UNDRR-ISC

Hazard Definition & Classification Review

2025 Update of the Technical Report

SENDAI FRAMEWORK
FOR DISASTER RISK REDUCTION 2015-2030

International Science Council

UNDRR
UN Office for Disaster Risk Reduction

Citation: United Nations Office for Disaster Risk Reduction, & International Science Council. (2025). *UNDRR–ISC Hazard Definition & Classification Review: 2025 Update of the Technical Report.* https://doi.org/10.24948/2025.04 Geneva, Switzerland, United Nations Office for Disaster Risk Reduction, Paris, France, International Science Council.

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Acknowledgements: UNDRR would like to acknowledge its major core donors for their support: Sweden, Norway, Japan, Switzerland and Finland, as well as other core contributors, including the Republic of Korea, Luxembourg, China, Philippines, Israel and France.

ISC would like to acknowledge the Academy of Sciences based in Taipei for its support of this project.

ISC would also like to acknowledge the Committee on Space research (COSPAR), the Global Land Program, the Integrated Research on Disaster Risk Programme (IRDR), the International Statistical Institute (ISI), the International Union of Geodesy and Geophysics (IUGG), the International Union of Geological Sciences (IUGS), The International Union of Pure and Applied Chemistry (IUPAC), the International Union of Soil Sciences (IUSS), and the Committee of Problems of the Environment (SCOPE) which nominated experts to support the project, and all its members for disseminating calls for interest.

Advisory Note: The text of the HIPs has been developed as a compilation of well used and authoritative sources, such as UN agency websites, reports and recognised publications, in order to increase alignment of evidence and knowledge.

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Foreword

Five years ago, the United Nations Office for Disaster Risk Reduction (UNDRR) and the International Science Council (ISC) collaborated to develop the Hazard Information Profiles (HIPs) – a unique effort that brought together hundreds of experts to consolidate scientific knowledge on hazards in support of the Sendai Framework for Disaster Risk Reduction. This work resulted in two landmark reports, referenced as "groundbreaking" in the Sendai Framework midterm review.

The HIPs serve as a trusted source of scientifically grounded, standardized hazard information used by governments, agencies, researchers and educators worldwide. They support risk assessment, disaster preparedness, loss tracking and multi-sectoral planning. Above all, they are a practical resource – valued because they are useful, usable and used.

Scientific knowledge continues to evolve, and so must the HIPs. In response to this need, UNDRR and ISC have worked on an update of the profiles. This update had two core aims: first, to ensure the HIPs reflect the latest science; and second, to incorporate the multi-hazard context to support integrated planning and early warning. This addition strengthens the utility of the HIPs for integrated risk assessments and supports alignment with the Sendai Framework's emphasis on multi-hazard early warning and planning.

Compiling authoritative information on hazards is inherently collaborative. This update brought together contributions from across the United Nations system, the private sector and the global scientific community, through the ISC Members including the Integrated Research on Disaster Risk Programme, the International Union of Pure and Applied Chemistry, the International Union of Soil Sciences, the Scientific Committee of Problems of the Environment, the Committee on Space Research, the International Union of Geodesy and Geophysics, the International Statistical Institute, and the Global Land Programme. More than 200 experts contributed directly to the revision, and over 100 users and reviewers helped test and improve the content, together forming a growing and engaged community of practice.

UNDRR and the ISC thank all those who have contributed to this collective endeavour. Your dedication helps ensure that this essential tool remains robust, relevant and responsive to the evolving needs of disaster risk reduction in a rapidly changing world.

Kamal Kishore,
Special Representative of the United Nations Secretary-General for Disaster Risk Reduction

Sir Peter Gluckman,
President of the International Science Council

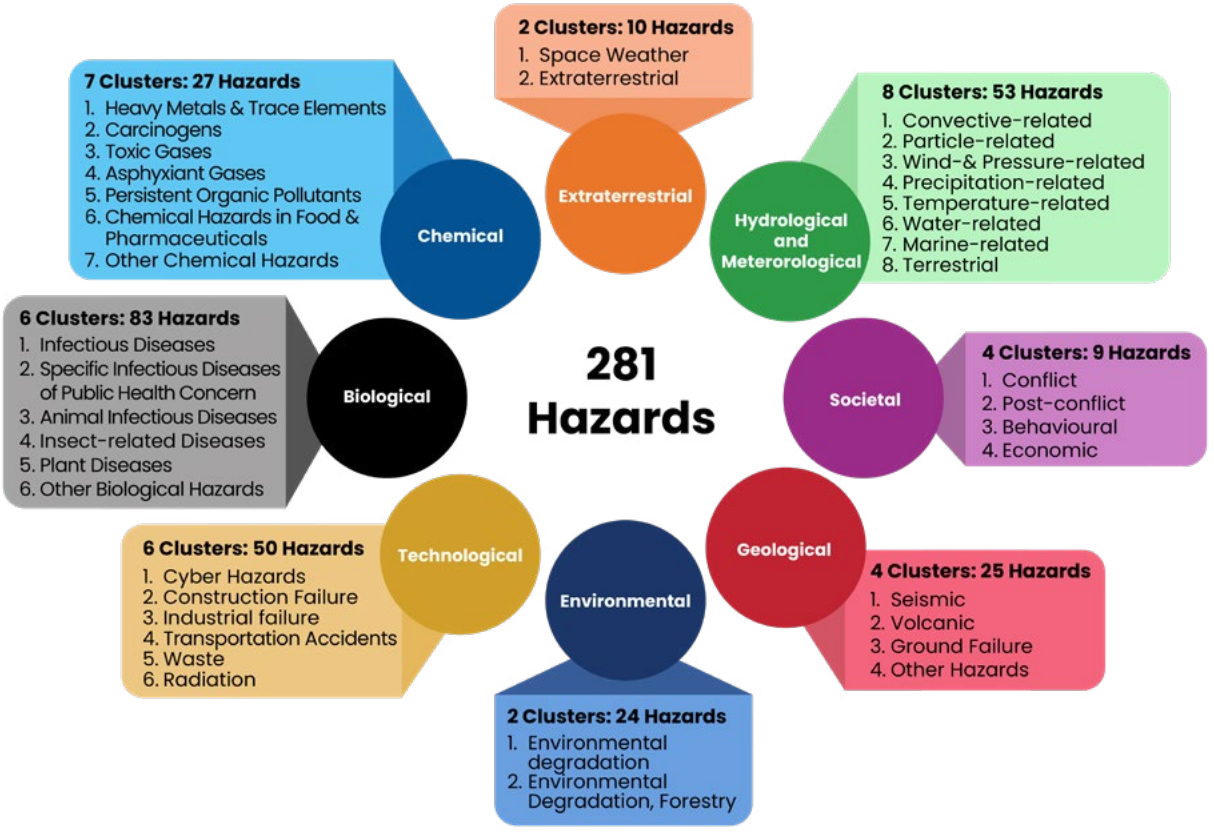
1. Executive summary

The Sendai Framework for Disaster Risk Reduction adopted in 2015 calls for a more holistic approach to risk reduction to counter the increasing severity and impacts of disasters. This encompasses an all-hazard approach to risk reduction, across natural and human-made hazards. At the time, no comprehensive guidance existed on the scope of hazards to be considered by decision-makers and stakeholders, and hazard terminology was not standardized across organizations and sectors. The UNDRR and the ISC joined forces to consult widely across the United Nations system, the scientific community, the private sector and the humanitarian community, and released in 2020 a report providing guidance on the need for a more standardized approach to risk reduction and a proposed list of 302 hazards, with a scientific description of each of these hazards, the Hazard Information Profiles, or in short the HIPs., published in 2021.

As the risk landscape and its understanding continuously evolve, it was recognized that the HIPs would need to be periodically updated to meet the needs of a wide spectrum of users and recognize the systemic nature of risk. In 2023, UNDRR and the ISC launched a revision of the HIPs, involving experts from organizations including United Nations agencies, scientific disciplinary unions, academia, the private sector and the humanitarian sector. In the end, 330 authors and reviewers from across more than 150 organizations participated.

The result is a revised list of 281 hazards grouped into eight hazard types:

1. Hydrological and Meteorological
2. Extraterrestrial
3. Geological
4. Environmental
5. Chemical
6. Biological
7. Technological
8. Societal



Contents

Key updates include:

- updated scientific information;
- inclusion of a multi-hazard context section;
- inclusion of a monitoring section;
- reorganization and groupings of the HIPs, with a new 'open' numbering system based on the hazard clusters, allowing the addition of new hazards within a cluster in future rounds of HIPs review;
- inclusion of chapeau HIPs providing general information that applies to similar hazards which do not have a dedicated HIP. For example, there is a chapeau HIP on Toxic Gases to provide information relevant for all toxic gases, including those without a dedicated HIP.

Recommendations from the 2025 Update

- **Recommendation 1:** Regular review and update of the classification and the HIPs.
- **Recommendation 2:** Improve information on the multi-hazard context.
- **Recommendation 3:** Continue to engage with users and stakeholders.
- **Recommendation 4:** Expand the use and usability of the hazard classification and the information profiles in databases and information systems.
- **Recommendation 5:** Link the HIPs to other global development frameworks and decision-making processes.
- **Recommendation 6:** Complement the HIPs with development of definitions and standardization of exposure and vulnerability.

2. Introduction and background

The HIPs were hailed as "groundbreaking" in the report of the Midterm Review of the Sendai Framework in 2023:

> *"Work undertaken with the International Science Council (ISC) and the engagement of more than 800 partners from scientific institutions, including national scientific advisers, the research funding community and numerous international organizations, led to the groundbreaking Sendai Hazard Definition and Classification Review Technical Report. The report, which contains 302 hazard information profiles, is a key tool for building common definitions for developing comparable data sets for monitoring and review. It provides a common set of hazard definitions to governments and stakeholders to inform approaches, policies and investments, whether integrated in sectoral interventions or DRR [disaster risk reduction] strategies and actions". (UNDRR, 2023)*

The HIPs continue to provide extensive information to various stakeholders across different sectors, including disaster risk reduction planning, monitoring, training and research. They are widely utilized by intergovernmental bodies, national governments, disaster management agencies, statistical offices, the private sector and academic institutions, fostering a more comprehensive and unified approach to disaster risk and impacts monitoring, recording and planning. The standardized list of hazards and the associated information help stakeholders, such as researchers or risk managers, compare events occurring in different municipalities or countries.

For example, the International Organization for Migration (IOM) have incorporated these profiles into their reference systems and are employing them in some of their training programmes globally. Additionally, UNDRR uses these profiles to provide standardization of hazard names in related databases, including the Sendai Framework Monitor and the Disaster Tracking System for hazardous events and disaster losses and damages. This offers the stakeholders using these tools information on the hazard classification and on other elements of the profiles beyond definitions and synonyms.

The HIPs also standardize hazard terminology at regional and national levels and are used by different stakeholders as foundational tools for disaster planning and response efforts, research and teaching. For example, in the Maldives, the HIPs enabled a multi-stakeholder process to map local terminologies on hazards to scientifically agreed globally known terms and definitions. The exercise informed a review of hazards of concern in light of disaster statistics and future risk projections. The analysis supported prioritization of hazard risk for further risk analysis and informed the development of the 2024–2030 Maldives disaster risk reduction strategy.

A stakeholder from the National Disaster Management Office in a Pacific Small Island developing State indicated that the *"HIPs are a valuable resource that contribute to effective disaster risk reduction. The profiles offer detailed insights into various hazards,*

aiding risk assessment, preparedness planning and resource allocation by enhancing community awareness, supporting policy formulation and serving as crucial tools for informed decision-making. They play a vital role in my work of engaging communities, guiding policy-makers and assisting emergency responders during disaster events. Additionally, HIPs contribute to monitoring and evaluating the effectiveness of risk reduction measures, fostering a proactive and resilient approach to managing the impacts of natural hazards at local, national and international levels".

When planning for emergencies and disasters, the HIPs help to facilitate the understanding of the triggers and the potential causes of disruptions, and identify a range of common consequences of various hazard scenarios, such as those related to evacuation planning.

Local and national emergency planning structures should utilize evidence highlighted in the HIPs to guide the development of preparedness, response and recovery arrangements that address the common consequences associated with multiple hazard types.

When planning to prevent, reduce, anticipate and prepare for likely impacts, it is also essential to consider existing early warning mechanisms, early action protocols, and preparedness and response arrangements and adapt them to accommodate any variability in effects and potential for cascades and complex interactions amplifying effects, rather than focusing solely on the types of hazards.

2.a Developing the Hazard Information Profiles – summary of the 2020 report

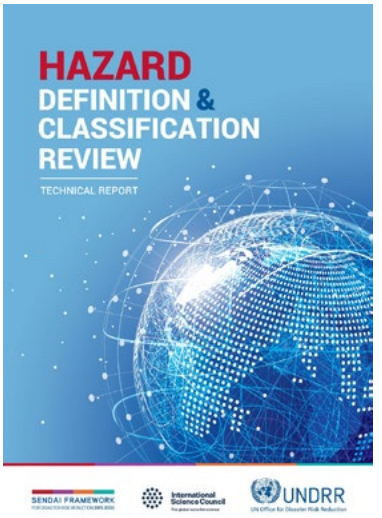
The Sendai Framework for Disaster Risk Reduction 2015–2030 (UNDRR, 2015) ('the Sendai Framework') proposed a comprehensive approach to disaster risk reduction, based on a better understanding of hazards and their related impacts in disaster. This approach has focused on the scope of hazards, with the Sendai Framework identifying a wider set of hazards, which covers "natural or man-made hazards, as well as related environmental, technological and biological hazards and risks" (Sendai Framework, Section 15); indeed, the Sendai Framework in paragraph 24(j) called for action:

> *"To strengthen technical and scientific capacity to capitalize on and consolidate existing knowledge and to develop and apply methodologies and models to assess disaster risks, vulnerabilities and exposure to all hazards".*

Recent extreme events and disasters, such as the COVID-19 pandemic of 2020, have demonstrated the complex interplay of hazards and the impacts they can have on lives, livelihoods and health, bringing into sharp focus the need for the implementation of the Sendai Framework. This hazard spectrum, the increasingly complex nature of natural and human-induced hazards and their wide-ranging impacts are all interlinked in the discussions on sustainable development and climate change adaptation.

In 2019, while many hazard definition lists existed, relevant for different contexts, there was no standardized hazard definitions providing a comprehensive picture to help inform the policy, practice and reporting of disaster risk reduction and management (Sillmann

et al., 2022). In May 2019, the UNDRR and the ISC jointly established an international technical working group to identify the full scope of hazards relevant to the Sendai Framework as a basis for countries to develop recommendations on the scope and definitions of hazards related to the Sendai Framework. The results were presented in the UNDRR-ISC Hazard Definition and Classification Review – Technical Report released in July 2020.



The technical working group was guided by the definition of 'hazard' adopted by the United Nations General Assembly in February 2017; namely, *"a process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation".*

This definition covers a broader scope of hazards than has traditionally been the case in the field of disaster risk reduction and expands the definition of hazard to include processes and activities. The initial hazard list was compiled from existing hazard glossaries and terminologies. To limit the potentially infinite scope of hazards addressed, a hazard was only included if it fulfilled each of the three criteria:

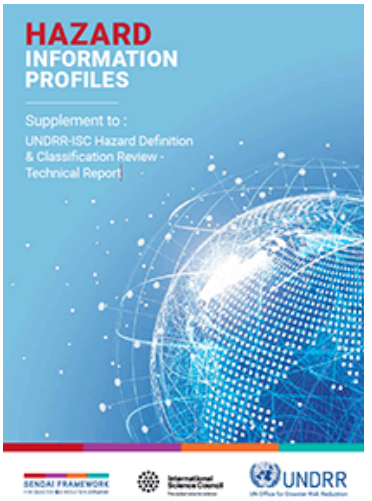
- has the potential to impact a community;
- has measurable spatial and temporal components;
- proactive and reactive measures are available.

The hazard list excluded complex human activities and processes where it was difficult to identify a single or limited set of hazards, compound and cascading hazards, and underlying disaster risk drivers (such as climate change).

Initial recommendations from the 2020 report and 2021 supplement

- **Recommendation 1:** Regular review and update.
- **Recommendation 2:** Facilitate the development of a multi-hazard information system.
- **Recommendation 3:** Engage with users and sectors for greater alignment and consistency of hazard definitions.
- **Recommendation 4:** Use this hazard list to actively engage policy-makers and scientists in evidence-based national risk assessment processes, disaster risk reduction and risk-informed sustainable development, and other actions aimed at managing risks of emergencies and disasters.
- **Recommendation 5:** Conduct further work to operationalize parameters for exposure, vulnerability and capacity, building on the UNGA definitions.
- **Recommendation 6:** Address cascading and complex hazards and risks.

Building on the recommendations of the technical working group, a Supplement to the Technical Report presented a first comprehensive attempt at compiling available definitions and information on each of the 302 hazards identified in the Technical Report in a concise and structured format (Murray et al., 2021). The development of the profiles involved a wide range of scientific experts from United Nations agencies and scientific networks, international scientific organizations and other disciplinary unions, universities, education and training bodies and research institutes, government scientific agencies, the private sector and the insurance industry. Overall, more than 200 authors were involved in the compilation of the profiles and over 130 reviewers from at least 100 organizations were involved in the peer review process.



Structure of the Hazard Information Profiles

Each hazard is described in a hazard information profile that provides the following information:

- a definition that is both scientifically robust and commonly used at the international level;
- a list of commonly used synonyms, when available;
- additional scientific description, providing more information on the hazard;
- a metric and numeric limit, when available;
- key relevant UN conventions multilateral treaties, and frameworks when applicable;
- examples of hazard drivers, impacts and risk management, including subsections on multi-hazard context and hazard monitoring;
- a list of references, supporting the evidence presented in the HIP; and
- a coordinating agency or agencies where applicable.

2.b Feedback from users of the Hazard Information Profiles

A survey was distributed through the ISC, UNDRR and partner networks in 2023 to better understand how and by whom the HIPs are used, and to assess the need for reviewing the profiles and improving their usability.

The survey, developed in partnership with, and hosted and analyzed by the UK Health Security Agency (UKHSA), received responses from 154 individuals across various sectors, including government, international organizations, civil society organizations, non-governmental organizations and academia, generating a global response.

The primary uses of HIPs span several critical areas:

- Disaster risk reduction: helping stakeholders identify and mitigate potential risks.
- Disaster response planning: preparing for and managing disaster situations effectively.
- Disaster risk monitoring: allowing for ongoing assessment and adaptation to changing risk landscapes.
- Research and education: providing a standardized and scientifically robust framework to understand hazards.

The research community relies on the HIPs extensively, as evidenced by the substantial proportion of respondents using them for academic and field studies, contributing to a deeper understanding of hazards and risk management strategies. Training programmes also benefit from the HIPs, leveraging their comprehensive and standardized information to educate and equip individuals and organizations in disaster preparedness and response.

A notable portion of users employ the HIPs for various other purposes, demonstrating the versatility and broad applicability of these profiles across different contexts and sectors (health sector, statistics offices, non-governmental organizations, insurance sector, development companies, etc.). This widespread and diverse usage pattern reflects the integral role that HIPs play in supporting disaster risk reduction efforts globally.

The survey feedback revealed that over 88 percent of respondents found the content of the HIPs useful, and more than 73 percent appreciated their clear and helpful structure

Users valued the HIPs for their standardization, well-structured and referenced content, conciseness yet detail, comprehensiveness and reliability. Additionally, the HIPs were praised for being user-friendly, straightforward and easy to navigate.

Respondents also suggested areas for improvement including:

- Visual aids and accessible language for non-specialists: Users recommended incorporating more visual aids and using language that is easier for non-specialists to understand.
- More precise information for emergency situations: There is a need for more detailed and specific information tailored to emergency situations.
- Inclusion of a multi-hazard context: Users emphasized the importance of including a comprehensive multi-hazard context to better understand the interplay between different hazards.
- Enhancements for better IT applications and interoperability: Suggestions included improving the profiles for better integration with IT applications and enhancing interoperability.

3. The 2025 update of the Hazard Information Profiles

3.a Introduction

Following the recommendation for regular review and update, three years after their initial release, the UNDRR and the ISC undertook an update of the UNDRR-ISC HIPs ahead of the 2025 Global Platform for Disaster Risk Reduction. These HIPs provide an authoritative reference on the scope, name and definitions of hazards of relevance to the Sendai Framework for Disaster Risk Reduction. As such, regular review of the hazard list and content is necessary to ensure user needs continue to be addressed.

In this update cycle, following the recommendations outlined in the 2020 report and feedback from users, particular emphasis is being placed on the 'multi-hazard context' whereby the HIPs aim to enhance understanding of the interplay between different hazards, which can result in cascading, compound and complex events. Hazard events rarely occur as single events; therefore, this will facilitate the broader use of the profiles for disaster risk management and multi-hazard risk assessment.

Leveraging the latest advancements in machine learning and building on the classification and coding systems for hazards introduced, efforts will also be made to make the taxonomy and the profiles themselves more machine-actionable, thereby expanding their usability and application.

3.b Process

A Steering Group was established in August 2023 to lead the update of the HIPs, chaired by Virginia Murray, UK Health Security Agency (UKHSA). The Steering Group comprised representatives from 18 United Nations organizations, scientific networks and other institutions involved in disaster risk reduction across the globe. The detailed composition of the Steering Group is available at Annex 2.

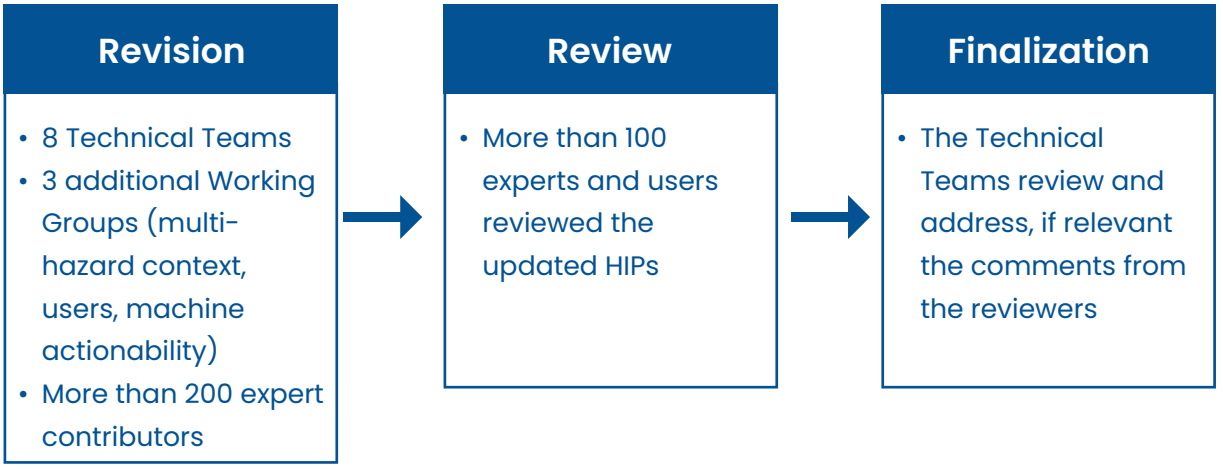
Virtual monthly Steering Group meetings oversaw the update process, carried out by eight dedicated technical teams focusing on specific hazard types: Meteorological and Hydrological; Extraterrestrial; Geological; Environmental; Chemical; Biological; Technological; and Societal. These technical teams coordinated the update of the HIPs for their group, drawing in additional subject matter experts, and submitted their changes to be approved by the Steering Group.

Following the user survey, a User Group was established to provide feedback and ensure the accessibility of the hazard information included in the HIPs. This ensured that the revised HIPs remain useful, usable and widely used by a broad range of users. Additional groups were established to conceptualize multi-hazard contexts and enhance machine actionability. See below for more details on the various groups.

The Technical Teams, building on their internal expertise, with external expert contributors, and the feedback from the User Group and the Multi-hazard Context Group, prepared updated HIPs, which were then sent to external reviewers. The Technical Teams then reviewed the comments before the finalization of the HIPs and approval by the Steering Group.

The update has resulted in the HIPs being reviewed, revised and updated (Figure 1), with several hazards being merged, some new hazards added, reclassification of some hazards across hazard types and establishment of a new 'open' numbering system based on the hazard clusters, which allows the addition of new hazards in future rounds of review.

Figure 1: Summary of the update process of the HIPs



3.c Technical Teams

The Technical Teams were composed of experts from United Nations agencies, scientific organizations, academia and the private sector with relevant subject matter expertise in their respective hazard type. Table 1 indicates the leading/coordinating organizations represented in the different Technical Teams, and a detailed list of members of each technical team can be be found in Annex 2b.

Table 1: Leading and Coordinating organizations in the technical teams

Technical team	Lead/coordinating organizations
Hydrological and Meteorological	World Meteorological Organization
Extraterrestrial	World Meteorological Organization, European Space Agency
Geological	British Geological Survey, Geological Survey of Canada, International Association of Volcanology and Chemistry of the Earth's Interior, Global Earthquake Model foundation, International Union of Geodesy and Geophysics
Environmental	United Nations Environment Programme, Food and Agriculture Organization of the United Nations
Chemical	International Union of Pure and Applied Chemistry

Biological	World Health Organization, Food and Agriculture Organization of the United Nations
Technological	Green Climate Fund, International Telecommunication Union, Rina, United Nations Environment Programme, United Nations Economic Commission for Europe
Societal	University of Extremadura, International Federation of Red Cross and Red Crescent Societies, Social Science Research Council

The role of the Technologoical Teams was to:

- coordinate the update of the HIPs in their hazard type;
- update the HIP identifiers and classification;
- update the existing information;
- add the new multi-hazard context and monitoring sections;
- review and update the references in the HIPs.

3.d User Group

The HIP User Group included users from a range of organizations and geographical locations to cover a broad range of use of the HIPs. Membership of the HIP User Group was voluntary, while aiming for geographic diversity, gender balance and participants at different stages of their career. Invitations were sent to targeted stakeholders or agencies representing disaster risk management, national and local governments, the private sector, academics, Indigenous communities, women's groups, persons with disability organizations, youth groups, etc. Organizations represented in the User Group include: the International Federation of Red Cross and Red Crescent Societies, the International Network of Local Governments, the Barokupot Ganocheton Foundation, the Organization for Women in Science for the Developing World, National Disaster Management Offices and universities. The full membership is detailed in Annex 2c. The group met remotely every month between July 2024 and May 2025.

The HIP User Group was responsible for collecting, collating and providing feedback on the hazard list (hazards missing from the list or redundant); and the information on the HIPs, in particular their accessibility and usefulness for users, reflecting the needs of users. The feedback and suggestions for improvements were shared with the Technical Teams and Steering Group. The HIP User Group was key in the review process. The continued engagement of users is an essential part of the update process and provides an opportunity to gather feedback and practical inputs for the continued improvement of the HIPs.

3.e Multi-hazard Context Group

The HIP Multi-hazard Context Group was established to provide input on the best way to include information about the multi-hazard context approach requested by the Steering Group and the User Group. The proposed multi-hazard context section was developed to address the needs of users. Suggestions for changes to the HIPs were

reviewed by Technical Teams and approved by the Steering Group.

Membership of the HIP Multi-hazard Context Group was voluntary, while aiming for geographic diversity, gender balance and participants at different stages of their career. Targeted stakeholders include technical experts involved in disaster risk management, academia, economic sectors and national and local governments.

The HIP Multi-hazard Context Group was responsible for designing and discussing different options to present multi-hazard context information on the HIPs in a scientifically correct, accessible and useful way for the users. The selected approach was then proposed to the Technical Teams and to the Steering Group for final discussion and approval.

The work of the Multi-hazard Group, project management team and Steering Group was informed by wider consultations with the multi-hazard and risk community. A core group of multi-hazard experts from the MYRIAD-EU project prepared a briefing note on the multi-hazard concept (see Annex 3 for more information), which was used to inform and support the Multi-hazard Context Group. The concept note addressed the following:

- The multi-hazard concept, including key definitions and associated terminology.
- The history of this concept in both intergovernmental dialogues and academic research.
- Examples to demonstrate the relevance of the multi-hazard concept to diverse geographies and hazard types.
- A discussion on the importance and relevance of the multi-hazard concept to diverse users.
- Lessons learned from multi-hazard research in recent decades and its potential implications for the development of the HIPs.

3.f Machine Actionability Group

The HIP Machine Actionability Group was established to discuss approaches by which the hazard classification and the information profiles (HIPs) could be more accessible for programmatic use through consistent structures and metadata describing the syntax and semantics of the data. The goal is to encourage future use of the HIPs, including digital and statistical uses, and to help increase the awareness of them.

Membership of the HIP Machine Actionability Group was voluntary, while aiming for geographic diversity, gender balance and participants at different stages of their career. Targeted stakeholders or agencies involved in data management include the Committee on Data of the ISC (CODATA), UNDRR technical experts and the EU Joint Research Centre.

Building on the use of the reviewed classification, terminologies and code to provide standardized lists of hazards for impact monitoring and reporting tools such as the

Sendai Framework Monitor and the Disaster Tracking System for hazardous event, losses and damages, the group reflected on potential uses of the hazard classification and the HIPs as a machine-actionable resource and the steps necessary to achieve this. Two activity tracks have been identified and are further detailed in Annex 4:

- Semantic and technological choices: Machine actionability requires devising solutions to formalize and document standardized hazard classification and HIP structures, encoding and the meaning of the different fields so that the HIPs information can be more effectively used by software.
- Governance and infrastructure: Stakeholders will have to agree on the update process, licensing and sustainability of machine-actionable HIPs and the implementation of these processes.

The group will continue its work to analyse the feedback collected during the 2025 Global Platform for Disaster Risk Reduction events where the HIPs were presented, and other similar community engagement efforts, and will refine the approaches in both activity streams.

4. The updated Hazard Information Profiles: What's new?

4.a Hazard classification

This review improved the HIPs in several ways. The Technical Teams identified hazards that were duplicated, leading to a lack of clarity for users; for example, the original HIPs included four HIPs for tsunami, depending on the event generating the tsunami (e.g. earthquake, volcanic eruption, submarine landslide). These duplicate HIPs were merged into one since, from a user perspective, a tsunami has the same characteristics and impacts, independent of the trigger hazard.

The review also identified hazards that needed to be moved from one hazard type to another. For example, hazards such as Polluted Air and Black Carbon were originally under the Hydrological and Meteorological hazards and have been moved to the Environmental hazards, with the Air Pollution hazards. These changes were proposed by the Technical Teams and were discussed and agreed on by the Steering Group.

The Technical Teams also identified areas where a HIP with general information on some hazards was needed without increasing the number of the HIPs. For example, geologists identify at least 19 categories of gravitational mass movements (landslides) based on the material displaced and the process that displaces it. Similarly, many chemical molecules are hazardous. Having one dedicated HIP for each category of gravitational mass movement or chemical molecule would be impossible; however, users need information about these hazards. To provide this general information, 'chapeau HIPs' were designed, providing information relevant for all hazards under the

chapeau. Examples of these chapeau HIPs include Flooding in the Hydrological and Meteorological hazards, Gravitational Mass Movements in the Geological hazards, and Toxic Gases and Persistent Organic Pollutants in the Chemical hazards (the complete list is available in Annex 1).

The result of this review is an updated list of 281 hazards divided into eight hazard types and 39 clusters (Figure 2).

Figure 2: Overview of the updated classification of the HIPs in eight types and 39 clusters

4.b Hazard identifier system

The original identifier system of the HIPs starts with two letters corresponding to the hazard type (e.g. CH for Chemical hazards) and four digits to number specific hazards. A new coding system has been established based on the hazard clusters, keeping the same code length and reference to hazard type with two letters, but including in the two initial numerical digits a code per cluster and keeping the last two numbers for specific hazards. This identifier system is 'open', allowing for future review of the hazard list, including the addition of new hazards in their relevant cluster, if required.

Table 2 provides examples of correspondence between old identifiers and new identifiers for a few HIPs. The whole correspondence list can be found in Annex 1.

Table 2: Examples of correspondence between old and new HIP identifiers

Hazard Type	Cluster	Hazard	New identifiers	Old identifiers
Hydrological and Meteorological	Wind- and Pressure-related	Tropical Cyclone	MH0309	MH0057
Extraterrestrial	Extraterrestrial Hazard	Meteorite Impact	ET0203	ET0004
Geological	Volcanic	Lahars	GH0204	GH0013
Environmental	Environmental Degradation	Permafrost Loss	EN0305	EN0021
Chemical	Toxic Gases	Ammonia	CH0301	CH0001
Biological	Infectious Diseases	Waterborne Diseases (Human)	BI0110	BI0018
Technological	Industrial Failure	Leaks and Spills	TL0301	TL0030
Societal	Conflict	Civil Unrest	SO0103	SO0003

4.c Multi-hazard Context

At the intergovernmental level, including in the Sendai Framework for Disaster Risk Reduction (UNDRR, 2015), there is widespread acceptance that a 'multi-hazard' approach is needed if risk reduction activities are to be effective. However, multi-hazard is a complex concept, and practitioners need guidance to better understand the relationships between hazards to improve risk analysis and impact assessments, and to enable more effective prevention, risk reduction preparedness and response plans and measures.

Multi-hazard is defined by the UNDRR as:

- *"(1) the selection of multiple major hazards that the country faces, and (2) the specific contexts where hazardous events may occur simultaneously, cascadingly or cumulatively over time, and taking into account the potential interrelated effects" (UNDRR 2017).*

Different interrelationships within the types of hazards are identified in the academic literature (Ciurean et al., 2018; Gill et al., 2022):

- **Triggering relationships:** One hazard event causes one or more other hazards to occur; the triggered hazard/s may then trigger additional hazards (Kappes et al., 2012). For example, a tropical storm may result in the destabilization

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and collapse of a slope, generating a mud flow, and trigger drain and sewer flooding, which may then trigger cholera.

- **Amplification relationships**: One hazard can change the likelihood and/or magnitude of hazards in the future. For example, drought increases the likelihood of wildfires (Richardson et al., 2022).
- **Compound relationships:** Two or more hazards may impact the same region and/or time period with impacts different (greater, lesser) than their sum (Zscheischler et al., 2020). These compound relationships can take different forms, including (a) multiple triggered hazards occurring simultaneously, or (b) two independent hazards impacting the same region and/or time period (or in close succession). Examples could include an earthquake coinciding with a period of extreme cold; or an earthquake followed by a tropical storm.

These three interrelationship types can combine and result in complex multi-hazard situations. For example, a volcanic eruption may 'trigger' a wildfire, which in turn 'amplifies' the likelihood and magnitude of a debris flow if heavy rain occurs soon after. One hazard may also 'reduce' the likelihood of another hazard occurring (Gill and Malamud, 2014; Duncan et al., 2016; Tilloy et al., 2019). More information on the multi-hazard context is presented in Annex 3.

The mapping of drivers, triggers and cascading of hazards now included in the HIPs will have a key role in improving multi-hazard risk characterization and encouraging a comprehensive approach to and systematic use of hazard terminology. The inclusion of a multi-hazard context section in the HIPs further strengthens their usefulness, allowing reflection on how hazards interrelate and what complex hazard scenarios may happen.

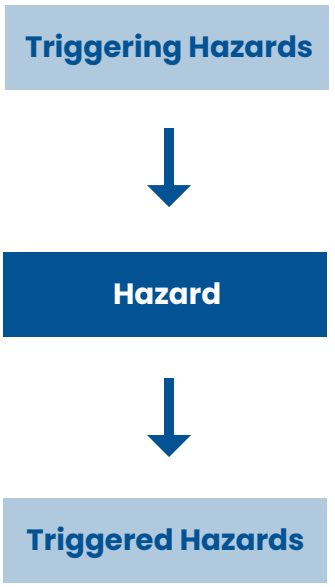
For the HIPs to continue to be useful, usable and used, the multi-hazard context needs to be simple and practical. It is unrealistic to include all possible multi-hazard interactions; therefore, the multi-hazard context focuses on triggering relationships: hazards that can trigger the hazard in question, and which hazards it can trigger in turn. Amplifying relationships, when available, are mentioned in the hazard drivers and impacts sections. We acknowledge that this is highly simplified and does not capture the complexities of multiple unrelated hazards or compounding relationships that can exacerbate and intensify disasters, nor the broader dimensions of exposure and vulnerability. In addition, the list is not exhaustive. Neither does it imply that those cascades are present in every context and manifest in every event occurrence.

Therefore, users should be aware that there may be other hazard interactions that are not included here. This section represents a first step in including the multi-hazard context in the HIPs, and it is recommended that this be a focus of review in the future.

Inclusion of Multi-hazard Context information in the HIPs

Multi-hazard Context is broad and complicated. Information can be found in different forms on the HIPs:

- In the Hazard Drivers section: examples of hazard drivers and hazard amplifiers, when available, with references.
- In the Impacts section: examples of short-term, long-term, direct and indirect impacts, when available, with references.
- In the Multi-hazard Context section: a simple diagram illustrating the triggering relationships between hazards. This diagram is expected to be illustrative, not comprehensive. The diagram is organized in three levels: the hazard on the HIP in the centre, the triggering hazards above and the triggered hazards below. The colour of the boxes corresponds to the colour code of each hazard type, and the hazards are indicated by their identifier.



4.d Monitoring

Users have emphasized the importance of knowing if and when people will receive a warning for a hazardous event so they can prepare. Information on early warning systems is embedded in the risk management section, but there were demands to expand it into a separate section for the HIPs to provide more detailed information on precursors, indicators, observation and forecasting requirements. This section reflects on different initiatives at global level, such as Early Warnings for All led by the World Meteorological Organization, UNDRR, International Telecommunications Unit and International Federation of Red Cross and Red Crescent Societies (World Meteorological Organization, 2023) or The Common Alerting Protocol which is promoted by many international agencies, including the International Federation of Red Cross and Red Crescent Societies (IFRC), the International Telecommunication Union (ITU), the United Nations Office for Disaster Risk Reduction (UNDRR), the World Meteorological Organization (WMO) and the World Broadcasting Unions.

The inclusion of information on early warning systems in the HIPs faced some difficulties:

- Early warning systems protocols and capacities vary between countries. In this context, either the information presented needs to be very detailed and consider a broad range of situations, or it is so generic that it is not useful for the users.
- Early warning systems are very well established for some hazards, in particular for the Hydrological and Meteorological and Geological hazards, and less

developed for others. It is difficult to identify an approach addressing both situations.

Several discussions within the Steering Group and the Technical Teams led to the decision to include information on one of the elements of early warning systems: the monitoring of hazards, providing information on the agencies typically conducting hazard monitoring and the methods they use.

4.e Meteorological and Hydrological Hazards

- The revision of the Meteorological and Hydrological HIPs aimed to ensure that these HIPs reflect the latest scientific knowledge and evolving risk landscapes, and that the hazard information maintains relevance for policymakers, practitioners and communities working to reduce disaster risk and build resilience to Meteorological and Hydrological hazards.
- The revisions sought to improve clarity by reclassifying, reclustering and merging several HIPs. The revised Meteorological and Hydrological HIPs now comprise 53 hazards (including the Flooding chapeau), categorized into eight clusters: (1) Convective-related (MH01); (2) Particle-related (MH02); (3) Wind- and Pressure-related (MH03); (4) Precipitation-related (MH04); (5) Temperature-related (MH05); (6) Water-related (MH06); (7) Marine-related (MH07); and (8) Terrestrial (MH08).
- Several hazards were reclassified, such as Polluted Air, Black Carbon, Ocean Acidification, Sea Water Intrusion and Acid Rain, which now fall within the Environmental HIPs, and Rock Slide within the Geological HIPs. Additionally, to reduce redundancy, the HIP Subtropical Storm was merged into Subtropical Cyclone, Tropical Storm into Tropical Cyclone, and Ice Storm into Freezing Rain.
- To maintain relevance and actionability, Meteorological and Hydrological hazard definitions were updated to align with the most recent authoritative definitions, and several sections were further elaborated upon to enhance depth and understanding, particularly on the drivers, impacts and risk management related to Meteorological and Hydrological hazards. Furthermore, the inclusion of two new sections, namely on early monitoring and the multi-hazard context, supports a more integrated approach to risk reduction.

4.f Extraterrestrial Hazards

- The revision of the Extraterrestrial HIPs encompassed an updating of definitions and scientific descriptions, the inclusion and revision of related metrics and numeric limits, as well as substantive elaboration on the drivers, impacts and risk management related to extraterrestrial hazards.
- The Extraterrestrial HIPs were reclassified into two clusters: Space Weather with four hazards and Extraterrestrial with six hazards.
- The Space Weather HIPs were renamed for clarity.
- A new hazard was added: Space Debris.

4.g Geological Hazards

- The review of the Geological HIPs was undertaken with a view to simplicity, practicality and improved clarity. As such, the review process has involved reclassifying, reclustering and merging several HIPs. To maintain relevance and actionability, Geological hazard definitions were updated to align with the most recent authoritative definitions, and several sections were further elaborated upon to enhance depth and understanding, particularly on the hazard drivers, impacts and risk management related to Geological hazards. Emphasis was placed on cross-referencing between hazards to highlight the interconnected relationships of many of the hazards included within the HIPs. Furthermore, two new sections were included, namely on multi-hazard context and monitoring, supporting a more integrated approach to risk reduction.
- Many of the original Geological HIPs had multiple entries for the same hazard depending on triggering processes. These have now been merged into a single HIP, with reference to triggering processes in the hazard drivers and multi-hazard context sections. This applies to Subsidence and Uplift, Liquefaction, Surface Rupture and Fissure, Ash/Tephra Fall (including Volcanic Ballistic Projectiles and Earthquake), which merged Earthquake, Ground Shaking (Earthquake), Ground shaking (Volcanic earthquake) and Ground shaking (Induced earthquake, reservoir fill, dams, cavity collapse, underground explosion, impact, hydrocarbon fields, shale exploration etc.).
- A new umbrella chapeau HIP has been created for Gravitational Mass Movement (Landslide) hazards, with individual HIPs for each gravitational mass movement classification following the widely accepted classification of Cruden and Varnes (1996).
- Several HIPs that were previously classified within the Geological hazards have been reclassified and occur within other hazard types. These are Tsunami, including those triggered by earthquake, volcanic or submarine landslide processes – which now sits within the Meteorological and Hydrological HIPs – as well as urban fires associated with volcanic eruptions, and aquifer recharge system failures and outages, which are now included in the Technological hazard HIPs.
- Following the reclassification, merging and introduction of the new HIPs, the revised Geological HIPs now comprise 25 hazards within four clusters. The Seismic (GH01) and Volcanic (GH02) hazards originate from deep earth (tectonic and magmatic) processes respectively. The Ground Failure (GH03) hazards largely originate from shallow earth gravitational (slope failure or ground collapse) or uplift processes, and other (GH04) hazards predominantly arise from shallow earth, or surficial, erosional, accretional and biological earth processes driven by water or gaseous transport of geologically sourced products.

4.h Environmental Hazards

- The update process for the Environmental HIPs involved updating data and hazard-related information, ensuring that the most recent references and state of knowledge were incorporated. Where available, open-source data and references were added.
- This update also introduced two key features: a monitoring system table and a multi-hazard context diagram, which presents non-exhaustive examples of other HIPs that may trigger or be triggered by the hazard in question.
- As part of this update cycle, several HIPs were reclassified: the Compressive Soils HIP and Soil Erosion HIP under the Geological hazards cluster, given that rapid-onset geological events – such as earthquakes and landslides – may act as triggers for these soil-related hazards.

4.1 Chemical Hazards

- The update of the Chemical HIPs was undertaken by a task group that was established within the International Union of Pure and Applied Chemistry (IUPAC). Initial drafts were reviewed within the International Union of Pure and Applied Chemistry before submission to the wider review process coordinated by the ISC.
- The update of Chemical HIPs sought to retain many of the high-priority specific hazards from the first edition, but a key goal for improvement was to find a way to broaden the applicability of the HIPs to encompass classes of hazardous chemicals in addition to those in the existing, much more specific, list. The Technical Team therefore added chapeau HIPs (e.g. Toxic Gases), which allow coverage of a much wider range of chemical hazards. This approach also allowed rationalization of existing HIPs, for example by combining existing pesticide-related HIPs.
- The Technical Team also sought to enhance understanding and interpretation of the hazards by providing the appropriate, widely used Globally Harmonized System of Classification and Labelling of Chemicals (GHS) pictograms in each case.
- New group HIPs have been added for:
    - Asphyxiant Gases: intended for gases that simply displace oxygen (without being toxic in and of themselves), high-pressure gas and cryogenic liquid storage and other mechanisms for oxygen displacement.
    - Corrosive Substances: which includes a range of industrially important corrosive chemicals, some of which are used in very large amounts, and which can cause significant harm.
    - Opioids and Psychoactive Substances: which are responsible for many deaths worldwide, sometimes in waves through communities.
    - Pesticides: from combining existing pesticide-related HIPs.
    - Persistent Organic Pollutants: by converting an existing cluster name

and generalizing the approach to cover recognized and yet to be recognized Persistent Organic Pollutants.
    - Toxic Gases: intended for compounds such as hydrogen sulphide(H_2S), hydrogen cyanide (HCN) and methyl isocyanate, and for multi-hazard contexts related to industrial plant events involving other toxic compounds.
- The review of specific hazards paid particular attention to the scale and frequency of past events. Thus, the number and scale of ammonium nitrate-related explosions has resulted in a specific HIP being prepared for that compound, and the very wide concern around polyfluoroalkyl substance (PFAS) contamination of the environment (particularly ground water aquifers) is reflected in the inclusion of a specific HIP for that class of compounds. By contrast, incidents involving phosphine tend to be of much smaller scale than others considered, and the technical team considered that it did not merit a specific HIP (but would fall under the umbrella of the Toxic Gases HIP).

4.j Biological Hazards

- The review of the Biological HIPs included updates to data and information related to each hazard, ensuring that the most recent references were incorporated. Where available, open-source data and references were added.
- The update strengthens the alignment of the human–animal interface for relevant hazards in the context of zoonotic diseases, thereby further reflecting and embedding the One Health approach. For HIPs related to zoonotic diseases, a dedicated table has been added to present both human and animal aspects of each hazard. A new Zoonosis icon has also been included in all relevant HIPs.
- Biological hazards were reclustered and some HIPs were merged to provide clarity for users. These include: Trypanosomosis and Trypanosomiasis (Human) (BI0238); Vector-borne Diseases (Human) and (Animals) have been consolidated into a unified HIP: Vector-borne Diseases (BI0108).
- An additional hazard of Marburg virus disease was added.
- Further HIP consolidations include:
    - Antimicrobial Resistance (BI0010) and Antimicrobial Resistant Microorganisms (BI0025), now merged into Antimicrobial Resistance HIP (BI0601).
    - Foodborne Microbial Hazards (BI0011) and Foodborne Diseases (BI0019), now merged into Foodborne Diseases HIP (BI0104).
    - Lastly, the previously separate HIPs for Invasive Species (BI0005) and Invasive Weeds (BI0004) have been combined into a single, overarching HIP titled Invasive Species (BI0504).

4.k Technological Hazards

- The Technological HIPs were updated to provide more recent information and references. The HIPs were reclustered and renumbered.
- Due to a large amount of overlap in the descriptions, the Radiation Agents and Radiation Materials HIPs have been combined.
- The eight Cyber Hazards HIPs were reorganized. Three HIPs were updated (Malware, Data Breach and Cyberbullying). The remaining five HIPs (Misconfiguration of Software; Non-conformity and Interoperability; Data Security-related hazards; Disrupt, Outage, Personally Identifiable Information Breach; and Internet of Things-related hazards) were reorganized into four new HIPs: Advanced Persistent Threat, Denial of Service, Supply Chain Attack and Social Engineering.
- An additional hazard on Tunnel Failure was added.

4.l Societal Hazards

- The former Societal hazards cluster included eight hazards and now includes nine, with the accommodation of the Suicide cluster HIP, originally under the Biological hazards.
- The revision mainly involved a close examination of the definitions and scientific description – as in the cases of Financial Shock, Suicide Cluster, Stampede and Civil Unrest, as well as new information on the multi-hazard context and monitoring systems. This exercise raised a difficult challenge, since any other hazard will have perceptible effects on society and commonly drive secondary Societal hazards.
- As to monitoring, except for Financial Shock, there are no clear signs that allow the anticipated identification of a short-term triggering event in most of the hazards, although mitigation measures are accessible for all and can be structurally implemented.
- Violence remains a comprehensive hazard, including multiple forms of violence, and its revision mainly involved its examination under the fresh lens of human rights.
- Expert consultations on Societal hazards yielded new insights into refining future reviews to accommodate more specific hazards, particularly by differentiating

Key learnings

- Due to the broad range of hazards addressed by the HIPs, effective collaboration between experts from different organizations, agencies, and disciplines is essential.
- Many users participated in the process and their feedback was key to co-creating a tool that is both scientifically robust and user-friendly.
- The process of the update of the HIPs generated extensive interest within the scientific community and beyond. Many volunteered, representing different regions, sectors and areas of expertise/interest. It is essential to nurture this community.
- The update of the HIPs requires time and resources to collect the invaluable inputs from the whole community of experts and users and to be inclusive of geographical, cultural and socio-economic situations.

5. Recommendations

The two-year process that has led to the 2025 update of the HIPs has provided a more robust and nuanced understanding of the need for standardized and up-to-date hazard information. The recommendations for the continued use and development of the HIPs that follow are the result of the multi-stakeholder dialogues and collaboration that have enabled this update.

- **Recommendation 1: Regular review and update of the classification and the HIPs.** Information on hazards keeps evolving and the HIPs need to continue to be regularly reviewed to ensure they are still scientifically up to date, and they remain relevant and used. The consolidation of the list of hazards should also continue. Future reviews should include a deeper dive on some categories of HIPs to identify emerging hazards. Identification of additional synonyms, documentation of regional names and authoritative translations to official languages should also be pursued.
- **Recommendation 2: Improve information on the multi-hazard context.** For this 2025 edition, the multi-hazard context information included provides a summary of the potential cascading impact of hazards to improve the consideration of hazard interactions in an accessible way. More work is needed to expand this section on how each hazard interrelates with other hazards, also including exposure and vulnerability. The new multi-hazard context section is a step towards addressing the need for understanding hazard interrelationships. However, there is much work to be done on developing the multi-hazard context section to include, for example, compound hazards and amplification hazard relationships that can exacerbate and intensify disasters and their impacts.
- **Recommendation 3: Continue to engage with users and stakeholders.** This update of the HIPs engaged experts and users, creating a community of interest. Sustaining that engagement is important to further promote the use of the HIPs and their improvement and could take the form of surveys and studies on how the HIPs are used. The continued engagement of users is an opportunity to gather feedback and practical inputs for improvements of the HIPs to ensure their ongoing use. Global and regional platforms on disaster risk reduction could provide a forum for exchange on the HIPs.
- **Recommendation 4: Expand the use and usability of the Hazard Information Profiles (HIPs) in databases and information systems**. The hazard classifications are already used to provide a standardized list of hazards for the Sendai Framework Monitor and for the UNDRR-supported enhanced Disaster Tracking System for hazardous events and losses and damages. Translations, clear version correspondence tables and conversion tools are essential to enhance the use of the hazard classification across

multiple data systems, such as the upcoming Global Framework on Disaster-related Statistics scheduled for endorsement by the United Nations Statistics Commission in 2026. The improvement of the machine actionability of the HIPs initiated during this update cycle should continue, to enable the wider and more effective use of the HIPs in information systems and databases.

- **Recommendation 5: Link the HIPs to other global development frameworks and decision-making processes.** Disasters have significant impacts on the livelihoods of the affected communities and their sustainable development prospects. Further application of the HIPs to record losses and damages from hazards could further enable assessing of progress on global agreements and goals such as the Global Goal on Adaptation, Sendai Framework targets, and current and post-2030 Sustainable Development Goals and indicators. The progress on the establishment of a mechanism to identify and compensate for loss and damages associated with climate change is also an opportunity to use the HIPs to support the identification of the hazards that are influenced by climate change. Raising the awareness of the HIPs among policymakers would provide opportunities to develop strategies integrating disaster risk reduction, climate change adaptation and sustainable development.
- **Recommendation 6: Complement the HIPs with development of definitions and standardization of exposure and vulnerability.** Hazards are one of the three components of risks. No comparable work has been conducted for the other two components: exposure and vulnerability. A better shared understanding of these elements is essential for disaster risk reduction strategies. The establishment of a dedicated group of experts to identify and operationalize these parameters would complement the HIPs.

6. References

Ciurean, R., Gill, J.C., Reeves, H., O'Grady, S.K., Donald, K., & Aldridge, T. (2018). Review of multi-hazards research and risk assessments, British Geological Survey Engineering Geology & Infrastructure Programme. Open Report OR/18/057, 109 pp. Available at: http://nora.nerc.ac.uk/id/eprint/524399/ Accessed 15 May 2025.

Cruden, D.M.,Varnes, D.J. (1996) Landslide Types and Processes, Transportation Research Board, U.S. National Academy of Sciences, Special Report, 247: 36-75

De Angeli S., Malamud B.D., Rossi L., Taylor F.E., Trasforini E., Rudari R. (2022) A multi-hazard framework for spatial-temporal impact analysis, International Journal of Disaster Risk Reduction, Volume 73, 2022, 102829, ISSN 2212-4209, https://doi.org/10.1016/j.ijdrr.2022.102829. Accessed 28 April 2025

Duncan, M., Edwards, S., Kilburn, C., Twigg, J., & Crowley, K. (2016). An interrelated hazards approach to anticipating evolving risk. Global Facility for Disaster Reduction and Recovery. In: GFDRR (Ed.), The Making of a Riskier Future: How Our Decisions Are Shaping Future Disaster Risk. Global Facility for Disaster Reduction and Recovery, Washington, USA, 114–121. Available online: https://www.gfdrr.org/sites/default/files/publication/Riskier%20Future.pdf (last accessed 15 May 2025)

Gill, J.C., Malamud, B.D. (2014), Reviewing and visualizing the interactions of natural hazards, Rev. Geophys., 52,680–722, doi:10.1002/2013RG000445. Accessed 28 April 2025

Gill, J.C., Duncan, M., Ciurean, R., Smale, L., Stuparu, D., Schlumberger, J, de Ruiter M., Tiggeloven, T., Torresan, S., Gottardo, S., Mysiak, J., Harris, R., Petrescu, E. C., Girard, T., Khazai, B., Claassen, J., Dai, R., Champion, A., Daloz, A. S., … Ward, P. (2022). MYRIAD-EU D1.2 Handbook of Multihazard, Multi-Risk Definitions and Concepts. H2020 MYRIAD-EU Project, grant agreement number 101003276, pp 75 https://www.myriadproject.eu/wp-content/uploads/2022/11/D1_2_Handbook.pdf Accessed 28 April 2025

Hochrainer-Stigler S., Šakić Trogrlić R., Reiter K., Ward P.J., de Ruiter M.C., Duncan M.J., Torresan S., Ciurean R., Mysiak J., Stuparu D., Gottardo S. (2023) Toward a framework for systemic multi-hazard and multi-risk assessment and management, Science, Volume 26, Issue 5, 2023, 106736, ISSN 2589-0042, https://doi.org/10.1016/j.isci.2023.106736. Accessed 28 April 2025

Kappes, M. S., Keiler, M., von Elverfeldt, K., Glade, T. (2012). Challenges of analyzing multi-hazard risk: a review. Natural hazards, 64, 1925-1958.

Murray, V., Abrahams, J., Abdallah, C., Ahmed, K., Angeles, L., Benouar, D., Brenes Torres, A., Chang Hun, C., Cox, S., Douris, J., Fagan, L., Fra Paleo, U., Han, Q., Handmer, J., Hodson, S., Khim, W., Mayner, L., Moody, N., Moraes, Luiz Leal ; O., Nagy, M., Norris, J., Peduzzi, P., Perwaiz, A., Peters, K., Radisch, J., Reichstein, M., Schneider, J., Smith, A., Souch, C., Stevance, A.-S., Triyanti, A., Weir, M., Wright, N. (2021) Hazard Information Profiles: Supplement to UNDRR-ISC Hazard Definition & Classification Review: Technical Report: Geneva, Switzerland, United Nations Office for Disaster Risk Reduction; Paris, France, International Science Council. DOI: 10.24948/2021.05 Accessed 14 May 2025

Richardson D., Black A.S., Irving D., Matear R.J., Monselesan D.P., Risbey J.S., Squire D.T., Tozer C.R. Global increase in wildfire potential from compound fire weather and drought. npj Clim. Atmos. Sci., 5, p. 23, 10.1038/s41612-022-00248-4 Accessed 28 April 2025

Sillmann, J., Christensen, I., Hochrainer-Stigler, S., Huang-Lachmann, J., Juhola, S., Kornhuber, K., Mahecha, M., Mechler, R., Reichstein, M., Ruane, A.C., Schweizer, P.-J., Williams, S. (2022). ISC-UNDRR-RISK KAN Briefing note on systemic risk, Paris, France, International Science Council, https://doi.org/10.24948/2022.01 Accessed 14 May 2025

Tilloy, A., Malamud, B. D., Winter, H., & Joly-Laugel, A. (2019). A review of quantification methodologies for multi-hazard interrelationships. Earth-Science Reviews, 196, Article 102881. https://doi.org/10.1016/j.earscirev.2019.102881 Accessed 28 April 2025

UN Early Warnings for All (2023) – the UN Global Early Warning Initiative for the Implementation of Climate Adaptation Executive Action Plan 2023-2027. A4 Format_ Final Edit Round 1 Nov _EW for All Executive Action Plan Draft v16 Final Accessed 14 May 2025

UNGA (2016). Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction. Note by the Secretary-General. United Nations General Assembly (UNGA). Document No. A/71/644. https://undocs.org/A/71/644 Accessed 28 April 2025

UNGA (2017). Resolution adopted by the General Assembly on 2 February 2017. 71/276. Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction. United Nations General Assembly (UNGA).

UNGA (2023). Political declaration of the high-level meeting on the midterm review of the Sendai Framework for Disaster Risk Reduction 2015–2030 UN General Assembly (UNGA) https://www.undrr.org/media/88061/download?startDownload=20250428 Accessed 28 April 2025

UNDRR (2023). The Report of the Midterm Review of the Implementation of the Sendai Framework for Disaster Risk Reduction 2015–2030. UNDRR: Geneva, Switzerland. https://sendaiframework-mtr.undrr.org/publication/report-midterm-review-implementation-sendai-framework-disaster-risk-reduction-2015-2030 Accessed 28 April 2025

UNDRR-ISC (2020) Hazard Definition and Classification report https://www.undrr.org/publication/hazard-definition-and-classification-review-technical-report Accessed 14 May 2025

Zscheischler, J., Martius, O., Westra, S., Bevacqua, E., Raymond, C., Horton, R.M., van den Hurk, B., AghaKouchak, A., Jézéquel, A., Mahecha, M.D., Maraun, D. (2020). A typology of compound weather and climate events. Nature reviews earth & environment, 1(7), pp.333-347.

7. Annexes

Annex 1: Correspondence between new and old HIP identifiers

Table 3: Correspondence between new and old HIPs identifiers

2021 UNDRR/ISC Hazard classification				2025 UNDRR/ISC Hazard classification			
Hazard Type	**Cluster**	**Specific Hazard-name 2021**	**Code 2021**	**Cluster**	**Code 2025**	**Specific Hazard-name 2025**	**Change Summary**
Meteorological and Hydrological	Convective-Related	Downburst	MH0001	Convective-Related	MH0101	Downburst	Continued
Meteorological and Hydrological	Convective-Related	Lightning (Electrical Storm)	MH0002	Convective-Related	MH0102	Lightning (electrical storm)	Continued
Meteorological and Hydrological	Convective-Related	Thunderstorm	MH0003	Convective-Related	MH0103	Thunderstorm	Continued
				Water-related	MH0600	Flooding	NEW- CHAPEAU
Meteorological and Hydrological	Flood	Coastal Flood	MH0004	Water-related	MH0601	Coastal Flooding	Continued & Cluster Renamed
Meteorological and Hydrological	Flood	Estuarine (Coastal) Flood	MH0005	Water-related	MH0602	Estuarine (Coastal) Flooding	Continued & Cluster Renamed
Meteorological and Hydrological	Flood	Flash Flood	MH0006	Water-related	MH0603	Flash Flooding	Continued & Cluster Renamed
Meteorological and Hydrological	Flood	Fluvial (Riverine) Flood	MH0007	Water-related	MH0604	Fluvial (Riverine) Flooding	Continued & Cluster Renamed
Meteorological and Hydrological	Flood	Groundwater Flood	MH0008	Water-related	MH0605	Groundwater Flooding	Continued & Cluster Renamed
Meteorological and Hydrological	Flood	Ice-Jam Flood Including Debris	MH0009	Water-related	MH0608	Ice-Jam Flooding Including Debris	Continued & Cluster Renamed
Meteorological and Hydrological	Flood	Ponding (Drainage) Flood	MH0010	Water-related	MH0609	Ponding (Drainage) Flooding	Continued & Cluster Renamed
Meteorological and Hydrological	Flood	Snowmelt Flood	MH0011	Water-related	MH0610	Snowmelt Flooding	Continued & Cluster Renamed
Meteorological and Hydrological	Flood	Surface Water Flooding	MH0012	Water-related	MH0606	Surface water Flooding	Continued & Cluster Renamed
Meteorological and Hydrological	Flood	Glacial Lake Outburst Flood	MH0013	Water-related	MH0607	Glacial Lake Outburst Flooding	Continued & Cluster Renamed
Meteorological and Hydrological	Lithometeors	Black Carbon (Brown Clouds)	MH0014	Environmental Degradation	EN0104	Black Carbon	Moved (EN)
Meteorological and Hydrological	Lithometeors	Dust storm or Sandstorm	MH0015	Particle-related	MH0201	Dust Storm or Sandstorm	Continued & Cluster Renamed
Meteorological and Hydrological	Lithometeors	Fog	MH0016	Particle-related	MH0202	Fog	Continued & Cluster Renamed
Meteorological and Hydrological	Lithometeors	Haze	MH0017	Particle-related	MH0203	Haze	Continued & Cluster Renamed
	Lithometeors	Polluted Air	MH0018	Environmental Degradation	EN0102	Air Pollution (Point source)	Moved (EN) & Split & Renamed
	Lithometeors	Polluted Air	MH0018	Environmental Degradation	EN0103	Ambient (Outdoor) Air Pollution	Moved (EN) & Split & Renamed
Meteorological and Hydrological	Lithometeors	Sand haze	MH0019	Particle-related	MH0204	Sand Haze	Continued & Cluster Renamed
Meteorological and Hydrological	Lithometeors	Smoke	MH0020	Particle-related	MH0205	Smoke	Continued & Cluster Renamed

Hazard Type	Cluster	Specific Hazard-name 2021	Code 2021	Cluster	Code 2025	Specific Hazard-name 2025	Change Summary
Meteorological and Hydrological	Marine	Ocean Acidification	MH0021	Environmental Degradation	EN0401	Ocean Acidification	Moved (EN)
Meteorological and Hydrological	Marine	Rogue Wave	MH0022	Marine-related	MH0701	Rogue Wave	Continued & Cluster Renamed
	Marine	Sea Water Intrusion	MH0023	Environmental Degradation	EN0302	Seawater intrusion	Moved (EN)
Meteorological and Hydrological	Marine	Sea Ice (Ice Bergs)	MH0024	Marine-related	MH0706	Sea ice	Continued & Cluster Renamed
Meteorological and Hydrological	Marine	Ice Flow	MH0025	Marine-related	MH0707	Ice flow	Continued & Cluster Renamed
Meteorological and Hydrological	Marine	Seiche	MH0026	Marine-related	MH0702	Seiche	Continued & Cluster Renamed
Meteorological and Hydrological	Marine	Storm Surge	MH0027	Marine-related	MH0703	Storm Surge	Continued & Cluster Renamed
Meteorological and Hydrological	Marine	Storm Tides	MH0028	Marine-related	MH0704	Storm Tides	Continued & Cluster Renamed
Meteorological and Hydrological	Marine	Tsunami	MH0029	Marine-related	MH0705	Tsunami	Continued & Cluster Renamed + Merged content from GH0006, GH0017 and GH0035
Meteorological and Hydrological	Pressure-Related	Depression or Cyclone (Low Pressure Area)	MH0030	Wind-& Pressure-related	MH0306	Depression or Cyclone	Continued & Cluster Renamed
Meteorological and Hydrological	Pressure-Related	Extra-tropical Cyclone	MH0031	Wind-& Pressure-related	MH0307	Extra-tropical Cyclone	Continued & Cluster Renamed
Meteorological and Hydrological	Pressure-Related	Sub-Tropical Cyclone	MH0032	Wind-& Pressure-related	MH0308	Sub-tropical Cyclone	Merged MH0056 & MH0032
Meteorological and Hydrological	Precipitation-Related	Acid Rain	MH0033	Environmental Degradation	EN0105	Acid Rain	Moved (EN)
Meteorological and Hydrological	Precipitation-Related	Blizzard	MH0034	Precipitation-related	MH0403	Blizzard	Continued
Meteorological and Hydrological	Precipitation-Related	Drought	MH0035	Precipitation-related	MH0401	Drought	Continued
Meteorological and Hydrological	Precipitation-Related	Hail	MH0036	Precipitation-related	MH0404	Hail	Continued
Meteorological and Hydrological	Precipitation-Related	Ice Storm	MH0037	Temperature-related	MH0506	Freezing Rain (Supercooled Rain)	Merged content of MH0037 & MH0044
Meteorological and Hydrological	Precipitation-Related	Snow	MH0038	Precipitation-related	MH0405	Snow	Continued
Meteorological and Hydrological	Precipitation-Related	Snow Storm	MH0039	Precipitation-related	MH0406	Snow Storm	Continued
Meteorological and Hydrological	Temperature-Related	Cold Wave	MH0040	Temperature-related	MH0502	Cold Wave	Continued
Meteorological and Hydrological	Temperature-Related	Dzud	MH0041	Temperature-related	MH0503	Dzud	Continued
Meteorological and Hydrological	Temperature-Related	Freeze	MH0042	Temperature-related	MH0504	Freeze	Continued
Meteorological and Hydrological	Temperature-Related	Frost (Hoar Frost)	MH0043	Temperature-related	MH0505	Frost (Hoar Frost)	Continued
Meteorological and Hydrological	Temperature-Related	Freezing Rain (Supercooled Rain)	MH0044	Temperature-related	MH0506	Freezing Rain (Supercooled Rain)	Continued

Hazard Type	Cluster	Specific Hazard-name 2021	Code 2021	Cluster	Code 2025	Specific Hazard-name 2025	Change Summary
Meteorological and Hydrological	Temperature-Related	Glaze	MH0045	Temperature-related	MH0507	Glaze	Continued
Meteorological and Hydrological	Temperature-Related	Ground Frost	MH0046	Temperature-related	MH0508	Ground Frost	Continued
Meteorological and Hydrological	Temperature-related	Heatwave	MH0047	Temperature-related	MH0501	Heatwave	Continued
Meteorological and Hydrological	Temperature-Related	Icing (Including Ice)	MH0048	Temperature-related	MH0509	Icing (Including Ice)	Continued
Meteorological and Hydrological	Temperature-Related	Thaw	MH0049	Temperature-related	MH0510	Thaw	Continued
Meteorological and Hydrological	Terrestrial	Avalanche	MH0050	Terrestrial	MH0801	Avalanche	Continued
Meteorological and Hydrological	Terrestrial	Mud Flow	MH0051	Ground-failure	GH0303	Flows	Merged
Meteorological and Hydrological	Terrestrial	Rock slide	MH0052	Ground-failure	GH0304	Slides	Merged
Meteorological and Hydrological	Wind-Related	Derecho	MH0053	Wind-& Pressure-related	MH0302	Derecho	Continued & Cluster Renamed
Meteorological and Hydrological	Wind-Related	Gale (Strong Gale)	MH0054	Wind-& Pressure-related	MH0303	Gale	Continued & Cluster Renamed
Meteorological and Hydrological	Wind-Related	Squall	MH0055	Wind-& Pressure-related	MH0304	Squall	Continued & Cluster Renamed
Meteorological and Hydrological	Wind-Related	Subtropical Storm	MH0056	Wind-& Pressure-related	MH0308	Sub-tropical Cyclone	Merged MH0056 & MH0032
Meteorological and Hydrological	Wind-Related	Tropical Cyclone (Cyclonic Wind, Rain [Storm] Surge)	MH0057	Wind-& Pressure-related	MH0309	Tropical Cyclone	Continued & Cluster Renamed
Meteorological and Hydrological	Wind-Related	Tropical Storm	MH0058	Wind-& Pressure-related			Renamed & Cluster Renamed
Meteorological and Hydrological	Wind-Related	Tornado	MH0059	Wind-& Pressure-related	MH0305	Tornado	Continued & Cluster Renamed
Meteorological and Hydrological	Wind-Related	Wind	MH0060	Wind-& Pressure-related	MH0301	Wind	Continued & Cluster Renamed
Meteorological and Hydrological				Marine-related	MH0708	Marine Heatwave	New
Meteorological and Hydrological				Precipitation-related	MH0402	Rain	New
Extraterrestrial	Extraterrestrial	Airburst	ET0001	Extraterrestrial Hazard	ET0201	Airburst	Continued & Cluster Renamed
Extraterrestrial	Extraterrestrial	Geomagnetic Storm (including energetic particles related to space weather, and solar flare radio blackout [R Scale])	ET0002	Space Weather	ET0101	Geomagnetic Disturbance	Renamed & Cluster Renamed
Extraterrestrial	Extraterrestrial	UV Radiation	ET0003	Extraterrestrial Hazard	ET0202	UV Radiation	Continued & Cluster Renamed
Extraterrestrial	Extraterrestrial	Meteorite Impact	ET0004	Extraterrestrial Hazard	ET0203	Meteorite Impact	Continued & Cluster Renamed

Hazard Type	Cluster	Specific Hazard-name 2021	Code 2021	Cluster	Code 2025	Specific Hazard-name 2025	Change Summary
Extraterrestrial	Extraterrestrial	Ionospheric Storms	ET0005	Space Weather	ET0102	Ionospheric Disturbance	Renamed & Cluster Renamed
Extraterrestrial	Extraterrestrial	Radio Blackout	ET0006	Space Weather	ET0103	Solar Flare	Renamed & Cluster Renamed
Extraterrestrial	Extraterrestrial	Solar Storm (Solar Radiation Storm) (S Scale)	ET0007	Space Weather	ET0104	Solar Energetic Particles	Renamed & Cluster Renamed
Extraterrestrial	Extraterrestrial	Space Hazard / Accident	ET0008	Extraterrestrial Hazard	ET0204	Space Hazard / Accident	Continued & Cluster Renamed
Extraterrestrial	Extraterrestrial	Near-Earth Object	ET0009	Extraterrestrial Hazard	ET0205	Near-Earth Object	Continued & Cluster Renamed
Extraterrestrial				Extraterrestrial Hazard	ET0206	Space Debris	New
Geological	Seismogenic (Earthquakes)	Earthquake	GH0001	Seismic	GH0101	Earthquake	Continued & Cluster Renamed + merged content from GH0002,GH0015,GH0021
Geological	Seismogenic (Earthquakes)	Ground Shaking (Earthquake)	GH0002	Seismic	GH0101	Earthquake	Merged content from GH0002,GH0015,GH0021
Geological	Seismogenic (Earthquakes)	Liquefaction (Earthquake Trigger)	GH0003	Ground Failure	GH0307	Liquefaction	Merged
Geological	Seismogenic (Earthquakes)	Earthquake Surface Rupture, Fissures, and Tectonic Uplift/Subsidence	GH0004	Ground Failure	GH0311	Surface Rupture & Fissure	Merged
Geological	Seismogenic (Earthquakes)	Subsidence and Uplift, Including Shoreline Change (Earthquake Trigger)	GH0005	Ground Failure	GH0309	Subsidence and Uplift	Merged GH0005 & GH0020 & GH0024
Geological	Seismogenic (Earthquakes)	Tsunami (Earthquake Trigger)	GH0006	Marine-related	MH0705	Tsunami	Moved (MH) and Merged with GH0006, GH0017 and GH0035
Geological	Seismogenic (Earthquake)	Landslide or Debris Flow (Earthquake Trigger)	GH0007	Ground Failure	GH0300	Gravitational Mass Movement (Landslide)	New Chapeau - merged content from GH0007, GH0300
Geological	Seismogenic (Earthquakes)	Ground Gases (Seismogenic)	GH0008	Other Hazards	GH0407	Ground Gases (CH4, Rn, etc.)	Merged GH0008 & GH0027
Geological	Volcanogenic (Volcanoes and Geothermal)	Lava Flows (Lava Domes)	GH0009	Volcanic	GH0201	Lava Flows (Lava Domes)	Continued
Geological	Volcanogenic (Volcanoes and Geothermal)	Ash/Tephra Fall (Physical and Chemical)	GH0010	Volcanic	GH0202	Ash/Tephra Fall (including Volcanic Ballistic projectiles)	Continued
Geological	Volcanogenic (Volcanoes and Geothermal)	Ballistics (Volcanic)	GH0011	Volcanic	GH0202	Ash/Tephra Fall (including Volcanic Ballistic projectiles)	Merged

Hazard Type	Cluster	Specific Hazard-name 2021	Code 2021	Cluster	Code 2025	Specific Hazard-name 2025	Change Summary
Geological	Volcanogenic (Volcanoes and Geothermal)	Pyroclastic Density Current	GH0012	Volcanic	GH0203	Pyroclastic Density Current	Continued
Geological	Volcanogenic (Volcanoes and Geothermal)	Debris Flow/Lahars/Floods	GH0013	Volcanic	GH0204	Lahars	Continued & Renamed
Geological	Volcanogenic (Volcanoes and Geothermal)	Landslide (Volcanic Trigger)	GH0300	Ground Failure	GH0300	Gravitational Mass Movement (Landslide)	Merged content from GH0007, GH0300
Geological	Volcanogenic (Volcanoes and Geothermal)	Ground Shaking (Volcanic Earthquake)	GH0015	Seismic	GH0101	Earthquake	Merged content from GH0002,GH0015,GH0021
Geological	Volcanogenic (Volcanoes and Geothermal)	Volcanic Gases and Aerosols	GH0016	Volcanic	GH0205	Volcanic Gases and Aerosols	Continued
Geological	Volcanogenic (Volcanoes and Geothermal)	Tsunami (Volcanic Trigger)	GH0017	Marine-related	MH0705	Tsunami	Moved (MH) and Merged with GH0006, GH0017 and GH0035
Geological	Volcanogenic (Volcanoes and Geothermal)	Lightning (Volcanic Trigger)	GH0018				Removed
Geological	Volcanogenic (Volcanoes and Geothermal)	Urban Fire (During/Following Volcanic Eruption)	GH0019				Removed
Geological	Volcanogenic (Volcanoes and Geothermal)	Subsidence and Uplift, Including Shoreline Change (Magmatic/Volcanic Trigger)	GH0020	Ground Failure	GH0309	Subsidence and Uplift	Merged GH0005 & GH0020 & GH0024
Geological	Other Geohazard	Ground Shaking (induced earthquake, reservoir fill, dams, cavity collapse, underground explosion, impact, hydrocarbon fields, shale exploration, etc.)	GH0021	Seismic	GH0101	Earthquake	Merged content from GH0002,GH0015,GH0021

Hazard Type	Cluster	Specific Hazard-name 2021	Code 2021	Cluster	Code 2025	Specific Hazard-name 2025	Change Summary
Geological	Other Geohazard	Liquefaction (Groundwater Trigger)	GH0022	Ground Failure	GH0307	Liquefaction	Continued & Renamed
Geological	Other Geohazard	Ground Fissuring	GH0023	Ground Failure	GH0311	Surface Rupture & Fissure	Continued & Renamed
Geological	Other Geohazard	Subsidence and Uplift Including Shoreline Change	GH0024	Ground Failure	GH0309	Subsidence and Uplift	Merged GH0005 & GH0020 & GH0024
Geological	Other Geohazard	Shrink-Swell Subsidence	GH0025	Ground Failure	GH0310	Shrink-Swell Subsidence	Continued
Geological	Other Geohazard	Sinkhole	GH0026	Ground Failure	GH0308	Sinkhole	Continued
Geological	Other Geohazard	Ground Gases (CH4, Rn, etc.)	GH0027	Other Hazards	GH0407	Ground Gases (CH4, Rn, etc.)	Continued and merged content GH0027
Geological	Other Geohazard	Riverbank Erosion	GH0028	Other Hazards	GH0404	River Erosion & Accretion	Renamed
Geological	Other Geohazard	Sand Encroachment	GH0029	Other Hazards	GH0406	Sand Encroachment	Continued
Geological	Other Geohazard	Aquifer Recharge (Systems Failure/ Outages)	GH0030				Removed
Geological	Other Geohazard	Submarine Landslide	GH0031	Ground Failure	GH0306	Submarine Landslide	Continued
Geological	Other Geohazard	Rockfall	GH0032	Ground Failure	GH0301	Falls	Merged GH0032 &GH0034
Geological	Other Geohazard	Landscape Creep	GH0033	Ground Failure	GH0302	Spreads	Renamed
Geological	Other Geohazard	Sediment Rock Avalanche	GH0034	Ground Failure	GH0301	Falls	Merged GH0032 &GH0034
Geological	Other Geohazard	Tsunami (Submarine Landslide Trigger)	GH0035	Marine-related	MH0705	Tsunami	Moved (MH) and Merged with GH0006, GH0017 and GH0035
Geological				Ground Failure	GH0305	Topples	New
Environmental	Environmental Degradation	Household Air Pollution	EN0001	Environmental Degradation	EN0101	Household Air Pollution	Continued
Environmental	Environmental Degradation	Air Pollution (Point Source)	EN0002	Environmental Degradation	EN0102	Air Pollution (Point Source)	Continued
Environmental	Environmental Degradation	Ambient (Outdoor) Air Pollution	EN0003	Environmental Degradation	EN0103	Ambient (Outdoor) Air Pollution	Continued
Environmental	Environmental Degradation	Land Degradation	EN0004	Environmental Degradation	EN0301	Land Degradation	Continued
Environmental	Environmental Degradation	Soil Degradation	EN0005	Other Hazards	GH0402	Soil Degradation	Moved (GH)
Environmental	Environmental Degradation	Runoff / Nonpoint Source Pollution	EN0006	Environmental Degradation	EN0106	Runoff / Nonpoint Source Pollution	Continued
Environmental	Environmental Degradation	Salinity	EN0007	Environmental Degradation	EN0303	Salinity & Sodicity	Renamed
Environmental	Environmental Degradation	Biodiversity Loss	EN0008	Environmental Degradation	EN0501	Biodiversity Loss	Continued

Hazard Type	Cluster	Specific Hazard-name 2021	Code 2021	Cluster	Code 2025	Specific Hazard-name 2025	Change Summary
Environmental	Environmental Degradation (Forestry)	Deforestation	EN0009	Environmental Degradation	EN0201	Deforestation	Continued
Environmental	Environmental Degradation	Forest Declines and Diebacks	EN0010	Environmental Degradation	EN0202	Forest Declines and Diebacks	Continued
Environmental	Environmental Degradation	Forest Disturbances	EN0011	Environmental Degradation	EN0203	Forest Disturbances	Continued
Environmental	Environmental Degradation (Forestry)	Forest Invasive Species	EN0012	Environmental Degradation	EN0204	Forest Invasive Species	Continued
Environmental	Environmental Degradation (Forestry)	Wildfires	EN0013	Environmental Degradation	EN0205	Wildfires	Continued
Environmental	Environmental Degradation	Desertification	EN0014	Environmental Degradation	EN0206	Desertification	Continued
Environmental	Environmental Degradation	Loss of Mangroves	EN0015	Environmental Degradation	EN0207	Loss of Mangroves	Continued
Environmental	Environmental Degradation	Wetland Loss/Degradation	EN0016	Environmental Degradation	EN0304	Wetland Loss/Degradation	Continued
Environmental	Environmental Degradation	Coral Bleaching	EN0017	Environmental Degradation	EN0404	Coral Bleaching	Continued
Environmental	Environmental Degradation	Compressive Soils	EN0018	Other Hazards	GH0401	Compressive Soils	Moved (GH)
Environmental	Environmental Degradation	Soil Erosion	EN0019	Other Hazards	GH0403	Soil Erosion	Moved (GH)
Environmental	Environmental Degradation	Coastal Erosion and Shoreline Change	EN0020	Other Hazards	GH0405	Coastal Erosion & Accretion	Moved (GH) & Renamed
Environmental	Environmental Degradation	Permafrost Loss	EN0021	Environmental Degradation	EN0305	Permafrost Loss	Continued
Environmental	Environmental Degradation	Sand Mining	EN0022	Environmental Degradation	EN0405	Sand Mining	Continued
Environmental	Environmental Degradation	Sea Level Rise	EN0023	Environmental Degradation	EN0402	Sea Level Rise	Continued
Environmental	Environmental Degradation	Eutrophication	EN0024	Environmental Degradation	EN0403	Eutrophication	Continued
Chemical	Gases	Ammonia	CH0001	Toxic Gases	CH0301	Ammonia	Continued & Cluster Renamed
Chemical	Gases	Carbon Monoxide	CH0002	Toxic Gases	CH0302	Carbon Monoxide	Continued & Cluster Renamed
Chemical	Heavy Metals	Arsenic	CH0003	Heavy Metals & Trace Element Contaminants	CH0101	Arsenic	Continued & Cluster Renamed
Chemical	Heavy Metals	Cadmium	CH0004	Heavy Metals & Trace Element Contaminants	CH0102	Cadmium	Continued & Cluster Renamed
Chemical	Heavy Metals	Lead	CH0005	Heavy Metals & Trace Element Contaminants	CH0103	Lead	Continued & Cluster Renamed

Hazard Type	Cluster	Specific Hazard-name 2021	Code 2021	Cluster	Code 2025	Specific Hazard-name 2025	Change Summary
Chemical	Heavy Metals	Mercury	CH0006	Heavy Metals & Trace Element Contaminants	CH0104	Mercury	Continued & Cluster Renamed
Chemical	Food Safety	Levels of Contaminants in Food and Feed	CH0007	Chemical Hazards in Food and Pharmaceuticals	CH0601	Levels of Contaminants in Food & Feed	Continued & Cluster Renamed
Chemical	Pesticides	Pesticides – Highly Hazardous	CH0008	Persistent Organic Pollutants	CH0501	Pesticides	Renamed
Chemical	Pesticides	Residue of Pesticides	CH0009	Persistent Organic Pollutants	CH0501	Pesticides	Merged
Chemical	Persistent Organic Pollutants (POPs)	Hazardous Pesticide Contamination in Soils	CH0010	Persistent Organic Pollutants	CH0501	Pesticides	Merged
Chemical	Pesticides	Insecticides	CH0011	Persistent Organic Pollutants	CH0501	Pesticides	Merged
Chemical	Pesticides	Fungicides	CHO012	Persistent Organic Pollutants	CH0501	Pesticides	Merged
Chemical	Persistent Organic Pollutants (POPs)	Dioxins and Dioxin-like Substances	CH0013	Persistent Organic Pollutants	CH0502	Dioxins & Dioxin-like Substance	Continued
Chemical	Persistent Organic Pollutants (POPs)	Microplastics	CH0014	Persistent Organic Pollutants	CH0504	Microplastics	Continued
Chemical	Gases	Phosphine	CH0015				Removed
Chemical	Gases	Chlorine	CH0016	Toxic Gases	CH0303	Chlorine	Continued & Cluster Renamed
Chemical	Hydrocarbons	Oil Pollution	CH0017	Carginogens	CH0203	Benzene & Hydrocarbons	Merged CH0017& CH0018 into New Cluster
Chemical	Hydrocarbons	Benzene	CH0018	Carginogens	CH0203	Benzene & Hydrocarbons	Merged CH0017& CH0018 into New Cluster
Chemical	CBRNE (Chemical, Biological,	Chemical Warfare Agents	CH0019	Other Chemical Hazards	CH0903	Chemical Warfare Agents	Continued & Cluster Renamed
Chemical	Other Chemical Hazards and Toxins	Asbestos	CH0020	Carginogens	CH0202	Asbestos	Continued & New Cluster
Chemical	Other Chemical Hazards and Toxins	Aflatoxins	CH0021	Carginogens	CH0201	Aflatoxins	Continued & New Cluster

Hazard Type	Cluster	Specific Hazard-name 2021	Code 2021	Cluster	Code 2025	Specific Hazard-name 2025	Change Summary
Chemical	Other Chemical Hazards and Toxins	Fluoride - Excess or inadequate intake	CH0022	Heavy Metals & Trace Element Contaminants	CH0105	Fluoride & Iodine/Iodide Excess or Inadequate Intake	Renamed & Cluster Change
Chemical	Other Chemical Hazards and Toxins	Methanol	CH0023	Chemical Hazards in Food and Pharmaceuticals	CH0603	Methanol	Continued & Cluster Change
Chemical	Other Chemical Hazards and Toxins	Substandard and Falsified Medical Products	CH0024	Chemical Hazards in Food and Pharmaceuticals	CH0602	Substandard & Falsified Medical Products	Continued & Cluster Change
Chemical	Fisheries and Aquaculture	Marine Toxins	CH0025	Chemical Hazards in Food and Pharmaceuticals	CH0605	Marine Toxins	Continued & Cluster Change
Chemical				Heavy Metals & Trace Element Contaminants	CH0100	Heavy Metals & Trace Elements	New
Chemical				Toxic Gases	CH0300	Toxic Gases	New
Chemical				Asphyxiant Gases	CH0400	Asphyxiant Gases	New
Chemical				Persistent Organic Pollutants	CH0500	Persistent Organic Pollutants	New
Chemical				Persistent Organic Pollutants	CH0503	Polyfluoroalkyl Substances	New
Chemical				Chemical Hazards in Food and Pharmaceuticals	CH0604	Opioids & Other Addictive Substances	New
Chemical				Other Chemical Hazards	CH0901	Corrosive Substances	New
Chemical				Other Chemical Hazards	CH0902	Ammonium Nitrate	New
Biological	Fisheries and Aquaculture	Harmful Algal Blooms	BI0001	Other Biological Hazards	BI0603	Harmful Algal Blooms	Continued & Cluster Change
Biological	Insect Infestation	Insect Pest Infestations	BI0002	Insect-related Diseases	BI0401	Insect Pest Infestations	Continued & Cluster Renamed
Biological	Insect Infestation	Locust	BI0003	Insect-related Diseases	BI0402	Locust	Continued & Cluster Renamed
Biological	Invasive Species	Invasive Weeds	BI0004	Insect-related Diseases	BI0403	Invasive weed/species	Merged BI0004 & BI0005 Cluster Change
Biological	Invasive Species	Invasive Species	BI0005	Insect-related Diseases	BI0403	Invasive weed/species	Merged BI0004 & BI0005 Cluster Change
Biological	Human-Animal Interaction	Snake Envenomation	BI0006	Other Biological Hazards	BI0605	Snakebite Envenoming	Continued & Cluster Change
Biological	Human-Animal Interaction	Human-Wildlife Conflict	BI0007	Other Biological Hazards	BI0604	Human-Wildlife Conflict	Continued & Cluster Change

Hazard Type	Cluster	Specific Hazard-name 2021	Code 2021	Cluster	Code 2025	Specific Hazard-name 2025	Change Summary
Biological	CBRNE (Chemical, Biological, Radiological, Nuclear and Explosive)	Biological Agents	BI0008	Other Biological Hazards	BI0602	Biological Agents CBRNE	Continued & Cluster Change
Biological	Mental Health	Suicide Cluster	BI0009	Behavioural	SO0303	Suicide Cluster	Moved (SO)
Biological	Food Safety	Antimicrobial Resistance	BI0010	Other Biological Hazards	BI0601	Antimicrobial Resistance	Continued & Cluster Change - subsumed content from BI0025
Biological	Food Safety	Foodborne Microbial Hazards (including human enteric virus and foodborne parasite)	BI0011	Infectious Disesases	BI0104	Foodborne Diseases (Human impact)	Merged BI0011 with BI0019
Biological	Infectious Disease (Plant)	Bacterial Plant Disease	BI0012	Plant Diseases	BI0501	Bacterial Plant Disease	Continued & Cluster Renamed
Biological	Infectious Diseases (Plant)	Fungal Plant Disease	BI0013	Plant Diseases	BI0502	Fungal Plant Disease	Continued & Cluster Renamed
Biological	Infectious Diseases (Plant)	Viral, Mycoplasma and Viroid Plant Disease Epidemics	BI0014	Plant Diseases	BI0503	Viral, Phytoplasma and Viroid Plant Disease Outbreaks	Continued & Cluster Renamed
Biological	Infectious Diseases (Human and Animal)	Anthrax	BI0015	Specific Infectious Disease of Public Health Concern	BI0201	Anthrax	
Biological	Infectious Diseases (Human and Animal)	Airborne Diseases	BI0016	Infectious Disesases	BI0101	Airborne Diseases (human and Animal)	Renamed & Cluster Renamed
Biological	Infectious Diseases (Human and Animal)	Blood Borne Viruses	BI0017	Infectious Disesases	BI0102	Blood Borne Viruses (Human and Animal)	Renamed & Cluster Renamed
Biological	Infectious Diseases (Human and Animal)	Waterborne Diseases	BI0018	Infectious Disesases	BI0110	Waterborne Diseases (Human)	Renamed & Cluster Renamed
Biological	Infectious Diseases (Human and Animal)	Foodborne Diseases	BI0019	Infectious Disesases	BI0104	Foodborne Diseases (Human impact)	Renamed & Cluster Renamed- subsumed content from BI0011
Biological	Infectious Diseases (Human and Animal)	Sexually Transmitted Diseases (Human)	BI0020	Infectious Disesases	BI0106	Sexually Transmitted Diseases (Human)	Continued & Cluster Renamed

Hazard Type	Cluster	Specific Hazard-name 2021	Code 2021	Cluster	Code 2025	Specific Hazard-name 2025	Change Summary
Biological	Infectious Diseases (Human and Animal)	Neglected Tropical Diseases (Human)	BI0021	Infectious Disesases	BI0105	Neglected Tropical Diseases (Human)	Continued & Cluster Renamed
Biological	Infectious Diseases (Human and Animal)	Vaccine-Preventable Diseases (Human)	BI0022	Infectious Disesases	BI0107	Vaccine-Preventable Diseases (Human)	Continued & Cluster Renamed
Biological	Infectious Disease (Human and Animal)	Vector Borne Diseases (VBD) (Human)	BI0023	Infectious Disesases	BI0108	Vector Borne Diseases (VBD) (Human and Animal)	Merged BI0023 & BI0071 - Renamed & Cluster Renamed
Biological	Infectious Diseases (Human and Animal)	Viral Haemorrhagic Fevers (Human)	BI0024	Infectious Disesases	BI0109	Viral Haemorrhagic Fevers (Human)	Continued & Cluster Renamed
Biological	Infectious Diseases (Human and Animal)	Antimicrobial Resistant Microorganisms (Human)	BI0025	Other Biological Hazards	BI0601	Antimicrobial Resistance	Merged with BI0010 which became a New Cluster
Biological	Infectious Diseases (Human and Animal)	Animal Diseases (Not Zoonoses)	BI0026	Animal Infectious Diseases	BI0301	Animal Diseases (Not Zoonoses)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Zoonotic Diseases	BI0027	Infectious Disesases	BI0113	Zoonotic Diseases	Continued & Cluster Renamed
Biological	Infectious Diseases (Human and Animal)	Diarrhoeal Diseases (Human)	BI0028	Infectious Disesases	BI0103	Diarrhoeal Diseases (Human)	Continued & Cluster Renamed
Biological	Infectious Diseases (Human and Animal)	Prion Diseases	BI0029	Specific Infectious Disease of Public Health Concern	BI0230	Prion Diseases	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Hepatitis B (Human)	BI0030	Specific Infectious Disease of Public Health Concern	BI0212	Hepatitis B (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Hepatitis C (human)	BI0031	Specific Infectious Disease of Public Health Concern	BI0213	Hepatitis C (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	HIV and AIDS (Human)	BI0032	Specific Infectious Disease of Public Health Concern	BI0214	HIV and AIDS (Human)	Continued & Cluster Change

Hazard Type	Cluster	Specific Hazard-name 2021	Code 2021	Cluster	Code 2025	Specific Hazard-name 2025	Change Summary
Biological	Infectious Diseases (Human and Animal)	COVID-19 (SARS-CoV-2) (Human)	BI0033	Specific Infectious Disease of Public Health Concern	BI0205	COVID-19 (SARS-CoV-2) (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Cholera (Human)	BI0034	Specific Infectious Disease of Public Health Concern	BI0204	Cholera (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Cryptosporidium (Human)	BI0035	Infectious Disesases	BI0111	Cryptosporidium (Human and Animal)	Renamed & Cluster Renamed
Biological	Infectious Diseases (Human and Animal)	Paratyphoid fever (Human)	BI0036	Specific Infectious Disease of Public Health Concern	BI0225	Paratyphoid Fever (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Typhoid Fever (Human)	BI0037	Specific Infectious Disease of Public Health Concern	BI0226	Typhoid Fever (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Hepatitis A (Human)	BI0038	Specific Infectious Disease of Public Health Concern	BI0211	Hepatitis A (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Escherichia Coli (STEC) (Human)	BI0039	Specific Infectious Disease of Public Health Concern	BI0210	Escherichia Coli (STEC) (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Listeriosis (Human)	BI0040	Specific Infectious Disease of Public Health Concern	BI0218	Listeriosis (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Shigellosis (Human)	BI0041	Specific Infectious Disease of Public Health Concern	BI0234	Shigellosis (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Avian Influenza (Human and Animal)	BI0042	Specific Infectious Disease of Public Health Concern	BI0245	Avian Influenza (Human and Animal)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Pandemic Influenza (Human)	BI0043	Specific Infectious Disease of Public Health Concern	BI0244	Pandemic Influenza (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Seasonal Influenza (Human)	BI0044	Specific Infectious Disease of Public Health Concern	BI0243	Seasonal Influenza (Human)	Continued & Cluster Change

Hazard Type	Cluster	Specific Hazard-name 2021	Code 2021	Cluster	Code 2025	Specific Hazard-name 2025	Change Summary
Biological	Infectious Diseases (Human and Animal)	Cysticercosis	BI0045	Infectious Disesases	BI0112	Cysticercosis (Human and Animal)	Renamed & Cluster Renamed
Biological	Infectious Diseases (Human and Animal)	Leptospirosis (Human)	BI0046	Specific Infectious Disease of Public Health Concern	BI0217	Leptospirosis (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Plague (Human)	BI0047	Specific Infectious Disease of Public Health Concern	BI0228	Plague (Human)	Continued and Cluster Change
Biological	Infectious Diseases (Human and Animal)	Leprosy	BI0048	Specific Infectious Disease of Public Health Concern	BI0216	Leprosy (Human)	Renamed & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Chikungunya	BI0049	Specific Infectious Disease of Public Health Concern	BI0203	Chikungunya	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Zika Virus (human)	BI0050	Specific Infectious Disease of Public Health Concern	BI0242	Zika Virus (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Diphtheria (Human)	BI0051	Specific Infectious Disease of Public Health Concern	BI0208	Diphtheria (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Measles (Human)	BI0052	Specific Infectious Disease of Public Health Concern	BI0221	Measles (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Meningococcal Meningitis (Human)	BI0053	Specific Infectious Disease of Public Health Concern	BI0222	Meningococcal Meningitis (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Pertussis (Human)	BI0054	Specific Infectious Disease of Public Health Concern	BI0227	Pertussis (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Polio (Human)	BI0055	Specific Infectious Disease of Public Health Concern	BI0229	Polio (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Smallpox (Human)	BI0056	Specific Infectious Disease of Public Health Concern	BI0235	Smallpox (Human)	Continued & Cluster Change

Hazard Type	Cluster	Specific Hazard-name 2021	Code 2021	Cluster	Code 2025	Specific Hazard-name 2025	Change Summary
Biological	Infectious Diseases (Human and Animal)	Varicella and herpes zoster (Human)	BI0057	Specific Infectious Disease of Public Health Concern	BI0239	Varicella and Herpes Zoster (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Yellow Fever (Human)	BI0058	Specific Infectious Disease of Public Health Concern	BI0241	Yellow Fever (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Dengue (Human)	BI0059	Specific Infectious Disease of Public Health Concern	BI0207	Dengue (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Malaria (Human)	BI0060	Specific Infectious Disease of Public Health Concern	BI0219	Malaria (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Crimean-Congo Haemorrhagic Fever (Human)	BI0061	Specific Infectious Disease of Public Health Concern	BI0206	Crimean-Congo Haemorrhagic Fever (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Ebola (Human)	BI0062	Specific Infectious Disease of Public Health Concern	BI0209	Ebola (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Lassa Fever (Human)	BI0063	Specific Infectious Disease of Public Health Concern	BI0215	Lassa Fever (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Tuberculosis (Human and Animal)	BI0064	Specific Infectious Disease of Public Health Concern	BI0237	Tuberculosis (Human and Animal)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Middle East Respiratory Syndrome (MERS) (Human)	BI0065	Specific Infectious Disease of Public Health Concern	BI0223	Middle East Respiratory Syndrome (MERS) (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Monkeypox (Human)	BI0066	Specific Infectious Disease of Public Health Concern	BI0204	Mpox (Human)	Renamed & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Rabies (Animal and Human)	BI0067	Specific Infectious Disease of Public Health Concern	BI0232	Rabies (Animal and Human)	Continued & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Severe Acute Respiratory Syndrome (SARS) (Human)	BI0068	Specific Infectious Disease of Public Health Concern	BI0236	Severe Acute Respiratory Syndrome (SARS) (Human)	Continued & Cluster Change

Hazard Type	Cluster	Specific Hazard-name 2021	Code 2021	Cluster	Code 2025	Specific Hazard-name 2025	Change Summary
Biological	Infectious Diseases (Human and Animal)	Rotavirus (Human)	BI0069	Specific Infectious Disease of Public Health Concern	BI0233	Rotavirus (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Animal)	African Swine Fever (Animal)	BI0070	Animal Infectious Diseases	BI0302	African Swine Fever (Animal)	Continued & Cluster Renamed
Biological	Infectious Diseases (Human and Animal)	Vector-borne diseases (VBD) (Animals)	BI0071	Infectious Disesases	BI0108	Vector Borne Diseases (VBD) (Human and Animal)	Renamed & Cluster Renamed
Biological	Infectious Diseases (Human and Animal)	Brucellosis (Animal)	BI0072	Specific Infectious Disease of Public Health Concern	BI0202	Brucellosis (Human and Animal)	Renamed & Cluster Change
Biological	Infectious Diseases (Animal)	Classical Swine Fever (Animal)	BI0073	Animal Infectious Diseases	BI0303	Classical Swine Fever (Animal)	Continued & Cluster Renamed
Biological	Infectious Diseases (Human and Animal)	Contagious Bovine Pleuropneumonia (CBPP) (Animal)	BI0074	Animal Infectious Diseases	BI0304	Contagious Bovine Pleuropneumonia (CBPP) (Animal)	Continued &bCluster Renamed
Biological	Infectious Diseases (Human and Animal)	Contagious Caprine Pleuropneumonia (CCPP) (Animal)	BI0075	Animal Infectious Diseases	BI0305	Contagious Caprine Pleuropneumonia (CCPP) (Animal)	Continued & Cluster Renamed
Biological	Infectious Diseases (Human and Animal)	Foot and Mouth Disease Virus (Animal)	BI0076	Animal Infectious Diseases	BI0306	Foot and Mouth Disease Virus (Animal)	Continued & Cluster Renamed
Biological	Infectious Diseases (Human and Animal)	Lumpy Skin Disease (Animal)	BI0077	Animal Infectious Diseases	BI0307	Lumpy Skin Disease (Animal)	Continued & Cluster Renamed
Biological	Infectious Diseases (Human and Animal)	New World Screwworm (NWS) (Animal)	BI0078	Animal Infectious Diseases	BI0309	New World Screwworm (NWS) (Animal)	Continued & Cluster Renamed
Biological	Infectious Diseases (Human and Animal)	Newcastle Disease Virus (Animal)	BI0079	Animal Infectious Diseases	BI0308	Newcastle Disease (Animal)	Renamed & Cluster Renamed
Biological	Infectious Diseases (Human and Animal)	Peste Des Petits Ruminants (Animal)	BI0080	Animal Infectious Diseases	BI0310	Peste des Petits Ruminants (Animal)	Continued & Cluster Renamed

Hazard Type	Cluster	Specific Hazard-name 2021	Code 2021	Cluster	Code 2025	Specific Hazard-name 2025	Change Summary
Biological	Infectious Diseases (Human and Animal)	Q Fever	BI0081	Specific Infectious Disease of Public Health Concern	BI0231	Q Fever	Renamed & Cluster Change
Biological	Infectious Diseases (Human and Animal)	Rift Valley Fever (Animal)	BI0082	Animal Infectious Diseases	BI0311	Rift Valley Fever (Animal)	Continued & Cluster Renamed
Biological	Infectious Diseases (Human and Animal)	Trypanosomosis (Animal)	BI0083	Specific Infectious Disease of Public Health Concern	BI0238	Trypanosomiasis & Tripanomosis (Human and Animal)	Merged BI0083 & BI0086 Cluster Change
Biological	Infectious Diseases (Human and Animal)	West Nile Fever (Human)	BI0084	Specific Infectious Disease of Public Health Concern	BI0240	West Nile Fever (Human)	Continued & Cluster Change
Biological	Infectious Diseases (Animal)	Rinderpest (Animal)	BI0085	Animal Infectious Diseases	BI0312	Rinderpest (Animal)	Continued & Cluster Renamed
Biological	Infectious Diseases (Human and Animal)	Trypanosomiasis (Human)	BI0086	Specific Infectious Disease of Public Health Concern	BI0238	Trypanosomiasis & Tripanomosis (Human and Animal)	Merged BI0083 & BI0086 & Cluster Change
Biological	Infectious Disease (Aquaculture)	Shrimp disease (bacterial) - Acute Hepatic pancreatic necrosis	BI0087	Animal Infectious Diseases	BI0314	Shrimp Diseases (Bacterial) - Acute Hepatic Pancreatic Necrosis	Continued & Cluster Change
Biological	Infectious Diseases (Aquaculture)	Oyster Disease Aquaculture	BI0088	Animal Infectious Diseases	BI0313	Oyster Disease Aquaculture	Continued & Cluster Change
Biological				Specific Infectious Disease of Public Health Concern	BI0220	Marburg Virus	New
Technological	Radiation	Radioactive Waste	TL0001	Radiation	TL0601	Radioactive Waste	Continued
Technological	Radiation	Radioactive Material	TL0002	Radiation	TL0602	Radioactive Agents & Material	Merged
Technological	CBRNE (Chemical, Biological, Radiological, Nuclear and Explosive)	Radiation Agents	TL0003	Radiation	TL0602	Radioactive Agents & Material	Merged TL0004 & TL0003 Cluster Change
Technological	CBRNE (Chemical, Biological, Radiological, Nuclear and Explosive)	Nuclear Agents	TL0004	Radiation	TL0603	Nuclear Agents	Continued - absorbed TL0004 & Cluster Change

Hazard Type	Cluster	Specific Hazard-name 2021	Code 2021	Cluster	Code 2025	Specific Hazard-name 2025	Change Summary
Technological	Construction/ Structural Failure	Building Collapse	TL0005	Construction / Structural Failure	TL0201	Building Collapse	Continued
Technological	Construction/ Structural Failure	Building, highrise, cladding	TL0006	Construction / Structural Failure	TL0202	Building, Highrise, Cladding	Continued
Technological	Construction/ Structural Failure	Structural Failure	TL0007	Construction / Structural Failure	TL0203	Structural Failure	Continued
Technological	Construction/ Structural Failure	Bridge Failure	TL0008	Construction / Structural Failure	TL0204	Bridge Failure	Continued
Technological	Construction/ Structural Failure	Dam Failure	TL0009	Construction / Structural Failure	TL0205	Dam Failure	Continued
Technological	Construction/ Structural Failure	Supply Chain Failure	TL0010	Construction / Structural Failure	TL0206	Supply Chain Failure	Continued
Technological	Construction/ Structural Failure	Critical Infrastructure Failure	TL0011	Construction / Structural Failure	TL0207	Critical Infrastructure Failure	Continued
Technological	Infrastructure Failure	Nuclear Plant Failure	TL0012	Construction / Structural Failure	TL0208	Nuclear Plant Failure	Continued
Technological	Infrastructure Failure	Power Outage/ or Blackout	TL0013	Construction / Structural Failure	TL0209	Power Outage / Blackout	Continued
Technological	Infrastructure Failure	Emergency Telecommunications Failure	TL0014	Construction / Structural Failure	TL0211	Emergency Telecommunication Failure	Continued
Technological	Infrastructure Failure	Water Supply Failure	TL0015	Construction / Structural Failure	TL0210	Water Supply Failure	Continued
Technological	Infrastructure Failure	Radio and Other Telecommunication Failures	TL0016	Construction / Structural Failure	TL0212	Radio and other Telecommunication Failures	Continued
Technological	Cyber Hazard	Misconfiguration of Software and Hardware	TL0017	Cyberhazards			Reorganized (Cyberhazards Cluster)
Technological	Cyber Hazard	Non-Conformity and Interoperability	TL0018	Cyberhazards			Reorganized (Cyberhazards Cluster)
Technological	Cyber Hazard	Malware	TL0019	Cyberhazards	TL0101	Malware	Continued
Technological	Cyber Hazard	Data Security-Related Hazards	TL0021	Cyberhazards			Reorganized (Cyberhazards Cluster)
Technological	Cyber hazard	Disrupt	TL0022	Cyberhazards			Reorganized (Cyberhazards Cluster)
Technological	Cyber Hazard	Outage	TL0023	Cyberhazards			Reorganized (Cyberhazards Cluster)
Technological	Cyber Hazard	Data Breach	TL0020	Cyberhazards	TL0102	Data Breach	Continued (absorbed partial content of TL0024)

Hazard Type	Cluster	Specific Hazard-name 2021	Code 2021	Cluster	Code 2025	Specific Hazard-name 2025	Change Summary
Technological	Cyber Hazard	Personally Identifiable Information (PII) Breach	TL0024	Cyberhazards	TL0107	Social Engineering	New (subsummed partial content of TL0024
					TL0107	Social Engineering	
Technological	Cyber Hazard	Internet of Things (IOT)-Related Hazards	TL0025	Cyberhazards			Reorganized (Cyberhazards Cluster)
Technological	Cyber Hazard	Cyberbullying	TL0026	Cyberhazards	TL0106	Cyberbullying	Continued
Technological	Industrial Failure	Natech	TL0027	Industrial Failure	TL0309	Natech	Continued
Technological	Industrial Failure	Pollution	TL0028	Industrial Failure	TL0302	Pollution	Continued
Technological	Industrial Failure	Explosion	TL0029	Industrial Failure	TL0304	Explosion	Continued
Technological	Industrial Failure	Leaks and Spills	TL0030	Industrial Failure	TL0301	Leaks and Spills	Continued
Technological	Industrial Failure	Soil Pollution	TL0031	Industrial Failure	TL0303	Soil Pollution	Continued
Technological	Industrial Failure	Fire	TL0032	Industrial Failure	TL0305	Fire	Continued
Technological	Industrial Failure	Mining Hazards	TL0033	Industrial Failure	TL0307	Mining Hazards	Continued
Technological	Industrial Failure	Safety Hazards Associated with Oil and Gas Extraction Activities	TL0034	Industrial Failure	TL0308	Safety Hazards Associated with Oil and Gas Extraction Activities	Continued
Technological	Waste	Disaster Waste	TL0035	Waste	TL0501	Disaster & Conflict Waste	Renamed
Technological	Waste	Solid Waste	TL0036	Waste	TL0502	Solid Waste	Continued
Technological	Waste	Wastewater	TL0037	Waste	TL0503	Wastewater	Continued
Technological	Waste	Hazardous Waste	TL0038	Waste	TL0504	Hazardous Waste	Continued
Technological	Waste	Plastic Waste	TL0039	Waste	TL0505	Plastic Waste	Continued
Technological	Marine	Marine Debris	TL0040	Waste	TL0506	Marine Debris	Continued
Technological	Waste	Electronic Waste (E-Waste)	TL0041	Waste	TL0507	Electronic Waste (E-Waste)	Continued
Technological	Waste	Healthcare Risk Waste	TL0042	Waste	TL0508	Health-care Waste	Renamed
Technological	Waste	Landfilling	TL0043	Waste	TL0509	Landfilling	Continued
Technological	Waste	Tailings	TL0044	Waste	TL0511	Tailings	Continued
Technological	Waste	Waste Treatment Lagoons	TL0045	Waste	TL0510	Waste Treatment Lagoons	Continued
Technological	Flood	Drain and Sewer Flooding	TL0046	Construction / Structural Failure	TL0214	Drain and Sewer Flooding	Continued & Cluster Change
Technological	Flood	Reservoir Flooding	TL0047	Construction / Structural Failure	TL0215	Reservoir Flooding	Continued & Cluster Change
Technological	Transportation	Air Transportation Accident	TL0048	Transportation Accidents	TL0401	Air Transportation Accident	Continued & Cluster Renamed

Hazard Type	Cluster	Specific Hazard-name 2021	Code 2021	Cluster	Code 2025	Specific Hazard-name 2025	Change Summary
Technological	Transportation	Inland Water Ways	TL0049	Transportation Accidents	TL0402	Inland Water Way Accidents	Renamed & Cluster Renamed
Technological	Transportation	Marine Accident	TL0050	Transportation Accidents	TL0403	Maritime Accident	Continued & Cluster Renamed
Technological	Transportation	Rail Accident	TL0051	Transportation Accidents	TL0404	Rail Accident	Continued & Cluster Renamed
Technological	Transportation	Road Traffic Accident	TL0052	Transportation Accidents	TL0405	Road Traffic Accident	Continued & Cluster Renamed
Technological	CBRNE (Chemical, Biological, Radiological, Nuclear and Explosive)	Explosive agents	TL0053	Industrial Failure	TL0306	Explosive Agents	Continued & Cluster Change
Technological				Cyberhazards	TL0103	Advanced Persistent Threat	New
Technological				Cyberhazards	TL0104	Denial of Service	New
Technological				Cyberhazards	TL0105	Supply Chain Attack	New
Technological				Cyberhazards	TL0107	Social Engineering	New- absorb partial content of TL0024
Technological				Construction / Structural Failure	TL0213	Tunnel Failure	New
Societal	Conflict	International Armed Conflict (IAC)	SO0001	Conflict	SO0101	International Armed Conflict (IAC)	Continued
Societal	Conflict	Non-International Armed Conflict (NIAC)	SO0002	Conflict	SO0102	Non-International Armed Conflict (NIAC)	Continued
Societal	Post-Conflict	Explosive remnants of War	SO0003	Conflict	SO0103	Civil Unrest	Continued
Societal	Post-Conflict	Environmental Degradation from Conflict	SO0004	Post-conflict	SO0201	Explosive Ordnance	Renamed
Societal	Environmental Degradation from Conflict	Post-conflict	SO0005	Post-conflict	SO0202	Environmental Degradation from Conflict	Continued
Societal	Behavioural	Violence	SO0006	Behavioural	SO0301	Violence	Continued
Societal	Behavioural	Stampede or Crushing (Human)	SO0007	Behavioural	SO0302	Stampede or Crushing (Human)	Continued
Societal	Economic	Financial shock	SO0008	Economic	SO0401	Financial Shock	Continued

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Over 108 colleagues join the update for 2025 of the UNDRR/ISC Hazard Information Profiles and have been very engaged, committed and supportive of the work – we thank them for their review of the HIPs. Many more colleagues volunteered to join the review and we thank them for their support.

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Annex 3: Multi-Hazard Context

Across diverse spatial scales, places are typically affected by more than one of the hazard types described in the UNDRR-ISC Hazard Information Profiles (HIPs). As set out in Section 7 of the main report, these hazards do not always occur independently of one another but can interrelate in various ways with other hazards (as well as other components of risk, vulnerability and exposure). Many hazard and risk assessments, however, continue to treat hazards as being independent phenomena. The assumption of independence is not always coherent with the observed reality, as demonstrated by Table 4 below. Multi-hazard interrelationships can be observed in many geographical contexts around the world. Table 4 briefly characterises four diverse multi-hazard case studies. For each example, a location and year associated with the event is noted, but it is recognised that some case studies extend over multiple territories and years.

Table 4. Multi-Hazard Interrelationship Case Study Examples.

ID	Location	Year	Overview	Reference (s)
A	Huascaran, Peru	1970	1. Earthquake triggered rockfall and ice flow. 2. Rock and ice accumulated further material while travelling downslope, the ice/snow melted, and a mud-rich debris flow formed.	Evans et al. (2009)
B	Mt Cook, New Zealand	1991	1. Heatwave triggered snowmelt. 2. Snowmelt triggered a large snow avalanche and landslide.	Huggel et al. (2010)
C	Rwenzori Mountains, Uganda	2013	1. Wildfires resulted in loss of vegetation and an increase in surface runoff during heavy rain. 2. High river discharge resulted in (re)activation of landslides, providing debris to the river system, and triggering a debris-rich flash flood. 3. The flood destroyed buildings and caused bridge failure.	Jacobs et al. (2016)
D	Afghanistan	2019	1. Heavy rainfall and rapid snowmelt leading to extensive floods 2. Followed by disease outbreak (diarrhoea)	iMMAP (2019); ACAPS 2019

An expanded discussion of the multi-hazard concept, this table of case studies, and the benefits of reflecting on this concept in the HIPS, is being prepared. This will be available on the MYRIAD-EU website (https://www.myriadproject.eu/library/).

References

ACAPS (2019). AFGHANISTAN Floods in Balkh, Herat, Badghis, Faryab, Sari Pul, Jowzjan. Available at: https://www.acaps.org/fileadmin/Data_Product/Main_media/20190404_acaps_start_briefing_note_afghanistan_flash_floods_.pdf (last accessed 5 March 2025).

Evans, S.G., Bishop, N.F., Smoll, L.F., Murillo, P.V., Delaney, K. B., Oliver-Smith, A. (2009). A re-examination of the mechanism and human impact of catastrophic mass flows originating on Nevado Huascarán, Cordillera Blanca, Peru in 1962 and 1970. Engineering Geology, 108(1-2), 96-118.

Huggel, C., Salzmann, N., Allen, S., Caplan-Auerbach, J., Fischer, L., Haeberli, W., Larsen, C., Schneider, D., Wessels, R. (2010). Recent and future warm extreme events and high-mountain slope stability. Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences, 368(1919), pp.2435-2459.

iMMAP (2019). Afghanistan: Population affected by natural hazards according to Rapid Assessment Form (RAF), 1 January - 29 May 2019. International Organization for Migration, https://reliefweb.int/report/afghanistan/afghanistan-population-affected-natural-hazards-according-rapid-assessment-form-1 (last accessed 5 March 2025).

Jacobs, L., Maes, J., Mertens, K., Sekajugo, J., Thiery, W., Van Lipzig, N., Poesen, J., Kervyn, M., Dewitte, O., (2016). Reconstruction of a flash flood event through a multi-hazard approach: focus on the Rwenzori Mountains, Uganda. Natural Hazards, 84, pp.851-876.

Voight, B., Constantine, E. K., Siswowidjoyo, S., Torley, R. (2000). Historical eruptions of Merapi volcano, central Java, Indonesia, 1768–1998. Journal of Volcanology and Geothermal Research, 100(1-4), 69-138.

Annex 4: Machine Actionability

Although the HIPs are already used in databases and information management systems to provide standardised list of hazards, to turn a publication such as the HIPs into a machine actionable resource will require different actions and steps. The UNDRR-ISC HIP machine Actionability Working Group identified two activity tracks that will address these steps:

- **Semantic and technological choices.** Machine actionability requires devising solutions to formalise and document standardised HIP structures, encoding, and the meaning of the different fields so that the HIPs information can be more effectively used by software. Making sure that units and geographical descriptions can be consistently resolved in software is one of the examples of a challenge related to machine actionability. Equally essential is ensuring that individual HIPs and their components can be referred to coherently and consistently across software solutions, requiring the use of persistent identifiers and locations (such as URIs). In sum, machine actionability means following current good practice for the representation and encoding of terminologies in line with the FAIR principles.
- **Governance and infrastructure**. The update process, licensing and sustainability of machine-actionable HIPs require agreement between stakeholders and the implementation of these processes. Licensing of the machine-actionable versions of HIPs cannot be based on document-based copyright, as it needs to be possible to include the HIP definitions into software components and services in ways that go beyond the established "fair use" practice. The sustainability of the infrastructure is also a crucial issue: compared to a human, a software solution is much more limited resolving a change of the URL where the information is stored, and HIPs should be reusable and accessible for years or decades.

In summary, machine actionability means adopting current good practices for the representation and encoding of terminologies in line with the FAIR principles (Wilkinson et al., 2016), as outlined by Cox et al., (2021) and the Cross-Domain Interoperability Framework implementation guidance on discovery metadata (CDIF, no date a) and using SKOS (CDIF, No date b).

References

CDIF (no date a). Implementation checklist. https://cross-domain-interoperability-framework.github.io/cdifbook/background/checklistForImplementation.html

CDIF (no date b). CDIF SKOS profile. https://cross-domain-interoperability-framework.github.io/cdifbook/controlled_vocabularies/cdifskosprofile.html

Cox, J.D., Gonzalez-Beltran, A.N., Magagna, B., Marinescu, M.-C. (2021). Ten simple rules for making a vocabulary FAIR. PLoS Comput Biol 17(6): e1009041. https://doi.org/10.1371/journal.pcbi.1009041

Wilkinson, M., et al. (2016). The FAIR Guiding Principles for scientific data management and stewardship. Sci Data 3, 160018. https://doi.org/10.1038/sdata.2016.18

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