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Past and present management of water resources in karst environments

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Karst is a very peculiar environment, and has a number of intrinsic features that clearly distinguish it from any other natural setting. Hydrology of karst is dominated by absence or very scarce presence of surface runoff, since water rapidly infiltrates underground through the complex network of conduits and fissures that are at the origin of the development of karst caves. The limited presence of water at the surface represented the main problem to be faced by man, starting from the very first historic phases of establishing settlements in karst territories.
As often happens in areas with limited natural resources, man was however able to understand the local environment through observations and direct experience, develop technique in order to collect the limited available water resources, and adapt his way of life to the need of the natural environment. In a few words, a sustainable use of the water resources was reached, that went on for many centuries, allowing development of human settlements and agriculture, and, at the same time, protecting and safeguarding the precious hydric resources.
Some of the most typical rural architectures built in karst areas of the Mediterranean Basin can be described as examples of such efforts: from the dry stone walls, to many types of storage-houses or dwellings, known with different names, depending upon the different countries and regions. Dry stone walls, in particular, deserve a particular attention, since they had multiple functions: to delimit the fields and properties, to act as a barrier to soil erosion, to allow terracing the high-gradient slopes, to collect and store water. At this latter aim, dry stone walls were build in order to create a small but remarkable micro-environment, functioning as collectors of moisture and water vapour.
In the last centuries, with particular regard to the last decades of XX century, the attention paid by man to the need of the natural environment has dramatically changed. This, especially in very fragile setting as karst, produced immediate negative consequences in terms of availability of water resources and protection from pollution. Several anthropogenic actions have been performed, at a very fast rate, which have been strongly favoured by the available technologies, that caused heavy and sometimes not recoverable changes in the natural karst landscape. The subdued morphologies that were typical of karst plateaus and low-mountain areas, for instance, have been rapidly modified or canceled in order to gain new lands to agriculture, or to allow development of urban and industrial areas. These actions radically changed the hydrologic features, both at the surface and underground, besides favouring the possibility to perform pollution and cause deterioration in the karst water quality. In addition, land use changes have a further negative effect, leading to increased erosion during rainstorms, and eventually causing flash floods, even in low-gradient karst.