Extended Partnership

multi-Risk sciEnce for resilienT commUnities undeR a changiNg climate

Spoke 7 – TS3 – Communities' resilience to risks: social, economic, legal and cultural dimensions

WP 7.7 – Legal and Ethical Aspects Prospect

Task 7.7.5 – Profiles of responsibility, compliance, and accountability of the Civil Protection System

DV 7.7.11

Methodology for integrating accountability methods in decision support system

Evidence-Based Decision Models: The Contribution of the " *WikiProcessi"* Database to Accountability and Decision Support Systems

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Introduction

As part of the RETURN project (multi-Risk sciEnce for resilient communities under a changing climate), **Spoke 7 – TS3: Communities' resilience to risks: social, economic, legal, and cultural dimensions** aims to **promote a correct perception of risk at all levels** —considering psychological and educational aspects—and to incorporate risk uncertainty into cognitive and decision-making processes. To this end, support is provided in preparing and building the resilience of the population exposed to risks through specific information, education, training, and participation processes, and in the definition of technological, methodological, and political risk mitigation measures for the protection of cultural and natural heritage. Among the dimensions explored by this Spoke is **research on liability profiles in decision-making chains:** WP **7.7 – Legal and Ethical Aspects Prospect** intends to conduct a critical assessment of the multilevel institutional and legislative frameworks relevant to environmental risks, in relation to the ethical dimension of risk, identifying gaps/conflicts, overlaps, and inconsistencies. The specific objective is to propose some remedies, after conducting a review of liability profiles and, more generally, accountability profiles with reference to national and international contexts, promoting the transition from "law of liability for natural risks" to "prevention of such risks." It follows that **Task 7.7.5 – Profiles of responsibility, compliance, and accountability of the Civil Protection System ,** for which the CIMA Foundation is responsible, aims to strengthen awareness of the legal responsibility of and in the Operators of the National Civil Protection System, with a view to the efficiency and effectiveness of the system, good governance, certainty and adequacy of the regulatory framework, as well as the dissemination of the culture of PC.

Before reporting on the outcome of the part of the Project carried out by the CIMA Foundation on the aforementioned Task, it seems appropriate to acknowledge what it normally carries out within the research programme called Governance & Responsibility in Civil Protection Systems:

(I) analysis and study of relevant case law regarding judicial cases - national and international, where significant - involving Civil Protection or, more generally, PC risks, for an examination of the critical issues of prediction, evaluation and decision-making procedures, of the critical issues of technological tools, which emerged following ex post judicial control and litigation in general;

(II) systematization of the case studies in WikiProcessi (https://wikiprocessi.cimafoundation.org), a platform owned by the Department of Civil Protection, created and managed by the CIMA Foundation as the Department's Centre of Expertise on the topic, among other things, of liability in civil protection;

(III) advanced training on the legal responsibility of National Civil Protection Service Operators;

(IV) support the Department in disseminating issues regarding responsibility for protection activities;

(V) support in identifying the "regulatory needs" for the System, in the training and analysis of the legislation and procedures applied, for the optimal functioning of the SNPC and the Observatory of good civil protection practices;

(VI) Auditing activities of the complex structures of the SNPC – such as Functional Centres and Operations Rooms – for greater compliance.

With reference to point (VI) above, please note that Deliverable *"DV 7.7.10 - Methodology for assessing the legal risk of decision-makers. Analysis of responsibility profiles and mapping of risk processes: the 'Audit' of Fondazione CIMA" has already been presented* . This document represents a significant contribution to the Project, having pursued a dual strategic objective: first, the systematization of the auditing activity that Fondazione CIMA has conducted for nearly a decade within the National Civil Protection System; second, its reworking according to an updated methodological approach, inspired by the most advanced internal audit practices in the public and institutional spheres. Through this work, the aim was not only to consolidate the experience gained, but also to promote critical and shared reflection on the methodology adopted and the results achieved, extending the discussion to a broader audience of stakeholders. From this perspective, and thanks to the RETURN project, auditing is increasingly recognized as a strategic lever for the continuous improvement of the Civil Protection System, as well as for raising standards of accountability, transparency, and quality of operational decisions.

This document, however, aims to specifically examine points (I) and (II) listed above, focusing on three main directions:

- **What does case law analysis mean for the Civil Protection System** , with particular attention to legal cases that directly or indirectly involve the various components (or rather, the Actors) of the Civil Protection System? This activity allows us to identify critical issues that arise in decision-making processes, including those related to the use of technological systems and tools in the forecasting, assessment, planning, governance, and general risk management phases. Case law analysis, in this sense, serves as a tool for cross-disciplinary analysis of the Civil Protection System's operations, useful both for highlighting areas of complexity within the system itself and for promoting informed improvements in operational practices and institutional responsibilities.
- **What is the utility of systematizing the aforementioned case law within the WikiProcessi platform** (https://wikiprocessi.cimafoundation.org/#/). The platform is designed as a dynamic and structured archive, easily accessible, capable of promoting—through case law and the lens of judicial review of operators' conduct—specific knowledge of the Civil Protection System. This is aimed at constantly improving operational practices and decisions made by the System's stakeholders, as well as improving the effectiveness and efficiency of judicial proceedings, and therefore "for the benefit" of magistrates, lawyers, scholars, and technical consultants.

- **Why was it necessary to enhance this *forensic investigation* approach , in synergy with some RETURN project partners** ? This collaborative effort allowed us to leverage the potential of case law as a tool for learning and evolving the system, promoting a critical reading of cases and aggregated results across the entire case history. At the same time, it enabled a comparison between the Wikiprocessi platform and other analysis tools—which will be explored in more detail below—including the "matrix" developed by the FEEM–Tor Vergata University-Legal Professionals working group, winner of a cascade call.

Finally, collaborations on the topic of liability with experts and non-experts in the PC system, brought together in the RETURN Project, have helped raise awareness of the importance of legal responsibility and accountability more generally, [1]and have opened new perspectives for the adoption of more effective and resilient solutions in risk management.

Below, we will detail the activities conducted by the CIMA Foundation regarding the analysis of case law and the systematization of case studies on the WikiProcessi platform. We will highlight the methodological and operational contribution offered within the RETURN Project, as well as the added value resulting from collaboration with the partners involved, with the aim of promoting shared reflection aimed at strengthening the National Civil Protection System.

1. Legal research at the CIMA Foundation

1.1 Towards a structured knowledge of liability in civil protection

The idea of observing and analyzing judicial proceedings and decisions relating to civil protection initially took shape within the Faculty of Environmental and Land Engineering at the Savona Campus, a branch of the University of Genoa, about twenty years ago. In this academic context, several researchers from the CIMA Foundation were engaged in teaching and research activities, under the guidance of Professor Franco Siccardi, founder of the Foundation and then Head of the Environmental Engineering Degree Program.

From the very first approaches, it became clear how fruitful the analysis of disasters was for students and teachers, both from a technical-scientific perspective—with particular reference to hydraulics and hydrology—and from a legal perspective, in an integrated perspective that allowed them to grasp the interactions between operational choices, technological tools, and institutional responsibilities.

[1]Legal responsibility is the obligation to answer for one's actions before the law when a legal obligation is violated; it is a formal, standardized institution that entails sanctions or compensatory consequences determined by a competent authority. Accountability, on the other hand, is the ability and duty to account for one's decisions, processes, and results in a transparent, comprehensible, and verifiable manner by stakeholders ex post. It does not necessarily depend on a violation and is not limited to a system of sanctions: it concerns the quality of governance, the traceability of decisions, and the consistency between objectives and actions.

This teaching experience, and subsequent scholarly research, has led to a systematic study of several emblematic events, which represented crucial turning points for both engineering and law. These include:

- the Becca di Nona landslide (15 October 2000), which gave rise to legal proceedings involving various actors in the civil protection system of the Aosta Valley Region;
- the flood in Vibo Valentia (3 July 2006) and the earthquake in L'Aquila (6 April 2009), events which led to the indictment of officials of the National Department of Civil Protection;
- the procedural epilogue of the 1994 Piedmont flood and the tragic events of Sarno and Quindici (5 May 1998);
- the initiation of criminal proceedings for the flood in Capoterra (22 October 2008) and that in Messina (12 September 2009).

These cases, due to their relevance and complexity, have offered a privileged platform for legal investigation, allowing for critical examination of the methods of risk prediction, assessment, and management, the adequacy of the regulatory and organizational tools available to civil protection operators at that particular moment in time, as well as awareness of the "status" of personal liability, especially criminal liability.

From these reflections, the idea of developing a more comprehensive and systematic methodological approach to the study of judicial cases that, directly or indirectly, involve the national and local levels of civil protection was consolidated. The objective was not merely reconstructive, but rather proactive: to understand the jurisdictional approach and the related procedural dynamics to identify the critical areas subject to review and, consequently, outline possible paths for improving and strengthening the civil protection system.

A fundamental and essential step for the consolidation of a culture of responsibility in the field of civil protection is represented – in the view of the CIMA Foundation[2] [3] [4]- the systematic collection, organization, and analysis of judicial data on civil defense cases. Only by building a solid, accessible, and shared knowledge base can we not only make a significant contribution to promoting informed decision-making processes, geared toward prevention and risk management, but also ensure the operator's accountability.

1.2 Towards the cataloguing of Civil Protection procedures

The digital platform "DeWiki" was conceived to address this need, later evolved and renamed "WikiProcessi." This innovative and strategic tool is owned by the Department of Civil Protection and managed by the CIMA Foundation, as the National Center of Expertise on Civil Protection Liability.

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[2]Altamura M., Ferraris L.: contributions to " *Civil Protection in the Risk Society* ", series edited by the Department of Civil Protection and the Cima Foundation, Ed. ETS, Vol. 2 and Vol. 3
[3]Altamura M., Amato D., Ferraris L.: contributions in " *Civil Protection in the Risk Society* ", cit., Vol. 6
[4]Altamura M., Amato D.: contributions in " *Civil Protection in the Risk Society* ", cit., Vol. 8

At the time, “DeWiki” was configured as a structured and interdisciplinary jurisprudential archive, aimed at systematizing the legal cases relating to responsibilities connected to catastrophic events in which civil protection personnel had operated .

Soon, however, it also became a tool for disseminating legal and operational knowledge among civil protection system stakeholders—including administrators, technicians, operators, and citizens—fostering the development of best practices based on legal evidence and multidisciplinary analysis, and promoting a culture of informed responsibility that emphasizes the principle of prevention.

Thanks to its modular structure, constant content updates, and technological development, "DeWiki" has been transformed into the broader and more comprehensive "WikiProcesses" Observatory and today represents a national reference point for understanding and deepening the legal responsibilities associated with civil protection [5]. The platform significantly contributes to institutional transparency, strengthening administrative capacity, and building shared knowledge, essential for effectively addressing the challenges posed by managing natural and man-made risks.

The Observatory of Proceedings Relating to the Liability of Civil Protection Operators draws inspiration from Galileo's motto, *"Observe to predict, predict to prevent [6]. "* In other words, we observe to understand the origins of judicial oversight of this type of activity, its nature, its impact on the system, the correspondence between the agent's canons of what is and what should be, as well as to prevent misconduct.

We also study to verify the validity of the prosecution's thesis: we therefore observe the original formulation and whether or not it is confirmed at the end of the proceedings. This also helps us understand the standards by which the judiciary considers liability, whether these standards are consistent in case law, and what scholarly opinion is on them ; finally, we seek ways to bridge the gap between different professional worlds that speak different languages.

From the analysis of the rulings, we also try to derive some "precipitates" - essentially "recommendations" - so that this work is truly accessible to a wide audience of subjects, from practitioners to scholars.

[5]https://www.ilgiornaledellaprotezionecivile.it/a/il-report-2024-sulla-responsabilit-giuridica-degli-operatore-di-protezione-civile

[6]https://www.cimafoundation.org/news/wikiprocessi-losservatorio-sulla-responsabilita-giuridica-degli-operatore-di-protezione-civile/

"WikiProcesses" Observatory

2.1 What is the "WikiProcesses" Observatory and how is it structured?

The Observatory, initially created as a simple database within a specific research program promoted by the CIMA Foundation, soon revealed its usefulness also in the broader context of risk reduction policies, the Foundation's strategic area of intervention.

From a technical standpoint, the platform's evolution has followed a significant path: from an initially rigid structure, inspired by the Wikipedia model, it has gradually evolved into a decidedly more dynamic—and, to some extent, "intelligent"—system capable of processing data, generating statistics, and formulating estimates. Indeed, each procedure, perceived to have some relevance to the topics of interest, is entered into the database through a dedicated file, divided into fields and subfields that allow for the collection of relevant information for legal analysis.

Beyond the merely quantitative and statistical dimension, the information collected feeds the production of documents ("Dossiers") on *leading cases* , as well as "Notes" on cases still pending but of particular importance.

Alongside the collection and cataloging of civil protection case law, the Institute conducts systematic regulatory analysis, encompassing national, European, and international levels in the fields of *civil protection* , *disaster risk reduction* , and environmental protection. This approach allows researchers to map the evolution of regulatory frameworks and, above all, to develop interpretations and identify legal concepts useful for strengthening the Italian civil protection system.

Therefore, analyzing the data contained in the Observatory's files allows us to identify and study the main jurisprudential and regulatory trends, offering a strategic vision that can guide regulatory compliance.

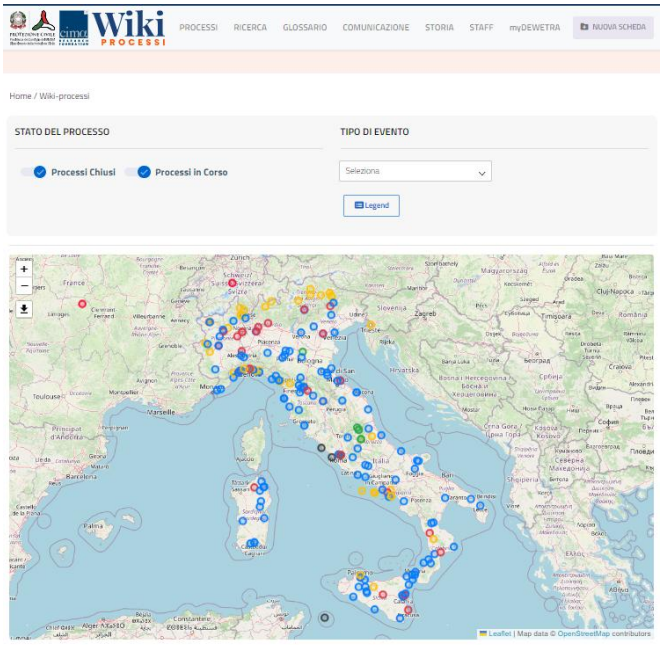
In recent years, the collection and cataloging effort has expanded well beyond the confines of civil protection proceedings strictly speaking, including related areas such as public health, personal safety, and environmental protection. A prime example is the collection of case studies related to the Covid-19 pandemic, which began with the first newspaper reports of suspicious deaths in residential nursing homes and continued with the opening of proceedings throughout the country, some of which resulted in actual trials.

Interest in these related areas stems from the understanding that observing case law and procedural outcomes in related fields allows us to anticipate, by analogy, the trends that may emerge in civil protection proceedings. Specifically, it provides insight into the principles on which the judiciary bases its decisions when it comes to risk management, with the responsibility

of protecting people from a hazard, whether natural or man-made, characterized by scientific uncertainty.

Currently, the Observatory collects approximately 200 monitored cases, corresponding to as many disasters that have generated legal proceedings that can be observed and documented. The entire corpus is divided into two main categories:

- **Concluded** cases , i.e. proceedings that have come to an end with the adoption of a definitive judicial decision;
- **Ongoing** cases , still being monitored by researchers at the CIMA Foundation, who follow their evolution and provide systematic updating of the data.



[Fig. 1: map of the proceedings]

Within the above-mentioned categories, the monitored cases are further classified based on the **type of naturalistic event** that generated the legal proceedings, namely:

- Landslides
- Floods
- Strong wind
- Earthquakes
- Climate events, which include Italian and supranational proceedings related to climate change

- Health events, a specific category that includes procedures initiated following the COVID-19 emergency, which have been found to bear significant similarities to the dynamics of civil protection.

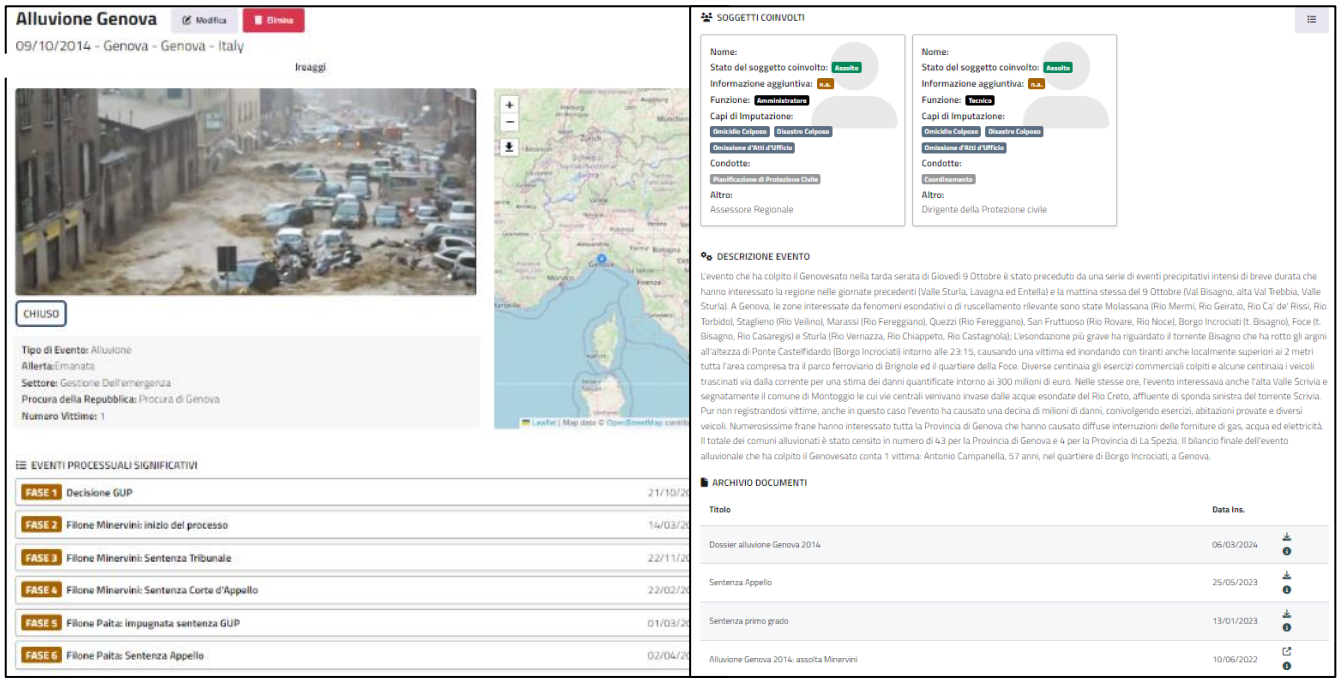
This thematic classification allows for a more precise analysis of the relationship between natural events and the resulting legal responses, offering a useful tool for research, training, and improving risk management policies.

Each monitored case is described in detail on a dedicated page of the Observatory, called the " **event sheet** ." The textual description is accompanied by extensive documentation. For this reason, the sheet represents the heart of the research work carried out by the CIMA Foundation, allowing experts to access official documentation relating to the event and the procedural evolution.

The factsheet, prepared for each legal proceeding, collects a series of structured information that facilitates analysis and understanding. Specifically, it includes:

- a description of the natural event that gave rise to the proceeding, with reference to the relevant circumstances and impacts;
- an indication of the most significant procedural phases, useful for reconstructing the evolution of the case over time;
- the list of parties involved, be they defendants, injured parties, public bodies or other institutional actors;
- the legal qualification of the contested crimes, according to the applicable legal provisions;
- the outcome of the proceedings, where available, with reference to the final judicial provision;
- a selection of news articles, collected by researchers, which document the media and social context of the case;
- any additional documents deemed useful for overall understanding, such as official weather bulletins, technical event reports, administrative or judicial documents.

Through this structure, the card allows for the gathering of heterogeneous sources into a coherent framework, promoting critical and comparative analysis of the monitored cases, as shown in Fig. 3.



[Fig. 3: example of an “event card”]

Within this legal research methodology, access to judicially-sourced documents is essential: only such documents allow for the reliability and robustness of the analysis, avoiding partial or erroneous reconstructions that could compromise the entire methodological framework and research findings. These documents allow for a clear delineation of the case's scope, a correct characterization of the contested conduct and its legal classification, an understanding of the rationale behind the judicial authority's decisions, and even a preliminary assessment of the content of interest from a legal research perspective.

In addition to the magistrates' records, we try to find, where possible, other procedural material in order to gather every element useful for analyzing the case: this is to avoid stopping at the question of "who did it", but rather to get to the point of "why it happened".

The collection of this documentation, often not immediately accessible, was made possible thanks to an intense and patient effort to build a network of functional and trusting relationships with civil protection experts, scientists, technicians, jurists, lawyers, and magistrates. These relationships, based on ongoing dialogue and shared scientific and institutional objectives, have allowed the Observatory to be continuously nurtured and updated, which today represents a strategic knowledge infrastructure: a true "capital" for the CIMA Foundation's legal research, as well as a qualified point of reference for the Department of Civil Protection.

Within this scientific network, the Regional Functional Centers and the Central Functional Center, the Catholic University of the Sacred Heart of Milan and the "Federico Stella" Study Center

on Criminal Justice and Criminal Policy play a particularly important role, as do a select group of academics and magistrates who, with their technical and legal contributions, enrich the analytical work and ensure its methodological rigor.

This relational infrastructure, built over time and based on multidisciplinary expertise, represents a distinctive element of the Foundation's working method, capable of combining scientific rigor, openness to discussion, and the operationalization of knowledge, consistent with its mission of supporting public policies for risk prevention and management.

2.2 Quantitative data from the "WikiProcesses" Observatory

As mentioned above, approximately 200 cases have been mapped over the years. This phenomenon, from a judicial statistics perspective, is evidently limited, but it has significant social and economic consequences, given the number of victims that calamitous events can cause, the extent of damage recorded after each disaster, and, not least, the media impact these events have. This phenomenon, among other things, seems to lead to a certain precautionary attitude among professionals, not unlike that of so-called "defensive medicine."[7]

What we are observing, therefore, is a phenomenon of great social significance, and for this reason, RETURN has conducted some analysis on the quantitative and qualitative data regarding the cases monitored by the Observatory, which we present below.

A closer look at the cases reveals that 121 are still pending; among these, flood events are the most prevalent, accounting for nearly two-thirds of the total.

Regarding the numerical evolution of proceedings over time, a marked increase has been observed since 2008. In the period between 1994 and 2008, in fact, only 11 known cases were recorded. It is plausible that this figure is somewhat inaccurate, primarily due to the difficulty in obtaining information from more remote periods; however, this limitation is believed not to significantly impact the robustness of the analytical framework. The discontinuity is evident considering that, in the subsequent period – from 2008 to 2023 – 171 proceedings were recorded. While this is not the place for an in-depth analysis of the causes of this increase, it is appropriate to highlight a key point: no significant correlation emerges between the number of natural disasters and the number of proceedings initiated. In other words, the hypothesis that the increase in legal cases is directly proportional to the increase in natural events does not appear tenable. The reasons for this growth will likely be found in other factors, such as the broadening of the regulatory framework, greater attention from investigative bodies, as well as growing social pressure towards natural phenomena that cause victims and damage.

[7]G. Forti, M. Catino, F. D'Alessandro, C. Mazzucato, G. Varraso , *The Problem of Defensive Medicine* , Discrimen , 2010. Available at the link: https://discrimen.it/libri/il-problema-della-medicina-difensiva/

The monitored proceedings are distributed across the country, albeit with significant regional differences. Specifically, Tuscany, Sicily, Liguria, and Emilia-Romagna each recorded approximately 20 proceedings, while in other regions the number is significantly lower. While it is not possible to delve into the causes of this disparity here, it is useful to highlight that it may be due, on the one hand, to the greater environmental vulnerability of some regions and, on the other, to local dynamics attributable to regional specificities and the functioning of judicial offices, which can influence the recording, management, and formalization of proceedings.

The analysis of the disputes highlighted 418 individuals involved, nearly half of whom are public administrators, with a particular incidence of mayors.

In light of this, the number of convictions is extremely low: only 36 individuals, including those not yet final. Some emblematic cases, such as those in Messina and the Seriana Valley, show a significant discrepancy between the number of defendants and those convicted, which in these cases is zero. Analyzing the overall outcome of the proceedings, we observe that only 7% result in a final conviction. The remaining 93% are distributed among:

- Archiving (almost half of the cases)
- Acquittals on the merits
- Other forms of acquittal

An interesting fact concerns the level of judgment: approximately a quarter of all disputes end up in the Supreme Court, a sign of great legal complexity and significant "litigiousness".

The crimes charged mainly concern manslaughter, negligent personal injury, and negligent disaster, but there are also intentional charges, such as ideological falsehood and failure to perform official duties.

Particular attention is deserved by the qualitative profile of the charges, which frequently consist of highly complex charges, sometimes accompanied by explanatory briefs drafted by the public prosecutor. In most cases, these are crimes of omission, relating to areas characterized by a high level of regulatory and technical complexity, such as:

- Territorial planning
- Government of the territory
- Communication and warning systems

The contested conduct consists of omissions or negligence, ranging from lack of planning, to failure to take mandatory precautions, to inadequate communication or incorrect wording of warning messages.

Regarding the timing of the processes, the analysis reveals that:

- Approximately 50% of proceedings last more than six years

- A third are between three and six years old
- Only a fifth are completed in less than three years

This data is particularly relevant considering that nearly half of the proceedings end in dismissal, highlighting how even cases without a substantial judicial outcome are characterized by long and complex timeframes, with a significant impact on the judicial system and on the management of civil protection responsibilities, as well as on the lives – including working lives – of those involved.

Analyzing only concluded cases, it emerges that in only 23% of proceedings was an expert opinion ordered, and the judge did not always decide to comply with the expert's conclusions. This data raises significant questions about the reasons why judges, in a highly technical field, fail to rely on specialized expertise, especially considering that, in many cases, the public prosecutor does not even appoint a consultant. In a context where omissions are intertwined with highly specialized dynamics, the lack of expert support risks compromising the quality of judicial investigations, raising methodological and substantive justice concerns. It has been noted that the experts used in the proceedings are professionals and academics, but rarely have expertise in the specific field of civil protection.

2.3 How to use the “WikiProcesses” Observatory

Through the Observatory, the CIMA Foundation also ensures ongoing training, research, and monitoring activities, as well as—as mentioned—data analysis. Over the course of over fifteen years of operation, experience has shown that the data collected constitutes a fundamental resource for understanding, in depth and from various perspectives, the complex system involving civil protection operators and their accountability, but also—as mentioned—the causes of disasters (in a sort of "forensic investigation" approach).

It is in this perspective that research takes on added value: not only as a tool for in-depth analysis and training, but also as a lever for guiding risk reduction policies and making a concrete contribution to improving the Civil Protection System.

For this reason, the RETURN Observatory has been expanded to include a broader audience of stakeholders, including—in addition to the CIMA Foundation and the Department of Civil Protection—the Project Partners. To support this openness, the latest version of the platform has been enhanced with an "advanced search" function, specifically designed to facilitate data access and querying.

This section of the Observatory allows users to deepen their understanding of the phenomenon being analyzed by uncovering quantitative elements derived from the collected documentation. The data contained in the event files is processed according to filters preselected

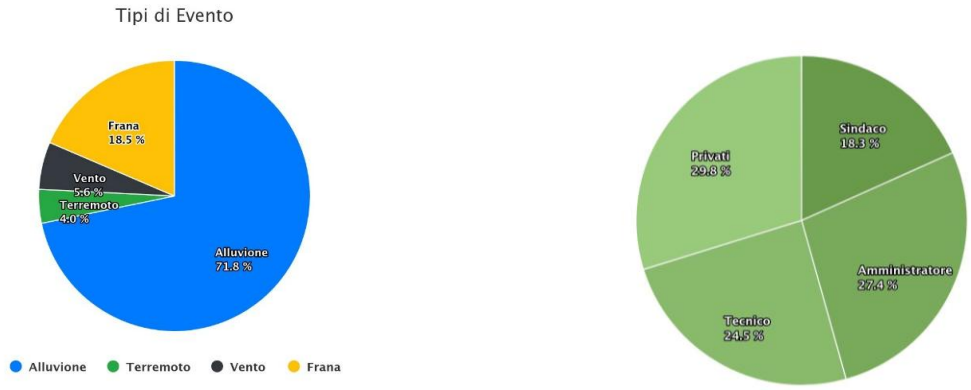
by the user, in order to answer specific research questions and support the analysis in a targeted and personalized manner.

[Fig. 5: dashboard for “advanced search”]

The filters inserted in the aforementioned "advanced search" concern:

- The status of the proceedings (whether the process is ongoing or concluded)
- The date
- The type of event
- The sector
- The territory in which it developed
- The function of the subject involved
- The crimes envisaged in the indictment
- The status of the subject involved
- The conduct

Below are some examples of graphs generated using the advanced search query.



[Fig. 6] [Fig. 7]

The chart in Figure 6, titled "Event Types," represents the percentage distribution of legal proceedings monitored by the CIMA Foundation Observatory in relation to natural events. It is a useful visual tool for understanding which types of disasters have most frequently generated litigation or judicial investigations. In particular:

- Floods (71.4%): The vast majority of monitored cases are related to flood events. This data highlights how floods are the natural phenomenon most frequently associated with operational, planning, or management responsibilities that result in legal proceedings.
- Landslides (18.5%): Landslides account for nearly a fifth of all incidents. Although less frequent than floods, they are still relevant for risk and liability analysis.
- Wind (5.6%): events related to strong winds (e.g. tornadoes, storms) generate a smaller, but not negligible, number of proceedings.
- Earthquake (4.4%): cases related to seismic events are the least represented in the sample, probably due to the different nature of the risk and the responsibilities involved.

This distribution not only reflects the frequency or impact of natural events on the territory, but also their legal relevance: that is, how often a disaster leads to the initiation of legal proceedings. It is a useful indicator for guiding research, prevention, and institutional reflection on risk management responsibilities.

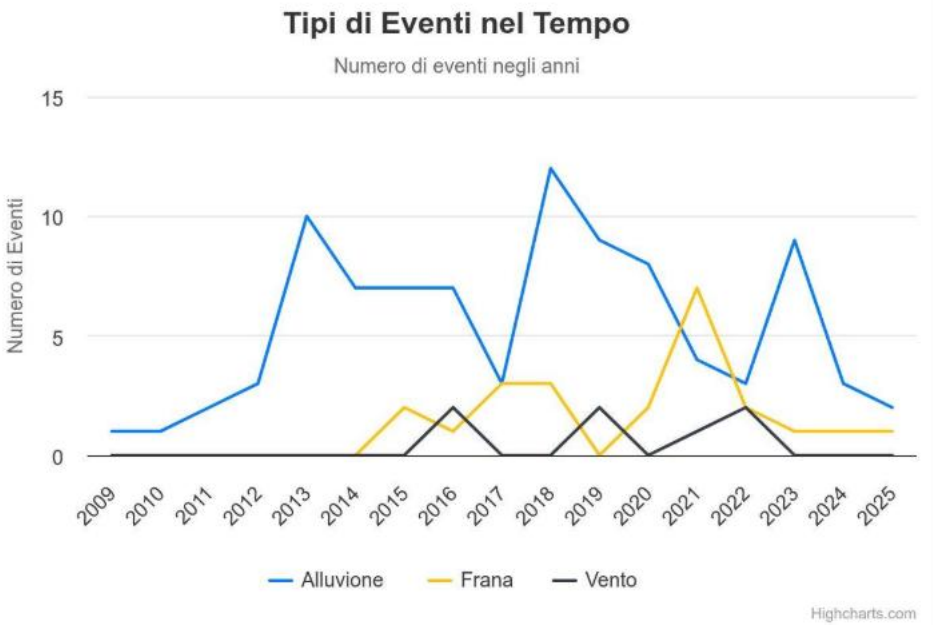
The pie chart in Fig. 7 represents the percentage distribution of parties involved in legal proceedings monitored by the CIMA Foundation Observatory, in relation to natural events. It is a useful tool for understanding which institutional or private figures are most frequently involved in processes related to risk and emergency management. In particular:

- Private individuals (35.3%): The highest share concerns citizens, businesses, or other non-institutional entities. This data suggests that, in many cases, legal liability is not limited to individuals connected to public entities, but also involves the individual or collective behavior of private individuals.
- Technicians (24.2%): A significant portion of the proceedings involve technical professionals, such as engineers, geologists, officials, or consultants. This highlights the crucial role of professional skills in risk management and planning, and their exposure to liability in the event of disasters.
- Administrators (22.4%): This category includes councilors, managers, and other political or management officials. This figure reflects the importance of administrative decisions in preventing and responding to natural disasters.

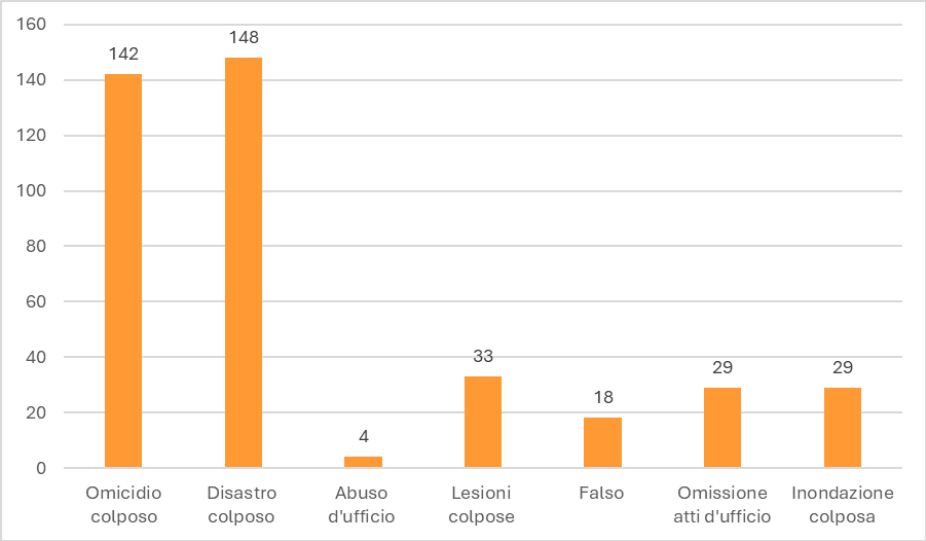
- Mayors (18.1%): As local civil protection authorities, mayors are directly involved in numerous proceedings. Their operational and decision-making responsibility is often subject to legal scrutiny, especially in emergency situations.

In summary, the graph shows how legal responsibility for civil protection is distributed between public and private actors, with a strong impact on technical professionals and citizens. This type of analysis is essential for understanding litigation dynamics and guiding prevention, training, and governance strategies.

In Fig. 8, the number of legal proceedings opened in the monitoring years (on the x-axis), divided by type of natural event.



[Fig. 8 Correlation between natural events and legal proceedings]



[Fig. 9 Number of proceedings and contested crimes]

Finally, the graph in Fig. 9 shows the distribution of crimes contested in legal proceedings related to natural events. The most frequent are negligent disaster (148 cases) and manslaughter (142), followed by negligent injury, negligent flooding, and failure to perform official duties. Less frequent are forgery and abuse of office. The prevalence of negligent crimes highlights the importance of understanding one's own responsibility in risk management and the actions that can potentially integrate the subjective element of negligence.

2.4 Qualitative data from the " WikiProcessi " Observatory

As part of CIMA's ongoing research, particular attention is paid to an in-depth analysis of judicial decisions, with a particular *focus* on court decisions, which represent the primary source of doctrinal reflections on liability.

Within the RETURN Project, this systematic study was explored in depth, identifying a series of key themes. We then deemed it appropriate to share them with the Project Partners, both to contribute to the overall discussion and to facilitate the creation of the "matrix" developed by the researchers and professionals who won the cascade call, which we will discuss in more detail below [8]. Indeed, these themes lie at the intersection of law, technology, and practice, thus providing a unique lens through which to observe not only the functioning of the judicial system, but also the complex challenges that risk society imposes on civil protection and public accountability.

The issues worthy of further investigation are the following:

[8]Department of Civil Protection of the Presidency of the Council of Ministers and CIMA Foundation , *Civil Protection in the Risk Society – The Management of Natural Risks and the Responsibility of Civil Protection Operators* , 2025, pp. 42-51.

- the identification of the subjects responsible for managing disasters, within the complex and multifaceted Civil Protection System;
- the jurisprudential principles developed on the subject of natural disasters, with particular reference to the criteria for assessing fault;
- the statute of criminal liability of civil protection operators, with its specificities and critical issues.

Below, we address some key legal issues, followed by details on how they formed the basis for constructing the "matrix."

2.4.1. Identifying those responsible

In the context of civil protection, identifying responsible parties raises particularly complex issues that merit further investigation. The system is, in fact, called upon to address predominantly exogenous, natural risks, for which the agent is not the perpetrator of the harmful event, but is nevertheless required, by virtue of their role as "risk manager," to prevent or mitigate its effects.

This is therefore part of the scope of improper crimes of omission, which raises the delicate issue of defining the sources of guarantor positions. Here, we want to emphasize that the identification of guarantors cannot be based solely on formal criteria, but must also take into account substantive parameters, deducible from the factual elements and the actual conduct of the individual.

This approach has significant implications for the attribution of liability, broadening the scope of potentially involved parties and making the legal assessment of omissions more complex and nuanced.

A further element of complexity is the polycentric nature of the National Civil Protection Service, as recognized by the Constitutional Court (ruling no. 327/2003) and, more recently, by the Criminal Court of Cassation (ruling no. 45590/2021). Contrary to what is sometimes believed, the system does not coincide with the Civil Protection Department alone, but should be understood as a complex and cooperative network, composed of multiple institutional components, operational structures, and competing entities, which interact as set forth in Article 3, paragraph 2, of Legislative Decree 1/2018. This "diffuse" structure means that responsibility for managing disasters is not centralized, but distributed—within a framework of subsidiarity—among various actors, each with specific expertise and varying roles depending on the nature and severity of the emergency. This configuration, which ensures flexibility and widespread intervention, complicates the precise identification of responsibilities.

A further liability profile concerns those individuals who, despite not having a formally recognized position of guarantor, may be held criminally liable if they interfered in the management of the disaster or actively cooperated with those holding a legally preventative obligation. In such circumstances, case law has clarified that operational interference or qualified cooperation can result in

the assumption of a "de facto" guarantor position, resulting in liability for improper omissions. For example, reference is made to the Criminal Cassation Court's ruling no. 22214/2019, relating to the 2011 Genoa flood, which found the liability of certain members of the Municipal Operations Center (COC). Although they did not formally hold guarantor roles, they had assumed significant decision-making and management roles during the emergency phase. A similar principle was affirmed in the same Court's ruling no. 12478/2016 (so-called "Major Risks"), which emphasized that even technical and scientific experts, if actively involved in the decision-making process, may be held criminally liable for the consequences of their conduct, by virtue of the role they actually play. These rulings confirm a consolidated approach: criminal liability is not based exclusively on formal or regulatory qualifications, but can also arise from de facto conduct that involves the assumption of management, direction, or influence over the event, with significant legal consequences.

The Observatory's case study analysis has highlighted numerous cases in which the Public Prosecutor and the Judge have faced the complex issue of identifying the individual actually responsible for risk management. The main case law scenarios are as follows:

- Worsening events: the question concerns who is responsible in the event of events classified as type A, B, or C (Article 7, Legislative Decree 1/2018). The Court of Cassation, in its ruling on the 1998 Sarno disaster (Criminal Court No. 16761/2010), later cited in the aforementioned 2011 Genoa ruling, clarified that the Mayor's role as guarantor does not cease, but is instead supplemented by that of the authority responsible for co-managing the emergency (in this case, the Prefect intervened); however, the Mayor cannot abdicate or delegate the functions inherent to his office (of "Local Civil Protection Authority").

- Relationship between the political body and administrative leaders: addressed by the Court of Genoa (2014 flood, ruling no. 1382/2017) and by the Court of Ministers in the proceedings regarding the pandemic in Val Seriana (Brescia Court, ruling dated June 7, 2023). Both provisions refer to Law no. 165/2001, which assigns operational tasks to administrative leaders. However, interference by the political body in actual management may lead to an extension of liability, even in derogation of the legal provision.

- Liability of technical-scientific bodies: The "Grandi Rischi" ruling (Criminal Court of Cassation no. 12478/2016), relating to the 2009 L'Aquila earthquake, precisely outlined the duties of experts, affirming—albeit as a general principle—that they may be held criminally liable for their expertise. However, each trial is strongly influenced by the specific facts, and case law solutions are not always replicable.

- Liability for interference or cooperation: Even individuals without formal obligations may be held liable for improper omissions if they interfered in the management of the event. This was the case of the COC members involved in the 2011 Genoa flood (Criminal Court No. 22214/2019), held liable for having taken an active role in managing the emergency. Similarly, in the case of the Pollein landslide, the issue of the liability of technical operators arose.

Although not formally bound by obligations, they had made significant decisions in managing the event, impacting the emergency dynamics [9].

2.4.2. The assessment of guilt

The issue of assessing culpability has yet to be definitively resolved in either doctrine or case law. The dogmatic uncertainties that characterize the general framework of criminal law are clearly reflected in the field of civil protection, especially when it comes to defining the parameters for assessing culpability of operators.

The rulings we have examined have addressed the issue from the perspective of the foreseeability of the event, the distinction between exceptional and unforeseeable events, and the behavioral requirements of precautionary rules.

The issue of the event's foreseeability has had the most significant practical implications. To address this issue, it is necessary to return to the aforementioned ruling on the Sarno disaster (Criminal Supreme Court ruling no. 16761/2010). Unlike the section on identifying guarantors, the passages regarding the assessment of fault appear problematic: the Supreme Court of Cassation states that the model agent is one who, in predicting the future, must consider not only what happened in the past, but also the possibility of similar events recurring with more serious or even catastrophic consequences. This approach is closer to the precautionary principle than to traditional criteria for attributing fault. This approach, foreign to the criminal law, cannot be used to establish the agent's liability. Yet, it has been taken up again in numerous decisions on the merits (see Lecce Court, 17 July 2014; Messina Court, 27 April 2016; Genoa Appellate Court, 23 March 2018), and at the same time it has been a factor of strong pressure for the operators called upon to manage the risk.

The original intent of the Court of Cassation in 2010 was to provide a benchmark to ensure the highest level of safety for the community. However, the systematic application of this criterion has generated distorting effects [10]: in short, if the operator had been required to systematically predict the worst-case scenario, all yellow alerts would have turned orange and orange alerts would have turned red, with the paradoxical result of one hundred red alerts per year per region. The consequences are easy to imagine: an overused warning system would lose credibility and could compromise the very function of early warning.

After nearly a decade, the Court of Cassation returned to the issue with its ruling on the 2011 Genoa flood (Criminal Court No. 22214/2019). While confirming the general validity of the judgment rule established in the Sarno case, the Court introduced important clarifications, aimed at bringing the

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[9]Criminal Court of Cassation, Section IV, Sentence, 18/11/2008, no. 43118, on the case of the Becca di Nona landslide (Pollein).

[10]These distortions were highlighted in a study by the CIMA Foundation presented in 2015 and published in the third volume of this series, *"Civil Protection in the Risk Society. Risk Communication, Citizen Safety, and Criminal Liability. Ambitions, Limits, and Perspectives,"* 2022.

parameter within limits compatible with the principle of culpability: the model agent is one who can foresee more serious consequences of a recurring phenomenon, but within reasonable limits. Thus, it is foreseeable that the frequent flooding of a stream may affect larger areas than in the past, but not the entire city; or that a phenomenon that caused minor landslides may lead to a more extensive landslide, but not the collapse of the entire mountain.

Concluding on the topic, the Fourth Section of the Court of Cassation issued a ruling the following year, relating to the 2011 Sant'Elpidio a Mare flood (Cass. pen. no. 29439/2020): on a superficial reading of the ruling, the ruling would seem to reiterate the 2019 approach, when in fact the reasoning reveals perfect continuity with the 2010 decision.

2.4.3. The statute of liability of civil protection operators

The third point we proposed for discussion with the RETURN Partners concerns the status of liability in risk professions.

Law no. 30/2017 – the enabling law for the adoption of the so-called Civil Protection Code (Legislative Decree no. 1/2018) – entrusted the delegated legislator, among other things, with the *"definition of the role and responsibilities of the civil protection system and its operators and their specific professional skills, including with reference to the management of operations rooms and the network of functional centers and the related discipline and regulation"* (Article 1, paragraph 1, letter n), Law 30/2017). This provision represented a first attempt to introduce, in this area too, forms of limitation of criminal liability – improperly referred to in the media as "criminal shields" – with the aim of protecting operators called upon to manage high-risk and unpredictable situations.

As is well known, this provision was not incorporated into the final text of the Code, likely due to the excessively general nature of the delegation, which could have raised significant questions of constitutionality had it been implemented. Since then, the regulatory framework on liability has remained unchanged, and the dialogue between legal scholars and case law has not yielded any results.

In the meantime, the legal system has produced a plurality of regulatory interventions aimed at limiting the criminal liability of individuals called upon to manage specific risks:

- in the healthcare sector, for example, we recall the so-called Balduzzi decree (2012) and the so-called Gelli-Bianco law (2017), the latter being the subject of an important intervention by the United Sections of the Court of Cassation (Mariotti ruling, Criminal Court, no. 8770/2017), which remodelled art. 590-sexies of the Criminal Code;
- The Covid-19 pandemic has further accelerated this trend, with the introduction of specific provisions regarding vaccinations (Article 3 of Decree-Law 44/2021, converted into Law 71/2021) and the provision of a limitation of criminal liability to cases of gross negligence for treatments provided in an emergency context (Article 3-bis of Decree-Law 44/2021, converted into Law 71/2021). Although conceived in an exceptional context and with a limited timeframe,

this framework is still in force, by virtue of subsequent extensions (see Article 4, paragraphs 8-septies and 8-octies, Decree-Law 215/2023, converted into Law 18/2024);

- In the wake of the pandemic emergency, legislative activism has transcended the area of medical malpractice, extending to the area of occupational health and safety, with the well-known "employer shield" (Article 29-bis of Legislative Decree 23/2020, converted into Law 40/2020). Since then, there has been growing pressure from trade associations and representative bodies, aimed at obtaining the introduction of favorable provisions capable of protecting their members from the risk of incurring criminal liability.

In light of the above, it is necessary to acknowledge that the legislator has chosen, in several areas, a different path than that adopted in the field of civil protection, with significant effects on the unity and coherence of the system.

3. The Observatory's products: Dossier, Note on the judgment and Precipitates

The legal, technical, and operational issues outlined above will be systematically organized into structured and recognizable research products starting in 2022. CIMA Foundation researchers delve into specific court cases and related rulings, selected for their particular scientific, legal, and operational relevance, developing scholarly products such as "Dossiers," "Notes on Judgments," and "Precipitates."

These products, with reference to some selected cases, were shared with the RETURN Project Partners. Before describing them, the main features of these products are briefly outlined.

3.1 Dossier

The "Dossier" is a working document that examines an event and the resulting process, through all its stages and decisions. The dossier therefore addresses a case that has already reached the final procedural stage, and its ultimate purpose is to capture, in a single document, the complete legal framework and the doctrinal considerations regarding the most relevant and innovative issues for civil protection. The "format" of this document is chosen to allow experts to examine the case.

[Fig. 10: Genoa 2011 flood dossier]

The "Dossier" is intended for users seeking in-depth knowledge of the case, both legally and in terms of the Civil Protection System. The proceedings are reconstructed in detail, and the factual and legal issues that arose during the proceedings are presented. The focus remains on what the provisions "tell" the System, so much so that the dossier concludes with Recommendations.

To date, the dossiers are as follows:

- "Dossier - Genoa Flood (2011)", which analyses the ruling of the Court of Genoa (no. 6302/2016), the ruling of the Court of Appeal of Genoa (no. 1100/2018) and the ruling of the Court of Cassation (no. 22214/2019);
- "Dossier - Aosta/Pollein Landslide (2000)", which analyses the charge, the ruling of the Aosta GUP (no. 8/2003), the ruling of the Turin Court of Appeal (no. 832/2008) and the ruling of the Supreme Court (no. 43118/2008);
- "Dossier - Genoa Flood 2014", which analyses the Genoa Court ruling no. 4307/2019;
- "Dossier - 2009 L'Aquila Earthquake", which analyses the first instance ruling (no. 380/2012), the ruling of the Court of Appeal (no. 2583/2014), and the ruling of the Court of Cassation (no. 22214/2019);
- "Dossier – Olbia Flood (2013)", which analyses the rulings of the Tempio Pausania Court (n. 772/2017), the Sassari Court of Appeal (n.314/2022) and the Court of Cassation (n. 15405/2024).

3.2 Note to the judgment

A "Note on a Judgment" is a document that analyzes an event and a related legal-procedural document (judgment or other document) deemed relevant. The choice to use this analysis tool is supported by the fact that, typically, the proceedings are not yet concluded, but a legal-procedural document is available that is nevertheless considered of interest for study and research purposes: consider, for example, a charge, a dismissal, or a first instance ruling.

The "format" of this document is assumed to allow experts to examine the case, but also to provide clear evidence of a case particularly relevant to our research and, in general, to the Civil Protection System.

To date, the ruling notes are as follows:

- “Notes on the ruling - Livorno flood (2017)”, which analyses the ruling of the GUP, no. 35/2022;
- “Notes on the ruling - Flood in Sardinia (2013)”, which analyses the ruling of the Court of Appeal 314/2022;
- “Notes on the ruling - L'Aquila Earthquake (2006)”, which analyses the ruling of the Civil Court, 9 October 2022;
- “Notes on the ruling – Gole di Raganello (CS)”, which analyses the ruling of the preliminary hearing judge of 30 October 2023:
- “Notes on the sentence - Arzachena (2013)”, which analyses the sentence of the Tempio Pausania Court, early September 2021;
- “Notes on the sentence - Cortina (2017)”, which analyses the request for archiving by the PM of the Court of Belluno n. 2487/2018 and the related opposition;
- “Notes on the ruling (no. 2) - Livorno Flood (2017)”, which analyses the ruling of the Livorno Court, no. 2158/2024.

The "Note to the Judgment" is intended for those seeking a quick overview of the issues addressed and the conclusions reached in the pre-trial proceedings. The document therefore succinctly outlines the procedural facts, identifies the parties involved and their responsibilities, provides summary considerations, and—always with a focus on the PC System—concludes with Recommendations.

It follows that, when a case monitored with a "Note to sentence" is enriched with new rulings or facts or finds a conclusion, it can, over time, become a "Dossier".

3.3 Precipitates

The document that collects the "Precipitati" is, in fact, a summary map of institutional and private responsibilities, identified by the judiciary, in risk and emergency management activities.

By systematizing the recommendations that emerged from the various proceedings, considered relevant by researchers with expertise in liability, the document clearly provides a dynamic framework for the relationships between entities that, in various capacities, participate in (or in) the civil protection system.

The content stands out for its practical application, articulated around key themes such as the position of guarantee, event predictability, risk communication, behavioral protocols, and the role of emergency planning. In this sense, the jurisprudential selection is not merely illustrative: it serves as an interpretative and evaluative basis, offering operational and reflective criteria for the institutions involved.

The recommendations are addressed across three categories of recipients:

- To researchers, as a tool for interpreting the evolution of jurisprudence on crucial thematic issues;
- To jurists, to observe how the law is concretely expressed and contextualized in applied practice;
- To operators of the Civil Protection System, to precisely reconstruct the scope of institutional responsibilities and duties during disasters.

The “precipitate” is intended as an essential device for the user because it sheds light on a crucial issue, increasing awareness of the matter at hand and the development of risk governance based on principles of responsibility.

The document allows you to analyze the evolution of the case law recommendations for each entity, following a logic of responsibility, conduct, and obligations. Alternatively, you can follow the evolution of recurring issues or compare different events (landslides, floods, earthquakes) and the related institutional responses.

Ultimately, "Dossier," "Note on Sentence," and "Precipitati" are not just a technical summary of events, including case law, but represent a call to responsibility and prevention in civil defense through planning, effective communication, and the creation of a true risk culture. Indeed, the stories told teach, highlight limitations, and entrust future generations with the task of acting, preventing, and protecting.

4. The " *WikiProcesses* " Observatory in the PNRR-RETURN Project

4.1 "WikiProcesses" enters the FEEM-University of Tor Vergata "matrix"

The PNRR-RETURN project is based on the understanding that climate change is a reality that profoundly impacts not only ecosystems, but also economies, institutional structures, and even the law. Indeed, increasingly frequent and intense extreme events generate impacts that transcend the natural dimension, involving legal, social, and psychological aspects. In this context, it is urgent to reevaluate the current civil protection approach to risk management and rethink mitigation policies, transcending disciplinary boundaries and adopting an integrated approach.

The collaboration between the CIMA Foundation, the ENI Enrico Mattei Foundation (FEEM), and the University of Tor Vergata—the latter two winners of the PNRR-RETURN Project cascade call—has developed to promote an innovative vision of risk governance: a vision that aims to integrate natural, technical, social, and legal knowledge, with the goal of developing operational tools capable of addressing the complexity of disasters.

While acknowledging the crucial role individual responsibility plays in analyzing the civil protection system, the Project attempted to "question" the framework, which is predominantly based on criminal law instruments. This was done not only to criticize the so-called "pan-penalism [11]," but above all to validate the data with other tools and methods.

Within this framework, CIMA's sharing of the "WikiProcessi" Observatory—with its nearly 200 monitored judicial proceedings—and the reflections contained in "Dossier," "Note a sentenza," and "Precipitati" has represented a valuable contribution to knowledge. Through this documentation, the Project has gained access to an in-depth understanding of how, over time, the judiciary has reconstructed responsibilities within the Civil Protection system, and how legal doctrine—and the "Observatory" itself—has highlighted critical issues, developments, and interpretative challenges.

In particular, within the joint activities, the Observatory has fed the RRCA (Risk and Root Cause Analysis) framework, thanks to a multidimensional model – called by FEEM and Tor Vergata "matrix" – which integrates scientific, social and legal data to identify the root causes of disasters and propose strategies to mitigate the operators' liability, i.e. tools to support the latter's decisions.

The "matrix", which consists of a A dedicated [12]*Generative Pre-trained Transformer (GPT)* system draws on the material and insights of several case studies: the Rigopiano avalanche, the L'Aquila earthquake, and the floods in Genoa and Olbia. These were chosen because they demonstrate how the vulnerability of places and systems is not only physical, but also regulatory, institutional, and even social.

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[11]G. Fiandaca, E. Musco, *Criminal Law. General Part* , 2020. Also included is L. Ferrajoli, *Law and Reason. Theory of Criminal Guaranteeism,* 1989. Finally, *Critique of Pan-Penalism* , Quaderni, no. 3, July 2023, available at: http://www.ristretti.it/commenti/2023/agosto/pdf/quaderni_panpenalismo.pdf

[12]Further details can be found in *"Deliverable 1 - Manual on the Criminal Liability of Civil Protection Operators"* , published by FEEM and Tor Vergata.

In particular, the "Dossiers" and "Notes on Judgments" developed by the CIMA Foundation have been an essential reference for the work of researchers at FEEM and Tor Vergata (who also drew on the expertise of several jurists specializing in administrative law and environmental criminal law). They have allowed for a rigorous reconstruction of the applicable regulatory framework and the specific dynamics of each event analyzed, offering an integrated interpretation of the available legal, technical, and documentary sources. At the same time, they have provided insight into the intertwining of conduct, omissions, and harmful consequences, facilitating the identification of causal links and responsibilities. This wealth of information has thus provided the knowledge base necessary to develop comparative analyses, coherent interpretations, and, above all, operational proposals aimed at improving risk governance and institutional capacity to prevent and manage disasters.

The collaboration, far from a mere reconstruction of the past or reworking of findings and procedures, is aimed at identifying ways to use the information, data, and their organization in the Observatory's database for prevention purposes and, in any case, for the development of a decision-support tool. This approach is fully aligned with the path that the CIMA Foundation is pursuing together with the Department of Civil Protection, and is concretely expressed in the conference *"Looking Back to Move Forward."*[13], held in Rome on April 23, 2024, dedicated to leveraging historical experience as a lever to strengthen disaster forecasting, preparation, and response capabilities, organized by the CIMA Foundation and the Department of Civil Protection.

The "WikiProcessi", then, once again takes on the role of a bridge between the legal and operational dimensions of risk:

- Providing forensic data to feed the Risk and Root Cause Analysis (RRCA) framework, which FEEM and Tor Vergata started from;
- Allowing to quantify institutional and regulatory vulnerabilities, integrating them into the FEEM risk matrix;
- Helping identify the root causes of disasters;
- Supporting the definition of new regulatory guidelines, based on case law.

As some RETURN Project Partners argued during the *"General Stakeholder Meeting" event* , held in Milan on 5 June 2025 and co-organised by CIMA, EURAC Research and the University of Florence, *"The Observatory is a tool that allows us to learn from past mistakes to build a more resilient future"* .

The CIMA Observatory, integrated into the risk matrix developed by FEEM/UniRoma 2, has thus established the ability to transform court decisions into operational knowledge, strengthening institutional accountability and promoting a culture of responsibility based on rigorous case analysis. This approach also contributes—always with a forward-looking approach—to improving transparency

[13]Details are available on the official website of the Department of Civil Protection: https://www.protezionecivile.it/it/notizia/una-giornata-dedicata-al-sistema-di-allertamento-il-rischio-meteo-idro-20-anni-dalla-sua-istituto/

in decision-making processes, thanks to a systematic analysis of the dynamics linking behaviors, omissions, and consequences. At the same time—and similarly—it allows for a more informed integration of the ethical and -legal dimension into territorial planning and civil protection activities, guiding decisions toward criteria of fairness, prevention, and protection of the public interest.

For methodological details, please refer to the deliverables developed by FEEM and Tor Vergata University. However, it is also useful to provide a general overview of the process followed, which is divided into the following phases:

- Jurisprudential analysis of liability: analysis of WikiProcessi and, in general, of the quantity and quality of the cases monitored by the platform.
- Targeted case study selection: systematic study of selected legal proceedings, selected for their relevance and related acquittals, convictions, and dismissals, to identify individual responsibilities as well as structural and systemic vulnerabilities. The cases were identified among those that most clearly demonstrated the legal relevance of regulatory and management gaps in disaster impacts. The selected cases serve as a laboratory for testing the effectiveness of the integrated model and for identifying recurring patterns of criticality.
- Regulatory and institutional review: critical analysis of the regulations in force at the time of the disputed conduct and the administrative practices followed by the entities involved in the analyzed proceedings, with the aim of assessing how formal and informal rules influence risk management and disaster impacts. This phase explored the interactions between legal frameworks, operational responsibility, and response capacity.

Ultimately, the matrix developed by FEEM and the University of Tor Vergata, enriched by the studies of the CIMA Foundation and the contents of the WikiProcessi, albeit with the perspective characteristics mentioned above , has nevertheless produced useful results, allowing us to highlight a series of legal and factual recurrences in the dynamics that contributed to the outcomes of the catastrophic events analyzed.

It was particularly significant that the so-called "behavioral" component—when characterized by inefficiencies, failures, and omissions—is not only one of the most frequent sources of liability identified by the judiciary, but also constitutes an aggravating factor in the natural disaster impacts under study. Among the most frequent omissions are:

- failure to activate procedures required by the plans or regulations in force;
- failure to evaluate or inadequately evaluate meteorological information;
- delays in adopting/implementing preventive measures;
- lack of control of infrastructure and areas exposed to risk;
- individual negligence.

At the same time, it has been noted that, where there is structured planning, the behavioral component has less effect on the harmful consequences of a natural event.

The matrices also show an equally significant recurrence regarding the so-called "contextual" component. Among the main elements:

- fragmentation of skills and decision-making levels;
- lack of emergency plans or failure to update/implement them;
- inefficiencies in administrative and management processes;
- poor coordination between institutions and institutional levels;
- difficulties in managing information flows.

These elements, even in cases where they do not directly constitute criminally relevant conduct, also appear to aggravate the natural effects of calamitous events.

Another recurring element that emerged from the analysis of cases using the matrix concerns the quality and effectiveness of risk communication addressed to citizens by institutions; the following were noted:

- reassuring or misleading messages not supported by any real scientific basis;
- absence or delay in communication;
- conflicting communications;
- Underestimation of weather warnings and, consequently, delays in deciding on the operational phase to be undertaken and in timely communication to the population.

The case studies also highlight recurring critical issues related to planning. Specifically:

- civil protection plans not updated;
- poor integration between urban planning and civil protection tools, particularly those for risk prevention;
- inadequate assessment of risk scenarios and, therefore, of their consequences on the reference territory to be included in the planning.

The above allows CIMA Foundation researchers to refine the Precipitates catalog, detailed in this Deliverable – section 3.3 – and, more generally, in CIMA's studies. An integrated reading of the Matrix and WikiProcesses findings is therefore already a fruitful product of this collaboration, because the two sets of information address responsibilities from complementary perspectives and, by validating each other, corroborate their respective findings.

In particular, from the integrated reading it emerges that:

- the "behavioral category" of the matrix coincides with the "types of conduct" category recorded in the Precipitati: this makes the comparison possible;
- The inefficiencies, failures, and omissions identified by the matrices, in the specific cases analyzed, correspond to those found in the analyses conducted by CIMA. In detail:
    - Fragmentation of responsibilities, lack of updated plans, administrative inefficiencies and lack of coordination are cited by judges as factors that aggravate or make the harmful event possible;
    - The conduct challenged in legal proceedings often involves reassuring or misleading messages, delays in communication, underestimation of alerts, and lack of coherence between institutional levels. Therefore, the matrix and WikiProcessi confirm that communication is a recurring critical issue;
    - Planning combines technical analysis and legal assessment. WikiProcesses and the matrix show that plans are often out of date, or at least not implemented, and often inconsistent with local reality. These shortcomings are often cited as factors of culpability.

Finally, it should be noted that, through a counterfactual analysis conducted by FEEM and Tor Vergata on the cases they investigated, we were able to reflect on possible alternative scenarios to those that actually occurred, thus offering a critical reading of the results of the joint analysis mentioned above. This approach allows us to hypothesize which consequences could have been avoided if different, more timely, more appropriate, or more consistent conduct had been adopted. Counterfactual analysis, in this sense, is not limited to a theoretical exercise, but—aside from its potential application in the procedural system to establish the causal link between action/omission and event—takes on an important heuristic and operational function: it allows us to more precisely identify the systemic and organizational criticalities that contributed to the occurrence of the harmful event, as well as to formulate concrete recommendations—in addition to those already identified by the CIMA Foundation—aimed at strengthening the response capacity and resilience of the regions, institutions, and stakeholders involved.

We also reflected on what the Civil Protection Agency and the legislator can do in light of this array of data and considerations.

The recurrence of inefficiencies, omissions, and behavioral and contextual criticalities highlighted by the matrices suggests the need for a two-pronged intervention: on the one hand, an operational and organizational strengthening of the civil protection system; on the other, an updating of the regulatory framework and tools governing risk management.

Faced with a situation in which the behavioral component significantly impacts the outcomes of disasters, Civil Protection can intervene on multiple levels:

- Strengthen organizational culture and ongoing training: Promote mandatory and recurring training courses for administrators, technicians, and operators, focusing on alert reading, standard operating procedures, uncertainty management, legal responsibilities, and risk communication.
- Ensure timely activation of required procedures: standardize and digitize operating procedures, reducing discretion and ensuring that the activation of preventive measures does not depend on isolated assessments or organizational shortcomings.
- Improve the evaluation and use of meteorological and hydrological information: strengthen the ability to interpret bulletins and warnings, including through decision-support tools, integrated dashboards, and specific training.
- Strengthen control of the territory and critical infrastructure: implement continuous monitoring systems, periodic audits, and mandatory verification protocols for areas and structures exposed to risk.
- Strengthen interinstitutional coordination: create permanent working groups between local authorities, regions, functional centers, and operational structures, with clear procedures for sharing information flows and managing responsibilities.
- Strengthen risk communication to the public: adopt national guidelines for institutional emergency communications, based on scientific evidence, timeliness, consistent messaging, and coordinated use of digital and traditional channels.
- Improve the quality of planning: regularly update civil protection plans, integrate them with urban planning and risk prevention tools, and ensure that scenarios are realistic, up-to-date, and understandable.

Legislators can intervene to reduce the structural and contextual criticalities that aggravate the impacts of disasters by acting on:

- Clarifying responsibilities and simplifying decision-making levels: reviewing and streamlining the distribution of responsibilities between agencies, reducing overlaps, ambiguities, and fragmentation that slow down preventive action and response.
- Stricter plan updating requirements: introduce binding deadlines, penalties for non-compliance, and external quality assurance mechanisms for civil protection plans and urban planning.
- Regulatory integration between urban planning and civil protection: make consistency between urban planning tools, emergency plans, and risk prevention plans mandatory, overcoming the traditional separation between sectors.
- Risk Communication Standards : Establish minimum national standards for institutional emergency communications, defining responsibilities, timing, channels, and criteria for ensuring the scientific validity of messages.

- Incentives and requirements for process digitalization: promote integrated platforms for alert management, data sharing, and process monitoring, reducing the risk of omissions or delays.

The picture emerging from the matrices shows that reducing impacts depends not only on the quality of the works or the strength of the natural event, but also on the system's ability to function in a coordinated, timely, and responsible manner. Civil Protection in its operations and Legislature in its regulation, acting in a complementary manner, can:

- reduce discretion and increase the predictability of decisions;
- strengthen institutional and individual responsibility;
- improve the quality of planning and communication;
- create a more resilient system, capable of learning from cases and preventing recurring errors.

4.2 The common glossary of “WikiProcesses” and the “matrix”

From the early stages of collaboration with FEEM and Tor Vergata University, the need for a shared glossary emerged clearly, which also constitutes an achieved project result.

In complex interdisciplinary fields, such as climate risk management, technical language can become a source of ambiguity: words, though identical in form, take on different meanings depending on the disciplinary and professional context. A term like "responsibility," for example, might evoke a specific legal construct for a criminal lawyer, while for a civil defense worker it refers to operational practices, or for a municipal environmental engineer it might evoke obligations to intervene.

The glossary, attached to this document, was created as an epistemological and operational facilitation tool, designed to support the collaborative work of the researchers involved in the RETURN project.

While not having a prescriptive or normative value, it is configured as a methodological device aimed at promoting a coherent and shared understanding of key concepts, encouraging the interaction between specialist knowledge and applied approaches.

Particularly noteworthy is the inclusion of a section dedicated to terms not yet codified in official glossaries—such as that of the Civil Protection Agency—divided by thematic area. This choice reflects the dynamic and progressive nature of the work, which aims not only to systematize the existing lexicon but also to contribute to its evolution.

Sharing legal knowledge with non-experts, in this sense, represents an act of democratizing knowledge. Making concepts such as "culpable cooperation," "model agent," or "causal link" accessible enables experts, administrators, and citizens to understand the regulatory and judicial implications of their actions, promoting a culture of widespread and informed responsibility.

Indeed, those working in land-use planning, civil protection, or environmental management are called upon daily to make decisions that may have legal implications. A precise and shared understanding of technical language allows for more effective interventions, reducing the risk of errors, omissions, or defensive behavior. In this sense, the glossary serves as a prevention tool, as well as a training tool.

The Glossary is designed as a dynamic tool, open to updates and expansions, in line with the evolution of the RETURN project. For this reason, the entries are presented in alphabetical order, but with strong thematic stratification, which is divided into:

- Legal-forensic field
    - Terms such as "model agent", "culpable cooperation", "damage event", "danger event", "Francese ruling", "causal relationship".
    - Each entry is accompanied by regulatory and case law references, with citations of emblematic rulings (e.g., Supreme Court of Cassation, Constitutional Court).
- Civil protection and risk planning
    - Operational definitions of "alert", "notice", "bulletin", "criticality levels", "municipal civil protection plan", "volunteering".
    - References to national directives and official Civil Protection glossaries.
- Natural and environmental sciences
    - Geological and hydraulic terms such as "earthquake", "epicenter", "magnitude", "flood", "inundation", "flood wave", "geomorphology".
    - Inclusion of technical concepts related to seismic classification and territorial zoning.
- Risk analysis and methodologies
    - Terms such as "cause-effect matrix", "causal factor", "monitoring", "mitigation", "prevention", "forecasting".
    - Introduction of the risk formula with conceptual extensions to include institutional and social vulnerabilities.

It is noted that some terms refer to others (e.g., behavioral refers to cause), in order to create a semantic network that reflects the interdisciplinary complexity. Explanatory notes are also included, clarifying the use of the term in different contexts (scientific, legal, operational).

In conclusion, a shared glossary is not simply a terminological repertoire: it is a cognitive cohesion tool, a catalyst for professional [14]*empowerment* , and a safeguard of epistemic justice [15]. It

[14]https://www.fondazionegolinelli.it/dallingiustizia-epistemica-al-sapere-condiviso-la-parola-a-david-stroupe/
[15]https://unipd-centrodirittiumani.it/it/temi/giustizia-epistemica-la-sfida-globale-per-una-scienza-aperta-a-tutte-e-

allows for building bridges between disciplines, roles, and levels of expertise, so that risk management can be truly integrated, equitable, and participatory [16].

The Glossary is at the bottom of this document.

5. Conclusions

Within the framework of the PNRR–RETURN project, the CIMA Foundation played a key role in integrating the legal dimension into civil protection and risk management policies.

Through systematic analysis of case law and cataloguing of proceedings on the WikiProcessi platform, as well as through data processing, both quantitatively and qualitatively, the Foundation has made rulings and regulations accessible and "readable" to researchers who are not experts in civil protection or law.

The activities carried out, in short, allowed us to:

- consolidate the dynamic and structured archive of legal cases “WikiProcessi”, useful for training and disseminating a culture of responsibility;
- concretely use some innovative legal products (Dossiers, Notes on Sentences and Precipitates), capable of guiding further products such as the cause-effect “matrix” of FEEM and Tor Vergata University;
- disseminate specific knowledge, both qualitatively and quantitatively, by translating the mass of data contained in the Observatory;
- contribute to the construction of the shared Glossary, as a tool for cognitive cohesion and interdisciplinary dialogue;
- assisting FEEM and Tor Vergata University in creating the cause-effect matrix, providing legal data and doctrinal interpretations, which enabled the correlation between natural, contextual, and behavioral causes and legal outcomes;
- develop further legal and systemic reflections in the specific sector of civil protection, within project contexts;
- Strengthen the network of scientific and institutional relations, consolidating CIMA's role as a national center of expertise on the subject of civil protection liability.

With particular reference to the cause-effect matrix, if further developed and improved, it could represent a particularly significant achievement for risk research and governance, as it allows for the connection between natural events, contextual factors, and human behaviors with the resulting

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tutti

[16]https://assr.regione.emilia-romagna.it/pubblicazioni/rapporti-documenti/glossario-integrato-gestione-del-rischio-nelle-strutture-sanitarie

legal outcomes, making the connections between causes and effects visible and clarifying the responsibilities attributed to entities, individuals, and structures. In this way, the matrix could serve as a decision-support tool, i.e., a learning and prevention tool, capable of supporting the retrospective analysis of case studies and also guiding operational choices.

The value of this work ultimately lies in its ability to support planners and risk managers, both in the preventive and operational phases. This perspective was explored in detail in the third Deliverable of the Project entrusted to the CIMA Foundation— *DV 7.7.9 – White Paper on Mitigating Decision-Makers' Responsibilities*— which will be the subject of an upcoming article in the collective on Federalismi.it, edited by the entire Spoke 7 team.

Transforming the "matrix" into a true DSS (Decision Support System) could prevent systemic failures, limiting the error of a single node and its propagation throughout the entire decision-making network. Discussions with various project partners have yielded several insights for future research on liability in civil protection:

- **Extend case law analysis** to new, related areas such as health, the environment (particularly water resources), and climate change, to anticipate trends and responsibilities, catalyzing the measures resulting from various judicial and parajudicial proceedings;
- **Further integrate technological tools and artificial intelligence** to verify cause-effect relationships and simulate counterfactual scenarios. In this sense, the "matrix" could be further developed or used as the basis for the creation of a new tool to be inserted directly into the "WikiProcessi" platform and made operational;
- **Strengthen training** for practitioners, administrators, and policymakers, so that the culture of legality becomes a stable foundation for institutional and territorial resilience, including through the use of the shared Glossary and the review of Best Practices.

Annex 0 – Shared Glossary

***Disclaimer** : This glossary is an orientation tool designed exclusively to support the collaborative work of researchers within the RETURN Project. The definitions and terms provided are not prescriptive or binding, but are intended to foster a shared and coherent understanding of the topics covered in the project.*

Model Agent

The model agent parameter represents the behavior that, in the same situation, a conscientious, prudent, and competent individual belonging to the same profession and social status as the actual agent would have adopted. This criterion is used to assess whether the harmful event was foreseeable and avoidable based on the technical knowledge and operational practices available at the time of the events.

In light of the case law regarding the 2011 Genoa flood, it is clarified that foreseeability does not concern the event in abstract (e.g., a generic flood), but must refer to the class of events that are concretely conceivable based on specific circumstances, such as the weather warning issued, the conformation of the territory, and the preventative measures that can be implemented. Failure to take precautionary measures, even in the presence of warning signs, may constitute a violation of the precautionary rule, even if the natural event was not entirely avoidable.

Supreme Court of Cassation ruling no. 22214/2019

Alert

Based on a predicted level of danger or risk, the term indicates a state of the warning system, necessary for the implementation of an operational phase; the alert is identified by an "alert level".

Directive of the President of the Council of Ministers on civil protection alerts and the public warning system (IT – Alert)

Wikiprocesses - Glossary

Flood

Water discharge, including the transport or mobilization of sediment, even at high density, from the usual banks of watercourses, natural or artificial basins, from the banks of natural and artificial streams, from lakes and reservoirs, even temporary, from artificial drainage networks, resulting from natural atmospheric events.

DECREE 30 January 2025, n. 18, Regulation containing the implementation and operational procedures for catastrophe risk insurance schemes pursuant to Article 1, paragraph 105, of Law 30 December 2023, n. 213 - Normattiva

Civil Protection Notice

A document issued, where appropriate, by the DPC or the Regions to draw further and specific attention to potential events reported in the weather monitoring and/or criticality bulletins. It may concern events already forecast as particularly anomalous or critical, or events that unexpectedly, but within a timeframe compatible with the capabilities and effectiveness of instrumental monitoring activities and assessment of the impacts on the territory, evolve towards higher levels of criticality.

The document is made available to the National Civil Protection Service so that, based on procedures unambiguously and independently established and adopted by the Regions, the various alert levels can be activated, corresponding to appropriate prevention and emergency management measures.

Civil Protection - Glossary

Regional Severe Weather Warning (or Regional Weather Warning)

Document issued by the Decentralized Functional Center, if activated and autonomous with regard to weather forecasts, in the event of the prediction of adverse events of recognized regional significance.

Civil Protection - Glossary .

Bulletin

A document issued daily by the Central or Decentralized Functional Center, which contains a forecast of expected events, both in terms of meteorological phenomena and an assessment of the possible resulting effects on the ground. The forecast is intended to be probabilistic, associated with significant levels of uncertainty, and is present for certain types of phenomena, such as thunderstorms. The document is made available to the National Civil Protection Service so that, based on procedures unambiguously and independently established and adopted by the Regions, the various alert levels can be activated, corresponding to appropriate prevention and emergency management measures.

Civil Protection - Glossary

National Weather Watch Bulletin

Bulletin issued by the Central Functional Center to report significant weather events expected for the day of issue and the following days, for each meteorological monitoring zone into which Italy is divided. The document lists the weather events relevant to Civil Protection purposes and indicates their quantities.

Civil Protection - Glossary

Hydrogeological and hydraulic criticality bulletin

Bulletin issued by the Central Functional Center to assess the average levels of hydrogeological and hydraulic criticality expected for the day of issue and the following day, for the alert zones into which Italy is divided. The document represents an assessment of the possible occurrence or evolution of ground effects (landslides and floods) due to meteorological phenomena, based on predefined event scenarios. The forecast is therefore to be understood in a probabilistic sense, as the degree of probability of the occurrence of predefined risk scenarios in an area of no less than a few dozen kilometers.

Civil Protection - Glossary

Avalanche Danger Location Map

The CLPV is a thematic map that identifies and delineates areas potentially subject to avalanches. It is a fundamental technical tool for territorial planning, civil defense, and hydrogeological risk management in mountainous areas. It reports avalanche sites detected through photointerpretation of aerial images, field surveys, and collection of historical evidence; it also includes defense structures, ski lifts, and other relevant territorial features. It provides essential support for urban planning and environmental assessment and forms the basis for avalanche danger zoning in Territorial Management Plans (PGT). It is also a reference tool for protecting built-up areas and designing mitigation interventions.

Avalanche Probability Location Map (CLPV) (https://inspire-geoportal.ec.europa.eu/srv/api/records/r_lombar:75d66de5-dee6-494a-8c4e-51aa095f4ea4)

Cause

It is what causes, determines, or originates an event, phenomenon, or condition. In civil defense, it often takes on three meanings:

- **Natural** : An event, phenomenon, or condition that causes an effect without human intervention, according to the laws of nature, and explains the occurrence of an event as a direct consequence of physical, chemical, biological, or geological processes. Examples include the movement of tectonic plates that creates an earthquake, and the accumulation and instability of snow that generates an avalanche. In science, natural causes are studied through

the principle of causality, which seeks to establish deterministic connections between observable events.

- **Behavioral** : A factor or set of factors that gives rise to observable human behavior, often in response to environmental, social, emotional, or cognitive stimuli. It is a functional explanation of why a person acts a certain way.
- **Contextual** : A factor that contributes to the production of an event in relation to the environmental, temporal, or situational conditions in which the event itself occurs. This category includes all non-natural factors that are not attributable to an individual's behavior (behavioral), but which nevertheless contributed to the occurrence of the event. It can arise from natural or human factors, but is only meaningful when inserted into a complex framework of factors. It is often used in the psychological, sociological, environmental, and legal fields to explain behaviors, events, or damage. In civil defense, a flood can be aggravated by a contextual cause such as uncontrolled urbanization or lack of land maintenance.

Link:

- Stanford Encyclopedia of Philosophy
- Treccani
- Effective Compliance and Behavioral Law – RiskCompliance.it

Seismic classification

Seismic classification is the division of the territory into zones with varying seismic hazards. Currently, Italy is divided into four zones, each requiring specific technical regulations with increasing levels of protection for buildings (anti-seismic standards). These regulations are highest in Zone 1, the most dangerous zone, where severe damage has occurred in the past due to strong earthquakes. All Italian municipalities fall within one of the four seismic zones.

Civil Protection - Glossary

Coc - Municipal Operations Center

Operations center activated by the Mayor to manage and coordinate rescue and assistance services for the population.

Civil Protection - Glossary .

Culpable cooperation

Offense provided for by Article 113 of the Criminal Code. Regulations governing cases of negligent commission of a crime by multiple individuals. The constituent elements are: a) the presence of multiple cooperating individuals; b) the commission of a completed crime; c) the causal contribution of each individual; d) the psychological link between the behaviors; d) the determination of guilt.

Behavior / Behavioral

Please refer to the term “Cause”.

Context / Contextual

Please refer to the term “Cause”.

Damage (from disaster)

Damage that occurs during and immediately after a disaster. It is usually measured in physical units (e.g., square meters of housing, kilometers of roads, etc.) and describes the total or partial destruction of physical assets, disruption of basic services, and damage to livelihoods in the affected area.

From a legal point of view, there is a distinction between damage events and danger events:

- Harmful events: there is an actual, concrete injury to a legal asset; the damage has already occurred, and therefore, criminal liability is based on the commission of the offense; they require a causal link between the conduct and the harmful event.
- Dangerous events: the legal asset is not yet damaged, but is exposed to risk; criminal protection is anticipated to prevent the damage from materializing; there are two different types: abstract danger, which is presumed by the legislator and does not require concrete proof; concrete danger, which requires proof that the asset has actually been endangered.

The distinction between damaging events and dangerous events is central to criminal law, but also has implications for civil law and insurance, where it is assessed whether an accident has caused actual damage or merely a dangerous situation.

Wikiprocesses - Glossary

Disaster

A serious disruption to the functioning of a community or society, at any scale, due to hazardous events interacting with conditions of exposure, vulnerability, and capacity, resulting in one or more of the following consequences: human, material, economic, and environmental losses and impacts. Note: The effect of a disaster may be immediate and localized, but it is often widespread and may last for an extended period of time. The effect may challenge or exceed a community or society's ability to cope with the disaster using its own resources, and therefore may require assistance from external sources, including neighboring jurisdictions, or those at the national or international level.

The Constitutional Court, in ruling no. 327/2008, defined the concept of "disaster" in criminal law as: "A destructive event of extraordinary proportions, though not necessarily immense, capable of producing serious, complex, and widespread harmful effects, capable of threatening the life and physical integrity of an indeterminate number of people." This definition was developed in the context of the constitutional assessment of Article 434 of the Criminal Code, which punishes the so-called "unnamed disaster," that is, those disasters not expressly classified by the Criminal Code.

Wikiprocesses - Glossary

Constitutional Court, ruling no. 327/2008

Event

In civil protection, the event can generally be classified as natural or legal:

- Naturalistic event: concerns the natural world and is a punctual occurrence, localized at a specific point in space-time. It is defined by spatial and temporal coordinates.
- Legal event: concerns the law and is the result of a conduct, whether active or inactive, that produces significant effects on the legal system. It may consist of the damage or jeopardy of a legal right protected by law. For example, death caused by a failure to comply with due process may constitute a legal event in the crime of homicide.

Treccani

Epicenter

The point on the Earth's surface where the shaking caused by the passage of seismic waves is strongest. The epicenter is located directly above the hypocenter.

Civil Protection - Glossary

Flood

Overflowing, especially of rivers and other watercourses.

Treccani

Causal factor (CAUSE)

Element, condition, or action that contributed, directly or indirectly, to the onset or worsening of the catastrophic event. Causal factors are classified by category (biophysical, structural, human).

The Franzese ruling of 2002 (Criminal Court of Cassation, United Section, No. 30328/2002) marked a turning point in Italian criminal law, redefining the concept of "cause" in the context of causality, especially in crimes of negligence by omission. The Court affirmed that a criminally relevant cause is human conduct, whether active or omitted, that is a necessary condition of the event, according to a counterfactual judgment based on scientific laws or rules of experience. In other words, conduct is the cause of the event if, if it were mentally eliminated, the event would not have occurred or would have occurred differently (milder or delayed). The criteria introduced by the ruling are therefore:

Counterfactual judgment: "If the agent had performed the required conduct, the event would not have occurred."

Logical probability: Statistical probability is not enough; a high rational credibility is required that the event could have been avoided.

Covering scientific laws: The judgment must be based on scientific laws (universal or statistical) or consolidated rules of experience.

Exclusion of alternative causes: It must be demonstrated that there are no other factors sufficient to cause the event.

The Court went beyond the purely statistical approach, introducing a two-phase model:

Abstract phase: Identification of the applicable scientific law.

Concrete phase: Verification that, in the specific case, the omitted conduct falls within the scope of the law and that the event could have been avoided.

Causal relationship

Causality can be:

- Active causality: A positive factor that is inserted into the causal process that leads to the event; it implies a relationship between two real entities (action and event) and is based on an explanatory judgment that consists in the reconstruction of the causal process that led to the event, which can be verified with certainty.
- Omission causation, as in the failure to prevent an event that one has a legal obligation to prevent. It consists of the failure to include the factor that prevented the event in the ongoing causal process.

Geomorphology

A branch of Earth Sciences that studies the shapes of the Earth's crust and the phenomena that shape them.

Civil Protection - Glossary

Hypocenter

Volume of rock at depth where the earthquake originates, and from which seismic waves propagate in all directions.

Civil Protection - Glossary

Criticality levels

A three-level scale that defines, for each type of risk, an event scenario that may occur within a given area. For hydrogeological and hydraulic risks, the criticality levels are defined as ordinary, moderate, and high. The assessment of criticality levels is the responsibility of the Decentralized Functional Center, if activated, or the Central Functional Center, based on the principle of subsidiarity.

Civil Protection - Glossary

Alert levels

National Civil Protection Service alert scale for expected or ongoing events, which triggers the activation of the risk prevention phase and/or the various emergency management phases. The relationship between the criticality levels assessed by the Functional Center and the various alert levels is established, unequivocally and autonomously, by the Regions and adopted in specific procedures. The declaration and adoption of the civil protection system alert levels are always the responsibility of the competent local bodies (municipality, province, and region) as defined in Article 108 of Legislative Decree 112/98.

Civil Protection - Glossary

Cause and effect matrix

An analytical tool used to visualize and systematically classify the causal factors of an event, sorting them by category, degree of influence, and temporality. It is a project methodology for analyzing court rulings in depth.

Structural prevention measures

These are physical and engineering interventions aimed at reducing the vulnerability of land and infrastructure. These measures are physical and permanent, requiring financial resources and technical planning. They include any physical construction designed to reduce or avoid potential hazard impacts,

or the application of engineering techniques or technologies to achieve hazard resistance and resilience in structures or systems. Note: Common structural measures for disaster risk reduction include dams, flood barriers, ocean wave barriers, earthquake-resistant construction, and evacuation shelters.

Wikiprocesses - Glossary

Civil Protection Code

Non-structural prevention measures

These are organizational, informational, and regulatory actions that do not involve physical construction but contribute to risk reduction. These measures are flexible and adaptable, often involving the active participation of communities (using knowledge, practice, or consensus to reduce the risks and impacts of disasters). Note: Non-structural prevention measures include building codes, land-use planning laws, early warning and monitoring systems, training programs for government and volunteer staff, school education, and public awareness.

Wikiprocesses - Glossary

Civil Protection Code

Mitigation

The reduction or minimization of the negative impacts of a hazardous event. Note: The negative impacts of hazards, especially natural hazards, often cannot be completely avoided, but their extent or severity can be substantially reduced through various strategies and actions. Mitigation measures include hazard-resistant engineering and construction techniques, as well as improved environmental and social policies and public awareness. It should be noted that, in climate change policy, "mitigation" is defined differently, and is the term used for reducing greenhouse gas emissions, which are the source of climate change.

Wikiprocesses - Glossary .

Monitoring

Constant observation of an event that has already occurred or could occur. It is divided into:

- Environmental monitoring: control carried out through the detection and measurement over time of certain biochemical-physical parameters that characterize the environment;
- Instrumental monitoring: control carried out through the detection and measurement over time of certain chemical-physical-mechanical parameters, through the use of receiving and recording machines, e.g., seismographs.

Civil Protection - Glossary

Magnitude

A measure of the energy released by an earthquake at the hypocenter. It is calculated from the amplitude of the seismic waves recorded by the seismograph and is reported on a logarithmic scale of recorded energies, called the Richter scale. Each magnitude point corresponds to an approximately 30-fold increase in energy: the energy released by a magnitude 6 earthquake is approximately 30 times greater than that produced by a magnitude 5 earthquake, and approximately 1,000 times greater than that produced by a magnitude 4 earthquake.

Civil Protection - Glossary

Natural / Naturalistic

Please refer to the term "Cause"

Anti-seismic regulations

Mandatory technical standards that must be applied in areas classified as seismic-prone when constructing a new building or improving an existing structure. Building in compliance with earthquake-resistant standards ensures the building's protection from the effects of an earthquake: in the event of an earthquake, an earthquake-resistant building may suffer damage but will not collapse, safeguarding the lives of its occupants.

Civil Protection - Glossary

Emergency planning

Management process that analyzes disaster risks and establishes measures in advance to enable timely, effective, and appropriate responses. Note: Emergency planning translates into organized and coordinated actions with clearly identified institutional roles and resources, information processes, and operational arrangements for specific stakeholders in times of need. Based on scenarios of possible emergency conditions or hazardous events, it allows key stakeholders to predict, anticipate, and resolve problems that may arise during disasters. Emergency planning is an important part of overall preparedness. Emergency plans must be regularly updated and exercised.

Wikiprocesses - Glossary

Municipal civil protection plan

Emergency plan prepared by municipalities to adequately manage a potential emergency in their territory, based on regional guidelines, as indicated by Legislative Decree 112/1998. It takes into account the various risk scenarios considered in the forecasting and prevention programs established by regional programs and plans.

Civil Protection - Glossary

Hydrogeological Planning Plans (PAI)

These are territorial planning tools aimed at protecting and managing risk. Introduced by Law 183/1989 and regulated by Legislative Decree 152/2006, PAIs are defined as *supplementary plans* to the River Basin Plan, aimed at protecting against hydrogeological risks (landslides, floods, erosion) and preventing disasters in at-risk areas (Article 67). The law establishes the procedure for adopting and updating PAIs, requiring the involvement of the Regions and District River Basin Authorities, public consultation and active participation of local authorities, and the possibility of modifications following landslides, new studies, or proven mitigation interventions. The PAI has regulatory force and is a binding tool for territorial planning, with impacts on urban planning, infrastructure, and civil defense.

LEGISLATIVE DECREE 3 April 2006, n. 152 - Normattiva

Basin plan

A cognitive, regulatory, and technical-operational tool through which actions and usage rules aimed at the conservation, defense, and enhancement of the soil and the use of water are planned and programmed, based on the physical and environmental characteristics of the territory.

Civil Protection - Glossary

Preparation

The knowledge and capabilities developed by governments, civil defense organizations, communities, and individuals to effectively anticipate, respond to, and recover from the impacts of probable, imminent, or actual disasters. Note: Preparedness occurs within the framework of disaster risk management and aims to build the capabilities needed to efficiently manage all types of emergencies and achieve orderly transitions from response to recovery.

Wikiprocesses - Glossary

Prevention

The set of structural and non-structural activities, also carried out in an integrated manner, aimed at avoiding or reducing the possibility of damage occurring as a result of catastrophic events, also on the basis of the knowledge acquired as a result of forecasting activities.

Wikiprocesses - Glossary

Forecast

Activity aimed at determining the causes of catastrophic phenomena, identifying risks and delimiting the territory affected by the risk

Civil Protection - Glossary

Operating procedures

A set of procedures governing the flow of information between the parties involved in emergency management, alerting, activation, and coordination of the components and operational structures of the National Civil Protection Service.

Civil Protection - Glossary .

Risk

Risk can be defined as the expected value of losses (human lives, injuries, damage to property and economic activity) due to the occurrence of an event of a given intensity, in a particular area, within a given period of time.

Risk can therefore be translated into the equation: R = P x V x E

P = Hazard: is the probability that a phenomenon of a certain intensity occurs in a certain period of time, in a given area.

V = Vulnerability: the vulnerability of an element (people, buildings, infrastructures, economic activities) is the propensity to suffer damage as a result of the stresses induced by an event of a certain intensity.

E = Exposure or Exposed Value: is the number of units (or "value") of each of the elements at risk (e.g. human lives, houses) present in a given area.

Civil Protection - Glossary

Judgment

decision that exhausts the procedural relationship or at least one phase or degree of it.

Wikiprocesses - Glossary

Richter scale

Scale devised by Charles Richter in 1935, it measures the strength of an earthquake regardless of the damage it causes to people and property, through the study of seismograph recordings.

Civil Protection - Glossary

Seismic swarm

A seismic sequence characterized by a series of earthquakes located in the same area, within a certain time interval, of comparable but not high magnitude. In a seismic swarm, a main shock is generally not discernible.

Civil Protection - Glossary

Earthquake

Intense ground shaking at a site, resulting from the rapid displacement of large portions of the Earth's crust along a fault within the crust, the seismic source. The magnitude of the earthquake depends on the geometric characteristics of the fault, the propagation pattern of the disturbance between the source and the site, and the site's lithostratigraphic and morphological characteristics.

Civil Protection - Glossary

Civil Protection Volunteering

A component of the National Service identified by Article 6 of Law No. 225/1992, it contributes to civil defense activities as a national operational structure, with functions supporting civil defense actions adopted by institutions: forecasting, prevention, and relief for civil defense events.

Specially trained and instructed, it operates through personal, voluntary, and unpaid services provided by individuals who belong to freely constituted non-profit organizations, including municipal civil defense groups. The participation of volunteer organizations in the public civil defense system is regulated by Presidential Decree No. 194 of 2001.

Civil Protection - Glossary .

Vulnerability

The ability of a given environmental component – human population, buildings, services, infrastructure, etc. – to withstand the effects of an event, depending on its intensity.

Vulnerability expresses the degree of loss of a given element or set of elements caused by a phenomenon of a given force. It is expressed on a scale from zero to one, where zero indicates no damage, while one corresponds to total destruction.

Civil Protection - Glossary

Zoning

Identification and subsequent classification of zones within the national territory based on the hazard level of events expected in those zones. In seismology, assignment of a seismicity level to a given territory, divided into zones, used to determine seismic activity and apply technical standards. Municipalities falling within these zones are included in lists and classified accordingly.

Civil Protection - Glossary