

## Chapter 15

# Sustainability in the Safety Measures of the Historical–Cultural Heritage against Hydraulic Risks

**Francesca Pirlone**  
*University of Genoa, Italy*

**Zaira Sotgia**  
*University of Genoa, Italy*

**Ilenia Spadaro**  
*University of Genoa, Italy*

### ABSTRACT

*This chapter describes a methodological approach based on different research experiences developed in EU contest: CHEF, aimed to prevent damages caused by hydraulic risks to historical and cultural heritage; and RIVES, aimed to safeguard territory by avoid damages. Based on these experiences, paying attention especially to urban fabric and historical contest, it has been created a reconnaissance and evaluative chart. It is necessary to find out and quantify all the specific indicators useful to make a clear and deep knowledge about the territory involved to simplify a security project to avoid damages caused by hydraulic risks. The CBA Method, used to find sustainable actions, aimed to make a safety plan, permits to identify actions to preserve the territory, as limited and erodible resource. With the Geographic Information System, it is possible have a graphical representation about the results. The test area is the historic centre of Genoa.*

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## **INTRODUCTION**

Ensure safety of a territory by a natural event can be considered a primary action to reach suitable levels of sustainability, both in terms of environmental policy and preventive actions to be taken.

In this context some of the results obtained in the scope of the research project developed at community level regarding the preservation of historical-cultural heritage are briefly carried over, in historical centre particularly, against the hydraulic risk<sup>1</sup> and the sustainability declined in the choices be implemented in these areas in terms of safety<sup>2</sup>.

The preservation in the historic centres requires appropriate assessments able to consider the various critical interconnected factors. For example, the complexity and issues related to the historical layers sometimes leads to a lack of documentation of the urban fabric. For proper planning and management of the historic centre is necessary multidisciplinary knowledge, to integrate the different levels of understanding of the components of regional systems of functional-type settlement.

It is for this reason that can be useful to use the GIS, just like having tools capable of integrating different data and simultaneously help the implementation and continuous updating of information in relation to historical and cultural heritage. As noted, Gis allow to connect data alphanumeric character to those of a geographical nature and to relate the knowledge available to elements defined geographically (for example, individual units or districts, etc ...). The latter may represents an added value in this research.

In recent years and also, in recent days<sup>3</sup>, there are many hydrological disasters occurred in Italy or in Europe, which have affected cultural goods. To be remembered the devastating flood in Florence, in 1966, and those of 2002 in Central Europe. From a careful analysis, it stands to reason the laws, instruments and initiatives run in several European countries appears to be heterogeneous

and very different. It is necessary, in a comprehensive community view<sup>4</sup>, an organic action with instruments and regulations aimed at protecting historical and cultural heritage in the event of hydraulic risk at different levels of scale. These goods, as noted, hold their value in relation to the historical, architectural and landscape in which arise; heritage which, if damaged, would be lost.

## **PRESERVATION AND SUSTAINABILITY POLICIES FOR THE HISTORIC CENTRES: METHODOLOGICAL APPROACH**

An analysis of the scientific literature and methods in the determination of hydraulic risk (a function of hazard, vulnerability and exposure) has been identified in the methodological approach described below.

This approach considers as basic premise the concept of sustainability (Figure 1) which, if accompanied by processes of cognitive-participatory and, by appropriate information technology, will serve as a DSS (Decision Support System) used by government and the Facilities Civil Protection for the identification of sustainable interventions to be deployed in historic centres (the preventive planning and emergency management phase).

The approach presented in this text draws on different research experiences (see Introduction) which considered the safety of the historical and cultural heritage from natural disasters and sustainability concerns. For the latter, within academic contexts<sup>6</sup>, has been called the “CBA or the three variants” method that, through the use and qualification and quantification of indicators, makes it possible to identify specific actions and/or interventions, sustainable, which are required to implement.

The “CBA” (Figure 2) comes from the experience of the Dutch method DCBA or four variants<sup>7</sup> integrating it with the intuitive techniques

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