Paola De Joanna, Dora Francese,
Antonio Passaro (edited by)

Sustainable Mediterranean Construction

Sustainable environment in the Mediterranean region: from housing to urban and land scale construction

Ricerche di tecnologia dell'architettura
FRANCOANGELI

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Preface

D. Francese[1]

This essay contains the Proceedings of the I SMC, International Cittam Conference on "Sustainable environment in the Mediterranean region: from housing to city and land scale Construction", held in Naples, at "Centro Congressi Federico II", from February 12th to 14th, 2012. It gathers the contributions, in the shape of single papers, written by the participants to the conference itself, and defined suitable to be published after a long process of Control, provided by a Double Peer Review procedure with a Blind verification, by means of a provided Assessment sheet, processed on purpose and filled by two different and anonymous Referees, chosen among the experts in the relative topic. The Local Scientific and the Organization Committees of the conference, following the meetings for the abstract selection, had transmitted the aforesaid Assessments for each paper to the Author/s with the positive or negative acceptance and possible integrations or corrections to be made. Once this process had been completed, the papers had been accepted and thus here published after the oral or poster presentation to the Conference days themselves, and/or by means of the regular registration.

[1] Chiarman of the Conference.

Sustainable construction in the Mediterranean region

D. Francese

Fully immersed in the worldly crisis, the European countries look for a possible escape by exploring their roots, their past and traditions within the history, the geography and the art.

This answer cannot be found rapidly, being the path long and twisting, and the obstacles, created by both the human diffidence and the political-commercial interests, hard to overpass and eliminated.

Mainly the particular task carried out by the engineers, the architects, the planners and all the other professionals involved in the transformation of land and city would be supportive, as long as a number of principles will be respected and any of the applied actions be addressed to the protection of environment and territory.

These notes are meant to introduce the research lines of a number of expertise who wish to achieve the aim of improving the environmental sustainability within a particular region: the Mediterranean area; the latter has been chosen as field of studies, for two main reasons, one of which is the obvious fact that the team promoting this subject is settled in the middle Mediterranean, in south Italy, and the other is the fact that this district can be considered as a launching spot for creating new network systems.

In fact the emerging trend, in this historical moment, of the Mediterranean area from the strategic viewpoint as union rather than competition bridge between Europe, Africa and Middle East, creates the need of thinking about the existing constructions, present all over the great number of countries which face this sea. The reflection about these present trends leads to wake up ancient communions of intents and cultural roots among the various populations and to focus on the need of a cultural consciousness within the citizens' souls about the importance of safeguarding the built as well as the natural heritage, by means of sustainable development strategies.

Moreover within the architectural lines, the engineering techniques, the planning and settlement organisation, established in the roots of Mediterranean traditional culture, a number of principles similar and in line with the sustainable development and ecological aims have been found, and can be deeply investigated so as to define a common strategy for founding different models of living in the city as well as in the country. Examples of these similarities have been discovered in the bioclimatic response of buildings to the weather and environmental conditions, in the modalities of materials employment, and also in a great number of social, technical and cultural human activities.

According to this belief the following pages and papers - here published - had recorded the contributions come from a number of intellectuals and experts from the research centres, the universities and the professional fields of the Mediterranean region, who had gathered in Naples so as to create a network of people desiring to make a change and to apply various approaches, strategies, projects and technologies aimed at improving human's way of life on the planet, and in particular in this area.

As it is very well known, the amount of resources on our planet are going to be depleted very soon, mainly those who need to be pure and clean, such as water, food and air; number and number of conferences, worldly summit and meetings in the high areas of government and management have been held during the last two decades around the themes of sustainable development, pointing out the need of moving our society towards a different economy and a different way of reflecting on the possible transformation of land and city. Such terms as "green economy", "smart cities", "emerging technologies" and others have been created so as to clarify the various opinions and movements which can help during the establishment of this new society. The ecological footprint (EF) , the indicator created by Mathis Wackernagel few years ago, has now become the way of measuring the level of man's impact on earth: given, in fact, that the available amount of resources on earth (soil, food and material, energy) , i.e. the *Bio-capacity*, has been calculated as land equivalent amount of 1.8 Hectare per person, thus the countries that have an EF superior to the Bio-capacity are actually debtors, while the countries that create an EF minor than the Bio-capacity are instead creditors. This situation brings the world countries into a very disparate situation regarding the actual fault in providing pollution over the planet, and needs to be considered during the evaluation of richness and importance of any countries within the global assessment of countries' power and rightness to decide for the whole; presently the globally accepted criteria are the opposite ones: the countries, considered the rich-

est, are those which impact more: i.e. consuming more resources and producing more pollution, devastating the globe reserves of pure air, clean water, uncontaminated soil. In order to reverse the situation a number of economic actions had been developed, as for example the "polluting tax" which can push the rich, dirtying and invasive activities of men's economy either to reduce their pollution and use of prime matters (energy, materials, water, soil, air....) or to pay more taxes, and thus to contribute to the funding for depurating, purifying, sanitizing and clearing the contamination.

As far as Mediterranean and European countries are concerned, even here the situation is very unbalanced: in the graphs of figure 1 and figure 2, it can be noticed that most of the countries of this region have overcome this limit, are debtors and are employing more than it is possible.

Fig. 1 - Ecological Footprint (EF) of Italy (after Wackernagel 2000)
Fig. 2 - Ecological Footprint (EF) of some Mediterranean countries (after Wackernagel 2000)

While in fact the Italian Ecological Foot-print has been calculated in 3.8 Hectares, the French in 5.7, the Portuguese in 5, the Spanish in 4.8, the Greek in 5.5, the Romanian in 3, the Jordanian in 2, the Libyan in 3.4, and thus are debtors for the fact that they consume and pollute more than it is possible for each of them (1.8), on the other hand the Egyptians (1.8), and the Moroccans (1.2 He) can be considered as creditors because they consume and pollute less than it is them allowed[1] .

[1] The data about the EC "Ecological foot-print" of the world countries is taken by the "WWF, Living Planet Report 2001", and reported by "AAVV Economia e Ambiente, EMI edition, Bologna 2005". If one looks at the whole reported data, an important element is that of the major providers of EF, such as the USA (6) or Kuwait (8.5), and so on (see M. Wackernagel, *Il nostro pianeta si sta esaurendo*, in AAVV, "Economia e ambiente", EMI ed., Bologna 2005, pag. 100).

From here the need of embracing new roads for development comes now as an urgent action to be carried out by any operator among the experts and the professionals involved in land transformation.

One of the paths can be recognised in the model of the "De-growth", which is defined as ".. a policy design … of constructing, in the North as well as in the South, convivial, autonomous and sober *societies …"*[2] *: it has* been lately outlined and already has a number of followers in various fields of the society members, not only in the economic sector but also in the construction sector, in the social sciences and so on. The idea, come out from all the people involved in processing this model[3], can be summarised in the few words, that Latouche, the very well known French economist, had written in one of his various essays:

> The de-growth is not a negative growth. It should be better to talk about "a-growth" as it is talked about "a-theism". In fact, it deals exactly with the abandon of a faith, a religion, that of finance, progress and development. It has by now recognised that the never-ending searching of the growth is not compatible with a finite planet, while the consequences (producing more and consuming less) are on the other hand very far from being accepted. However, if there will not be a route inversion, an ecological and human catastrophe is expected for us. We are still in time for imagining, peacefully, a system founded on a different logic: that of a "de-growth society".

One of the means for achieving this aim is that of forgetting the *modern employment of the GDP (Gross Domestic Product),* as indicator of richness of a country, since it has been demonstrated that it is only able to represent the consumption rather than the welfare and even less the happiness of populations, and another one is that of considering and following the

[2] *S. Latouche 2009.*

[3] As far as the degrowth model is concerned, a great number of scientists and economists had been dealing with that lately. See for example: Aries, Paul, *Decroissance ou barbarie*, Golias, Villeurbanne 2005 ; Bartolini, Stefano *Come passare dalla società del benavere a quella del ben-essere,* Donzelli, Roma 2010 ; Beitonne, Alain e Navarro, Marion, *Decroissance. Le poids des mots, le choc des idees*, on line (www. Lareveudumauss.com) ; Benoits, Alain, *Demain, la decroissance ! penser l'écologie jusqu'au bout,* Edite, Paris 2007 ; Daly, Herman, *Oltre la crescita- L'economia dello sviluppo sostenibile*, edizioni comunità, Torino 2001 ; Duverger, Timothee, *La Decroissance. En quete d'un capitalisme*, Unìversité de Bordeaux, 2010 ; Friedman, Yona, *L'architetura di sopravvivenza. Una filosofia della povertà*, Bollati Boringhieri, Torino 2009; Georgescu-Roeegen, Nicholas, *La Decroissance. Entropie, écologie, èconomie*, Sang de la Terre ed., Paris 1995; Illich, Ivan, *La convivialità. Una proposta libertaria per una politica dei limiti alo sviluppo,* Mondadori, Milano 1974; Latouche, Serge, *Come si esce dalla società dei consumi. Corsi e percorsi della Decrescita*, Bollati Boringhieri, Torino 2010.

worldly initiatives, such as the Directive 20-20-20, the measures undertaken by the European parliament, in the approved energy packet for the 2020; this packet of proposals previews the need for EU countries of reducing by 20% the emission of greenhouse gases, of limited the energy consumption by 20%, and of employing renewable systems for the 20% of the total energy requirements in public buildings; the idea is to generate new techniques and procedures so as to align them with such possible solutions.

If the De-growth is thus a political, economic, and social movement based on environmentalist, anti-consumer, and anti-capitalist ideas, aimed at reducing consumption and maximizing happiness and well-being through non-consumptive means, an application of this model to the present construction systems can be proposed so as to promote less polluting and less foot-printing actions. Thus applying the idea of the Latouche's eight Rs, which are meant as the second stage of the de-growth process, that of "action", an interpretation within the construction sector considers the following measures for each of the R; the first, being the Re-evaluation (which means providing new values to our life) can be split into the various values which the society should, according to Latouche's thought, change, coming back to the important human feelings and way of living. One of these new values, recorded by the economic and social theory as A*ltruism*, can be interpreted as "helping weak ones" , and thus transferred in the construction sector as the importance of "taking account of social needs": sentence that seems to be obvious for a land transformer, but that lately, particularly among big archi-star and engi-star, had been actually almost completely disappointed, failed and neglected. The second term, the *Cooperation*, socially meant for collaborating rather than competing, can be transferred to the construction sector as the well known idea of "Participating design", which would help during the all life-cycle of a building and any other work for the public so as to reduce the common idea of imposing from the top the decisions, the ideas, the projects, the actions and the buildings. The value of "social life over unlimited consumption" stands for, in terms of social and economic patterns, *voluntary simplicity*, and can be interpreted in the construction language as the need of selecting durable, healthy, economic and ecosustainable products and materials. Another value which has to be changed is the importance of the "Local over global", which denotes mainly the preference for regional products and services: this can create a new application of the bioregionalist concepts to new construction choices, i.e. materials, techniques and design strategies. "Beautiful work over productive efficiency" is another of the values to be revisited by the de-growth approach, which can be clarified from the social and economic view point as a new link for sociality and community and thus ap-

Identity of rural landscape. Traditional constructions and hydraulic works in Cilento

P. De Joanna, A. Passaro[1]

Abstract

The configuration of the rural landscape of the Cilento area reflects the state of crisis in agriculture in the industrialized countries which is, in these years, to face the negative phase derived from the growing increase in labour costs and declining consumer prices, and the introduction of products imported from developing countries. To meet this contingency there is a tendency to widespread outsourcing and the industrialization of agriculture that led to an upheaval in many parts of the traditional aspect of the agricultural landscape.

The natural configuration of the land has been shaped by man for thousands of years with moderate or, sometimes, complex works of adaptation.

Was fulfilled, thus, a balanced process of composition of the functional aspects that returned an harmonic configuration of the territory.

The specialized production that is related to criteria for company management and forced by the market logic, the tendency to shorter rotations of crop plants, the increase in the average size of the plots worked, necessarily require a production efficiency through mechanization and a different logistic for the plants. In addition, the plant of greenhouses and protected crops in general, the replacement of the surface drainage network with underground systems, the water collection tanks for irrigation and all the appropriate facilities to new cropping systems specialist, as well as having changed the functional structure of the territory, assume great importance and impact in the usual scenarios.

[1] Dipartimento di Configurazione e Attuazione dell'Architetura, Università di Napoli Federico II.

The exploitation of water resources in rural purposes is one of the most ancient activities, the management of water resources has always been a work of vital importance for the survival and development of rural life, by developing and by perfecting techniques it has left a sign in the way of raising, in the type of crops and in the organization of rural settlements.

In order to envisage the monitoring tools to effect a rehabilitation of degraded agricultural landscape, we assume an integrated view of environmental protection, planning and enhancement of the landscape that is geared towards a specialized ownership of the territory, closer to the recognition of the natural elements and of all phenomena, generated by the interaction between man and environment, which are why the current configuration.

Relevant works and identity of the rural landscape of Cilento

Within a broader framework on the sustainable development project for the Parco del Cilento e Vallo di Diano, there are many initiatives and rehabilitation projects in rural areas.

These actions are grafted on a renewed interest in the recovery of material culture on the agro-forestry-pastoral (however recognized as the most suitable in some environmental situations), and in many singular testimonies related to it. In recent years considerable economic resources, public and private, have been used in recovery and rehabilitation of degraded areas and buildings within this region. The results are too often disappointing, if not reprehensible.

Interventions managed by local authorities without the necessary control of the agencies in charge to verify the adequacy of the design choices, in many cases proved to disregard every minimum requirement.

Despite the Cilento area is listed as a UNESCO[2] protected landscapes,

[2] The Parco Nazionale del Cilento e Vallo di Diano and archaeological sites of Paestum and Velia and the Certosa di Padula are entered in the UNESCO list of protected cultural landscapes on 5/12/1998 on the basis of the selection Criteria *III* and *IV* with the following reasons.

...

Criterion III (to bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared): *during the prehistoric period, and again in the Middle Ages, the Cilento region served as a key route for cultural, political, and commercial communications in an exceptional manner, utilizing the crests of the mountain chains running east-west and thereby creating a cultural landscape of outstanding significance and quality.*

its urban and landscapes realities have a high level of degradation and neglect that betrays the lack of a coordinated systematic action and, above all, the lack of awareness among the local population that the territorial identities are potential resource and need to be protected.

The Cilento is a geographic area with a discontinuous morphology that is characterized along the coasts, from flat bays closed with low hills covered with olive trees or from cliffs overlooking small harbours, while the hinterland has a rugged terrain, cutted by river valleys that isolate limestone nucleus where towns are often located.

The Geo-morphological profile is very rich: in the hinterland, for the most part, a limestone formation dominates with significant karst phenomena, which has varied layers from very different and specific colour, while, along the coast, a geological formation prevails consisting a sedimentary brown rock (sediments, from the erosion of the reliefs are transported to the sea by rivers, and deposited in adjacent marine basins, these form what, in the geological literature, are indicated by the name of flysch) [3]; in both areas the natural morphology is strongly marked by an hydro-geological matrix, characterized by deep valleys incisions, rather wild-looking, with gullies and river beds where the runoff is highly conditioned by regular rainfall, with an inhomogeneous flow in winter and completely absent in summer months.

The few rivers flowing abundant especially in the vast plains between mountains that separate the sections of the Apennines; nevertheless they remain almost torrential character. Some, intercept the river basins to the north and flow into the Sele, and other major waterways (Bussento, Mingardo, Lambro and Alento) mark the coast up to the sea (Figure1).

Criterion IV (to be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history): *In two key episodes in the development of human societies in the Mediterranean region, the Cilento area provided the only viable means of communications between the Adriatic and the Tyrrhenian Seas, in the central Mediterranean region, and this is vividly illustrated by the relict cultural landscape of today.*

...

The evaluations that have supported the inclusion of the Cilento region between UNESCO protected landscapes are given by the ICOMOS expert mission (February 1998) which found in it an exemplary synthesis of biological and geological characteristics of extinct elsewhere (Operational Guidelines for the Implementation of the World Heritage Convention).

[3] The Cilento area described in the Carta Geologica d'Italia (Istituto Poligrafico dello Stato e Zecca dello Stato) sheets: 198 and 209 Eboli - Vallo della Lucania, classifies many geological formations, in particular, the most common that characterize the landscape are:

- ...
- Flysch of Cilento, quartz sandstone and quartz-mica gray and ocher.

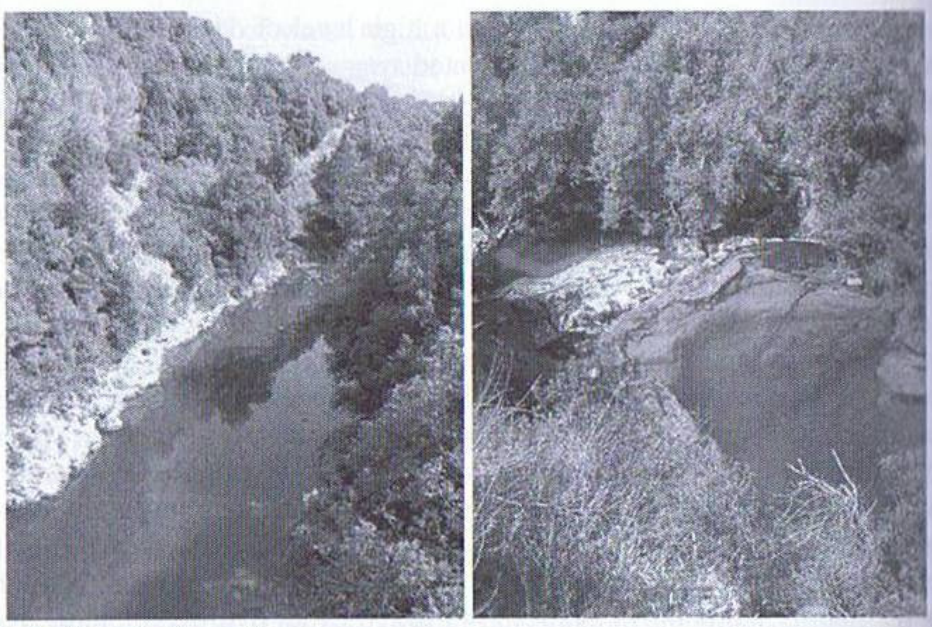

Fig. 1 - Rivers in deep valleys

The worldwide recognition of the heritage landscape values that characterize Cilento is reflected in the planning objectives for the recently approved Piano del Parco[4]; it replaces the previous planning instruments. Behind the study of the elements that compose the landscape of Cilento has the identification of "landscape units" (LU - landscape unit) and their evolutionary trends. The landscape units represent homogeneous fragments of the landscape system where local identities are recognizable and constitute

[4] Report to the Plan by the Parco Nazionale del Cilento e Vallo di Diano (approved by the Regional Council of Campania and published on the 24/12/2009 BURC of 01/27/2010).

2.2.1. The goals ... the preservation and enrichment of the wealth of historical, anthropological, social and cultural landscape and the significance of local cultures;

2.2.2. The functions - these objectives will inevitably give the Piano del Parco - the largest and most complex of instruments to be processed - a role quite broad enough to allow him to "replace" any other type of plan, including landscape plans. ... Are now on the Cilento area different types of planning tools and programmers supra, with uneven flow and operational capacity:

1. Territorial Coordination Plan of the Province of Salerno (PTCP), still in draft form;
2. Plans Coastal and interior landscape of the Cilento, only recently approved after a long series of procedural;
3. Plans of the mountain communities, adopted in the early '80s and updated a decade later, but is largely obsolete in the reduced capacity in strategic and operational equipment taken.

the frame of reference for land management policies[5]. The UP recognition needs a common frame of criteria and categories for the representation of the structural system of the territory, which would identify representative areas and value factors[6].

Overall, the area of the park includes nine large visual basins, of which five (Vallo di Diano, valli del Calore, dell'Alento, del Mingardo, del Lambro) are perceived as large unitary landscapes structures, the other four (the two valleys Bussento, the coastal systems of Monte Stella, Bulgheria, and Policastro-Sapri) are fragmented into heterogeneous districts[7]. The identity of the landscape of Cilento is given, rather than a unified framework, from a collection of separate images, but their sequences share a perspective matrix of hills that stretch to infinity.

(De Joanna)

Agriculture and landscape: the landscape size of rural between permanence and evolution

The descriptions of the peaceful Roman countryside, the rolling hills of Chianti or the wild cliffs that rise from the Tyrrhenian Sea to the Sila, writ-

[5] Hydro-geo-morphological units, - environmental units, - historical and cultural contexts - settlement systems or contexts, - areas landscape and visual perceptual and districts, - local socio-economic systems.

[6] Within the Parco Nazionale del Cilento e Vallo di Diano, there are:

- *thematic areas* - 1. physical environment (geological, geomorphological, climatic, hydrogeological, soil), 2. biological environment (flora and vegetation, wildlife, ecology, agro-forestry activities), 3. cultural-historical framework (history and geography of the area, cultural heritage), 4. settlement patterns (urban and regional planning, settlement systems), 5. landscape-anthropological (landscapes and sign systems, visual systems of relations);
- *factors* - structuring, characterizing, qualifying critical.

(Report by the Piano del Parco Nazionale del Cilento e Vallo di Diano.)

[7] Within the variety and richness of the landscape are recognized eight types of landscape:

- sand dunes and beaches of the equipment;
- the coastal slopes and cliffs;
- karst mountains;
- wooded mountains;
- inter-montains basin;
- mixture of wetlands;
- wooded hills;
- Cilento hills.

ten by all who, engaged in the Grand Tour[8] and in drafting picturesque Travel [9], travelled in Italy within the past centuries, belong perhaps a fact lost forever. A reality that was outlined in a conceptual construction closed in on itself and finished in a static image contradicts the logic of the evolutionary processes of adaptation and transformation that her generated.

Excluding the few areas that, to date, can be considered completely natural, the current layout of the area is not the result of a spontaneous evolution, but the result, in the long centuries of history, of a slow and gradual process of adaptation to an economy and agricultural production. The agricultural colonization of the hilly areas and plains has distorted their original and natural appearance; at first these areas were cleared, then, with wise adaptation works, were rendered to the productive activity that during the time has more and more specialized, however retaining a close and intimate bond with the land and its constraints. The organization of cultivation, generated by the need to adapt to the morphology of the soil, by the destination to several varieties of crops, by the exposure and fractionation of land, has resulted, over time, a form of land characterized by a rich and varied plot where an apparent disorder is indeed a unique synthesis of rules and balances that the human work has developed over time.

The natural configuration, wherever possible, has been shaped by man for millennia, as evidenced by the network of hedgerows in low-lying areas, by dry stone walls and windbreaks, while in mountainous and piedmont hilly, complex works of embankments and terracing[10] allowed the realization among the rocky slopes of specialized crops[11]. This scenario is complemented and enhanced with a rich variety of settlement types on

[8] The Grand Tour, a literary and artistic traveling since the middle of half of the 700 to 800, every man of European culture must have done in Italy in search of Greek and Roman classical memories often included in wild rural landscapes.

[9] The pictorial journey or picturesque voyage is a type of publication that is especially developed in the early nineteenth century and lies midway between the tour guide and art book. Volumes were made up of a number of engraved plates, accompanied by a descriptive comment more or less wide; engravings could be colored, at the request of the purchasers of the work. This production was addressing an audience of elite, composed of nobles and intellectuals, the same public that were part of the travelers at that time.

[10] The difference between terraces and embankments is that, in the first case, the support function of the shelf is carried out by dry stone walls; in the second case, by the outer wall of the embankment suitably turf to make it stable and compact.

[11] The terracing of steep rocky slopes is the testimony of the arduous and tenacious work of man who, with the construction of dry stone walls, behind which you collected the soil run-off, or whatever it was transported from a distance, drew from the slopes arable areas of the mountains. The plants were mostly vines and olives, while on the ground were carried out alternated crops (cereals and pulses) according

to the canons of traditional mixed cultivation.

dominant positions or buried in the vegetation. Villages, villas, castles, isolated towers, rural buildings and equipment made with very simple techniques, but composed from various elements and original solutions due to the traditional knowledge and the use of local materials, seem to be generated from the same land. Until a few decades ago, this occupation of the territory was carried out through a slow process, the use of limited technical resources and the adoption of proven solutions; thus natural systems endured to adapt to new conditions without the strong tensions. By this way was performed a balanced process of composition of the functional aspects that returned an harmonic configuration of the territory. The landscape slowly passed from anecumenical[12] areas, characterized by geomorphological, hydrological and phytogeographical[13] elements, to populated areas to end up in urban areas. Between these two extremes, the landscape, dominated in the past by different icons of the local culture, acquired identity and recognition, not simply as a physical and historical reality but as a complex system of signs and forms that evolved over time (Figure 2)

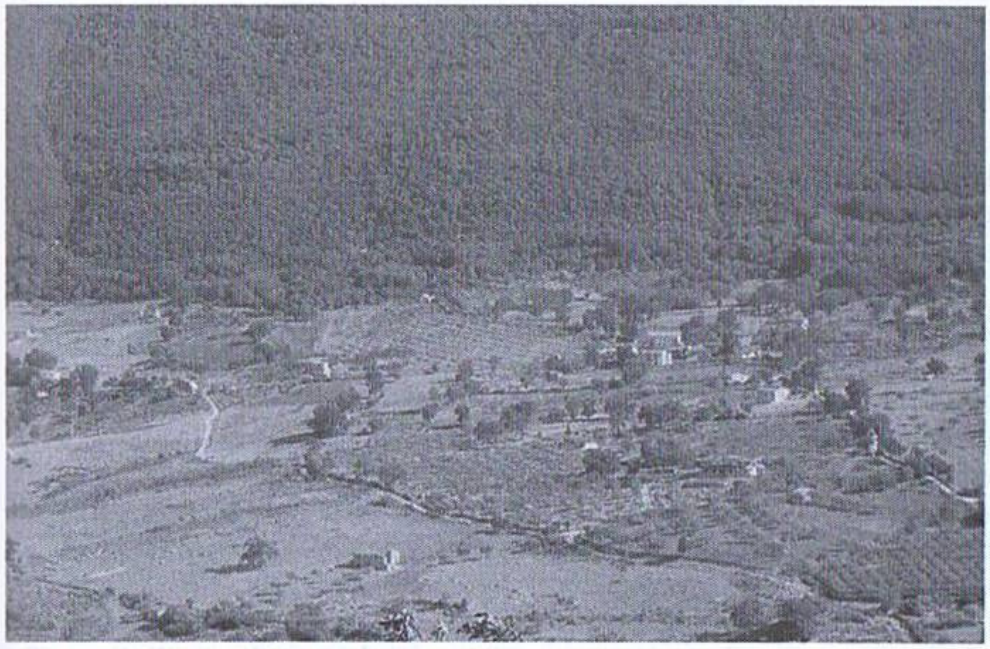

Fig. 2- Typical hilly landscape carved by water

The current rural landscape reflects the state of crisis of agriculture in

[12] *Anecumene* - ... part of the land uninhabitable by man because of physical or climatic conditions. From: Sabatini – Coletti, Dizinario Italiano (1997), Giunti, Firenze.

[13] *Phytogeography* - ... the relationship between plants and the environment in which they live, with particular reference to their distribution on the surface. From: Italian Dictionary Sabatini – Coletti, (*op cit.*).

industrialized countries that, in recent years, faced with a negative phase because of the growing increase of the labour costs and the general decline in consumer prices due to the introduction in the market of imported products. Obviously the farmers of the hillside land (already largely abandoned and uncultivated because of the conversion of the farmers to workers in heavy industry in the boom years) are those who mostly suffer the inconvenience of this situation; they were in fact forced to face the difficult morphology of the area which only allows a specialized production[14] and hampers modernization and mechanized management, making thus their products uncompetitive. This situation is common in many mountain regions of our country, excluding the few areas where it is implemented for years the production of high quality agricultural products, particularly wine, which, associated with the offering of complementary services such as rural tourism, provides a supplementary income to employees.

The territories of the slope[15], therefore, lay into a total neglect and abandonment or are cultivated by improper techniques not compatible with the delicate balance that regulated this area. The stone clearance and levelling of land to allow the use of mechanical means, the plowing of deep furrows that go through the humus layer and bring on the infertile ground and large quantities of stones and clay, have made the land vulnerable to the action of rain. Often to implement questionable greening policies, non-native tree species have been planted, both on public lands and in private funds, with government funding at a subsidized rate, even if completely inappropriate to the local climatic profile.

Different albeit similar fate has befallen the plain areas where, due to the technical requirements of an increasingly mechanized agriculture and to the gradual acquisition of agricultural land by multinational companies, the old fields were combined and made more extensive and more squared. In particular, this phenomenon occurs for arable crops, where the constraints are lower and the degree of mechanization is higher, but it is increasingly affecting the cultivation of trees and shrubs, where specialized cultivation replaces the traditional promiscuous one. The specialized production as related to company management criteria and forced by the market logic, the tendency to shorter rotations of crop plants, the increase in the average size of parcels processed require necessarily to implement the production efficiency through mechanization and other logistics facilities, often much

[14] The use of these soils is medium to low profitability, especially for fodder, small orchards, vineyards, etc.

[15] The extreme fragmentation of landholdings, not allowing a planned and assisted agricultural activity, led to a fall in income of workers and the consequent gradual abandonment of the funds.

more monotonous and certainly devoid of all the traditional features.

The greenhouses and protected crops in general, the replacement of the surface drainage network with underground systems, the collection tanks for irrigation water in the new specialist farming systems, have produced, in addition to the functional change of the territory, a strong impact in the usual scenarios. The traditional rural buildings is also compromised by heavy building renovations and extensions (for example, the stone walls with multiple textures and colour varieties have been covered, in the renovation of the old rural buildings, with anonymous plaster) that distort the typical features, while new buildings are characterised by extraneous typological solutions, the excessive use of reinforced concrete instead of materials and techniques traditionally used, have impoverished and homogenized the building language.

(Passaro)

The relationship between water resources and agricultural landscape of Cilento

The topography, the climate and an economy of scale have influenced, in the past, the choices of crop land along the hillside mainly intended for trees and seed.

The farming systems found in the analysed territory are essentially of two types: those that affect the land of plains and those affecting the hilly terrain and foothills; the element that most characterizes the differences between the various systems is the hydraulic work to control the water regime in excess or in defect, surface and deep, according to the need to capture water or lifting or regimentation, depending on whether it's rain water, spring water or subsoil. The rural landscape is enhanced by single elements such as wells, tanks, cisterns, fountains, drinking troughs or continuous elements (canals, ditches, irrigation systems, ...) that not only contribute to the design of the landscape but also to the understanding of the hydrogeological characteristics and climate and of the over time refined techniques that have resulted in a consolidated image (Figure 3).

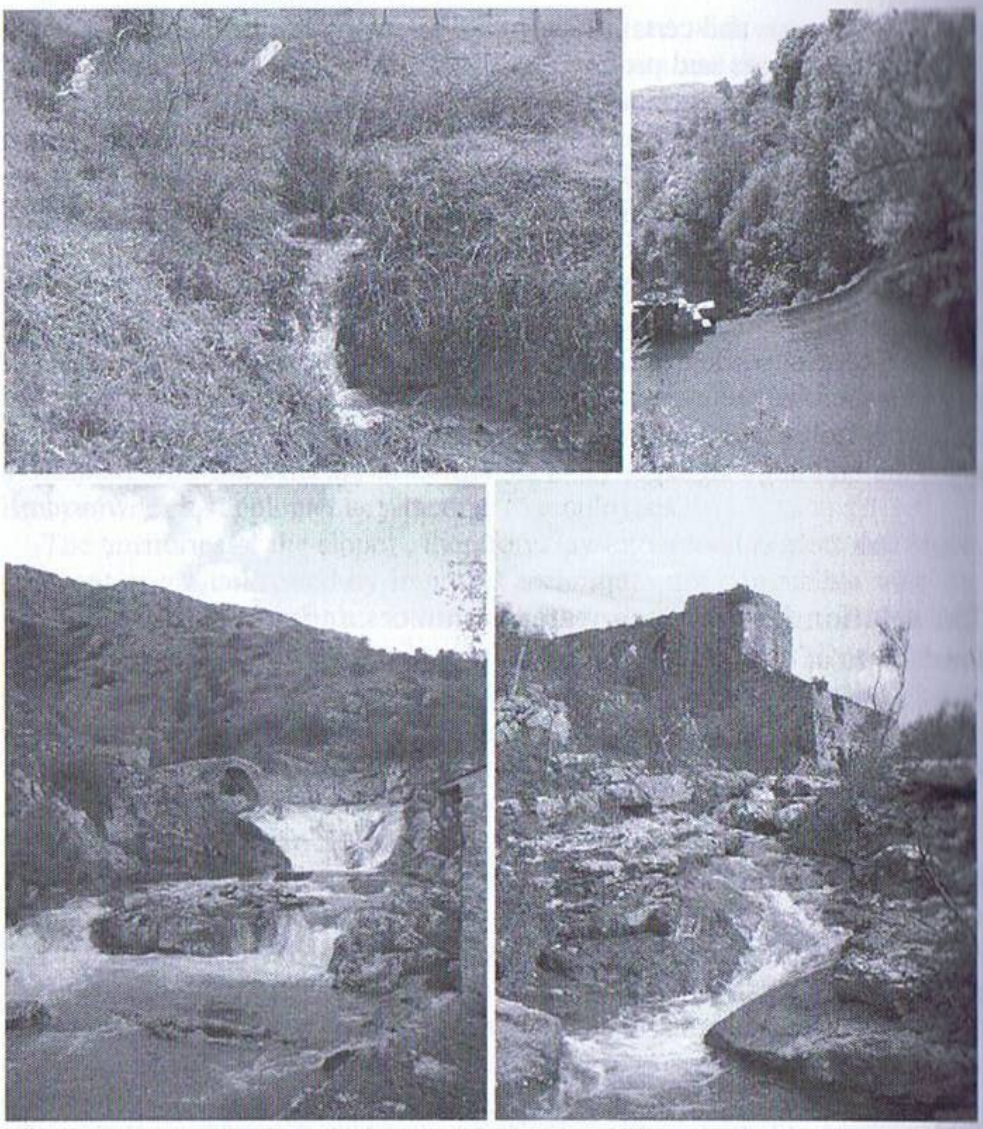

Fig. 3 –Ditches, ponds and torrents.

In the flat land, the soil frame is characterized by a regular subdivision of plots, mainly corresponding to the different estates, which overlaps the interstate tracks and the canals system. The sloping land are marked by a terrace works to correct or compensate the inconveniences due to the slope of the ground. Finally, among the cultivation of hilly lands, distinctive features can be considered[16]:

[16] We consider as structuring image all the elements of recognition and orientation within the park such as:

- the almost constant presence of the vineyard (as a boundary between different cultures);
- the organization of space in order to optimize the availability of water;
- the size of the field commensurate with the available family forces;
- the definition of the funds with dry stone walls and mixed hedges;
- the careful arrangement of the ground for the regime of surface runoff of rainwater tended to minimize the effects of erosion on agricultural land and for the water storage in tanks.

(De Joanna)

The traditional buildings and hidraulic for the management of water resources in rural areas of Cilento

The water resource is regulator in the dynamics of land use; the water use for the increase of agricultural production is one of the most ancient work and it has always been of vital importance for the survival and development of rural. The techniques of water supply and control marked the Cilento area conditioning both the types of crops and the organization of rural settlements.

In hydraulic it is necessary to distinguish works aiming at the use and works of defence and protection from possible damage to crops and rural settlements[17]. These are a function of many factors linked to other local

- the peaks of Mount Soprano and the mountain below;
- the crest of Vesole-Chianello;
- the slopes, the crest and north-western cliffs Alburni;
- the summit of Mount Stella;
- the ridge and the summit of Monte Sacro-Gelbison (a real focal point of the park, as it is visible from the street or from the centers of 6 pools of 8);
- the promontory of Capo Palinuro;
- the ridge and the summit of Mount Bulgheria.

(Report by the Piano del Parco Nazionale del Cilento e Vallo di Diano.)

[17] The use of water resources in agriculture activities is aimed at:
- drinking water,
- watering,
- irrigation,
- energy production.

The activities for the promotion and protection are mainly aimed at the creation of works:
- regimentation of stormwater;
- land reclamation, drainage and disposal of surface water (open ditches or underground);

resources as well as to the structural features of the technical elements necessary for adaptation to local resources and their exploitation.

The variety of solutions over time characterizes the landscape, sometimes very significantly, it represents the junction between the different forms of presence of water in nature and work of adaptation that man has made for purposes of settlement and productive.

Works for the control and exploitation of water resources are influenced not only by the morphology of the territory but also and mainly by the availability of the resource in relation to its location: surface, underground flow, underground water table.

The elements will be identified that contribute to determine the configuration of the rural landscape of Cilento and their integration due to the use of local materials and techniques of natural and man-made landscape.

Those elements can be distinguished and classified according to their function; therefore we can operates a distinction between the engineering work carried out for reasons of: collection and extraction, transportation and storage, use and disposal. Among the works for the collection and extraction, according with the needs of lifting, diversion and containment, we recognize wells, springs, dams, dikes and works by drawing water; works such as artificial ponds, tanks and peaches are also aimed at conveying and collecting of water resources to maximize the availability and exploitation. Particular attention should be given to the hydraulic that meet the many different uses that, in the Cilento area, characterize the rural landscape. Single elements, such as fountains, troughs, or sinks typically associated with domestic uses, and elements that mark a continuous segments of landscape, as irrigation systems and drainage works for irrigation purposes, can be identified.

Among the works for collection and extraction, those appointed to the containment and regimentation of water (dams and levees) are without doubt those of greatest environmental impact both for the changes in the aspect of the sites and for changes in the organic equilibrium of local flora and fauna. We are accustomed to the presence of these elements in the landscape that we perceive as "domesticated" and justify on the basis of basic needs for survival of the settlements and productive; anyway the growing focus on the environmental impact of these works is directed not only to protection of hydrological conditions of risk or of the habitat, but also to minimize the landscape alteration.

- removal / disposal of sewage.
- works for the prevention of flooding or runoff.

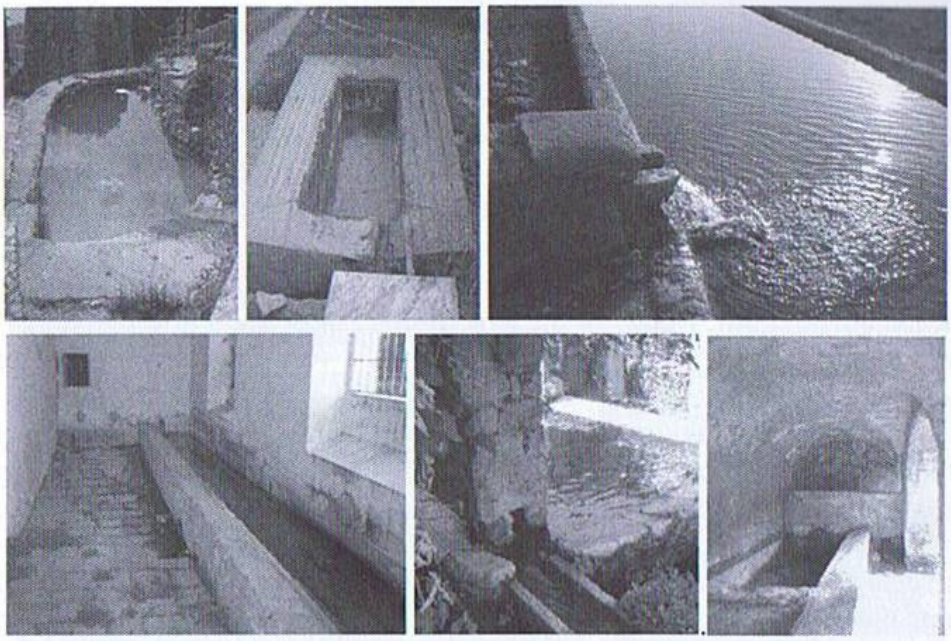

Fig. 4 - Wells, washhouse, cisterns, fountains, drinking troughs.

Similarly, works by drawing water, as from source or river or lake[18], although if they involve less extensive areas of the above, are the hydraulic where the choices for the technic requirements prevail on the landscape protection, and they impoverish the local values.

The presence of wells[19] and springs[20] is related to the exploitation of minor water resources, and it therefore affects the agricultural landscape in

[18] The intake works for the uptake of water from rivers or streams can be achieved by: lifting systems, siphons straddle beams and towers of bank or collection. The lifting systems are generally composed of a pump (dry or submerged) and pipelines to transport water. The siphon of a knight instead of a particular bank is required to overcome the trap of the bank of the river and requires the installation of a hydraulic pump, otherwise the uptake by a stream of water can also be achieved by creating an opening along the river wanted to deflect part of the flow. In the case of stagnant surface water the uptake occurs through placement at different levels of depth of gate towers with windows that can trap the water at different levels depending on seasonal variations in the level of the basin.

[19] The well may be of groundwater, when the cavity is generated by natural vertical development that intercept the waters of the aquifer naturally or can be an artesian well if it is made by drilling and insertion of the soil pipe.

[20] The springs are made of a resurgence of the plain where the water gushes from the ground (the head of a source can have varying depths from 1 to 5 m) and a channel flow of water. The head of the source can be formed by dry-stone walls that allow water to flow to ground water from tanks placed in the bottom of the head of the source up to 2.5 m or from tubes with windows that intercept the water to a depth of 10m and forces towards the head of the source.

a isolated manner, sometimes it is closely linked to land ownership and the type of crops and livestock in it. At present, the abandonment of many cultivated areas or focus on new and different forms of water supply has resulted in the sale and the consequent destruction of the springs due to natural vegetation; in the same way the need to protect the cavities of wells requires today concrete superstructure that, though temporary works, are a sign of obsolescence and neglect places.

In this discussion, the reclamation[21] and irrigation[22] systems deserve special attention; they draw in the agricultural landscape a grid that underlines all gutter lines of farm plots or limits in a very fragmented frame of the territorial extension.

We still include, among the works of the rural landscape, the elements of the agricultural tradition which implicitly recognized the role of housing values and memories of the rural culture and the *genius loci*: those little architectural episodes are distributed across the territory and built to enslave settlement activities related to agriculture. It refers to the variety of fountains, troughs, sinks, and collection tanks that in every place develop new forms and different features to suit the availability of local materials and functional requirements of the context to which they belong. These works from the technical point of view and constructive, both with a surprising bill or low importance, summarize the expression of an experience and a wisdom that for centuries has combined the natural resources with human activities. The construction of hydropower for exploitation of watercourses play a special role. In going up the most of beds of streams and rivers of Cilento is often see abandoned buildings where it is possible to identify the remains or traces of hydraulic machines, which for centuries have marked the economic and social life of these areas (Figure5).

You can find these buildings, after a long and narrow paths, crumbling and covered with vegetation, often, it is also difficult to determine the work that these structures were designed; it is possible to recognize the nature of factories or water mill because it is, usually implanted on the side of a stream and trapped in a natural slope steep enough.

[21] The works of hydraulic interventions are aimed at the recovery of vast tracts of land flooded with stagnant water to make them suitable for use and urban agriculture. The drainage works require the construction of a network of channels for the collection and removal of water.

[22] The choice of method for irrigation depends on factors such as water availability, type of crops, the type of soil, climate, etc.. The main methods currently in use are: flooding, to scroll, or by sprinkling rain, drip, for sub-irrigation; these differ in the volume of water distributed on the crop, for the method of distribution and for the duration and frequency of watering cycles.

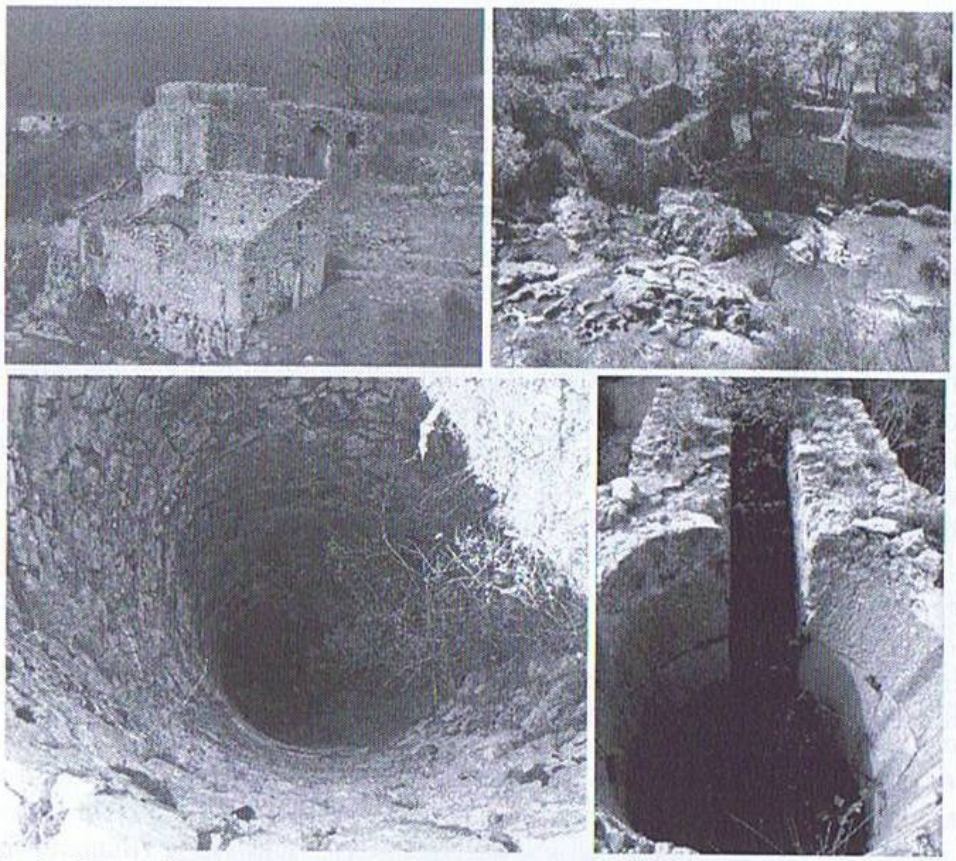

Fig. 5 - Water mills

We are speaking about construction difficult to date, carried out until the late nineteenth century, where the building types follow ancient models, when men discovered the possibility of use the hydraulic power as a replacement of muscle power of humans or yoked animals[23].

(Passaro)

[23] The use of hydropower in the milling of cereal grains, to obtain flour for food, replaces the first rudimentary tools (simple flat surface and a stone roller, hold with one or two hands, to rub on the first or the simple mortars) and roundabouts biconical millstones used in Roman times (found in archaeological excavations of Pompeii and Ostia, they are made from a base, blunt cone grinding wheel, which rotates on a cylindrical grinding wheel biconical hollow inside: the surfaces are juxtaposed grooved the upper cavity acts as a hopper, and both wheels are tough and the upper stone was rotated under the pressure of a slave or a beast of burden. These mills, despite significant improvements, were used to sec. XI, vintage where they spread the water mills).

The Historical Information System (georeferenced information system historically logged) for the protection of the rural landscape of the Parco del Cilento e Vallo di Diano

The analysis and study of structures related to the rural culture, expressions of the production cycles and of the working and processing of agro-forestry-pastoral products, require to analyze the individual elements and how these in the past were a reference to contextual reality.

The rich heritage of event and elements, related to water resources in rural areas, must be preserved, protected and valued as evidence of a civilization that disappeared, but, most importantly, as a background of experience in managing the hydro-geological layout, which after recent catastrophic events, identifies the primary function of prevention in the knowledge and management of the territory by farmers. The simplicity of rural artifacts is associated with a complex working, that is possible only thanks to the management known only to those who supervised the conduct. The identification of the traditional hydraulic works and construction is aimed at the interpretation of the phenomena that led to the historical configuration of the area to define new functions appropriate and consistent strategies.

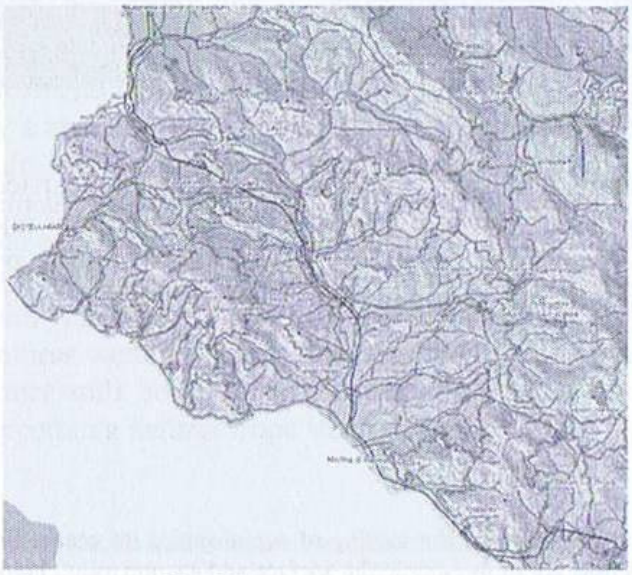

Fig. 5 - Hydrographic system of the Cilento

In view of the protection requirements laid down by national legislation for protected areas and, in particular, in relation to UNESCO guidelines for the protection of the heritage landscape of the Cilento you configure the need to improve tools for control and monitoring on the territory under

study. The computer tools for management of the information in the Parco Nazionale del Cilento e Vallo di Diano [24] provide for the implementation of a data structure that allows to acquire, catalogue, analyze and return geo-related information also. For a more and more careful control of the territory, the increase of information is not enough such as the methods and procedures to be used in data processing. The enhancement of the tools through the mapping of traditional hydraulic engineering, overlapping the actual hydraulic configuration of territory, may permit an historicized reading towards the construction of a virtual image of the past rural landscape, thus, when the historical stratification of the landscape is known, new diachronic integrations are possible. Such an operation is currently in correspondence with the rural censuses sanctioned by DPR 154, 2010[25], in adaptation to the European Directive Regulation (EC) nr. 1166/2008, which are planned for the years in 2010 (to be completed in June 2012), 2013 and 2016. The network of hydraulic works in the traditional territory of the Cilento's Park may therefore constitute the reference indicator for returning information about the culture previous system and the way of exploiting the land in the local agricultural economy. Often the transformation of the production system dictated by obsolescence of equipment or new production requirements have resulted in neglect and abandonment and the consequent re-appropriation of places by natural vegetation. In this sense, there has been a blurring of the structure and image of the pre-industrial area era that has gradually given way to new textures and new colors.

The development of a Georeferenced Information System Historically Logged (GISHL) entails the creation of an image consisting of several layers composed of groups of raster data and vector data stored in different formats[26].

The individual layers can be viewed individually or as a group to form a theme. The groups of layers and layers can be placed in a tree structure expanded at will. In the consultation, therefore, you can search, view and capture data, by using the tools of graphic layers active, the data available.

The GISHL is structured through a comparative study, divided into successive levels relative to the amount and quality of information to be man-

[24] *La Costa del Cilento: analisi multicriteri per un modello di gestione*, Quaderni - Ambiente e Società 2/2010 - ISPRA – Istituto Superiore per la protezione e la ricerca ambientale.

[25] Decreto del Presidente Della Repubblica 23 luglio 2010, n. 154 *Regolamento di esecuzione del sesto censimento generale dell'agricoltura*, a norma dell'articolo 17, comma 2, del decreto-legge 25 settembre 2009, n. 135. (10G0168) (GU n. 214 del 13-9-2010).

[26] Vector data formats: PostGIS, ESRI Shapefile, ESRI ArcSDE, etc.. and raster data in: TIFF / GeoTIFF, GIF, PNG, ERDAS, JPEG and EPPL7, etc...

aged, including information derived from analytical data compared and integrated with the technical survey and interviews conducted with different methods and aims.

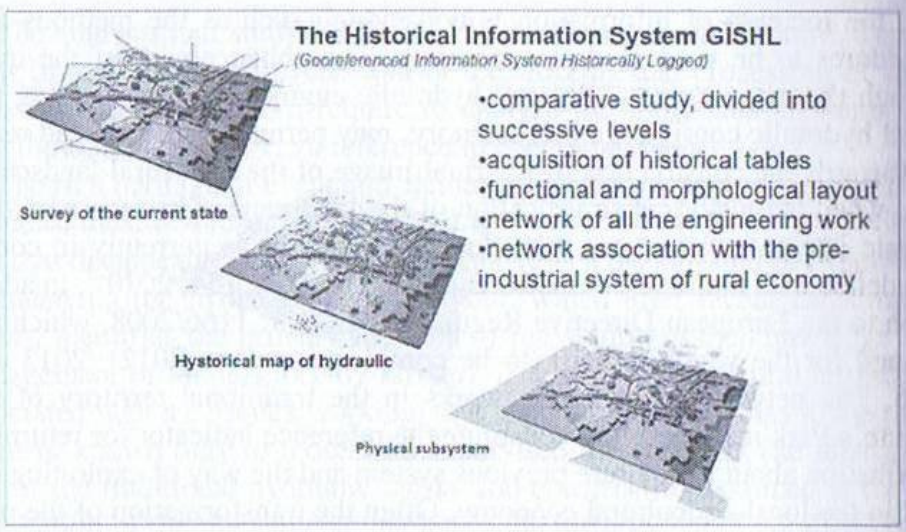

Fig. 6 - Georeferenced Information System Historically Logged

Since there is no census of hydraulic works, in drafting of a GISHL, the working hypothesis starts from the acquisition of historical tables[27] and maps of the Istituto Geografico Militare (IGM)[28], with which to draw layers, one for each type of element, where you can identify the location of hydraulic engineering as reported (Figure 7).

This first structure is then implemented with data from interviews to residents and technicians of the study area, in order to find additional elements not contained in the acquired documentation.

The latter is crucial as it is still possible today (as was the case for the discovery of a mill in ruins in the municipality of Giungano so overgrown that it was difficult to distinguish the nature of factory) to document through memory or oral transmission those elements whose tracks were lost.

[27] Carta Idrografica del Regno D'Italia, Minute Originali Di Campagna delle Levate .... Della Carta Del Reame Di Napoli, tablets on scale 1:20.000.

[28] Tablets series 25v.

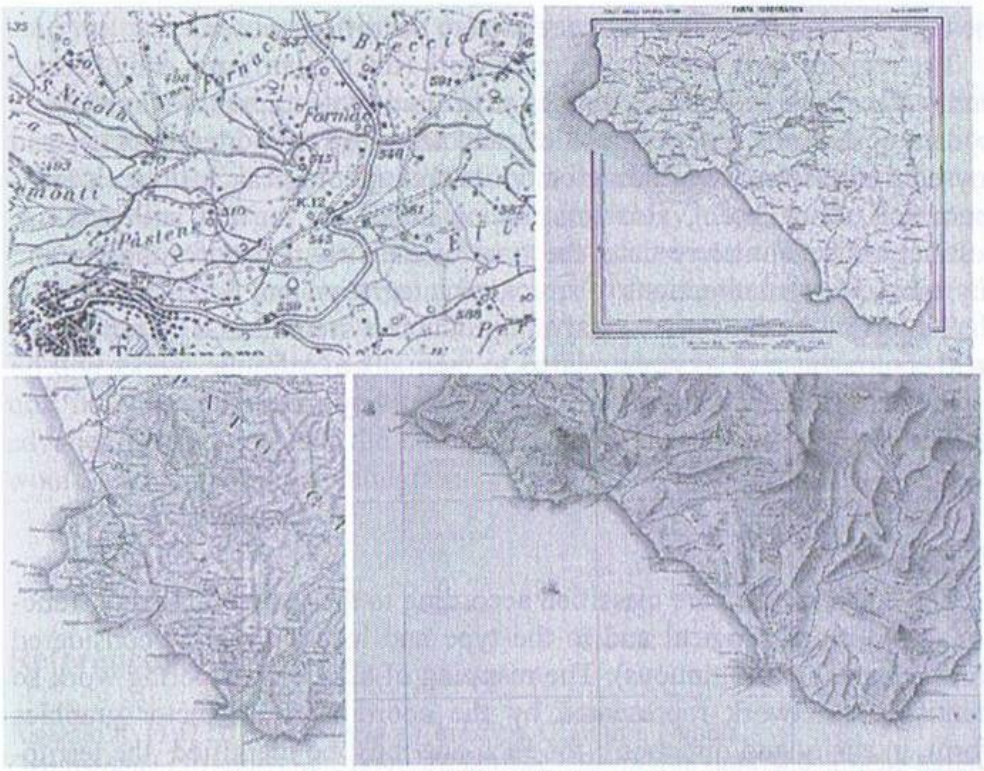

Fig. 7 - Maps of the "Istituto Geografico Militare", Carta idrografica Prov. Salerno , Atlante del Regno di Napoli, Carta del Reame di Napoli

After the first mapping of hydraulic and historical works comes the inspection of the building in which you perform surveys and compilations of default tabs:

- interview with the owner of the land or building in order to obtain general information;
- detection of geographical coordinates with Global Positioning System instrument;
- metric survey performed according to a programmed protocol;
- geo-referenced and photographic survey and photos-survey;
- samples of materials for examination and for laboratory tests;
- filling sheet about degradation state and, where evident, the causes of any structural failures.

Particularly important is the preparation of a survey able to provide all the information useful in assessing the situation, by identifying fully the physical, identifying, quantifying and cataloging the materials, the conditions in place, the causes of deterioration and the boundary conditions. The collection of survey data should include metric data and construction and material data, and should explain the relationship of the different parts of

the building and functional joints related to the different uses.

The registry card, both for a simple work (ditch guard) or a complex one (mill with a bath and drop tower), is structured so as to provide, in addition to data concerning the geographical and administrative identification and any constraints on the building or on its area (geological, historical, environmental, floor, etc..), also information about the current and past use destinations, quantitative data, the time of the first plant, if possible, and any subsequent interventions of structural integration and functional.

Subject of the census are rural and productive systems and all infrastructure, equipment and services related to them. The hydraulic works will be catalogued on the basis of the various goals to they are made:

- capture and retrieval;
- transport and storage:
- use;
- disposal.

The collected data are classified according to the structural layout, functional and morphological and to the type and location on the considered area (punctual or continuous). The mapping of all the engineering work so identifies a network represented by the coordinates of vector graphics (form, intensity and direction); for each one must be identified the territorial area served, its land area used and its catchment area.

In order to grasp the integrity of the landscape dimension of these works, or how their presence influenced the dynamics of landscape change, all information on areas served by the network must be associated with the data of plants in the pre-industrial system of rural economy. The rendering tool lets to view the mosaic returned from all areas under cultivation or spontaneous vegetation and to appreciate, where the water regime has been modified, the resulting transformations of the visual catchment. The rendering tool lets to view the mosaic returned from all areas under cultivation or spontaneous vegetation and to appreciate, where the water regime has been modified, the resulting transformations of the visual catchment.

The picture of these censuses, implemented in an information system, outlines the development trend of the park and, when superimposed on the pre-industrial system, can reveal areas of detachment from the traditional model or conversion (for instance: some sites excluded from the rural production system manifest a tendency to be reabsorbed by the tourism production system).

The purpose of a geographic information system, integrated with the data on the traditional production technologies and with data from the current censuses, is to highlight and represent the development trends in relation to plan-

ning instruments adopted within the park and in relation to voluntary initiatives.

In this sense, we can gain control capability on the lines of development, adaptation and monitoring in compliance with the objectives of protection of local cultural heritage. The difficulty in developing the described system is due, rather than to the sophisticated technology used, to the data processing and recording and their relevant associated costs. Therefore it also may be suggested the use of an open source software that should gather all the information voluntarily submitted by the individual actors involved. These can be identified in any type of entity, when an hierarchic coordination has been planned to verify the consistency of the information. The advance notification and the subsequent joint analysis of the information would lead to integrated validation.

(De Joanna, Passaro)

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The Cittam (Centro Interdipartimentale di ricerca per lo studio delle Tecniche Tradizionali dell'Area Mediterranea) has always been dealing with the great subjects of the architecture, landscape and urban design within the Mediterranean region, through a number of different studies about the traditional technologies and strategies employed by the populations inhabiting this so rich cultural basin.

This international conference has the aim of investigating about the reflection – over the sustainable development strategies and the ecological approach – of a number of principles, already present and rooted in the Mediterranean traditional culture, such as the bioclimatic response of buildings, the local resource employment and the social and cultural factors involved in the human activities. In fact, following the Meridian Thought, the dialogue, the communication, the fertility and the nomadism of ideas and people, and last but not least the slowness set against the frantic life, can be taken as re-founded values for the Mediterranean common culture. As far as contemporary architecture is concerned, and thus new application of city and land configuration, the teaching lectures learnt from the aforesaid principles, included in the Mediterranean tradition, will provide a large and deep aid to the actions and design items aimed at reducing the ecological footprint and at respecting the existing landscape.

The challenge of this Cittam conference is the enhancement of the cultural connection between the architecture, the infrastructures and the XXI century city configuration, all of which had contributed to the whole process – from the big works of the 19th century, till the nowadays innovation in material and product employment; by means of comparison and discussion about examples, theories, ideas and studies, the relationship between the various scale design and the sustainable development approach within the Mediterranean region will be faced.

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La passione per le conoscenze

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