

A new service offered by rural environment to the city: stormwater reception.

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Stormwaters are the main cause of urban floods in many urbanized areas. Historically, stormwater management practices have been focused on building infrastructures that achieve runoff attenuation through the storage of water volumes in large detention basins. However, this approach has proven to be insufficient to resolve the problem as well as it is difficult to implement in areas with a dense urban fabric. Nowadays, around the world, water managers are increasingly embracing “soft path” approaches, that aim to manage the excess of urban runoff through Green Infrastructures, where detention capacities are provided by the retention proprieties of soil and vegetation elements. Along the line of these new sustainable stormwater management practices, the aim of this study is to promote a further paradigm-shift with respect to the traditional practices i.e. to investigate the possibility to use the already existing green infrastructures of the peri-urban rural areas as reception element of the surplus of urban runoff. Many territories in Northern Italy, for example, are characterized by a high density of irrigation canals and agricultural fields that, in some cases, are isolated or pent-up inside urbanized areas. Both these elements may represent storage volumes for accumulating stormwater from urban areas. In this work, we implemented a holistic framework, based on Self Organized Map technique (SOM), with the objective to produce a spatial map of the stormwater reception level that can be provided by the rural environment. We elaborated physiographic characteristics of irrigation canals and agricultural fields through the SOM algorithm obtaining as output a series of cluster groups with the same level of receptivity. This procedure was applied on an area of 1933 km² around the city of Milan and a map of 250x250m resolution was obtained with three different levels of stormwater reception capacity. About 50% of rural environment has a good level of reception and only 30% and 20% of rural areas have respectively a moderate and scarce level of reception. By the results we can conclude that the rural environment could become a valuable structural alternative to the traditional stormwater control methods, ascribing the rural environment to a new role in urban flood protection from.