

POLITECNICO DI TORINO
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Master of Science in Territorial, Urban, Environmental and Landscape
Planning
Honors theses

Flood risk estimation and management in urban areas

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The modern concept of flood risk assessment is based on combination of flood hazard, probability and potential negative consequences of floods for human health, economic activities, the environment and cultural heritage: flood risk is a function and a product of hazard, vulnerability and exposure. The study about risk emerges in the international context around the eighties, fueled by the debate about the dangers of technology: the scientific community begins to ask what should be the level of security in order to be considered acceptable, it looking definitions and mathematical formulas that can quantify the risk, in order to make the best choices regarding risk management.

The thesis brings a overview of the current concepts, definitions and methods of hydrogeological risk assessment and management, with particular reference to flood risk in urban areas, in the light of recent studies, methods and experiments in the field of international scientific literature. The specific objective is to compare the features and innovations that emerged from international context analysis, with the Italian approach about the theme of risk management (defined as a process that goes from his estimation, evaluation, drafting of policies to reduce), in order to bring out problematic nodes and possible areas of improvement. This objective is developed in the light of the changes introduced by European Union through the Floods Directive, which is considered as an important opportunity for renewal. In this regard, particular attention was given to the issue of vulnerability in urban areas, as a factor to be leveraged for risk reduction (resilience), and finally on the criteria which could inspire useful tools to support the new guidelines.

The thesis consists of three parts: the first concerns the normative framework for risk reduction, with specific reference to the contents of the European Directives and to the Italian context. The evolution of the complex legislative system has allowed us to know the salient features, and finally the problematic issues that characterize the national approach.

The second part concerns the reconstruction of a theoretical and methodological framework around the theme of Risk Management: the argument is divided into two parts, the first relating to the description of the most common methods and tools of analysis and risk assessment. The second part is dedicated to management flood risk strategies: in that regard have been considered and compared different experiences (European and international), in order to know the main international guidelines. Particular attention was given to examples relating to the assessment and vulnerability reduction policies.

The third part concerns the comparison between the characteristics that emerged from the experiences described above, and the Italian approach. From this comparison, have emerged characters and the critical aspects of the planning system in relation to national policies and strategies for flood risk managing. Considerations have been developed regarding possible ideas for improvement of the system (in particular the importance of the role that could play the vulnerability reduction of local communities) and on the tools that may support this renewal.

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