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pca
european journal of
postclassicalarchaeologies

volume 5/2015

CONTENTS PAGES

DOSSIER - OPEN ACCESS AND OPEN DATA IN ARCHAEOLOGY

RETROSPECT

PROJECT

REVIEWS

PCA 5 (2015) ISSN: 2039-7895 (pp. 347-356)
Post - Classical Archaeologies

project

MEMOLA project. Mediterranean Mountainous Landscapes: an historical approach to cultural heritage based on traditional agrosystems

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The project "Mediterranean Mountainous Landscapes: an historical approach to cultural heritage based on traditional agrosystems", known as MEMOLA project, is coordinated by the University of Granada, and financed by the European Commission FP-7 funding[1]. There are ten partners from five different countries involved, including public universities (Granada, Palermo, Padova, Sheffield and Córdoba), a public research centre (CSIC), SME (Arqueoandalusí Arqueología y Patrimonio S.L. and Eachtra Archaeological Projects) and non-profit associations (Centro UNESCO Andalucía and Centre of Research and Promotion of Historical and Archaeological Albanian Landscapes-CERPHAAL).

Four mountainous areas of the Mediterranean are being studied: Colli Euganei (Padova, Italy), Monti di Trapani (Sicily, Italy), Vjosa valley (Albania) and Sierra Nevada (Granada, Spain). The main objective is to analyse cultural landscapes on these areas with a focus on the relationship changes between human communities and natural resources from Antiquity until today. The MEMOLA project proposes an interdisciplinary approach to cultural landscapes of Mediter-

[1] The MEMOLA Project - nº 613265 is financed by the European Union's 7th Framework Programme (2014-2017).

ranean mountainous areas, taking as a central axis the historical study of two natural resources, essential to generate agro-systems: water and soils.

The definition of cultural landscape used in the project assumes that the logics ruling landscapes and their structure are strongly conditioned by the need of ensuring the livelihood of rural communities over time. The construction of landscapes is based on strategies of production and reproduction of societies, each one with its own different characteristics, throughout history. Therefore, to understand the landscape it is necessary to investigate the historical processes that have led to a specific relationship with the environment, aimed at the extraction and use of resources in certain social contexts. These uses have deeply modelled the environmental context, generating not only its forms, but also the cultures that made possible its management and maintenance until today.

Agricultural traditions represent, in themselves, culture. The knowledge of the different ways in which natural resources are exploited and managed over time is crucial for landscape conservation and its adaptation to current global changes: globalization, agrarian industrialization, climate change, loss of peasant knowledge and rural population. In this sense, mountainous areas act as repositories for both tangible and intangible cultural heritage, where socio-economic tissues are constantly submitted to erosion. The collection, registration and diffusion of this complex heritage assemblage represent an important enrichment in terms of local social cohesion, cultural identification and social awareness.

Because of the importance of incorporating an interdisciplinary approach in the study of cultural landscape, the MEMOLA project is integrated by an international team of researchers and experts, including archaeologists, historians, anthropologists, agronomists, hydrologists, botanists or geologists, who provide an innovative approach to the study of landscapes by enhancing the environmental perspective and providing useful insights into the way in which human communities interact with their environmental surroundings. The importance of the archaeological works within the project is essential, providing data on landscape evolution. In this way, specialists in the study of current landscapes and agrosystems obtained data from the past, which allows them to incorporate historical view into their studies.

One of the main objectives in the project is to investigate the logic that rules the process of historical landscapes formation in relation to natural resources within a diachronic framework. We will conduct

a specific historical and archaeological studying the four study areas. The project will quantitatively assess the long-term historical uses of water and soils in each territory and will analyze the agrosystems and the productivity and resource efficiency.

Another objective is to draw context-tailored strategies of preservation, diffusion and valorisation of the cultural heritage (both tangible and intangible) and of the environment. We intend to stimulate sustainable development in rural areas and analyse the efficiency of these systems as well as the current problems of survival within the context of global change (including climate change) and the European policies framework. This objective includes the analysis of ecosystem services to examine their role in maintaining biodiversity (wild and cultivated), and trace an historical trajectory of agro-ecosystems leading to the creation of a "High Nature Value farmland". In addition, proposals will be developed for improving resources-use efficiency and conservation of cultural landscapes. The recognition and promotion of the local identity of rural communities within the study areas is an important piece in the research, as active members possessing the knowledge that must be preserved as a vehicle to ensure the survival of their own landscapes.

Finally, the MEMOLA project proposes to develop new methodologies for the study of cultural landscapes, through the creation of scalable working protocols, able to take advantage of the solid background of technologies and analysis methods available to the research group. For this, the project includes the organization of periodic workshops, courses and seminars among project members in order to share the different working techniques and specific methodologies of every area included in the study, thus contributing to the training of the research staff of each of the participant partners. Applying a multidisciplinary perspective widens the range of specialists involved in cultural heritage study to agronomist, hydrologists, botanists, hydrogeologists, geologists, architects, historians and archaeologists. Promoting skills-hybridization in research work (both humanist and scientific aspects), prompting new forms of job creation.

The proposed study areas are located in the Mediterranean mountainous landscape. However, their particular characteristics defined through historical processes and geographical conditions, entails a comparative approach based on their particularities.

Sierra Nevada comprises a protected area crossing through Granada and Almería provinces (Spain). The Sierra Nevada Moun-

tains are mainly linked to the administrative area, established as a protected space belonging to Southern Penibetic Systems of the Iberian Peninsula. The protected area of Sierra Nevada includes both the National and Natural Parks, and it was declared Biosphere Reserve by UNESCO in 1986. Studies carried out mainly concern the environmental richness of these mountains: given its unique location it is one of the protected areas with highest biodiversity across Europe, and also a living laboratory where important researches are realised as part of the Network of Global Change Observatory of Andalusia. Despite the fact of being a protected natural reserve, it has been a very anthropized area where several communities have left track of their activities, and exploited its resources for centuries.The landscape was strongly altered during the Late Roman period, the Islamic presence and afterwards, during the Castilian conquest, introducing important transformations based on their relationship with natural resources.

The mountainous territory of the Euganean Hills is the result of the relationship between a geological substrate, and a very special geomorphological evolution and a history of human settlement that has prehistoric origins. The versants, with their various slopes and exposures, create very different micro-environments; they are covered with vegetation and the forest is very varied and rich in types of grasslands. They are characterised by glacial and endemic species; meadows and forests are the product of anthropogenic land use and of its historical changes, like the cultivated fields and vineyards, widely present in the areas not too steep or flat around those hills. The Late Roman period shaped an important landscape change, including the Byzantine epoch and the process of feudalisation until the Venice conquest. The settlements form a very dense network – if we exclude the steeper slopes – marked by the presence of medieval villages, castles and fortresses, villas, ancient monasteries and churches, or even simple rural settlements. All elements characterised and give great value to the Euganean landscape, including a totality of resources (agriculture, forestry, breeding, mining) handled along routes (road network on mainland and water circuits), irrigation systems (for drainage and irrigation) or parcel distribution.

The Trapani Mountains are located in the Northwestern region of Sicily (Italy). They are characterised by a seaside orientation of the mountain range that has favoured the flourishing of cultural and natural singularities. The historical process after the Roman downfall continued through with the Byzantine period, then the Islamic and

Norman conquests until the entry of the Aragonese, later Spanish, period. Part of this wide territory has been protected since 1981 after the creation of the Natural Reserve of the Zingaro, one of the most attractive shores in Italy. After centuries of deforestation, the climax forest formations were reduced to the protected areas of Scorace, San Giuliano and Inici mountains. The historically scarce productivity of the soil and an agrarian tradition started in the late Middle Ages with the end of the Islamic period, have oriented the rural activities towards breeding and arboriculture. Recently, the abandonment of the countryside has promoted uncontrolled building speculation, with a tremendous impact on the coastal area. Instead, in the inland, the intensive grape cultivation is substituting traditional crops.

In the area of the Trapani Mountains, we can distinguish two well differentiated morphological systems. The first one, located in the northern side, is characterised by carbonate massifs, surpassing 1000 meters of altitude. The second system is located in the southern area towards the inland, and it is characterised by a landscape of soft reliefs conformed by clayish hills and wide valleys and isolated peaks. Obviously the lithology has influenced the hydrogeological aspects, which are strictly connected to the historical settlement patterns. The most important local springs, which seem to have been exploited for agricultural irrigation in the Islamic period, are nowadays menaced by over-exploitation and pollution.

The River Vjosa Valley, which in antiquity formed part of the northeastern territories of the historical region of Epirus, is now located between the modern states of Greece and Albania. It was part of the Byzantine Empire until the Ottoman conquest during the 15th century. During modern times, the Communist regime re-shaped the old landscape introducing drastic modernisation processes in the lowlands. The sample study area of the valley stretches between the cities of Përmet and Këlcyra in southeastern Albania, limited in the west by Dhëmbel – Nemërçkëmountain range and in the east by the highlands of the historical region of Dangëllia. A particular feature of the valley is the rugged mountain and hilly terrain, which has conditioned and determined the livelihoods, productive activities, and communications networks in the region. The mountains at altitudes between 650 and 2400 m above sea level are geo-morphologically part of the volcanic greenstones strata at their higher peaks and limestone terrain on lower locations. The most elevated territories are characterised by steep slopes with rich meadows and pastures. Sur-

Fig. 1. Permet High School guided visit to the cultural landscape of the Vjosa Valley (Albania).

rounding areas are distinguished by extensive fir and oak forests, where the National Park of Hotova Fir, located on the highlands of Dangëllia, is of significant importance. A number of perennial or seasonal rivers and streams supply the main River Vjosa from both sides. The flysch beds, at altitudes from 380-650 m above sea level, consist of high and lower hills covered in Mediterranean bushes, plateaux, and rich river terraces, historically utilized as arable lands. A series of rural settlements, dating from late medieval period, are located on the low lying hills of the flysch strata. Traces of ancient settlement occupation, dating from antiquity to the early medieval period are discovered at the lower ends of flysch strata. At river terraces, extended on lower terrains from ca. 230-380 m above sea level, in both sides of the river Vjosa, the past archaeological excavations have revealed a series of tumulus and flat cemetery (fig. 1).

The first MEMOLA year has been extremely successful in its implementation. The research team has carried out several archaeological excavations and surveys, hydraulic surveys, soils analysis, agronomic and botanic studies. At the same time, an important element

Fig. 2. *Acequia* of Barjas restoration (Cáñar, Spain).

of this project involves local networking with political decision makers, local stake holders and, primary and secondary, schools. Working with local communities and developing activities that put their heritage and culture into value has been extremely important for the socioeconomic promotion of these areas.

In Sierra Nevada (Granada, Spain), the first MEMOLA year has been focused on the study of the traditional Andalusian irrigation systems, *acequias*, which consists of a complex and extensive hydraulic network and thousands of hectares of cultivated land. Last February the old *acequia* of Barjas was recuperated. Almost 200 volunteers and the irrigators community from the village of Cáñar, worked together to reactivate its use after more than twenty years of abandonment (fig. 2). The restoration of the canal provides the opportunity to study the impact of irrigation in an area of high ecological value inside the Protected Area of Sierra Nevada. The collaboration of hydro-geologists, hydrologists, environmentalists and agronomists

Fig. 3. Archaeological excavation in Pizzo Monaco (Custonaci, Italy) during the visit of the Sciacca Scientific High School.

in the project allows the study of underground water, soil formation in the irrigated terraces, fertility and, above all, an impact evaluation of the recuperated *acequia* in the area (http://www.memolaproject.eu/node/381).

Also in Sierra Nevada, at the village of Lanteira we have developed an excavation in a site dating from the first Islamic occupation until the 13th century. The place has been interpreted as a hamlet or a quarter, probably identified in old documents with the tribal name Benizahala or Benahaque. A *silo* was also documented at the surface. These pits were the main aim of the activity, as their archaeobotanical remains could be analysed to identify the cultivated plants, understand the environmental context, and shed light on the ways cropping has changed historically until today. Archeobotanist and agronomist working in the project will process the old samples, but also will analyse the soils to establish criteria on the potential of current species for cultivation, varieties within the species and, especially, market demands. The results of their collaborative analysis will be available to the public as guidelines for the support of the farmers in the area. The results of the excavation will provide relevant information for the project in the upcoming months. A total of five storage pits in a domestic area have been found. A burial area has also been

excavated, and the skeletons found will be studied in order to find information on the diet of the time.

Last year archaeological investigations at the Trapani Mountains in Sicily (Italy) included a survey that was also focused on the relationship between settlements and the location of water sources and springs. Topography of the landscape and the toponymy of the area have been carefully studied. An excavation campaign was carried out last November at Pizzo Monaco (Custonaci, Trapani; fig. 3). This site, documented in local sources, is surrounded by a wall of considerable dimensions and contains around fifty cells with similar sizes. The plan, physical characteristics and some written references suggest that the site could be a collective fortified granary (*aghadir*) dated in the Islamic period (10th-11th centuries). The excavation, conducted by MEMOLA members, have documented five structures containing ceramics, archaeobotanical remains and soil samples that are now under analysis by members of the CSIC (National Research Council of Spain), the University of Palermo and the University of Sheffield.

The archaeological excavation at the Montagnon Castle is as a case study of a medieval fortified settlement turned into a rural residential site in the Colli Euganei (Padova, Italy). The area has been identified, thanks to the integration of written sources which attest the presence of a castle from the first half of the 11th century, using

Fig. 4. Archaeological excavation at the Montagnon Castle (Montegrotto, Italy).

remote sensing, where the LiDAR images were in fact valuable to identify the main structures of the castle, as the outer wall and the moat remains were covered by dense vegetation. The choice of the location of the excavations was carried out after the GPR survey. Under the scientific direction of Professor Gian Pietro Brogiolo (University of Padua), the excavation yielded a fair amount of ceramic materials, especially late medieval. Flotation samples from the indicative layers have been taken with the collaboration of Prof. Leonor Peña Chocarro (CSIC) with the purpose of obtaining material for archaeobotanical analysis.

At Colli Euganei Julia Sarabia (University of Padua) has also surveyed the water mills still preserved. She has documented 25 structures analysing the location, building techniques, mechanisms and property. All of them have been georeferenced and added into a GIS.

The MEMOLA project has also a very important socio-economic side that makes the difference in regards to other projects. This socio-economic perspective is focused mainly on reinforcing the relationship between scientists and rural communities where field work is taking place; involving local stakeholders and policy makers, in order to enhance the possible outcomes of the project. The activities are varied, including landscape restoration, traditional knowledge transmission, recuperation and reactivation of agrarian practices, ecosystem services evaluation, thematic seminars and guided visits, cultural tourism and routes proposal, Water Framework Directive and EU Water Blueprint strategy impact on the traditional uses, educative resources and teacher formation in cultural landscapes, etc. The social implication of the MEMOLA is an essential part of the project. For the whole team, the scientific impact in local people real life is the best way to disseminate the project results and the most effective tool to preserve the historical landscapes.

More information:
http://memolaproject.eu
https://www.facebook.com/MEMOLA.PROJECT