ANALYSIS AND SURVEY OF LAKE GARDA LEMON HOUSES: A TOOL TO UNDERSTAND AND MANAGE A MEDITERRANEAN LANDSCAPE IN LOMBARDY

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Abstract – Lake Garda mild microclimate allowed the settlement and flourishing of a peculiar cultivation, that of the *limonaie* (lemon houses), which, at the time of its splendour, during the Little Ice Age, was the Northernmost citrus cultivation in whole earth and exported citrus in Central and Northern Europe. In a contribution to the 8th edition of the Symposium we highlighted the Mediterranean character of the landscape of the lemon houses [6]. Here we enlighten how, in order to preserve this unique cultural heritage, there is an urgent need of a census accounting for both the current condition of the ancient productive sites and for all the agroecosystemic relationships between the *limonaie*, which contributed to shape their landscape. Due to the great water requirement of the citrus cultivations at mid latitudes, a particular attention is devoted to the traditional water harvesting and irrigation structures.

Introduction

Lake Garda, thanks to its mild microclimate, allowed in its North-West portion the settlement and flourishing of a unique cultivation, that of the lemon groves, which shares many architectural, technical and irrigation features with labour intensive Mediterranean landscapes (see our previous contribution to this Symposium, [6], for details on this point). Here a blooming citrus cultivation flourished during the Early Modern Age to export lemons, citrons and other citrus in Northern Europe. Despite the climate favour, the citrus cultivation nevertheless required a lot of care and attention to preserve the trees from winter cold. In fact, to make citrus growing possible in whole earth at this latitude (the most Northerly in the World), monumental stone greenhouses were built, the lemon houses (*limonaie*), set on long terraces shaped on the best exposed slopes to solar irradiation and most sheltered from cold winds. This is even more remarkable if it is accounted that citrus commerce flourished here during the Little Ice Age and reached its maximum development between the 18th and 19th Century [7, 8, 12] (Fig.1).

Historical sources document that the architectural layout of the *limonaie* was consolidated in all its essential components since at least the 16th Century (see again [6] for a review). During the 19th Century, up to 20 million lemons a year were exported to Northern and Eastern Europe, but from the end of the 19th Century various reasons led to the gradual abandonment of the production system [8, 28] (Fig. 2).

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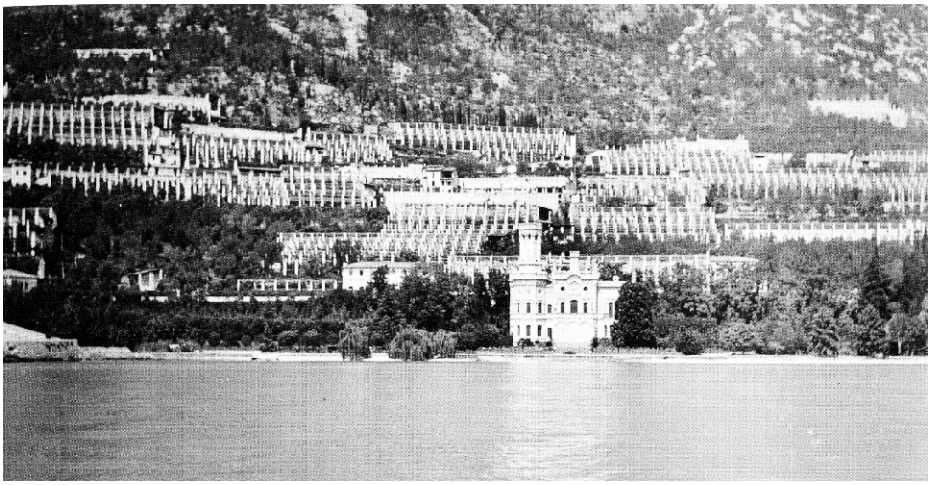

Figure 1 – Gargnano (Brescia, I) in 1911: the landscape is characterized by many *limonaie* still conserved and productive.

Figure 2 – Gargnano (Brescia, I): the map (by A. Cazzani) highlights in yellow the *limonaie* documented by the cadastral maps of 1851 and in green the lemon houses still active in 1905.

Compared to the 50 hectares destined to citrus groves at their maximum development in the 19th Century, today probably only 25–30 % of those areas are still cultivated with citrus fruits, but the historical agricultural landscape – despite the recent urbanization and territorial transformations – is still clearly readable as the numerous remains of lemon groves connected to terraced olive groves, vineyards, woods, laurel trees and typically Mediterranean vegetation (cypresses, capers, oleanders, myrtles, agaves…; Fig. 3).

Such an intensive citrus cultivation required to organize the surrounding landscape to provide the required resources, viz the water for the irrigation, the timber to support the lemon trees, the windows, the wood and the nails to close the green houses, the soil itself to grow the trees.

Therefore, the lemon groves and the landscape system related to them are the result of a complex process of territorial transformation and of a continuous maintenance work

carried out for centuries by the same farmers who guaranteed its perpetuation. This complex landscape system was set and built without an architect plan. It fascinating meets Rudofsky's concept of "architectures without architects" [25] and the definition of the cultural landscape proposed by the UNCCD to describe the terraces of the Mediterranean area, where "the environment is not only the result of natural processes, but rather represents a cultural landscape where historical centres are the crystallization of knowledge appropriate to environmental management and maintenance" [29, p.51]. Therefore not only the future management of this peculiar traditional rural landscape will not be possible if policies and strategies are not aimed at the knowledge and promotion of this unique heritage rich in historical, architectural, landscape, botanical and agronomic and intangible cultural values, but also – again in the UNCCD perspective – the understanding of the dense network of relationships underlying the landscape will unveil the comprehension of the intimate "search for symbiosis and harmony intrinsic in local knowledge" [29, p.51].

For the above, in order to better understand and be able to enhance the extraordinary and unique heritage of the upper Garda *limonaie*, the paper intends to highlight how urgent it is to analyse the current state of the lemon groves system, by surveying the *limonaie* structures and counting the productive citrus plants in the municipalities of upper Garda. The first step will be an in—depth landscape analysis of the current situation, including a detailed investigation and classification of the present components, in order to collect reliable data on architectural and material characteristics, state of conservation of the sites, nature and number of properties, state of the irrigation and infrastructural system, landscape context, citrus fruit varieties, processing activities and types of products, etc. The census is not a purely analytical—cognitive phase: it is a pillar to define the intervention strategies, essential for the architectural and landscape enhancement of the *limonaie* system, for the promotion of biodiversity in the upper Garda and for the settlement of the production chain. The census is conceived as a GIS—based dynamic tool that allows continuous updates and additions to better manage and process all the data collected in the future. The goal of the mapping and census is to know the current state of the *limonaie* system, compared with the historical state documented by maps and archival documents and by previous studies prepared to define management criteria at the district level, identifying the compatible vocations and uses, and conservation, maintenance and management aims, hoping for possible incentives for owners to be actively involved in the valorisation of this precious landscape.

The landscape of the *limonaie*

The NW shore of Lake Garda is characterized by a mild climate with typically Mediterranean agricultural crops such as olive groves, vineyards and citrus groves. The citrus groves - already documented since the 15th Century [5, 7, 9, 10, 12, 18, 19, 20, 21, 23] - are undoubtedly the ones that most characterize this landscape. Even today the *limonaie* are a distinctive feature, particularly the tall, stone perimeter walls, some of them eight to ten meters high, built on the terraced land to protect lemon trees from the winds that blow down from the mountains behind (Fig.3). Thin stone pillars stand sentry—like along the terraces, built to secure a grid of wooden beams. A complex network was necessary to guarantee the irrigation for citrus trees.

Figure 3 – Gargnano (Brescia, I) today: this photo shows how much the *limonaie* (clearly recognizable by the terraces and pillars) still characterize the upper Garda landscape.

During the winter months, the *limonaie* were closed by wood plank roofs and large window panels facing the sun, turning the structures into seasonal greenhouses. These elements, assembled and disassembled with extreme care every year, were kept in summer in high stone warehouses adjacent to the lemon houses themselves: the *caselli*, rustic buildings that rise almost like a tower, higher than the pillars, communicating, at the top, with the roof of the lemon house in order to allow the covering and closing operations. The construction methods and the choice of materials were refined by centuries of experience so that the lemon houses became technically very functional greenhouses and highly productive structures. The cultivation of citrus fruits has therefore led to a strong anthropization of this landscape [5, 7, 18, 19, 20, 27]: not only the construction of unique artifacts in the world with the finding of the necessary construction materials, but also the construction of a water system, roadways, windbreak systems, the creation of a commercial network for the export of citrus fruits historically especially in northern and eastern Europe [8, 16, 17, 26]. The work and expertise of many people therefore revolved around the lemon groves, as did all the artisan and rural culture of entire generations, who from the trade mainly of lemons, but also of oranges and cedars drew the benefits of a prosperous economy until the end of the 19th Century, based on the uniqueness and excellent quality of the product.

Several socio—economic reasons, in addition to the discovery of the chemical formula to synthetically produce citric acid, led to the gradual abandonment of citrus cultivation from the end of the 19th Century. During his stay in Gargnano in 1912, the writer D.H. Lawrence was able to observe the lemon houses and notice the progressive decay that characterized them, comparing them to an archaeological landscape: “All summer long, upon the mountain slopes steep by the lake, stand the rows of naked pillars rising out of the green foliage like ruins of temples” [22].

During the 20th Century numerous lemon houses were converted into olive groves,

vineyards, orchards and vegetable gardens and from the 1960s also into gardens or built areas and intensely transformed and only a few dozen *limonaie* remained active and productive according to traditional techniques. Of the 50 hectares historically destined to citrus groves, today only 30 % of those areas are still cultivated with citrus fruits, but a specific survey aimed at censoring the citrus groves and productive citrus plants in the municipalities of the upper Garda (in particular in Toscolano Maderno, Gargnano, Tignale and Limone sul Garda) has yet to be completed.

The lemon houses and the landscape system related to them are the result of a complex process of territorial transformation and of a continuous maintenance work carried out for centuries by the same farmers who guaranteed the perpetuation of this heroic agriculture. Although awareness of the unique and exceptional value of the lemon groves landscape has been growing in recent years, there is still the risk of losing the peculiarities of the tangible heritage and above all of the intangible heritage related to them.

The future conservation and management of this unique traditional rural landscape will be possible if policies are defined and strategies aimed at the knowledge, dissemination and promotion of this heritage rich in historical—documentary, architectural—landscape and botanical—agronomic values are issued. The *limonaie* should not be considered today as monuments of the past, only partially still existing, but as a fundamental resource and opportunity for the future of this area. It is therefore important to define management criteria, by carefully analyzing the current conditions of this landscape system, its level of permanence and present uses, by identifying compatible use vocations and conservation, maintenance and rehabilitation goals, hoping for possible public funding and incentives.

Architectural census and survey of the *limonaie*: an analytic and strategic tool

Considering the above, in order to better understand and be able to enhance the extraordinary and unique heritage of the upper Garda *limonaie*, it is urgent to analyze the current situation of the lemon houses system, also starting from specific censuses carried out in the 80s and 90s relating to the Municipalities of Gargnano and Limone sul Garda.

Specifically, the Municipality of Gargnano carried out a census of *limonaie* in 1983, only partially updated in 2011 and included in the Municipal Urban Plan (PRG, *Piano Regolatore Generale* in 1983, PGT, *Piano Governo Territorio* currently). 134 lemon houses have been registered, considering that the cadastral maps of 1851 document that about 400 lots were destined for "citrus gardens". The census [11] referred to structurally conserved or partially conserved *limonaie*, however recognizable as ancient lemon houses, while the traces have only been mapped. The census analyzed the lemon houses for the architectural and landscape role they present and not only for the productive function. Specific forms have been compiled that highlight: the site number, the name of the owner, the address, the location (in the inhabited center, in inhabited areas, on the lake, isolated), the orientation, the landscape—environmental value. An aerial photogrammetric map identifies the lemon house and its context. Some significant photographs are attached, located on the map. Other information concerns the current use of the *casello* (storage rural building) and the terraces, the state of conservation of the various construction components (perimeter walls, terracing walls, pillars, wooden beams, exterior and interior of the *casello*, irrigation system with specification of the presence of springs, wells or water collection tanks). The state of conservation is briefly defined as bad, mediocre, good, renovated (the component

is transformed from its historical state, even if in good condition), absent if the components or buildings have disappeared and traces if the components are only episodic or partial. The survey also indicates the number of citrus plants present in the lemon house, highlighting adult or historical plants. The form includes a brief description of the characteristics of the site and an assessment of the historical, architectural and environmental values. If the lemon house is still cultivated with citrus trees, the census reports information on the tenant (farmer, hobbyist), on the area dimension, on the number and type of citrus plants, on the average annual production of lemons and on the materials and techniques of covering and closing.

The census forms were only partially updated in 2011 [24] and often do not report the current situation: there are no indications of several *limonaie* restored in recent years and of many citrus trees planted.

For the Municipality of Limone sul Garda there is a census of the *limonaie* of 1992 [13] made with the same goals and similar forms as the census of the *limonaie* of Gargnano. This census was updated in detail in 2006-2009, adding maps with the location of the architectural components and features of the lemon groves [14]. The Limone census aims to detect the *limonaie* present in the Municipality to protect their conservation and prevent their decay, identifying the historical components that are still visible: *caselli,* perimeter walls, terracing walls, pillars, any covering elements, to be able to read the historical identity of the *limonaie* system. The lemon houses by now completely transformed into hotels or private residences have not been surveyed. Overall, the census includes 12 *limonaie*, considering that in Limone many lemon houses were built during the 18th Century by the Bettoni-Cazzago family and have very large dimensions.

The data reported in this census are similar to those of the census of the Municipality of Gargnano, even if during the updating some data have been added, such as the distinction between "ancient" citrus plants and "new" trees (i.e. planted after the abandonment of citrus cultivation), a description of the significant elements and notes regarding the irrigation system (where and how it was fed), the treatments carried out over the years on pillars and walls, the interventions completed on the buildings and the specific historical facts of the site. In addition to the cadastral map and the aerial photogrammetric map, the research carried out a specific survey on a scale of 1: 500 - 1: 200 which precisely reports all the data and features analyzed. The form is completed by a detailed photographic survey.

In addition to the census and survey of the lemon houses, the Municipal Plan of Limone sul Garda includes a *Manuale tipologico degli elementi edilizi tradizionali (Typological manual of traditional building elements)* [15] which also concerns the features of the *limonaie*. In particular, the main components of the lemon houses (perimeter walls, terracing walls, pillars, *caselli,* wooden beams, irrigation system, accesses and stairs, other stone elements and other historical elements) are briefly described and specific rules are defined for each component in order to conserve the historical architectural, technical and material features and to prescribe the interventions to be carried out.

With reference to the censuses already defined, it is necessary to extend the study of the *limonaie* system to all the municipalities of the Upper Garda Riviera, and for Gargnano, in the past the center of citrus growing, to program not only the updating of the 1983 census but a more detailed research. The aims of this more comprehensive research are to detect more precisely and to critically evaluate the current landscape of the *limonaie*, also highlighting the transformations that have happened in the last 40 years that in several cases regard the recovery of the structure of the lemon house, the agricultural re—functionalization and the replanting of numerous citrus trees (Fig.4).

Figure 4 – A *limonaia* in Gargnano, recently restored following historic construction techniques and using past materials and maintained according to traditional methods, then closed and covered in the winter months.

It is important to remember that in some areas the *limonaie* are connected to each other and they create a single architectural and landscape complex: the good exposure, the availability of water, easy accessibility have led to the concentration of several lemon houses in specific areas. In the case of the Municipality of Gargnano, for example, in the localities of Villavetro, Quarcina, Tesolo, Crocefisso, San Faustino, San Giacomo, there is a very significant presence of *limonaie* that constitutes an emerging system of landscape and environmental, as well as cultural, value. This system must be analyzed in a unitary way, highlighting the various existing relationships: water and road network, trees in groups and in rows, settlements of buildings and agricultural areas.

An inventory / survey aimed at the knowledge of the tangible and intangible components of the *limonaie* must consider: (1) the architectural and material characteristics and their state of conservation, with particular attention to the analysis of traditional construction techniques and historical materials; (2) plant / agricultural components with identification of the different species and varieties; (3) the water harvesting and the irrigation system (presence and state of conservation of cisterns and channels and historical and current water supply sources), as highlighted in the following paragraph; (4) the landscape context and the pedological features; (5) current uses; (6) the property status; (7) historical and current cultivation methods, with particular attention to irrigation and cold protection methods for citrus plants; (8) current agricultural production; (9) the intangible components, often documented only by oral sources. A multidisciplinary team must develop the census, so that the historical—architectural as well as the hydraulic—infrastructural, landscape—naturalistic, agronomic—productive and social aspects are considered and evaluated. The census must also know how to involve, in addition to the local administrations and the Alto Garda Bresciano Regional Park, associations, committees and local cooperatives, schools, *limonaie* owners, experts and scholars to define an active participatory planning process that leads to the community most aware of the complexity and value of the *limonaie* landscape.

The census is therefore not just an analysis document, but the indispensable strategic tool to define recovery and enhancement interventions, both landscape— and production—finalized. The survey of some *limonaie* has already highlighted the importance and usefulness of a census thus conceived: for example, sites were found where only the terraces remain, but

the hydraulic system is still preserved, rather than lemon houses used today as vineyards and olive groves, still with high pillars and intact and original roofing structures, or sites recently recovered using traditional materials and techniques and others in which contemporary materials have been used and modern features have been introduced (Fig.5). The survey in several sites also underlined how necessary it is to compare and to share different problems in order to define criteria that can solve some conservation and management issues. The census / survey makes it possible to read the stratification and the level of permanence and / or transformation of the landscape of the *limonaie* and to define a future for this heritage referred to principles of compatibility and sustainability, with the aim of preserving them and continuing the history of these extraordinary artifacts.

Figure 5 – The *limonaie* landscape: a *limonaia* in Gargnano, today used as a vineyard and lawn, that still conserves the architectural structure, the high pillars and the water distribution system.

The hydrological and hydraulic relationship with the landscape

The link between the landscape of the lemon houses and the irrigation is deep and close, because the cultivation of citrus fruits in a temperate climate requires a large amount of water. According to the present practice and to recent testimony it is estimated in 100 to 300 litres per plant every 8 days during the summer season, in agreement with (yet greater than) the amount estimated by the 16th Century agronomist Agostino Gallo at the threshold of the Little Ice Age [21]. The structural difficulty of finding water along the shallow—soil slopes of Lake Garda NW shore induced the farmers to bow the choice of the site for new lemon houses to the presence of water streams or sources, thus colonizing also steep slopes far from the lake, in order to settle nearby the sources or the streams, and to adopt a plant—to—plant distribution technique typical of the Mediterranean and Central Asia water scarce conditions. Whereas the irrigated agriculture is always recognized more labour intensive with respect to the arid agriculture [4], this aspect is even more emphasized in water—scarce conditions and plays a central role in the production. In our previous contributions [1, 3, 6] we provided insights on the structure of the irrigation system and on its technical functioning. Here, following as guideline the eight conjectures on traditional irrigation proposed by [2], we will recall its main aspects in relationship to the purpose and first results of a hydrological and hydraulic survey conducted in five lemon houses (*limonaie* La Malora, Fondo Campagnola, Fondo Crocefisso and Ragusini in Gargnano, and *limonaia* Pra' de la Fam in Tignale). Apart from La Malora,

which is relatively small and dates back at least to the 17th Century, the others range from a medium to a big size and date back to the 18th Century.

The traditional hydraulic system of the *limonaie* is divided into three fundamental parts: (1) the water harvesting and storage works, (2) the water distribution network inside the lemon houses and (3) the drainage network to remove the excess water. The collection and storage works are always upstream of the garden or, more commonly, of the system of gardens which were irrigated with the same water supply. These works are in turn of three types: direct water intake from a stream, storage tanks and natural or artificial sources. The direct intake from a stream was separated from the irrigation channels by a stilling basin, from which the water was usually taken by means of a submerged intake. Tanks' volume ranged from about 1 m^3 to some hundreds of cubic meters, depending if they were used only as stilling and partitioning basins, or they were used as a reservoir for big lemon houses systems. The pumping of water directly from the lake was introduced in recent times and it is practiced only for those gardens that are located on the lake shore.

The surveyed lemon houses give an idea of the variety and complexity of the water collection and storage works. As an example, La Malora was part of a complex system which derived the water from a stream, the *Fosso dei molini*, to be used for many lemon houses and mills (*molini*) and of which only some traces may be found nowadays. Upstream the lemon house there are two small tanks which are still functioning – even if the water is no longer provided by the *Fosso dei molini* – and served as a stilling basin and as a partition basin respectively, to share the water between the terraces, the surrounding lemon houses and a mill settled inside the lemon house. The other three lemon houses surveyed in Gargnano were all mainly dependent on the upstream source of the *Ravere*, from which an aqueduct shared the water to a complex system of lemon houses, but at least two of them (Fondo Crocefisso and Fondo Campagnola) benefit

Figure 6 – Underground room at *limonaia* Fondo Campagnola (Gargnano) to collect and drain the water springing from the rocks.

also from internal sources and spontaneous water emergences from the rocks. Here a big cistern (some tens of cubic meters) connected to the aqueduct is still active and many small others were placed upstream the terraces to distribute the water to them. An interesting underground room, inspectionable by means of two vaulted tunnels, collected the water springing from the rock and presumably conveyed it to a cistern. Also the *limonaia* Fondo Crocefisso is still connected to the aqueduct, but at present it mainly uses water from an internal spring.

The water, conveyed by means of the external works toward the upstream terrace of the garden, was distributed to the plants by means of flumes running along the retaining walls upstream of the terraces and equipped with at least one little rectangular spillway at each field, i.e. every 4 or 5 m. The traditional flumes were mostly made of pink marble or grey sandstone, both being common in the area. Some flumes may be found also built in sided—up roof tiles but they should be attributed to more recent (yet not contemporary) interventions. The flumes were sustained by brackets, arches or, sometimes, by pillars, at a height ranging between one and two meters from the base of the wall. The measured slopes of the flumes range from 0.01 m/m (e.g. in the *limonaia* Pra' de la Fam, Tignale) to 0.1 m/m (e.g. in the *limonaia* La Malora, Gargnano). In the same lemon houses, measured flume sections are (reversed) trapezoidal and range 11 to 12.5 cm for the larger base, 5 to 5.5 cm for the smaller base, and the depth is about 6.5 cm. It is worth noting that almost all the observed sections show the same shape and dimensions, close to the section of least hydraulic resistance, and that all the components of the articulated distribution system (like many other functional elements of the lemon houses) are characterized by a remarkable degree of standardization. If the complex provisioning system is often neglected and hidden, the flumes are the most evident aspect of all the water management system and manifestly play also an aesthetical role inside the lemon houses, so that in most of the cases we found them in relatively good conditions. They are quite complete, with original pieces or anciently restored with roof tiles, even if some modern interventions to restore the continuity of the flumes with old pieces were not intended to use them for irrigation and therefore the presence of the spillways was frequently neglected. A part the ones of Fondo Campagnola, which original lemon house destination was abandoned tens of years ago, in most of the other cases the flumes can be activated or easily reactivated and, on the basis of the information collected, it seems that in recent times the consciousness of this peculiar core of the lemon houses is growing and many owners are interested either to maintain active or reactivate them, at least for cultural aspects. This growing consciousness is an important step along the route to recognize the traditional irrigation technique as a cultural heritage [2]. A remarkable artifact is the water partitioning box, in most of the cases installed upstream to the flumes, to share the water between the one irrigating the terrace and the one flowing to the downstream terrace through an underground pipe covered with stone slabs, the *caladrìa*. As in many ancient aqueducts, *caladrìa* was realized by means of terra cotta *fistulae* [6]. The drainage was guaranteed by either covered or free surface small stone channels placed at the foot of the uphill retaining walls (to drain the springs and rivultes coming from the uphill rock, in the *limonaia* La Malora) or nearby the downhill border of the terrace (traces referred by the owners of the *limonaia* Fondo Campagnola). Excess water either was returned to the stream, or it flew toward downstream lemon houses, or it was used for horticulture of the ancillary cultivations.

From these lines it appears how the irrigation played a key role in the lemon houses management, and how it innervated all the landscape, so that the knowledge of the hydraulic works and of the channels network is necessary to understand how deep the anthropisation of the landscape was and how great the real extension of lemon houses system was.

Figure 7 – Two activated spillways at the *limonaie* Ragusini (left) and Fondo Crocefisso (right).

Conclusions

In this paper we aimed at suggesting how complex and deep was the link between the lemon houses system and the landscape, and how important is, in view of designing a future for the lemon houses which respects and preserves this unique cultural heritage, to understand the relationships between the lemon houses and the surrounding environment.

In order to better understand the stratification of this heritage it is necessary to define a census / survey aimed at analyzing the current situation considering the historical—cultural aspects, but also the productive and agronomic ones. During the 20th Century, the lemon houses were described as components of the past, that had now lost their importance and meaning with the decline of citrus groves: only some isolated sites could be restored and used as a museum. In the 21st Century, the role of *limonaie* as an extraordinary component of the upper Garda landscape that must be enhanced and reused for productive purposes has increasingly been highlighted. It is about heroic, quality agriculture, linked to sustainability criteria and territorial promotion, with the aim of encouraging awareness of traditional values and the link between landscape and products. The census illustrated here is intended to constitute the operative reference for knowing the complexity of historic building techniques, traditional materials, construction details and related conservation problems to define preservation guidelines and management criteria for the *limonaie*, as they return to being living and supporting elements of the upper Garda territorial system.

By investigating the external capture works, which the lemon houses often shared with mills and other factories, it will be possible (1) to estimate the effective territorial and social extension of the phenomenon of citrus cultivation – an operation relevant for historical, educational and tourist research purposes – and (2) identify any abandoned waterways that could be restored for the agricultural recovery of some terraces. The study of the water resource management techniques inside the lemon houses (1) will allow to verify the level of standardization of the techniques themselves, characterizing any local differences and (2) it

will contribute to an efficient agricultural recovery of the lemon houses based also on a resilient water management.

It is therefore very important now that conservation and recovery interventions are carried out not only with particular attention to maintaining the historical, landscape and documentary significance of the *limonaie*, but also to the agronomic and productive value, with the perspective of preserving the landscape ecosystem services. There is in fact a risk that the historical cultivation techniques are lost and that construction elements, materials and plant species are introduced that are not congruent with the historical landscape. Through a process of conservation and rehabilitation not only of the structure of the *limonaie*, but also of the hydraulic, infrastructural and landscape components, conserving and increasing species and cultivars traditionally cultivated in the upper Garda, it would be possible to strengthen a rural economy that could support and valorise monuments that are unique in the World[1].

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