks of the woods, the crests of the mountains" and the "various jagged edges of the underlying banks, open on an immense sea that spreads out in an endless space". The view is judged as "varied, cheerful and inexpressible" and "the beauty of the landscape of the Coast is superior to any comparison and description" [7]. The same opinion is shared by the many travellers who visit the Amalfi Coast at the time of the Grandtour providing further historical bibliography on the image of the landscape.

	Artificial surfaces urban areas	Citrus grove	Orchards	Vineyards	Olive groves	Arable land with permanent crops	Arable land with olive groves	Arable land with vineyards	Broad-leaved forest	Coniferous reforestation	Shrublands	Sparsely vegetated	Total areas (Ha) 1944
Artificial surfaces / urban areas	44,2	0	0	0	0	0	0	0	0	0	0	0	44,2
Citrus grove	20,92	31,5	0,88	1,41	0,84	5,69	3,18	0	10,37	0,21	4,59	0,35	79,94
Orchards	4,61	0	8,15	6,25	0	1,94	1,61	0	2,15	0	5,45	0	30,16
Vineyards	3,65	1,79	1,05	4,41	0	1,3	0	0	2	0	8,58	0	22,78
Olive groves	0,68	0	0,52	0,01	0	0,86	0,35	0	0	0	0,97	0	3,39
Arable land with permanent crops	1,85	4,13	0,14	2,28	0,72	1,51	0,28	0	8,84	0,14	3,58	0	23,47
Arable land with olive groves	3,95	0,8	0	0,57	0,79	0	0,46	0	0,23	0	1,92	0,03	8,75
Arable land with vineyards	0	0	0	0	0	0	0,32	0	2,56	0	1,6	0	4,48
Broad-leaved forest	0,6	0,1	0,64	0	0	0,77	0,22	0	149,5	0	55,79	0	207,62
Coniferous reforestation	0	0	0	0	0	0	0	0	0	0	0	0	0
Shrublands	6,14	2,27	2,26	1,12	0,11	0,62	0,14	0,14	47,97	1,29	75,89	0,67	138,62
Sparsely vegetated areas	1,43	0,77	0,17	0,07	0	0	0	0	1,07	0	0,83	3,7	8,04
Total areas (Ha) 2015	88,03	41,36	13,81	16,1	2,46	12,69	6,56	0,14	224,69	1,64	159,2	4,75	571,45

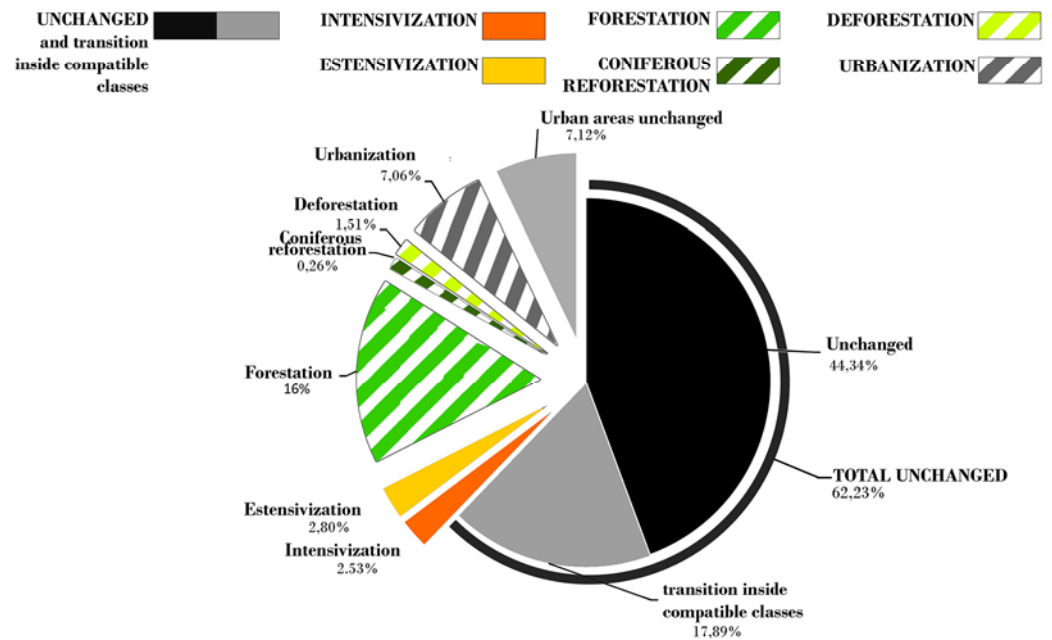


Fig. 2. Cross tabulation transitions and permanences of LUCC 1944-2015.

Gregorovius and Wadsworth, among many others, define Amalfi, respectively, as a phantasmagoria and a paradise by electing the Amalfi Coast as the epitome of the Mediterranean garden which, in this way, "will play an important part in the birth of the romantic taste for the Italian agricultural landscape" [8]. The contemporary Amalfi citriculture landscape architecture is composed of terraces, scattered houses with vaulted roofs, lemon groves, imposing pergolas of large chestnut poles. It is crossed by a complex irrigation system made of masonry basins (peschère), masonry canals (scelloni) and a capillary network of embankments dug into the ground by hoe. It is a landscape that does not allow mechanisation, the canons governing his construction and all the operations of the agronomic calendar date back to ancient archetypes imported from the Arab world and codified in the Cordoba calendar (mid 10th century AD).

#### Land Use and Cover Change (LUCC) analysis

In the present study, the Land Use and Cover Change (LUCC) analysis, was used to quantify

permanence and transformation of the agro-forestry structure of the territory and identify the incidence to the integrity of the landscape. This aim refers to investigating the permanence of landscape framework resulting from slow co-evolutionary transformation involving the culture and traditions of a population, the environment in which it lives, adaptive behaviours, exploitation of available resources or apply techniques and technologies to compensate the absence or scarcity of resources. The level of transformation was calculated by comparing the landscape mosaic of the territory at the date of 1954 (photo interpretation of the flight GAI 1954) and at the date of 2015 (Corine Land Cover 2012 database was updated by photo-interpretation on aerial photo 2015). The analysed area of 472 hectares is a wide area within the municipal territory of Amalfi (constituting approximately 80% of the municipal territory). The analysis on the distribution of crops within the investigated area described the dominance, in terms of agricultural land uses only, of citrus groves: 72 hectares for a 15% representativeness in 1955 and 48, about 10%, in 2015.



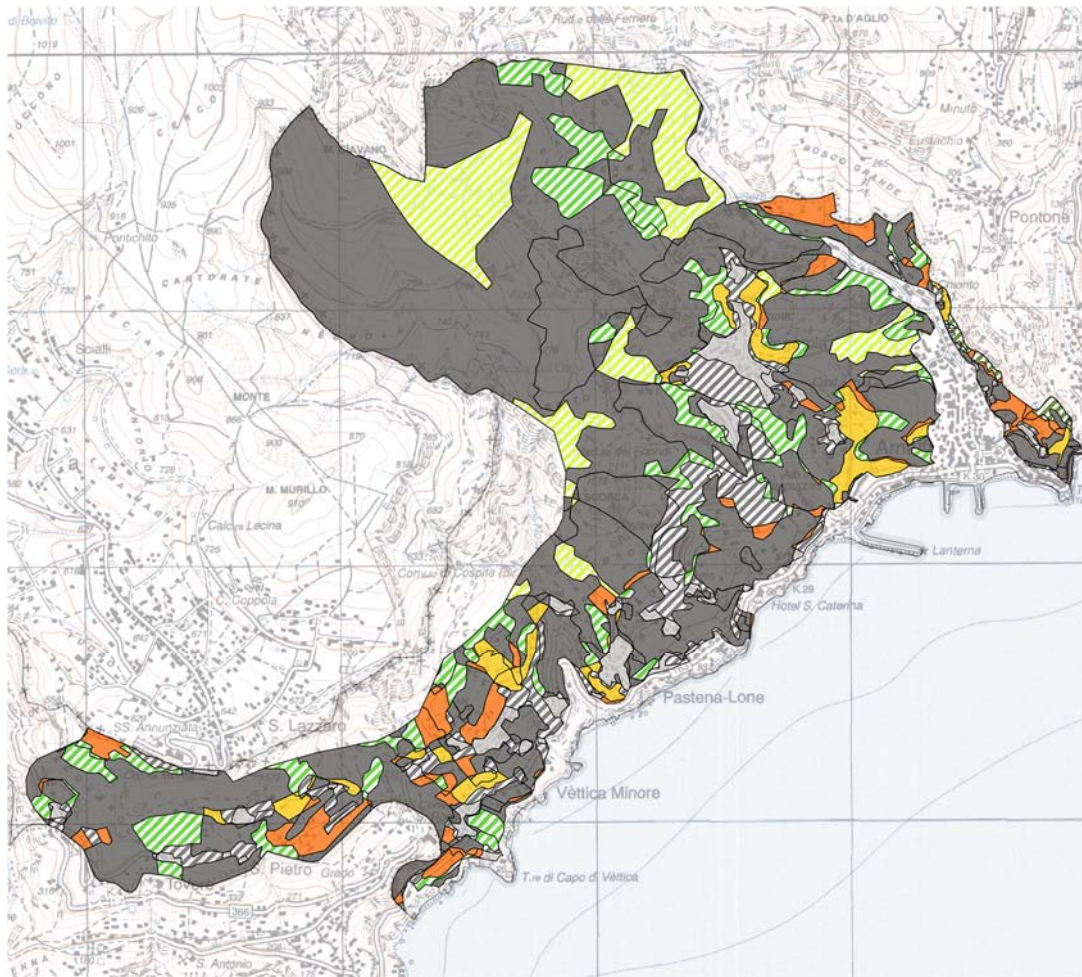


Fig. 3. Map of transitions and permanences of LUC in the investigation area.

The vegetable gardens involved, in both periods, the second most widespread use of agricultural land, followed by vineyards. The areas in which cultivation of vineyards was practiced in association with arable land should be added, a practice with low representation (3.46 hectares, equal to 0.7%) but with a important configuration importance for coastal landscapes. It was also noted that olive cultivation in 1954 resulted from reduced extensions and yet with a fairly important representativeness if we add, to the areas where monoculture cultivation is practiced, the areas of mixed cultivation with associations of vegetable and arable crops to woody crops such as the olive tree (in 3.23 hectares of monoculture areas, 7.15 hectares of mixed cultivation are added, reaching a representativeness of 2.2%). The cultivation of the olive tree in 2015 has a residual representativeness (0.7% in mono crop and 0.5% in promiscuous) and refers to a condition differentiated by the presence of areas of permanence from the wood crop only for purposes of subsidiary domestic profitability. Further confirmation of the importance of the practice of promiscuous cultivation for the configuration of the agricultural landscape to 1954 is due to the extended of this use for about 20 hectares, with a representativeness of 4.2%. Today the same category still has an important representativeness, considering that the areas with promiscuous cultivation represent a total of 7.76 hectares, about 1.6% of the investigated territory.

An important issue to be addressed relates to the extension of the classes of land use and cover with a prevalent forest characterization: deciduous forests, shrubs and areas with sparse vegetation. In 1954 the set of these classes constitutes 63% of the total area, in 2015 the same categories reached a representativeness of 70%. The surfaces covered with deciduous forests with an extension of about 214 hectares are the most widespread category. From the configurative point of view low Mediterranean scrub, with an extension of about 117 hectares, represents a very important class due to its role in the landscape characterisation of the Amalfi coast.

To observe the percentages of distribution of the data regarding the dynamics of LUC, it is possible to notice that, in the face of an wide unchanged areas (55.88%, corresponding to 319 hectares) the land use classes that contribute most to the general data are the woods and the shrubs, while the unchanged agricultural areas contribute for one sixth of the overall result and concern 9% of the investigated territory. It must be specified that they belong to the unchanged class, not only the areas on which a permanence of the land use has been detected, but also the areas on which a regulation of land use has been recorded that is connected. For example, of vineyards or olive groves taken over in 1954 which were transformed into citrus groves in 2015, have coherent agro-landscape characteristics such that in general the morphological-typological characterization of these areas remains unchanged.

### Carta delle dinamiche di trasformazione dell'uso del suolo 1954-2015



Fig. 4. Legend.

The evolutionary dynamics that can be traced from the vegetation colonization of bare areas or agricultural land abandoned, to the following development of the forest, involved about 18% of the territory. If we observe the data relating to the specific transitions of uses, we note that this phenomenon, in addition to involving some areas where shrubs were already present in 1954, concerns the areas that presented citrus orchards (about 10 hectares) and arable crops (about 8 hectares).

A specific investigation of the transformations and the permanence of the citrus groves. It is possible to detect a certain amount of land units in which the land use remains unchanged, for a total of 31.5 hectares, corresponding to about 5 % of the territory investigated and representing about 40% of the citrus grove areas present in 1954. Compared to 1954 the quantity of citrus grove territory contracted, from 79 to 41 hectares. If we look at the specific data on transitions we can conclude that the main processes that have affected the transformation of citrus orchards into other land uses are urbanization and forestry. The share of citrus groves that transited from the use of 1954 to an urbanized area in 2015 is equal to 21 hectares and represents approximately 43% of the total transformations, while the share reached by the forestation process is around 31% [9].

### Conclusions

The historical - bibliographic and iconographic - sources on traditional lemon groves and analysis of the current land use in Amalfi show that the landscape has preserved strong connotations of historicity and traditionality. In this kind of landscape the fate of the cultural heritage is strongly intertwined with the sustainability of the traditional agriculture. Therefore is essential to understand how agriculture can survive in the coming years in terms of social and economic changes. Landscape protection measures must necessarily be 'active protection measures', i.e. measures aimed at increasing the profitability of farming practice.

### Proposed Actions

The first goal is to increase income from farming. We must start from an analysis of who



the farmers are in this kind of landscape. A major problem at the moment is that most of the existing economic measures in support of agriculture are not accessible to farmers in Amalfi. Most of Amalfi's agriculture is family farming, an invisible activity for the Italian Census of Agriculture and the Regional Rural Development measures [10].

The percentage of private cultivated land at family level compared to that owned by farms is very high. From the analysis of the ortho-images used, in the territory of the municipality of Amalfi there are 41 hectares of lemon groves, while from the Agricultural Census of 2010 the agricultural area designated to citrus fruits is equal to 11.97 ha. This difference shows that there is a prevailing percentage of family farming compared to that carried out by agricultural enterprises. Compared to the entire area planted with lemon groves, less than a third of the land is farmed and cultivated for the sale of products, while the remaining hectares are owned by private individuals who cultivate their gardens for family consumption. Support is therefore needed for both categories of farmers.

As far as farms are concerned, they must increase their business income by focusing on the recognition and excellence of the product while maintaining the balance sheet in surplus, also thanks to multifunctionality.

Multifunctionality must be encouraged by facilitating the bureaucratic process with regional and municipal support offices.

Agritourism hospitality is certainly undersized compared to its potential. This is confirmed by the "Dossier of the Local System of Amalfi", which is part of the "National Atlas of the Rural Territory of the MIPAAF 2007-2013". In implementing multifunctionality of agriculture and its integration into a creative and innovative tourist offer, we see the best possibilities of resilience and perpetuation of cultivation activities.

A further increase in income could result from the extension of PGI certification. At the moment, too many farmers in Amalfi continue to sell their lemons without certification, earning very little income for a high cultivation cost.

In order to increase the possibility of selling the product and the associated income, it is necessary to strengthen the short distribution chain. This has already been started by the municipality of Amalfi with the creation of a farm-to-table products market. The promotion of the market on tourist channels could expand the potential of this project.

Another system to reduce the distance between farmers and the world's lemon market is the strengthening of e-commerce, currently practiced by very few entrepreneurs.

The second goal is to reduce processing and cultivation costs. The Campania Region is the body most involved in this as the objective is to target the funds of the regional PSR (Piano di Sviluppo Rurale) to allow them to reach the farmers of Amalfi. Given the micromosaic size of the Amalfi Coast landscape and the enormous particularisation of the land, it is necessary to extend the possibility to participate in the measures of the PSR Campania to farmers who own small extensions of land (even less than 1

hectare). With this in mind, the creation of Enterprise Networks with suitable assistance offices should be facilitated. The access to the PSR measures is useful for the farmers of Amalfi who have a lot of expenses, it is a very "built" agriculture that needs chestnut poles, cover nets, reconstruction of rubble, replanting of lemons affected by 'malsecco' periodically.

Access to PSR measures must also reach non-agricultural entrepreneurs. Family farmers must be recognised for the value of the 'ecosystem service' they provide to the land (cleaning of the land, forests, water regulation in terraces and riverbeds).

Useful for lowering costs, both for family and entrepreneurial farming, is the development of a network of monorails. This would always be carried out after the creation of a Management Committee to take on the burden of routine maintenance.

The most urgent action is the simplification of administrative procedures for the recovery and restoration of macere (terraces). It is useful for both family and entrepreneurial agriculture. In particular, the local rural community requires the possibility of repairing a collapsed macera (dry stone wall less than three meters high) independently. A further facilitation would be to abolish the structural calculation to be deposited with the Civil Engineers for all the rubble to be restored in agricultural land that does not insist on the main roads.

The third objective is the transmission of knowledge. Amalfi's agriculture is an intangible heritage that needs to be handed down from generation to generation [11]. Therefore, training courses on small agriculture and courses for the construction of stone walls are to be increased. Farmers have a crucial role in this transmission as the case of Salvatore Aceto shows. The fourth objective is to bring the Amalfi tourist flow into the hinterland, through the promotion of paths and the enhancement of the ironworks valley with the recovery of some ancient paper mills [12]. Here the protagonist of the activities is the municipality. To this end, it is important to make the most of the old paths that connect the centres of Amalfi with its rural districts: the Sentiero degli Dei, Valle delle Ferriere, the Sentiero dei Limoni etc. are an opportunity to leave the coast behind and enter the rural identity of the Coast.



Fig. 5. Salvatore Aceto Azienda Agricola promotes organic and sustainable production. Salvatore Aceto also organizes Lemon Tours, Meetings and Cooking Lessons, all closely linked to the world of Lemon cultivation on the Amalfi Coast.

An opportunity to pass from sailors to farmers. An opportunity to feel in your own legs the fatigue of a landscape that we hope will be admired also by our children.

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