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Recovery and conservation of old water mills in Central Sicily

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Abstract

Established on the analysis of an area dotted by interesting anthropogenic and natural elements, this paper focuses on the recognition of the cultural value of Central Sicily's river landscape. In the territory of Piazza Armerina (Enna) the presence of streams full of water allowed, since the 14th century, a significant production cycle mainly related to the wheat cultivation and grinding. Of the related watermill system, abandoned as any longer functional, today remain little traces, which are, however, important source of cultural identity. This heritage, if rediscovered, conserved and enhanced, may play an essential role in the area's socioeconomic regeneration.

Peer-review under responsibility of IEREK, International experts for Research Enrichment and Knowledge Exchange

Keywords: restoration; watermill; cultural landscape; Piazza Armerina; ecomuseum.

1. Introduction

The numerous and continuously increasing chronicles on ecological and hydrological disasters added, on the other hand, to those relating to severe problems of supply and drought, shown the imprudent management and the inadequate attention towards water, an essential resource for human life and important to many sectors of the economy.

At a time when the contemporary environmental crisis had been already triggered, the German philosopher Martin Heidegger asserted that we must "build" to dwell. He also added: "the basic character of dwelling is to spare, to preserve. Mortals dwell in the way they preserve the fourfold in its essential being" [1]. Established on these assumptions, this paper originates from reflections and analysis carried out on a territory - the province of Enna in the

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heart of Sicily - littered with isolated goods and places, associated in the past with the exploitation of natural resources, but today not anymore functional and deserted.

The *status quo* emerged from an extensive research still in progress, allowed to understand the widespread manner with which, a number of important presences from the past branch out and, at the same time, to assess their identity value and to define those homogeneous characters resulting from the interrelations between nature and human history in the area. In particular, the interest was focused on the system of water mills. Nowadays, of these hydraulic machines - the outline of a structure of great economic importance as well as a constant resource from the Middle Ages until the advent of industrialization - remain little traces, which however deserve to be re-discovered, protected and returned to the community as an important part of its culture.

As a pilot project, the territory of Piazza Armerina - famous for the presence of the downfalls of the Villa Romana del Casale (one of 51 UNESCO World Heritage Sites in Italy) and thus affected by significant tourist flows - was particularly studied. The historical fluvial network of mills, currently little known, could become a real asset for the area. However, to this end, it should rely on processes able to make known the history of these sites. It should stimulate the interest and curiosity of visitors, today largely taken from the frantic need to quickly escape to the next stage of a touch-and-go tourism.

In this sense, this study has aimed to bring out the historical origins of this heritage, to identify its typological and building characteristics and, therefore, to assess the state of conservation. Simultaneously, the analysis of archival sources and of the territorial planning instruments into force has helped to provide a comprehensive knowledge framework. This set of information, implemented and optimized for the establishment of a web platform for data sharing, has been an essential tool for the development of recovery, re-use and promotion proposals.

The program, admittedly sensitive to the preservation of these pre-existences and encouraging practices founded on the concept of "minimum intervention", intends to establish specific guidelines. It aims at enhancing the tangible and intangible components of this legacy, providing an instrument for its active safeguarding which should improve the dialogue between the memory of the landscape – today profoundly altered – and its current perception. It, therefore, addresses the issues of conservative restoration, fruition and valorisation of a rural heritage, which is relevant from the architectural and natural points of sight, but also a strategic asset for the growth of tourism and leisure industry.

In this sense, it is significant the combination of the words "design and build" with the term "care" proposed by Nicola Emery [2]. Today, more than ever, we must design "to care" what survived to the outcomes of policies hurtful and disrespectful to the cultural and natural heritage. In this way, the word "resilience" has to be considered: not only related to physical assets, but also to the identity values of which they are harbingers.

2. Ancient water mills in Central Sicily

As known, the adequate availability of fresh water is one of the basic requirements for the life and the socio-economic development of a civilization. Over the centuries, every culture has assigned to water a religious importance: the ancient classical writers associated the presence of a source of the precious liquid to the sacredness of a place.

The Sicilian inland testifies the presence of a past characterized by cultures extremely respectful of water resources. In particular, this part of Sicily is plentiful of places characterized by the constant presence of water, consecrated to Demeter and Kore goddesses, with a clear propitiatory purpose related to land fertility. Several difficulties were encountered by the Catholic Church, to redeem the bond of the people who lived and worked these lands, with pagan rituals so ingrained in their culture. Even today, in many rites used in the province of Enna, in which water is a constant presence, there is a fusion of pagan and Christian cultures.

This is the case, for example, of the pilgrimages against drought documented in Assoro since ancient times to the *Grotta della Madonna dei Miracoli* and the hypogeum of St. Elena; the sacred processions dedicated to the *Madonna della Visitazione* in Enna and to St. Filippo in Agira; and the cult of St. Vito in Regalbuto that, according to some historians, is related to that of the God Adranos [3].

The apotropaic ceremonies connected with agricultural production show how the land, in particular the cultivation of wheat, is rooted in the local tradition. Avoiding drought was not only necessary to irrigate the fields and ensure abundant crops, but from water derived the essential energy to activate the grinding machines. The diffusion of watermills is proved in the first century BC by Vitruvius [4], parallel to the development of millstones, which took advantage of the use of human (*mola trusatilis*) or animal (*mola asinaria*) powers. The growing and milling of cereals

is a very remote man achievement: the oldest mills unearthed in some prehistoric sites of Syria and Iraq date back to the 11th millennium BC [5]. In Sicily, with the culture of Stentinello (4000 BC), the lithic industry includes, among others, lava stone grinders which spread everywhere in the copper age [6]. Nevertheless, it is only in the 3rd century BC, after the victory of Rome in the first Punic War, that the island obtained the hegemony in the extensive wheat production and trade, so to became the so-called "Granary of Rome". The discovery of the great granaries of Morgantina, dating back to the second half of the 3rd century BC, has provided an archaeological evidence of the extraordinary fertility and agricultural productiveness in inland Sicily.

2.1. Landscape description from the notes of 18th and 19th centuries foreign travellers

Beside a collective imagination, that associates the traits of inland Sicily with a land barren and burned by the sun, the area of Piazza Armerina requires a distinction; here the rich presence of water is an exception that has characterized anthropic and natural landscape.

The amenity of this part of Sicily has not gone unnoticed to the many foreign voyagers who have crossed it during the 18th and 19th centuries when "began what that certainly can be defined as cultural tourism. Namely the tourism of the travellers who came in Sicily, not exclusively for study reasons, but to visit the island that was at the origins of European civilization" [7]. The historian Ignazio Nigrelli has drafted a thorough and complete collection of these memories in 1999. All the trip reports of the illustrious visitors - erudite in different human fields such as architecture, archaeology, numismatics, geology, literature and painting - share the same positive view on the territories surrounding the city of Piazza Armerina.

They share the feeling of pleasant surprise generated by the emergence of a nature characterized by evergreen coniferous forests, dominated by oak and hazel (Fig. 1). It seems appropriate to quote the architect Eugène Viollet-le-Duc which in his *Lettres d'Italie 1836-1837 adressées à sa famille* expressed the common foreign travellers' perception of Piazza Armerina: "in the surroundings of Piazza we find ourselves in a beautiful and fresh valley, covered by the most beautiful vegetation, not olive and orange groves of which we begin to be filled, but poplars, oaks and hazel trees, so to believe we are almost in France".

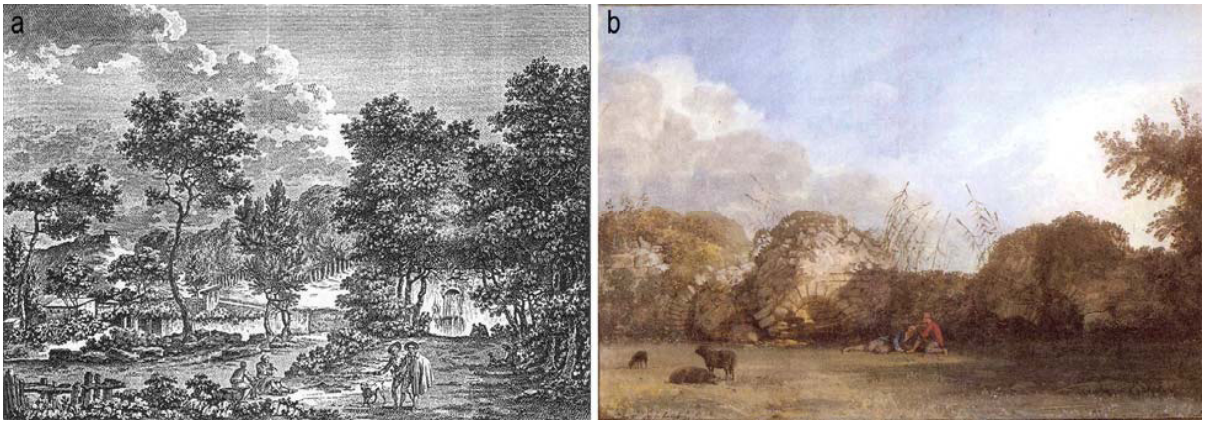

Fig. 1. (a) View of the surroundings of Piazza Armerina from *Voyage pittoresque* (Picturesque journey), by Abbot Richard De Saint-Non (1781-86); (b) *Ruines de Gela (Meditterranea)* from *Voyage pittoresque des Isles de Sicilie de Lipari et de* Malte, by Jean Houel (1786-87).

2.2. Technological aspects of horizontal-wheeled water mills

The abundance of water resources in this territory has historically allowed the development of a production cycle mainly linked to grain and wool processing. Actually, both activities were based on the presence of numerous waterfalls and *paratori* - a regional term synonymous for fulling - along the first step of the basin of Gela river, which stretches for about thirty kilometres in the lands of Piazza Armerina and Mazzarino.

These engines, exploiting a horizontal wheel, widely used in the rest of Sicily, were powered by streams of torrential nature and variable flow rate during the different times of the year, which were diverted by a gathering system of the waters, called *prisa*, and channeled along *saie* (ducts) mostly made of rammed earth. The water then reached a stone conduit, a structure similar to an aqueduct, which conveyed the water inside of the mill by the *gora*, a vertical or oblique channel, with the inner section slightly tapered towards the lower end (Fig. 2a). The difference in level allowed to maximize water pressure in the terminal part of the canal, so generating the propulsion required to move a water wheel with vertical axis to which were connected the millstones [8].

The horizontal finned wheel, composed of wooden elements, was located inside a compartment underneath the floor of the building used for grinding (Fig. 2b). Its movement operated various pulleys, which transferred the action to a pair of cylinders (rolling mills), through which passed the grain to be ground. In case of malfunction, the wheel was replaced by another one, kept in the same compartment. Once the process was completed, the water flowed into another *prisa*, to be returned to the river.

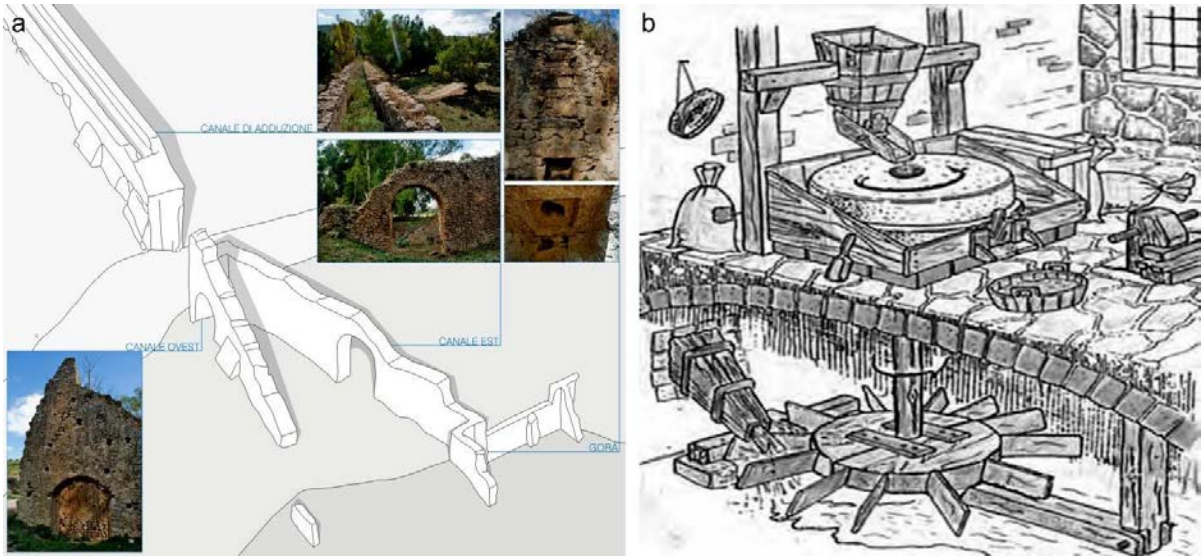

Fig. 2. (a) Axonometric view of the *status quo* of the Olivo mill in Piazza Armerina (Enna); (b) scheme of a mill with horizontal wheel.

2.3. Analysis of historical sources for the inventory and the study of ancient mills in Piazza Armerina

The economic cycle gravitating around these activities - closely linked not only to alimentary and textile production but even to the productive sectors, i.e. the extraction and processing of the stones for the fabrication of the grinders - has been a constant resource in Sicily. However, only recently, researchers and institutions have paid particular attention to these productive realities. In the specific case of the province of Enna, a first cataloguing of this heritage was conducted by the local Superintendence for Cultural and Environmental Heritage, on the occasion of the documentary exhibition entitled *I mulini ad acqua dell'ennese. L'acqua miti, riti e feste* held in Enna from 3 to 11 May 2003. 13 survivor mills were identified in the hills of Piazza Armerina but a precious iconographic source - a map of the territory of 1782 (Fig. 3) - has allowed to reconstruct a more complete picture of the local waterways in the area.

This watercolour canvas shows, at the territorial scale, the settlement system around the Gela river in both its urban (the city of Piazza Armerina and Mazzarino, *vassallaggio di Buttera*) and isolated components related to the agricultural world such as farms (towers and houses), rural religious buildings and mills. The water cycle is the principal theme, since all the sources and the union of river Giozzo with Piazza Armerina's duct are specified; this latter indication is very useful to reconstruct the genesis of this map. A detailed legend allows locating 74 sites,

including more than 20 mills, 20 sources, numerous towers, namely the farms, some of which, of medieval origins and fortified [9].

A comparison between the data provided by this document and the *Piano di Molini ed altre macchine idrauliche esistenti nel distretto di Piazza* (1821-23), the *Stato di tutte le macchine idrauliche esistenti nei Comuni della provincia di Caltanissetta* (1840) and the *Piano generale delle macchine idrauliche in Sicilia* (1851), all conserved at the State Archives in Palermo, shows a certain lack of homogeneity due to a different degree of census accuracy. Leaving aside these differences, it is important to bring out another fact: the clear asymmetry in the distribution of mills and fulling mills along the Gela river. Actually, there are 16 mills in the first section of the river, inside the territories of Piazza; 4 are in the area of Mazzarino and only 3in the plain of Gela.

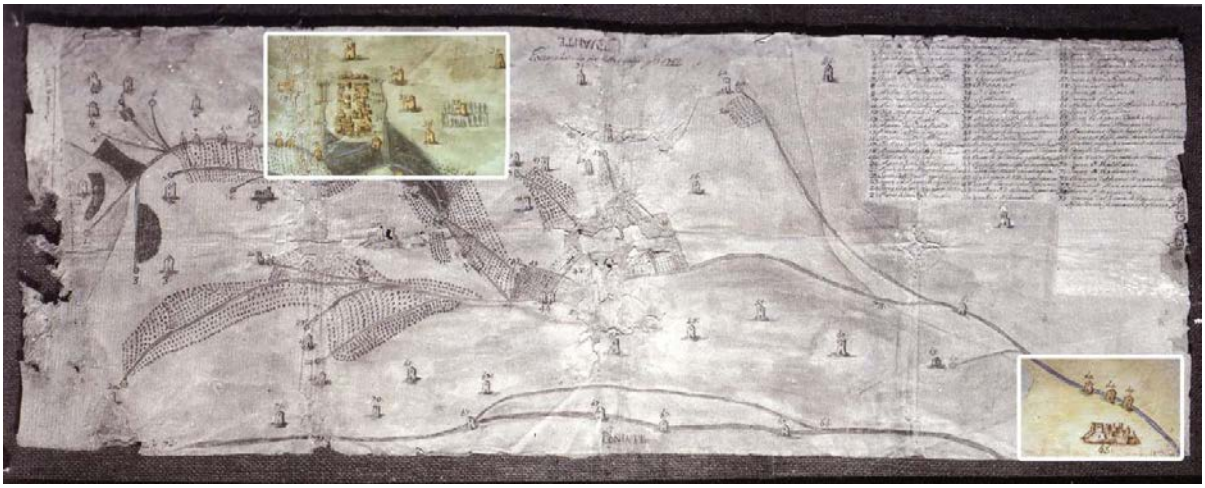

Fig. 3. Graphic elaboration of images from *The upper valley of the river Gela by Bellia Mazzarino* (1872, private collection R. Mammano).

This skewed distribution may be due to orographic reasons: the hilly nature of the upper valley of the river Gela ensured a constant flow of water capable of powering numerous canals without having to resort to the construction of complex works of interception. These structures were, however, necessary in the territories of the Gela's plain. A well-known example is the *presa* of Grotticelle built around the 16th century where the high costs of the hydraulic works, made uneconomic its realization. Another interpretation comes from economic and political causes. The business gravitating around the wheat milling and fulling had such an economic value to become, since the 14th century, the subject of a noble title with the establishment of the barony *delli Salti delli Molini di Piazza*, which reached its maximum prestige when the Trigona family inherited this position in 1704. As described in the list of this barony's goods, the Trigona's mills were the *Pergola*, the *Padre Santo*, the *Donnaguerrera* and *Timpanello*, the latter also equipped by fulling mill. However, the real instrument of the power of this particular barony - together with grain production and tissue processing - was water control and the related fees, because the interception canal buildings were essential in the basin of Gela river due to the variable speed of the water [10].

The economic influence related to the wheat cultivation and milling is still incisive in Piazza Armerina's society in the first two decades of the 20th century. Although harbouring the big Grottacalda mining complex and having a lot of population employed in the sulphur processing, as well as hundreds of workers coming from different municipalities, Piazza Armerina was not a town with a prevailing mining economy. This is confirmed by the fact that in the second decade of the 20th century, during the town's demographic boom, the population living in scattered houses and in the rural areas reached 10,579; the double compared with the previous decade and nearly a third of the overall [11]. Rediscover and protect the river landscape of Central Sicily

The inventory of the watermills that identify the landscape of the river Gela valley has highlighted a state of general neglect of these important testimonies. Only persist massive aqueducts made in blocks of local stone and, in a few cases, the ruins of the premises used for grinding.

Referring to the philosophical definition given by Gilles Deleuze and Félix Guattari, these pleasant places have been concerned with a process of territorialisation, understood as the action of "taking possession" of a geographical space from a community; i.e. the birth of a "relationship with the earth" which was followed by an uncontested deterritorialization defined as the loss or theft of social relations [12]. This approach requires the activating of a cyclical process called TDR culminating with reterritorialization, normally seen as the creation of a new territorialisation elsewhere, but that can intervene - in a more sustainable way - through a new "taking possession" of places already previously the subject of TD phenomena [13]. The desirable new deal that aims at transforming this heritage into a resource cannot be separated from the acknowledgment, the values recognition, the protection and conservation of those features that make up a real cultural landscape with a strong character.

In Italy, the landscape preservation has for a long time been regarded as a primary need as to be contemplated by the Constitution. Moreover, in the article 2 of the *Code of Cultural Heritage* (2004) this term received a complete expression as "homogeneous part of the territory whose features are derived from nature, human history or from mutual interrelations", obviously in compliance with what stated in the *European Landscape Convention* (2000). This tool is, without doubt, an important step in a process directed at the full knowledge of the landscape's identity, but it was thanks to UNESCO that, many years before, the category of "cultural landscape" was introduced and considered as a specific element to protect [14].

Twenty years after its approval, the *1972 Convention concerning the Protection of the World Cultural and Natural Heritage* following a revision of its *Operational Guidelines* has become the first international legal instrument designed to identify and protect cultural landscapes. In 1992, the Committee has, in fact, adopted the guidelines for their inclusion in the World Heritage List also recognizing that cultural landscapes represent the "combined works of nature and of man" designated in Article 1 of the Convention. They are illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal [15].

The term cultural landscape embraces today a large number of demonstrations of the interaction between human and his natural surroundings. The Operational Guidelines for the implementation of the World Heritage Convention (2013) - approved at the first session of the World Heritage Committee (Paris, June 1977) and amended, most recently, during the 37th session of the World Heritage Committee (Paris, July 2013) by the decision 37COM12 - are an important instrument for the typological definition of the cultural landscape. In this classification, the subcategory "relic (or fossil) landscape" well defines the set of man-made and natural events related to the production cycle of the old mills of Central Sicily. In it are included those landscapes whose evolutionary process came to an end at some time in the past, either abruptly or over a period, and whose significant distinguishing features are, however, still visible in material form.

2.4. Re-territorialisation: the park of the Villa Romana del Casale as a stakeholder

The river Gela is an element of great importance in the process of territorialisation of Piazza Armerina. It skirts the western edge of today's urban centre and crosses, after about three kilometres, the ruins of the Villa Romana del Casale, which the latest research also identified as the foundation site of the ancient *Platia*. The town flourished till the 12th century and then, under Guglielmo II, was transferred to the current location and repopulated with the arrival of people from Northern Italy [16].

The wealth of historical meanings and identity valued embodied in the upper valley of the river Gela and the number of isolated goods intercepted along the stretch between the core of the modern city and the famous UNESCO site - including the ancient watermills - originated the proposals for the valorisation and active safeguarding of this forgotten landscape.

The sustainable recovery and re-use of pre-industrial artefacts here conceived is based on reasoning and design assumptions for large area, already advanced in the planning tools. Especially in the last decade, these instruments have increased focus and attention in the Villa del Casale, seen as an element of strong tourist attraction that should not remain isolated in the territory but, on the reverse, could interact as promoting agent of the surrounding area, too often eclipsed by policies insensitive to synergistic actions of protection and enhancement [17]. In this regard, the first hypothesis for the establishment of an "Archaeological Park of Villa Romana del Casale and the archaeological sites in Piazza Armerina and surrounding municipalities" - drawn up with the 2003-2008 functional recovery and restoration

project of the monumental complex and the drafting of the UNESCO Sites Management Plan assigned to the arch. Guido Meli - are particularly interesting.

Looking at the historic city centres of the neighbouring towns as well as at the several isolated goods - including the 16 mills - and the archaeological sites situated in the southerly portion of the province of Enna, it offered a very wide delimitation of the archaeological park, also extending to the urban areas and beyond the administrative boundaries. It aimed at establishing an effective protection and promotion policy, in which a key role was reserved to the axis of the river Gela, perceived as a key element in both the modelling of the landscape and in the comprehension of the history of the territory [18].

The ambitious project was unfortunately much reduced, losing its intercommunal dimension and that synergistic vision which was one of the most fascinating aspects of the institution of the archaeological park.

3. New project proposals for the recovery of the river landscape

Based on these assumptions, the authors of this work have addressed some proposals for the recovery and reuse of three mills - San Andrea, Berretta and Falcone - situated on the banks of the river Gela, along a country path that connects Piazza Armerina to the Villa del Casale. Although, as emerged from the census and from the research carried out, the presence of ancient watermills develops diffusely, with facilities also present along other river branches including the Braemi and Olivo streams (Fig. 4), most of them are today difficult to reach or are private properties.

The mills placed in very remote locations require considerable efforts to ensure the enjoyment to a wide and diverse audience. This makes it tricky the project proposal related to a path that can intercept them.

On these grounds, in order to initiate recovery strategies through the establishment of guidelines and best practices of intervention, the stretch of the river Gela in which are located the already mentioned three artefacts was selected (Fig. 5). The chosen route, in addition to develop in the immediate vicinity of the town is easily accessible, as it joins traits of existing old infrastructure: such as mule tracks and *trazzere*. While these ones entered over time into disuse, they have never been entirely abandoned. They also are specially suitable for trekking, cycling or horseback riding.

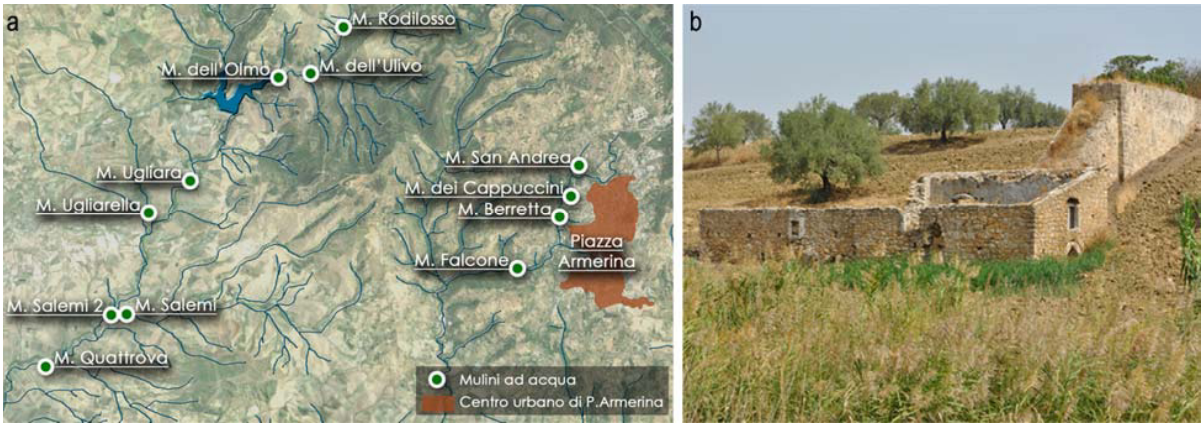

Fig. 4. (a) Localization of the mills in the territory of Piazza; (b) Ugliara mill, situated in a particularly isolated area of the territory.

The chosen fluvial trail is also particularly interesting as it represents a natural connection between two important cultural polarities - the historic centre of Piazza Armerina and the Villa del Casale - but also in view of a rediscovery of the urbanization process of the city which origins, as already mentioned, have to be found in the Medieval settlement discovered near the imperial age's site. The first mill is located close to the Grand Priory of St. Andrew. The only portion of the original structure still visible is the feeding channel, while other premises were restructured and used as a dwelling.

The masonry of the canal is in square blocks of local stone and then plastered. Two semicircular arches support the terminal part of the artefact. Also visible are the iron chains that were applied to stabilize the masonry. Certainly one of the oldest facilities was directly responsible for the Military Order of the Holy Sepulchre, who settled in 1148 in Piazza Armerina [19].

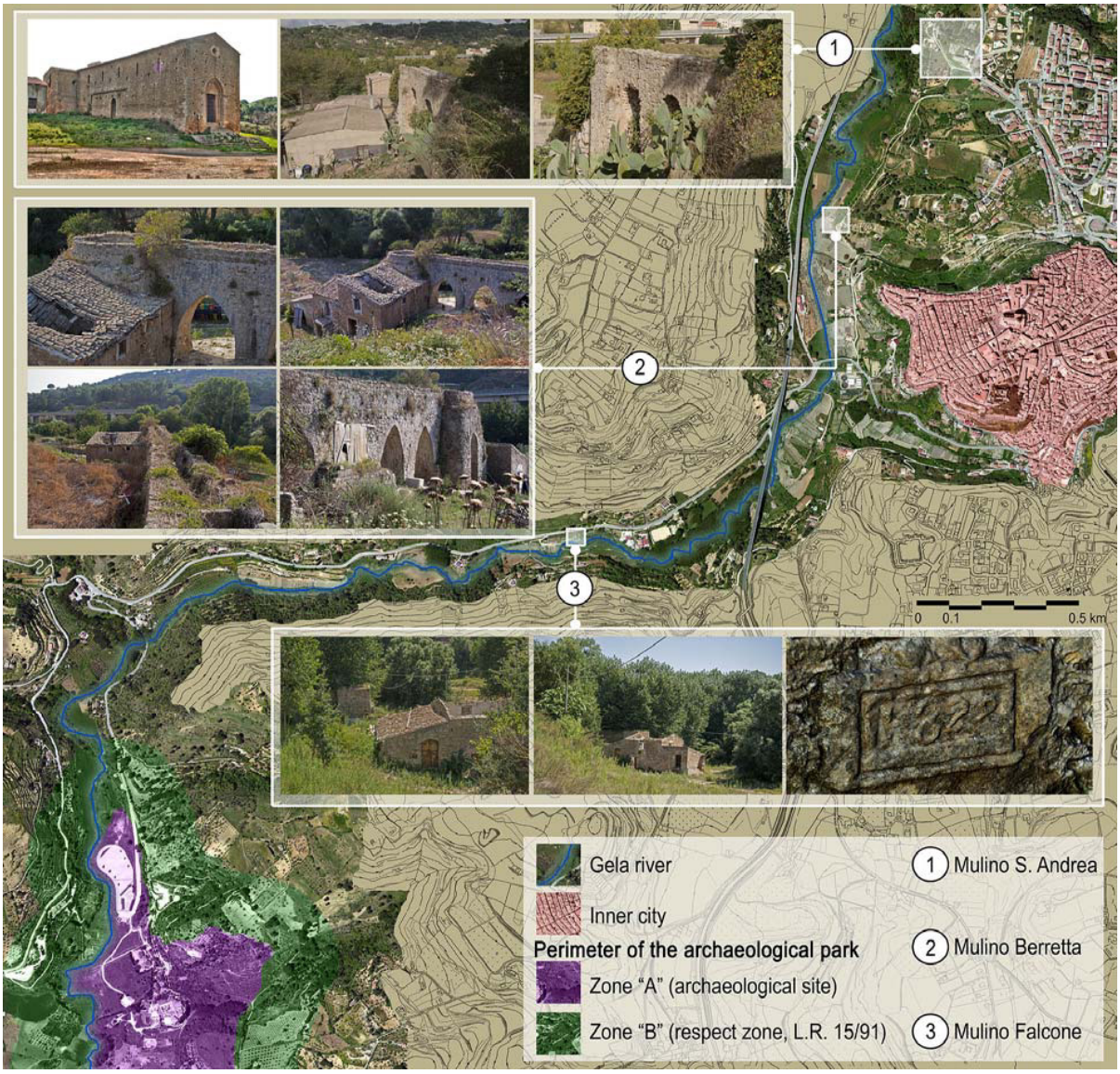

Fig. 5. The Gela river and the territory of Piazza Armerina. Localization of interventions and study areas.

Here is planned the starting point from which to launch the itinerary, at the crossway between the town and the nature trail, where visitors can learn about the ancient history of the Priory and obtain general information about the next steps.

Moving for about 800 meters parallel to the river, the mill named Berretta is placed. The structure of this artefact is clear thanks to not bad preservation conditions. The service premises are made of square stones; the wooden floors and the typical Sicilian roof are still observable. Some tampering or unnecessary/improper renovations are visible in

one part of the roof covered with Marseille tiles, but this does not lessen the charm of this old factory that has a high formal character conferred by the succession of the four pointed arches that support the canal system. Its state of conservation suggested a re-use as an educational museum to illustrate the ancient activity of these hydraulic machines used both for milling wheat and as fuller.

The third stopover of the route is at the Falcone's mill. Even in this case the feeding channel made of shapeless stones constitutes the most preserved part (Fig. 6). Very near to the riverbank, this building is a significant step, from which penetrate in the last stretch of about three kilometres, marked by the more natural aspects of the river landscape that, intercepting staging points sights, leading to the ruins of the Villa of the Casale. In this section, it is planned to restore hazel groves.

This crop, selected with the name of *cultivar Armerina*, has ancient origins in this part of the island. According to some agronomists; it was introduced for the first time in Sicily between the 3rd and 4th centuries AD, right along the edges of the Piazza Armerina's rivers [20].

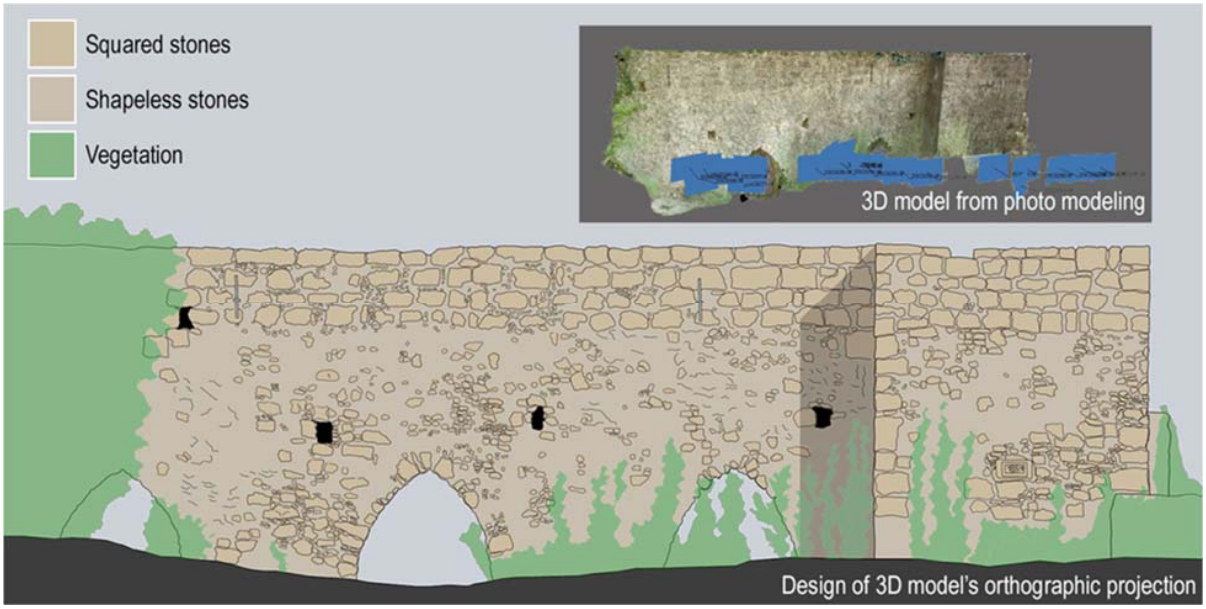

Fig. 6. Falcone's mill: survey by the means of 3D photo modelling.

In modern times, the cultivation of hazelnut is almost totally disappeared in the territory, leading to oblivion traditional food products, but also techniques of pruning and watering plants. At the stage of the Falcone mill, an information point, aimed at enhancing and evoking the tradition of the so-named *jardinu* - the local term for hazel grove - will be created.

4. Innovative proposals for cataloguing, disclosure and promotion of cultural heritage

Today, the digitization and online accessibility of contents has become very important in the process of conservation, enhancement and integrated management of cultural heritage, shaking up traditional models, transforming value chains and calling for new approaches. Following the European Commission: "Conservation is increasingly geared towards preserving and enhancing a whole cultural landscape rather than an isolated site, and also becoming more people-centred. If old approaches sought to protect heritage by isolating it from daily life, the new ones focus on making it fully part of the local community. Sites are given a second life and meaning that speak to contemporary needs and concerns" [21]. In this context, the development of a web sharing platform obtained by studies and data (conventional and digital) implementation, especially if related to inaccessible (or almost) objects

and places, is becoming indispensable. The potential of this tool is manifold. It provides a significant increase in the dissemination of knowledge for educational purposes (i.e. through virtual reconstructions of production processes presentable by 3D models or animated videos), storage (also sharing archival documents hardly available), support for project activities and scientific researches (sharing of surveys, historical researches and the results of investigations). It can also sensitizes and addresses the intellectual curiosity of the community towards the protection of these valuable identity resources and so triggering virtuous cycles of funds collection to invest on recovery projects and maintenance plans. In this sense, collaborative tools as crowdfunding - a form of alternative finance, which involve community to provide financial support for heritage preservation's actions - may give a highly effective support.

4.1. Examples of preservation, protection and promotion of cultural heritage of pre-industrial era

The study, restoration and promotion of heritage inherited from the pre-industrialization period have been placed at the core of European Community's programs, such as the *Raffaello* that, during its three years of life between 1997 and 1999, has provided support for more than 200 development projects [22]. Italy is among the most beneficiary countries with several proposals approbation, including the project *Pòtamos. I mulini ad acqua: tecnologia e tradizioni culturali*. The geographical area examined in this EU's action, interested countries of Southern Europe - especially Sicily, the region of Murcia in Spain and the island of Crete - to carry out an interdisciplinary intervention program on watermills, taken as pre-industrial production facilities, in order to increase their scientific knowledge, protection and preservation, conservation and utilization. The project has funded the restoration and promotion of ancient watermills in the province of Palermo: the *Fiaccati* in Roccapalumba, the *Petrolito* in Castellana Sicula and those insistent in the ancient valley of the mills named *Flomaria molendinorum* in Polizzi Generose; here were also established permanent exhibitions and historical-anthropological tours, with accentuated teaching vocation, aimed at spreading of ancient grinding techniques.

Is worth noting that proto-industrial facilities, such as those examined in this paper, are the subject of academic researches and several programs for the protection and promotion, even very recent, conducted by regional or sub-regional actions or on private initiative usually involved by public institutions in the role of promoting committees.

A case in point is the project *Waterpower – Programma di Recupero per la Valle dei Mulini e delle Ferriere* [23], a project aimed at establishing an integrated process of protection and re-functionalization of mills, paper mills, ironworks and hydroelectric power plants, which are located along the torrents near the Amalfi coast. The mentioned Amalfi experience began in 2007 and still is in the execution phase. While with its 35 projects in 9 municipalities, it is to be counted among the most extensive retraining of this important heritage, it does not seem at the time, believing in the contextual development of promotion programs based on contents that could take advantage of the virtual multimedia with interactive, educational and reminiscent purposes.

This is the approach that some G.A.L. (Local Action Groups) in the Veneto region demonstrate, albeit not in a very specific manner, would like to undertake with the *Muhlen - Mulini* project, financed by funds allocated by the European Community through the Rural Development Program 2007-2013. In this case, the valorisation processes based on improving the "physics" accessibility of hydraulic machines and their re-functionalization with cultural and educational purposes; prompted the creation of multimedia materials to support the disclosure of the material collected.

4.2. Cultural polarity network. Between digitization and data sharing

The studies conducted on the mill's system in Piazza Armerina highlighted the difficulties related to the usability of the goods most isolated. For them, at the time, it has not been foreseen a recovery project but only some safety actions. Nevertheless, the important meanings emerged from this research require the preservation of the identity of these old production facilities, designed as a real asset, bearer and generator of cultural value. It was therefore essential to design some valorisation hypothesis in order to prevent the oblivion of the set of knowledge, traditions, memories and peculiar characters closely linked to the concerned cultural landscape.

Nowadays, the most recent dynamics of cultural heritage management impose a rethinking of the actions to undertake for the protection and enhancement. This involves putting in place a genuine dialogue between the institutions, public and the *genius loci*. The goal is to get in touch with the intrinsic character of the good; for this

purpose, visual codes and graphic vocabularies have to be reworked and developed useful to orient, to animate and to decode the place in question.

The document gathering and the digital content production, performed in the course of the archival and bibliographic research, field surveys and cataloguing, led to the creation of a diversified database that can serve as the tool for a holistic approach to the knowledge and disclosure. As part of the promotion of these particular identity resources emerges, the undoubted effectiveness of the network sharing of the data collected.

Through the examination of experiences carried out in the development of virtual platforms to support cataloguing and dissemination of cultural heritage, it was noted the important contribution introduced by ICR (Institute for Conservation and Restoration) through the provision of WebGIS on the Risk Map. The ambitious project pursued by this institution, reporting directly to the Italian Ministry of Cultural Heritage and Activities and Tourism, comes from the concept of "preventive restoration" introduced by Cesare Brandi in the '50s. It constitutes the operational tool for the process of preventive maintenance and planned conservation initiated by Giovanni Urbani approximately twenty years later. Although unable to gain full knowledge of the purely operational potentialities that the advent of new communication technologies could provide to his theories, Brandi was the first to argue that "the preventive restoration is even more imperative if not more necessary than that of extreme urgency because it is precisely aimed at preventing this, which unlikely could be achieved with a full save of the work of art. Therefore, if we agree with this vision of the restoration, it is clear how the full commitment of the person or entity to which it is entrusted the work of art should primarily focus on preventive restoration" [24].

Through the web portal of the Risk Map, the Ministry of Culture has provided an effective system of conservative cataloguing of cultural heritage that allows assessing the risk to which the cultural objects are exposed in relation to their state of preservation and to the characteristics of the area they belong to [25]. After more than twenty years after its conception, this instrument is still operating. On it, (geo-referenced) information of a wide catalogue of Italian architectural and archaeological heritage can be found. However, this service is today little benefited by the web users, maybe due to a missing revitalization of the system in light of new technologies and new types of digital data [26].

From this perspective, the project aimed at creating a multimedia platform dedicated to the mill system of Piazza Armerina should be considered. It would be conceived as a sort of large virtual container - for the knowledge, the technical control and the enhancement - aimed at enabling a multi-level access to information: from the guided tours for the simple visitor to the thematic in-depth analysis for experts and researchers. It would finally secure the interaction with the users, now more and more involved in the process of web sharing through the possibility of incorporating new contents in dedicated areas.

To this end, it has therefore been necessary to design the "architecture" of the information for such a platform by building the organizational and semantic structure [27]. The inclusion of very complex and diversified data has imposed the establishment of a computer database in SQL language (Structured Query Language). It will allow the coexistence of different types of digital data - including 3D virtual models in formats currently not listed in Italian ICCD (Central Institute for Cataloguing and Documentation) standards for architectural heritage - connected via specific URL (Uniform Resource Locator) pathways. Moreover, it is easy to implement and compatible with existing platforms.

This last feature is essential to prevent a data redundancy. This is a very important aspect especially in view of a continued growth of the system and of its integration with existing platforms such as the above-mentioned Risk Map's portal, the General Information System for Cataloguing (SIGEC) - the national system for the acquisition and integrated management of knowledge of Italian cultural heritage managed by ICCD - or even the many GIS platforms developed in support of spatial planning instruments.

5. Conclusions

Through policies aimed at a sustainable conservation and careful to the signs of contemporaneity, it is possible to safeguard memory and tradition in their meaning of resources able to transmit to future generation those interrelationships between man and nature which are able to identify a cultural landscape. The triggering of a new cycle that will lead to an effective transformation of forgotten heritage into a real resource for the whole community,

must follow a process of "signification" based on the identification and promotion of all tangible and immaterial elements in it embodied [28].

The rehabilitation and adaptive reuse of heritage with such symbolic values - buildings that have loosen their function and unfortunately are in the way of oblivion - should take into account the intangible message that lies under the material structure; it should consider its sensitivity and compose with creativity to enhance the hidden cultural references. An appropriate use of new technologies would also be precious in a process aiming at keeping alive the spirit of the places.

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