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The Water and the Rural Landscape

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Abstract

Nature and history are integrated in the rural landscape and they summarize the infinite configurations of the local heritage. The symbiotic relationship between the environment and the rural nature of the sites is deposited on the centuries in a partnership that is an expression of identity and, with the exception of few areas that can still be considered whole natural, the current configuration of the territory is not the result of a spontaneous evolution, but it is a gradual adjustment operation and exploitation of local resources. 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. The elements that are necessary for the control and exploitation of water resources vary a lot from place to place for the area's topography and the availability of the resource itself. We want to highlight certain constructive elements that derive their being from the need of exploitation of water resources, that influence the configuration of the landscape of our country as an iconography funded in the memory of places.

Keywords: rural landscape, water costruction, country iconography, water resources

The Rural Landscape as Heritage

The agricultural landscape is the product of the authentic culture and human nature. In the landscape, both in form and in the elements that make up the territory, as it presents itself, nature and history combine and summarize the endless interventions that are layered over time.

The configurations of the landscape are as diverse as there are different measures to adapt to the needs of rural communities that have worked for centuries in the territory modifications, accommodations and cropping systems. This overlap has led to the genesis of characters, meaning, usefulness, problems, through an evolutionary process in the synthesis of event and place, establishing a clear identity. The landscape is defined, then, as the set of natural and anthropogenic events, product of culture and social relations, the spatial and temporal dimensions, fusion of historical memory and the present[i].

The symbiotic relationship between the environment and the rural nature of this area is settled over the centuries in a partnership that is itself an expression of identity; with the exception of a few areas that can still be considered to be purely natural, the current configuration of the territory is not the result of a spontaneous evolution, but a gradual process of adaptation and enhancement of local resources (Figg. 1-2).

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Fig. 1-2: Water mill in the Cilento. The Perfect Integration between Construction and Natural Landscape

Reclamation or correction of the hydro-geological maintain a close and intimate bond with the land and its constraints. The crops, generated by the necessity of adaptation to the morphology of the soil, from destination to different varieties of crops, by the different exposure, from the fractionation land and the mode of water supply, has determined, in time, the texture of the territory characterized by a rich and varied plot, where the absence of a precise geometric pattern is associated with the apparent disorder of the work of human.

Outdated by now the meaning of the natural landscape as an area that has not changed for the work of man, we can assume that the entire land space has been explored and known in its physical aspects and there is no definition of the modern landscape that does not take into account the human component.

The word "culture" has its etymology, Latin *colere*, the meaning of living that is inseparable from grow, caring, worship and grace, in other words, of being. So living means taking care of the places through the ways of building and cultivating, recognizing and respecting the *genius loci*, which means to assume that in every place the physical component and human come together in a unique inseparable. If, therefore, we can assume that every landscape has the meaning of a cultural centre, every alteration of its formal and symbolic identity will result in an imbalance in the system of cultural identification and the process of recognition of communality between a particular form of culture and the set geo - environmental context in which life has taken.

The agricultural settlement are the main structure of the landscape as centres of organization of rural life; buildings for agricultural activities are an integral part of the landscape, mirror and witness for centuries of exploitation of local resources; the peculiarities and own use of the sites have given rise to a wide variety of shapes and colours of the building elements that link human activity to the context, through a dynamic process that, due to the evolution of considerable agricultural techniques, often brings these elements to become obsolete and therefore no longer maintained.

The strong impulse made in the last twenty years by the intensification of the means of communication and by cultural exchange, has produced new models of reference in the development process that often betray or neglect those that are the values of the rural context; the lack of knowledge of these values, or their mystification, often produces the tendency to import foreign models to local culture without assessing their impact on heritage.

The History of Water in the Agricultural Landscape

Irrigated agriculture has historically drawn our rural landscape, the topography of the place and the climatic characteristics are the basis of culture organization, marked in an unmistakable way the different types of rural landscape through the manner in which crops are arranged. The cropping systems can be divided mainly into two types, mainly influenced by the morphology of the land on which it engages the agricultural activity: those that affect the land of the plain, and those that relate to the hilly terrain and foothills. Highly distinctive element between the various organizations systems are hydraulic arrangements made to control the water regime - in excess or defect, surface and depth - and to support the operations of cultivation.

Therefore, the presence or lack of water resources becomes a highly distinctive element for the agricultural landscape; like the vegetation and crops, depending on the need to capture and water lifting or regimentation, depending on rainwater, spring water or subsoil, the environment is enhanced by specific signs (wells, tanks, cisterns , fountains, drinking troughs, Fig. 3-4-5-6-7) or continuous (canals, ditches, irrigation systems, ...) that contribute not only to the design of the landscape, but above all to the understanding, for the observer, of the hydro-geological characteristics and climatic factors of places and exploitation techniques honed over time that resulted in a consolidated image.


Fig. 3-4-5-6-7: Hydraulic Constructions Employing Traditional Local Materials

In *flat terrain*, although the characteristics of the different places and historical events have led to hydraulic arrangements and different cropping systems, generally the warping of the soil is characterized by a regular subdivision of plots, mainly corresponding to the different land ownership, which overlaps in a more or less specific to the network of rural paths and the system of the ditches. The latter have irrigated function, both adduction of the water, both of collection and regimentation of rainwater.

The soils in the *slope* are marked by oriented accommodations to correct or compensate for the inconvenience caused to the slope; the most widespread types of sorting are: *terrace, banks and large steps*. Finally, the cultivations of hilly terrain are not tied to particular works of hydraulic arrangements or compensation for the rugged nature of the land, in such contexts, the most widely used types of sorting are: *cavalcapoggio*, *girapoggio* and *rittochino*[ii].

The Relationship between Agricultural Activity and Water

Water as a resource is a dynamic ever-changing state according to its natural cycle. During this cycle the waters serve multiple functions and are used for multiple purposes by man for domestic use, energy production, agricultural use, industrial, sporting, recreational, or scenic and decorative. The exploitation of water resources in rural purposes is one of the oldest activities; the management of water resources has always been a work of vital importance for the survival and development of rural activities, developing and perfecting techniques that have left their mark both in the way of cultivating that in the type of crops grown and the organization of rural settlements.

Water, like all natural resources, may constitute, as well as a great resource also a potential for harm if not properly regimented; therefore must be a distinction between the actions aimed at better use of water and the advocacy and protection from damage that would be harmful to crops and the rural settlements in general.

The utilization of water resources in agriculture is designed to following activities:

- Drinking water,
- Watering,
- Irrigation,
- Energy production.

The activities for the defence and protection are mainly aimed at the creation of works for:

- Regimentation of storm water;
- Land reclamation, drainage and disposal of surface water (ditches in the open air or underground);
- Removal / disposal of sewage.
- Works for the prevention of run-off or flooding

These activities, the base of rural activities, are a function of many factors related to other local resources that affect the type of crops and livestock as well as the structural characteristics of the technical elements necessary for adaptation to local resources and their exploitation. Therefore, the same works for irrigation or regimentation of rainwater can take very different forms depending on the location and availability of local resources. The variety of solutions over time developed is not only the very expression of the diversity of places but also the history and customs that in time produced different cultures; it would be difficult to classify and to compare the solutions developed for the exploitation of water in agriculture, but here we want to pay attention on how these intervening to characterize the landscape, sometimes very significantly, thus representing the conjunction between the different forms of presence of water in nature and work of adaptation that man has developed for purposes of settlement and productive.

The Architecture for the Management of Water Resources in Rural Areas

The elements necessary for the control and exploitation of water resources differ from one place to another, not only because of the topography of the area but also to the availability of the resource in terms of location: surface, underground rail, underground groundwater. The type of availability, the method of procurement and the extent of the resource, the characteristics of the soil and climatic factors also affect the organizations culture.

We want to dwell on a few items that, being functional to the need for exploitation of water resources, contribute to determine the configuration of the rural landscape of our country according to an iconography that sedimented in memory of places.

It recognizes the elements of a traditional building capacity to integrate into the landscape due to the use of local materials and techniques that are reflected in the shades of colour and texture of the natural and man-made; it is also necessary to make a distinction between works that fit in a timely manner in the rural built and those which, although less recognizable, shape it according to new configurations.

Among the works of uptake and removal, containment, and those for the regimentation of water (dams and levees[iii]) are undoubtedly those of greatest environmental impact for both the transformations on the appearance of the places and the changes that generate on the biological balance of flora and fauna. We are, in fact, used to the presence of these elements in the landscape that we perceive as "domesticated," and that we justify on the basis of basic needs for the survival of human and productive settlements; however, the increasing focus on the environmental impact of these works is paid not only to the protection of the natural hazard or conditions of the natural habitat, but also to minimize the effects of alteration of the landscape due to the presence of this works and the mutations that trigger. Similarly, the intake works, whether they are from the source[iv], from the river or lake, while affecting less extensive areas of the above, configure the same as hydraulic works where very often the technical requirements of construction and operation exceed decisions aimed at protecting the landscape with the consequent inevitable sacrifice that produces impoverishment of local values.

The presence of wells[v] and springs[vi] is linked to the exploitation of water resources less extensive and therefore intervenes in the agricultural landscape in a punctual manner, sometimes closely linked to land ownership and the type of crops and livestock in it.

At present, the abandonment of many cultivated areas or prioritize different and new forms of water supply has resulted in the disposal and the consequent destruction of the springs by natural vegetation; in the same way the need to protect the cavities of wells today involves the insertion of concrete superstructures which, while qualifying as provisional works, are index of obsolescence and carelessness of places. Deserve special attention in this discussion the land reclamation[vii] and irrigation systems[viii] that draw in the agricultural landscape a network that highlights all the lines of the gutter or the limits so returning a very fragmented picture of the territorial.

Include still, among the works that construct the rural landscape, the elements of the agricultural tradition in which is implicitly recognized the role of housing values and memories of rural culture and the *genius loci*: are those little architectural events around the country and made to enslave settlement activities related to agriculture; it refers to the multiplicity of fountains, troughs, wash and collection tanks that are in every place with new shapes and different characteristics to adapt to the availability of local materials and to the functional needs of the context to which they belong. These are works that from the technical point of view and constructive, whether they make a surprising manufacture or modest importance, summarizing the expression of an experience and wisdom that for centuries has combined the natural resources with human activities.

With regard to the works here described, we are referring to traditional agriculture, the iconographic vocabulary that over the centuries has slowly improved and enriched, giving rise to a landscape in which every place is picture of local peculiarities. The acceleration of the media together with the radical transformation of the agricultural economy in the last thirty years has resulted in a distortion of the techniques of agricultural land use that is evident from the introduction of new elements in the rural landscape that occur in contexts without distinction, although extremely different, upsetting a balance for centuries statements.

The adaptation to rapidly changing market demands and cultivation techniques has also produced new techniques for supply and use of water resources that leave traces in the landscape; this is the case for example, the realization of collection tanks in the detected and in the open air which distort the topography of the area.

The concern for this rapid transformation process is particularly acute because it affects a very short period of time; within a single generation production radical innovations are made and often they are not adequately tested in a specific place, simply due to the easy availability of transfer of new technologies and the easiness of the means of exchange (Figs. 8-9-10-11).

Fig. 8-9: Artificial Ponds to Collect Water Particularly Evident in Top view (Catania)

Fig. 10-11: Riverbed Concreting of a Stream and of the *Regi Lagni* near Caserta

In the light of these reflections already in many Italian regions have been undertaken actions aimed at safeguarding the protection not only of biological balances but also the local cultural heritage, aiming at a global rethinking and "sustainable" agriculture relating to the use of water resources that, for the same qualitative results / quantities, allows a substantial saving of the same.

The irrigation system must maintain the requirements of naturalness, but new production requirements lead us to think of an alternative use of the resource in a manner than the grating surface with the risk of changing the hydraulic structure and morphology of the territory. Some new experiments are made up of irrigation systems employed by the direct use of groundwater along with solutions that limit the maximum dispersion of water in their management-level grid (waterproofing irrigation network).

We therefore look towards virtuous paths that lead to the definition of alternative or complementary point of view of development in which it recognizes the role of the traditional heritage resource that can add value to the production process.

Note

[i] Law. 9th january 2006, N. 14 - *Ratification and Implementation of the European Landscape Convention*, Florence 20 october 2000.

[ii] In *cavalcapoggio* crops are arranged on double slope, opposite each other, the irrigation network size curves transversely; the disposition to *girapoggio* is characterized by a system control of water and ordering of crops according to the trend of the level curves; the *rittochino* is characterized by a provision of the crops according to the lines of maximum slope.

[iii] The banks can be made in *froldo* or as *golena*, depending on which are in direct contact with the water course, or placed at distance from this with the interposition of a strip of land. The provision *froldo* is needed because of the lack of space or when the space around the bed can not be sacrificed, however, is a work subject to heavy erosion for continuous contact with the liquid mass and the water pressure on that it is exercised; on the contrary the golena, does not imply over exposed surfaces to degradation, it allows the mass of water of the flood wave expandes without compromising the control of water levels

downstream. The dams depending on the shape and geology of the close of the river as well as the available materials (concrete, masonry, stone or mixed material) may be: gravity, arch, buttress or in the ground.

[iv] The work of taking water from the source must be located at the point where water flows naturally, so as to limit the impact of human natural environment, it consists of a tunnel in the rock that encased the convoys water in a building (booty outlet) where the tanks are housed and equipment of the aqueduct. The basins are: the stilling or sedimentation (if any are held sands carried by water); the bath of measurement (when the water flow rate is measured conveyed); the load tank or outlet (when the pipes are placed for the works of adduction); each tank has a bottom outlet for emptying in case of maintenance, and discharges the overflow for the elimination of water in excess.

[v] The shaft can be of groundwater, when it is generated from natural cavities in vertical development that intercept spontaneously waters of the aquifer, or artesian if realized by means of boreholes soil and insertion of tubes. Very often the term "well" refers rather to the "well-curb" that indicates the protection structure external to it that assumes very different connotations in different contexts for the nature of the materials with which it is made and to the geometric characteristics and morphological that may arise.

[vi] The *fontanili* are the springs of flat land formed by a point at which the water flows from the ground (head of that source may have varying depths from 1 to 5 m) and a channel of water runoff (rod of the spring). The head of the source may be formed by dry walls which allow water to merge, vats positioned in the bottom of the head of the source up to 2.5m by filter tubes which intercept the water to a depth of 10m and convey towards the head of the source. The auction of outflow generally consists in a duct that directs the water sources towards the irrigation channels. These simple elements for the collection and distribution of surface water requiring only little maintenance to clean the channels and the head of the source from weeds, aquatic or otherwise, and to remove any deposits of dirt that could cause obstructions.

[vii]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 in agriculture and settlement. The reclamation works require the construction of a network of channels for the collection and removal of water. It defines reclamation for natural drainage if the soil to be remedied is located at an altitude higher than that of disposal of water and, therefore, the network of channels exploits the slope of the ground; if instead the soil to be reclaimed is at an altitude lower than that of disposal is to work filled.

[viii] The choice of irrigation method depends on factors such as water availability, type of crops, the morphology of the terrain, the climate, etc.. The main methods currently in use are: flooding, sliding, spray or rain, drip, for subsurface irrigation; these differ in the volume of water distributed on the crops, for the distribution method and for the duration and frequency of the watering cycles.