

An example of Hydro-Geological Management Plan (P.A.I.): the Metropolitan Area of Vicenza City (Italy)

BACKGROUND

Catastrophic floods endanger lives and cause human tragedy as well as heavy economic losses. Floods are natural phenomena, but human activities surely have an impact on their frequency.

Through the right measures it is possible to reduce their likelihood and limit their impacts.

In order to pursue hydraulic protection, the Veneto Region has elaborated some Hydro-Geological Management Plans¹. Here is the example of Vicenza's Plan.

PROBLEMS

The hydrographic network crossing the Municipality of Vicenza mainly includes the Retrone River and the Bacchiglione River, which merge exactly in Vicenza downtown.

- Due to an insufficient capacity of rivers banks to hold peak flows during heavy - even if not extraordinary- and frequent rainfalls, the rivers confluence has been affected by hydraulic criticality since a long time.
- The handling of peak flows is a historical problem in this area, due to the

morphology of the main and secondary drainage systems.

- In the last decades, a big development of infrastructures and residential/industrial settlements, still now in progress, affecting the majority of the territory of the Retrone River Watershed did contribute to the increase in hydraulic difficulties.
- The progressive waterproofing of the land and the construction of artificial drainage systems led to a remarkable overload of the recipient network whose structure was designed taking into account an environmental context extremely different from the present one.



Source: http://p.vtourist.com/1865967-Loggia_Valmarana-Vicenza.jpg

¹ See Good Practice “Hydro-Geological Management Plans in the Veneto Region”.

SOLUTIONS

The complexity of the problem, which does not only pertain to the hydraulic system, but equally to the socio-economical conditions of the territory, imposed the realization of an intervention planning study that, besides the design of local protection works, does focus on a basin scale approach.

Starting from both the P.A.I. hints and the risk maps that define the priority of interventions, it has been identified an optimal solution for risk prevention and protection of an urban area (Vicenza town) that is highly populated and rich of infrastructures.

Subsequently, the hill areas of the territory have been studied, in order to identify intervention systems taking into account also the effects of the introduced changes and considering the territories downstream from Vicenza (such as the Bacchiglione River stretch from Vicenza City to the territory of the Province of Padova).



Source: www.nicoledidi.ch

In such activity it is particularly important to involve Local Entities, to get an agreed technical solution.

The identification of the areas intended as temporary river retention basins was done according to the following needs:

- To locate the interventions upstream from the watershed, in order to share benefits with most of the river reaches that currently have an insufficient runoff capacity.
- To place the river retention basins next to the river sections that close a portion of watershed large enough sufficient, in order to obtain relevant benefits also for the main river.
- To occupy areas that have minor commercial value.
- To identify areas that, thanks to their morphological and hydro-geological conditions, could be transformed in temporary river retention basins.

BENEFITS

- The application of an integrated approach that allows the complete analysis of local hydraulic problems embedded in a watershed context.
- A cost-benefit analysis of interventions.
- The temporary use of the areas intended for flooding in order to assure hydraulic protection, without transfer of the ownership of such agricultural properties where works are being carried out.

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