



Federal Institute for  
Research on Building,  
Urban Affairs and  
Spatial Development

within the Federal Office for  
Building and Regional Planning



# Resilience and Cultural Heritage in Urban Development

Guidance Paper on  
Integrated Risk Management



## IMPRINT

### Published by

Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR)  
within the Federal Office for Building and Regional Planning (BBR)  
Deichmanns Aue 31–37  
53179 Bonn

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### Edited by

RHA - Reicher Haase Assoziierte GmbH, Aachen/Dortmund

### State

April 2023

### Typesetting and layout

RHA - Reicher Haase Assoziierte GmbH, Aachen/Dortmund

### Printed by

Federal Office for Building and Regional Planning, Bonn  
Printed on recycled paper

### Orders from

bastian.wahler@bbr.bund.de; Reference: Resilience and Cultural Heritage

### Picture credits

Cover picture: Maren Blecking. Content: see list of figures, p. 81

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# Resilience and Cultural Heritage in Urban Development

Guidance Paper on Integrated Risk Management



Federal Ministry  
for Housing, Urban Development  
and Building



**ExWoSt**

The project of the research programme "Experimental Housing and Urban Development" was carried out by the Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR) on behalf of the Federal Ministry for Housing, Urban Development and Building (BMWSB).



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## Introduction

Our urban heritage can help shape collective identities, create a sense of belonging within urban communities and mobilise civil society. Furthermore, cultural heritage is the result of developments that have emerged and adapted over the long term. It has been in existence for hundreds, if not thousands, of years and has withstood many hazards and threats over time.

Even though it is an essential source of resilience, cultural heritage can nevertheless be particularly exposed and its very existence threatened. Its associated characteristics, such as aging and its state of conservation, etc., mean that cultural heritage can carry a certain amount of vulnerability.

New, increasingly urgent and rapidly changing global conditions and challenges, such as climate change, the pandemic and the war in Ukraine, have a substantial impact on our living environment and cultural heritage, while the disastrous flooding in Germany, Belgium and the Netherlands in 2021 was an undeniable call to action for us all.

Against this background, a group of European experts has worked intensively to jointly discuss and develop Guiding Principles for Resilience and Integrated Approaches in Risk and Heritage Management in European Cities. This collaborative process started in 2020. The Partnership on Culture and Cultural Heritage in the Urban Agenda for the EU subsequently decided to make the guidelines set out in UNESCO's manual 'Managing Disaster Risks for World Heritage' usable specifically in the European context. Several experts have worked on this initiative – or 'Action' – since its inception and the German Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR) commissioned a German consortium of scientists, managers and planners

from the heritage and risk management fields to develop guiding principles for local stakeholders and decision-makers in a multi-step process. In addition, an Action Group encompassing various areas of expertise and representing different administrative levels has supported and enriched the dialogue by contributing a broad range of perspectives and experiences on heritage and risk management.

Guiding questions such as those listed below provided a common thread and served as guidance throughout the joint working process, helping to develop new perspectives and recommendations:

- How can cultural heritage sites and historical districts in European cities make positive contributions to urban resilience in the future against the background of ecological and social challenges? Which adjustments may be needed? Which integrated approaches are necessary?
- Which actors, stakeholders and institutions are, or should be, involved? Which local skills should be reinforced, and which cooperations should be strengthened?
- Which existing measures, processes, instruments and integrated approaches can benefit cities across Europe?
- Which possible conflicts between heritage management and risk prevention exist, and which processes and methods can resolve these conflicts?

The current research project (spring 2021 – winter 2022) has pursued these questions by means of the following series of working steps:

- An analysis of available documents helped gain an overview of existing literature and research throughout

Europe, identify gaps and develop a knowledge base.

- Two expert analyses deepened this knowledge – an analysis of the resilience of cultural and natural heritage by Barbara Minguez Garcia (a World Bank consultant at the time) and an analysis of the relevant EU regulations and funding programmes in the fields of risk and heritage management by Massimo Migliorini (LINKS Foundation, cultural heritage & urban regional development).
- An examination of 10 good practice examples helped identify challenges and opportunities.
- Interviews with practitioners from different levels of heritage and risk management and representing the local practice perspective helped deepen and cross-check the previously gained insights.
- A two-day interdisciplinary expert workshop in September 2021, held in Bordeaux and online, confirmed and enriched draft conclusions for action and established the basis for the guiding principles.
- A two-day interdisciplinary 'simulation game' in April 2021 in Bad Münstereifel in Germany – a town badly affected by the floods – tested and simulated the process of elaborating a risk management framework for the town's future urban development strategies.

This practice-oriented Guidance Paper summarises these working steps and outlines some key conclusions, including the following:

- It is vital to improve and regulate the communication, collaboration, coordination and exchange between risk and

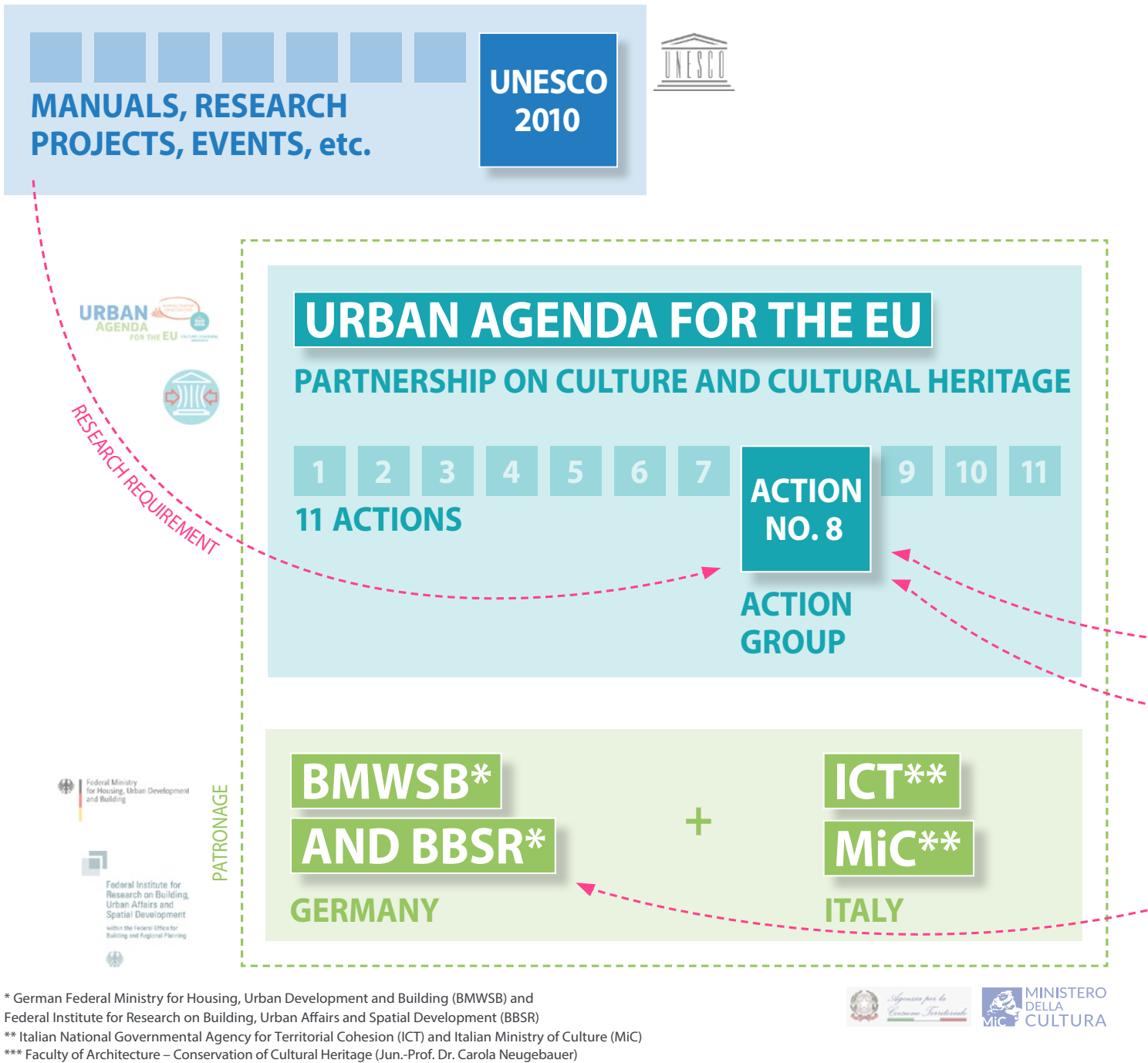
heritage management stakeholders – and between institutions, experts and practitioners within each field.

- It is important to involve both local stakeholders and political agents in the risk management process.
- It is crucial to act before a crisis or disaster, and not merely in its aftermath. The three-step approach of risk assessment, risk evaluation and risk management has proved very useful in the framework of the Risk Management Cycle.

The working method described above is rooted in the Partnership on Culture and Cultural Heritage in the Urban Agenda for the EU. The Partnership explores the opportunities that cultural heritage brings to European cities and develops possible strategies – known as 'Actions' – to preserve and develop it further. The German Federal Ministry for Housing, Urban Development and Building (BMWSB) and the BBSR, together with Italy, spearhead the Partnership. It is solely in the Urban Agenda that EU initiatives, member states, regions and cities enter into a joint dialogue on urban issues, with the aim of exploring new approaches and solutions and developing recommendations for the EU, national and local levels.

This joint process identified several key outcomes, including the need to build both theoretical and practical capacity within the field of urban development that deals with cultural heritage. In particular, the risk management method – which can be complex in part – needs to be implemented at local governance level and must therefore be explained and communicated to a wide range of stakeholders. Consequently, this publication aims primarily to support local practitioners in the fields of risk and heritage management, and it marks the culmination of a remarkable project and process.

# DIAGRAM OF THE INSTITUTIONAL FRAMEWORK



\* German Federal Ministry for Housing, Urban Development and Building (BMWWSB) and Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR)  
 \*\* Italian National Governmental Agency for Territorial Cohesion (ICT) and Italian Ministry of Culture (MiC)  
 \*\*\* Faculty of Architecture – Conservation of Cultural Heritage (Jun.-Prof. Dr. Carola Neugebauer)



Fig. 1: Overview of the institutional framework of the research project (RHA 2022)



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# 1 Setting the scene – the actuality and relevance of Integrated Risk Management in the development of cultural heritage

1.1 The known, yet growing, relevance of threats and risks	11
1.2 Cultural heritage at risk	11
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1.4 Key features of Integrated Risk Management in urban development	15



Fig. 2: Notre-Dame Cathedral being devastated by fire. Paris, France (iStock.com/David Henry)

Cultural heritage is a major cultural, economic and ecological resource, which is crucial for the sustenance and resilience of European communities at different levels and of varying scope. At the same time, heritage is vulnerable to a huge range of risks and disasters, both human-made and natural, which are increasingly becoming a part of everyday life in Europe. This explains the need to enhance the resilience of **cultural heritage** in European communities and to strive for Integrated Risk Management. In short, the key factors are:

- The lasting and growing relevance of **human-made and natural disasters** for European communities and cultural heritage sites.
- The importance of **cultural heritage as a resource** for sustainability and resilience.

### **1.1 The known, yet growing, relevance of threats and risks**

In recent years, there have been many examples of human-made and natural disasters in Europe, including Russia's war in Ukraine, the catastrophic floods in Germany, Belgium and the Netherlands in 2021, and the droughts that have affected north-central Europe since 2018. The fire in Notre-Dame Cathedral in Paris in 2019, the tornado in Moravia in 2021, and the earthquake in L'Aquila in 2009 are further examples of the range of sudden and long-term threats faced by European communities and cultural heritage sites. Although

catastrophic events are not new in the history of humankind, it is vital to recognise the permanent and ever-growing importance of human-made and natural hazards.


In this regard, it is important to mention the highly complex and unstable links between accelerating climate change and associated hazards. In many cases, the impacts of climate change pose a direct threat to human life and the built environment, including cultural heritage. In other cases, the links are indirect. For example, climate change may make heavy rainfall more likely, which in turn increases the risk of flooding if local land use patterns impede water retention. Elsewhere, the likelihood of rainfall decreases due to climate change, rendering other land use patterns more suitable. In these latter cases, the risk of flooding does not increase. Finally, human-made events, such as technical accidents or wars, are often not triggered by climate change, although they can add up systemically. An important goal should therefore be to intensify risk management activities that are based on a better understanding of risk.


### **1.2 Cultural heritage at risk**

Both human-made and natural hazards put cultural heritage at risk. This is why various international policy documents and acts of legislation from recent decades unanimously underline cultural heritage as an important object of protection within risk management. Key UNESCO, ICOMOS and European Commission



Index:  
Cultural heritage

 Further reading:  
the ICOMOS  
publication (2019),  
'Future of Our  
Pasts'

 Further reading:  
SHELTER, ARCH  
and CHEERS

policy documents are based on the 1954 Hague Convention, which is the earliest policy document to mention armed conflict as an event that threatens cultural heritage sites. Furthermore, the ICOMOS publication (2019) identified and described cultural heritage as an object of protection in the context of climate change. UNESCO published a manual on managing disaster risks at world heritage sites in 2010 (UNESCO 2017). In 2018, the European Year of Cultural Heritage, the European Commission published a document entitled 'Safeguarding Cultural Heritage from Natural and Man-Made Disasters'. These key policy documents have been important stimuli for raising awareness and promoting an Integrated Risk Management approach that is sensitive to cultural heritage.

EU legislation also categorises cultural heritage as an object of protection. Key European framework directives are the Floods Directive (see Art. 4(2d)) and the Environmental Impact Assessment Directive (see Art. 3(1d)). Implemented into the national laws of the EU member states, these directives constitute the legal basis for the consideration of cultural heritage in risk management. The EU directives and respective national laws also underline the legal requirement for municipal actors to integrate cultural heritage and risk management into local decision-making.

Shortcomings in the integrated approach to cultural heritage and risk management became particularly evident during the review of existing guidance literature and

were also an issue that repeatedly came to the fore during the expert interviews and discussions with Action Group members. Many ongoing or recent EU research projects, such as SHELTER, ARCH and CHEERS, to name but a few, already address these shortcomings. The deficits as regards the integration of cultural heritage and risk management into practice and theory became the starting point for this Guidance Paper.

In terms of Integrated Risk Management, the central problem is the lack of mutual understanding between heritage professionals and risk managers. There is a notorious tendency to neglect cultural heritage at every stage of risk management. Risk management research has only recently begun to address the challenges and potential of heritage-sensitive risk management (i.e. taking its risk-related specificities into account), and many problems remain unresolved. One of the issues is that the rationales and languages of the two disciplines – risk and heritage – are very different. Moreover, risk management needs to be improved in other respects, e.g. with regard to updates on changing risk scenarios in general (see chapter 4).

In turn, experts in monument preservation and heritage management largely disregard the need to consider risk management. There is little awareness of this issue and scant resources are dedicated to it unless a disaster strikes. A significant lack of basic knowledge in the field of risk management often prevents cultural heritage professionals from working towards heritage-sensitive local risk management.

Some local examples do exist in which actors have sustainably learnt from disasters and documented and exchanged accumulated knowledge to achieve better – i.e. integrated – risk management. Various Italian cities, for example, given their significant exposure to earthquakes, have successfully developed strong approaches in this regard. However, these initiatives are few in number, which shows there is a need for further impetus in this area. Furthermore, the attention paid to risk management by cultural heritage experts is often fragmented in nature, and the growing awareness of the need to adapt cultural heritage in the face of climate change often takes the place of proper risk management. Important as they may be, climate change adaptation measures cannot be a substitute for proper programmes to prevent, reduce and manage risks to cultural heritage. To date, only a few of the cultural heritage professionals surveyed have been fully abreast of the rapid developments in risk management research.

As the goal is to strengthen integrated, heritage-sensitive approaches to local risk management, these gaps in knowledge call for a considerable improvement to the current practice. There is a need to develop a **common, consistent and guiding knowledge base** that enables local conservationists to bring a cultural heritage perspective to risk management on the one hand and local risk managers to adequately consider cultural heritage on the other. **Guidance on how to encourage and steer Integrated Risk Management in local (urban) development is required.**

When Integrated Risk Management approaches are introduced, **local heritage experts** often struggle to respond properly to very precise questions, such as:

- **What are the risks that monuments in my city are exposed to?**
- **Whom can I ask for advice so I can prepare for possible events?**
- **Do I know what to do in the event of flooding – whom do I call ....?**
- **Am I aware of the specific susceptibility of my built environment and its mobile inventory?**
- **Are some assets and forms of my cultural heritage more worthy of protection than others?**

**Risk managers**, on the other hand, may ask themselves the following:

- **What is cultural heritage? Which assets do I have to consider?**
- **Whom can I ask for advice to get proper information on cultural heritage?**
- **What is the specific susceptibility and coping capacity of the built environment and its mobile inventory? Are these particularly worth protecting? If yes, which forms and assets?**
- **What can cultural heritage contribute to the building of resilience?**

### 1.3 Cultural heritage as a resource for sustainability and resilience


The aforementioned documents and acts of legislation underline the general **protection-worthiness** of cultural heritage. This results from the broad recognition and growing awareness of cultural heritage as a valuable resource. For decades, studies have demonstrated the manifold effects (benefits) of heritage in relation to societal, economic and spatial development (e.g. Neugebauer 2014) and revealed the values that local actors and stakeholders attach to it (e.g. Manson et al. 2002).


Most recently, ICOMOS (2021) outlined the contribution that heritage and its management make to the Sustainable Development Goals. This document underlines anew the manifold resources cultural heritage can contribute to sustainable urban development in all fields of societal and spatial development, providing a strong argument for its protection-worthiness. At the same time, it highlights that the question as to whether cultural heritage proves effective and contains resources for sustainable urban development strongly depends on adequate management that carefully valorises and enhances the benefits of cultural heritage (cf. Neugebauer 2014; World Heritage Convention and its Operational Guidelines).

The latter point also applies to **potential contributions of cultural heritage to urban resilience**; (urban) heritage, when well managed and valorised, can positively contribute to the 'core components of **resilience**'. According to Davidson et al. 2006, the 'core components of resilience'

are 'persistence, absorption, recovery, identity preservation, self-organisation and adaptive capacity'. Cultural heritage contributes, both in itself and through its particular characteristics and functions for local communities, to the maintenance of these components of resilience, as illustrated by the four examples below:

- Firstly, cultural heritage has proved to be one of the **key anchors for collective identities** and for people's sense of spatial belonging and sense of place. In turn, a sense of belonging encourages residents to engage with their heritage, cities and neighbourhoods. Such engagement can include risk prevention and management activities, thus increasing urban resilience (cf. STRENCH and CHEERS on the nexus between civil-society-oriented and heritage-oriented risk management). The German Federal Ministry of the Interior (BMI) offers an example of acknowledging this significance; introducing the concept of '**symbolic criticality**', it proposes considering 'an infrastructure' as 'critical if, due to its cultural or identity-forming significance, its destruction can emotionally shake a society and psychologically unbalance it in the long term' (KRITIS BMI 2019, 5). Cultural heritage can deploy such critical meaning for local communities as proved by many human-made and natural disasters in history. The case of Mostar (cf. chapter 6.2.2) is one example. The historical bridge Stari Most was destroyed in the Yugoslavian war in the early 1990s and was later rebuilt thanks to local and international initiatives. Furthermore,

 Index:  
Symbolic criticality

 Further reading:  
KRITIS BMI 2019

 Index:  
Resilience

the fire in Notre-Dame Cathedral in Paris in 2019 underlined the symbolic criticality of heritage, when Europe donated towards its restoration.

- A second example relates to the **the tangible assets of heritage**. Cultural heritage not only has symbolic, emotional or economic significance for societal resilience – it also provides material infrastructures that can facilitate crucial services in the event of a disaster. Historical parks and cultural landscapes that serve as rain and water retention areas that reduce the height and speed of floods are one example of this – they offer crucial capacity in the event of a disaster. Historical bridges and roads that can serve as crucial transport routes in the event of a crisis are another example. These are 'functionally critical infrastructures' that are protected by EU Directive 2008/114/EC, Art. 2. Cultural heritage can also represent socially sensitive infrastructures such as hospitals, nursery schools and the like, which are protected by national legislation (e.g. by fire protection laws).
- Thirdly, cultural heritage is a repository of important **historical knowledge for resilience**, in the form of design and construction knowledge, techniques and craftsmanship, for example. Risk-sensitive practices of previous generations have made cultural heritage itself resilient and adaptable to various threats to this day.
- Fourthly, Migliorini (2021) summarises the potential of cultural herit-


age for resilience, stating that cultural heritage 'plays a key role for the identity of cities and villages, providing not only important cultural, but also **social, environmental, and economic functions**, while relying on infrastructure services from these environments to keep functioning'. Cultural heritage, in all its diversity and with all its resources, is thus particularly worth protecting against all types of threats.


Integrated Risk Management must consider and target cultural heritage as an object of protection. At the same time, cultural heritage itself is composed of objects, sites and knowledge with potential for disaster resilience. This calls for its **acknowledgment and systemic valorisation in risk management**.

#### **1.4 Key features of Integrated Risk Management in urban development**

All the aforementioned arguments – and, in particular, the timeliness and growing need to deal with human-made and natural hazards and insidious environmental changes – underline the need for integrated approaches to risk management in urban development. **Cultural heritage** must play a role in this approach, both as a protected asset and as a resource for sustainable and resilient urban development. If this is the case, the approach is called '**Integrated Risk Management**'.

**Integrated Risk Management** is a comprehensive process of identifying, analysing, evaluating and managing all kinds of threats that endanger people, cultural heritage and other critical assets

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Cultural heritage

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Management

## NOTRE-DAME, FRANCE



Fig. 3: Reconstruction of Notre-Dame. Paris, France (iStock.com/Razvan)

### Lessons learnt

- The symbolic criticality of the cultural asset justified the life-threatening rescue efforts of the firefighters
- Innovative appropriation of historical construction methods and craft techniques for the authentic reconstruction of Notre-Dame
- Raising awareness of the need for action to protect UNESCO World Heritage Sites
- Decision to adhere to a 'classic', narrow and static understanding of resilience (cf. chapter 5.1)

### Setting

Notre-Dame Cathedral is listed as a UNESCO World Heritage Site as part of 'Paris, Banks of the Seine'. During the evening of 15 April 2019, the 12th-century Gothic cathedral caught fire and the flames destroyed two thirds of the roof and brought down the famous spire. Putting their own lives at risk, firefighters prevented the collapse of both main towers by continuing to cool the heated masonry with fire-extinguishing water. Immediately after the event, emergency measures were taken to secure and stabilise the building's structure (UNESCO 2020).

### Learning moment

After the devastating fire at Notre-Dame, the restoration of the damaged areas began. All available information about the World Heritage Site is being collected and researchers are analysing the rubble and remains left by the disaster. All historical information about the cathedral's con-

struction, materials and architecture can contribute to its preservation. In addition, the restoration is using traditional practices and techniques of craftsmanship to preserve the World Heritage Site faithfully for future generations (UNESCO 2020).

New and more modern architectural ideas such as an accessible glass roof or a spire made of laser lights were discussed, but eventually traditional construction methods were selected (Badelt 2020). Thus, a historicising approach in line with the classical understanding of resilience instead of a transformative approach to resilience was chosen (cf. chapter 5.1). UNESCO is also prepared to assist the French authorities in further assessing the damage and discussing plans for the preservation and restoration of the destroyed parts (UNESCO 2020). National and international events, such as the Notre-Dame fire, can be crucial in raising awareness of the need for action to protect cultural heritage (Interreg Central Europe 2019, 43).



of urban environments. Four features define Integrated Risk Management:

- Pursuit of the all-**hazards**-approach: This approach involves paying attention to all manner of natural and/or human-made threats (such as flooding, storms, droughts, earthquakes, fire, technical collapses or armed conflict) and strives to include the interactions between these threats as effectively as possible.
- Consideration of all phases of **prevention, preparedness, response and recovery** (for details, see chapter 4.2). Consequently, risk management is limited neither to the moments of disaster and immediate response, nor to the subsequent recovery activities. Instead, Integrated Risk Management must consider these phases and engage with the prevention of, and preparedness for, risks.
- **Systemic approach to cultural heritage**: This approach involves acknowledging the close links between nature and culture, object and site, tangible and intangible assets, and the ordinary

and extraordinary assets of cultural heritage. It considers both state-listed monuments and legacies that are meaningful to the local communities. This systemic approach builds on the aforementioned circular understanding of heritage, acknowledging that cultural heritage is both an object for protection in risk management and a potential source of resilience.

- **Addressing the local (urban) level and actors**: Although risk management is also needed at, and applicable to, all upper spatial levels, such as regional and national levels, the primary interest is in the local, urban level. This is the lowest spatial and organisational level at which the integrated approach to risk management is both possible and effective. At the same time, the need for Integrated Risk Management guidance is greatest in situations where manifold actors have to interact and coordinate in risk management in pursuit of the protection of critical assets, including complex heritage sites such as historical city centres, urban districts or cultural landscapes.

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Hazard

## 2 Aims, target groups and beneficiaries of this Guidance Paper

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Fig. 4: Flood event in North Rhine-Westphalia in July 2021. Stolberg, Germany (Dovern 2021)

## 2.1 Aims and merits

Against the background of the pressing actuality and growing relevance of Integrated Risk Management in urban development outlined in chapter 1, the purpose of this Guidance Paper is to address the urgent need for guidance in local (urban) practice. The aim is thus to build **local capacity for Integrated Risk Management in urban development at European level**. To this end, it develops and disseminates:

- **Basic knowledge about Integrated Risk Management and cultural heritage** – knowledge which is urgently needed in local practice. It includes the definition and explanation of key terms, concepts and approaches in relevant fields.
- **Key principles**, which help improve both Integrated Risk Management in urban development in general and the adequate consideration of cultural heritage in urban risk management in particular.
- **References to further reading and practical case studies**, which facilitate self-education and provide further details. The practical case studies shed light on critical issues; they serve as examples and not per se as best practice studies.

The Guidance Paper may therefore have several merits. It provides background knowledge that can facilitate the introduction and further development of Integrated Risk Management in urban development. It also provides key knowledge about the terms and concepts of risk management and cultural heritage management in a systematic and instructive way that practitioners can easily under-

stand and apply. Furthermore, it presents key methodological and procedural principles that support successful Integrated Risk Management processes. In addition, the Guidance Paper draws attention to the advantages and disadvantages of methodological approaches to risk management and to the disciplinary and interdisciplinary challenges of the integration of both topics. It thus encourages critical thinking and offers orientation in the interdisciplinary field of Integrated Risk Management.

Ultimately, this Guidance Paper is not a detailed manual that takes the readers step by step through all the details of Integrated Risk Management. Instead, it provides information about the basics of risk management and raises awareness of key principles of general validity and value. This knowledge and the key principles can then be applied in a case-specific context at local level.

## 2.2 Target groups

Given the great need for consultation and interdisciplinary dialogue at urban level, this paper is aimed in particular at **local actors responsible for risk management and/or the administration of cultural heritage at European level**. The target groups are therefore local actors whose areas of expertise, fields of activity and self-understanding have evolved considerably over the last decade. Clarification about who the local cultural heritage and risk managers may be and which resources and responsibilities they should have is provided in the paragraphs below.

**Local heritage managers** are those public experts who have legal responsibility for, and actively take care of, heritage sites or objects at local (urban) level. They are in

contact with state authorities and expert bodies in the fields of monument conservation, spatial planning, civil protection and risk management at the various state administrative levels, including the local and, ideally, the regional levels. Moreover, local heritage managers (ideally) have direct access to the democratically legitimised decision-makers at local level, such as the mayor, city council and regional parliament. Heritage managers are usually expert advisors and not political decision-makers.

**Local risk managers** are those experts who have been assigned responsibility for risk management at urban level – either by legislation or political decision. Risk managers often form part of the local state authorities. They are thus connected to state authorities and expert bodies in the fields of civil protection, spatial planning, risk and climate change management and monument conservation at both local and further administrative levels. They (ideally) have direct access to the democratically legitimised decision-makers at local level. Like the heritage managers, they are expert advisors and not political decision-makers.

The two main target groups of this Guidance Paper – local heritage managers and local risk managers – thus have several things in common. One important commonality is that there is no clear, standardised occupational profile for their professions that is unambiguous and easily recognisable in any European city. Instead, the above-mentioned occupational profiles point to the novelty and interdisciplinarity of their professional fields. In some cities, such positions have only recently been introduced. In other cities, the growing attention to risk management and the administration of cultural heritage may have

triggered the discussion about who should be responsible for it.

Ultimately, **local heritage managers and risk managers** can come from different disciplinary backgrounds, e.g. from monument conservation, risk management, spatial planning, civil protection, environmental protection, etc. They can also be appointed to a variety of professional roles. For example, they can be local monument conservators within the city administration, managers of a local UNESCO World Heritage Site, managers of state-owned museums, historical parks, castles and gardens in the region and the like. They may also have been recently appointed as new team members of the mayor's office responsible for urban sustainability, resilience and climate change adaptation.

In any case, these local heritage and risk managers are the main target groups of this Guidance Paper. They should invest in Integrated Risk Management for the following reasons:

- They have been legally appointed to implement the state's responsibility for general services, spatial development, civil protection and risk management, culture and monuments.
- They have the best capacities and legal resources to serve Integrated Risk Management, in particular resources and capacities to initiate, substantiate and/or steer risk management processes that are based on broad and inclusive partnerships. They should ideally combine forces by forming local 'resilience teams' which can tackle the complex topic of Integrated Risk Management (cf. ARCH 2021, ARCH 2020, see chapter 6.2 → Principle 8: 'Roles and responsibilities').

- They can serve as role models for other stakeholders, towns and counties due to their networks and public visibility.

### 2.3 Other beneficiaries

The Guidance Paper could also inspire and support other beneficiaries, such as:

- Private, cooperative or collective **owners of historical properties** such as state-protected monuments, valuable old buildings or more complex sites, e.g. historical city centres, etc.
- **Civic organisations and groups** that are engaged with cultural heritage and other issues relevant to risk management.

These property owners and civil society groups may wish to become involved in Integrated Risk Management because of their individual concerns and special interests. They will benefit from this Guidance Paper by finding insights and ideas about which actions to take and how to integrate their activities into the overall local system of risk management. As informed property owners and civil society groups, they can best act as drivers and corrective agents for local risk and heritage management activities, becoming key partners in local Integrated Risk Management.

However, this Guidance Paper does not fully cover the needs and interests of these beneficiaries in risk management. It focuses primarily on local heritage and risk professionals who have a public mandate (responsibility) for Integrated Risk Management. The specific needs and contexts of property owners and civil society groups – such as their legal and financial constraints and interests – are not considered in this Guidance Paper. Never-

theless, private property owners and civil society groups can still benefit from this publication, as outlined above.

### 2.4 Structure

This Guidance Paper to Integrated Risk Management follows a simple structure.

Chapter 3 outlines the overall **risk management framework**. Reflecting briefly upon the most important ways of conceptualising and explaining risk management in general, the chapter provides basic knowledge, defines key terms and points out lessons to be learnt. Moreover, it completes and visualises the risk management framework on which this Guidance Paper is based. The **three topics of 'understanding risk', 'evaluating risk' and 'managing risk'** are highlighted as the core challenges of risk management.

Consequently, the following chapters 4, 5 and 6 focus on each of these challenges in turn, i.e. on understanding risk, evaluating risk and managing risk. Each chapter starts by introducing new basic knowledge. It then proceeds to name, explain and discuss the **key principles** that are considered essential to the challenge and thus to the improvement of Integrated Risk Management in urban development in a way that adequately respects cultural heritage. Each chapter also includes text boxes with references to further reading and practical case studies.

Chapter 7 describes the overarching principle of **'iteration'**, ultimately linking the three core topics of Integrated Risk Management by describing the regular updating of assessments, evaluations and management activities.

 Index:  
Iteration

## How to read this Guidance Paper

NOTRE-DAME, FRANCE



Lessons Learnt

- The symbolic criticality of the cultural asset justified the life-threatening rescue efforts of the firefighters
- Innovative appropriation of historical construction methods and craft techniques for the authentic reconstruction of Notre-Dame
- Raising awareness of the need for action to protect UNESCO World Heritage Sites
- Decision to adhere to a 'classic', narrow and static understanding of resilience (cf. chapter 5.1)

**Setting**

Notre-Dame Cathedral is listed as a UNESCO World Heritage Site as part of 'Paris, Banks of the Seine'. During the evening of 15 April 2019, the 12th-century Gothic cathedral caught fire and the flames destroyed two thirds of the roof and brought down the famous spire. Putting their own lives at risk, firefighters prevented the collapse of both main towers by continuing to cool the heated masonry with fire-extinguishing water. Immediately after the event, emergency measures were taken to secure and stabilise the building's structure (UNESCO 2020).

**Learning moment**

After the devastating fire at Notre-Dame, the restoration of the damaged areas began. All available information about the World Heritage Site is being collected and researchers are analysing the rubble and remains left by the disaster. All historical information about the cathedral's construction, materials and architecture can contribute to its preservation. In addition, the restoration is using traditional practices and techniques of craftsmanship to preserve the World Heritage Site faithfully for future generations (UNESCO 2020).

New and more modern architectural ideas such as an accessible glass roof or a spire made of laser lights were discussed, but eventually traditional construction methods were selected (Bodali 2020). Thus, a historicising approach in line with the classical understanding of resilience instead of a transformative approach to resilience was chosen (cf. chapter 5.1).

UNESCO is also prepared to assist the French authorities in further assessing the damage and discussing plans for the preservation and restoration of the destroyed parts (UNESCO 2020). National and international events, such as the Notre-Dame fire, can be crucial in raising awareness of the need for action to protect cultural heritage (Interreg Central Europe 2019, 43).

of urban environments. Four features define Integrated Risk Management:

- Pursuit of the **all-hazards-approach**:
- This approach involves paying attention to all manner of natural and/or human-made threats (such as flooding, storms, droughts, earthquakes, fire, technical collapses or armed conflict) and strives to include the interactions between these threats as effectively as possible.
- Addressing the local (urban) level and actors: Although risk management is also needed at, and applicable to, all upper spatial levels, such as regional and national levels, the primary interest is in the local, urban level. This is the lowest spatial and organisational level at which the integrated approach to risk management is both possible and effective. At the same time, the need for Integrated Risk Management guidance is greatest in situations where manifold actors have to interact and coordinate in risk management in pursuit of the protection of critical assets, including complex heritage sites such as historical city centres, urban districts or cultural landscapes.
- Systemic approach to cultural heritage: This approach involves acknowledging the close links between nature and culture, object and site, tangible and intangible assets, and the ordinary and extraordinary assets of cultural heritage. It considers both state-listed monuments and legacies that are meaningful to the local communities. This systemic approach builds on the aforementioned circular understanding of heritage, acknowledging that cultural heritage is both an object for protection in risk management and a potential source of resilience.

See Index

Further reading

1

Chapter

Definition  
(see Index, p. 77)

Core statement

Further reading

Case study

Fig. 5: How to read this Guidance Paper (RHA 2022)

## The structure of this Guidance Paper

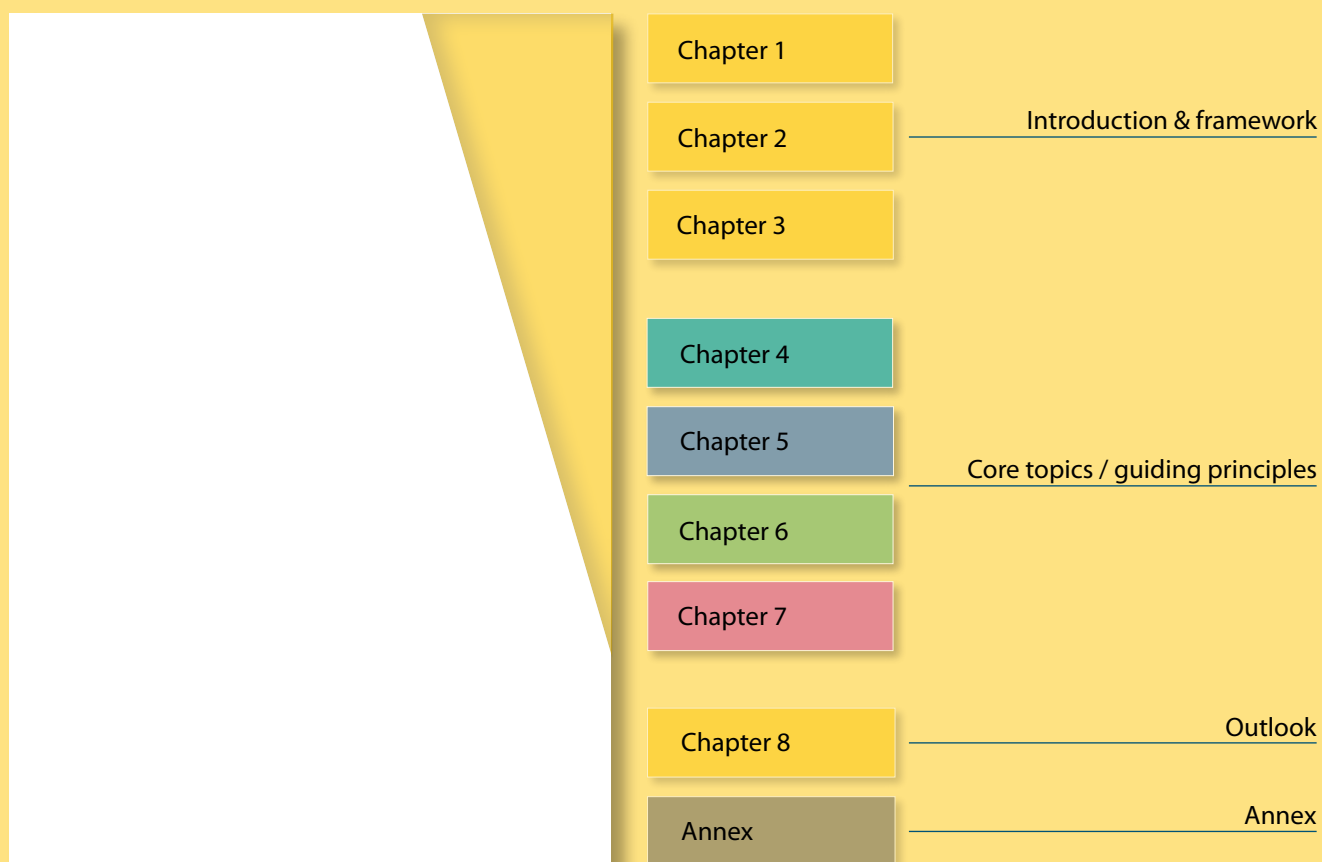


Fig. 6: The structure of this Guidance Paper (RHA 2022)

## 3 The Risk Governance Framework

3.1 Basic knowledge	25
3.2 The Risk Governance Framework	27
3.3 Core topics for guidance	28



Fig. 7: Canal and historical buildings. Venice, Italy (Klanten 2018)



As elaborated in chapter 1, Integrated Risk Management is not only an important, forward-looking field of action in urban development that helps strengthen resilience and safeguard critical assets and resources for future generations – it is also a process and a task of challenging complexity. The Risk Governance Framework provides an important overview of the field of risk management. It reduces the complexity of the field to the essentials in terms of the relevant stages, steps and actors. Chapter 3 serves as an introduction to this topic.

### 3.1 Basic knowledge

Existing research uses several descriptions of the general nature of **risk management**. The two major models used to describe and explain it are the Risk Management Cycle and the Risk Governance Cycle. Each approach draws attention to crucial, but different aspects of risk management. The Risk Management Cycle (as shown in fig. 8, based on the SHELTER project) highlights the different stages of risk management in an exemplary way. According to the scheme, comprehensive risk management comprises at least four stages (action fields) that are defined according to the UNDRR terminology (2009) as follows:

- **Prevention** – the outright avoidance of adverse impacts of hazards and related disasters.
- **Preparedness** – the knowledge and capacities developed by governments, professional response and recovery organisations, communities and individuals to effectively anticipate, respond to and recover from the impacts of likely, imminent or current hazard events or conditions.

- **Response** – the provision of emergency services and public assistance during or immediately after a disaster to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected.
- **Recovery** – the restoration and, where appropriate, improvement of facilities, livelihood and living conditions of disaster-affected communities, including efforts to reduce disaster risk.

The four stages are closely linked. The SHELTER project even describes them as a continuum rather than a cycle of separate stages (cf. SHELTER D.2.1, 2019). The key message here is that the contents and activities of each stage should refer to and build on each other as much as possible. Any break in this continuous circle threatens the effectiveness of risk man-

📖 Index:  
Risk management

📖 Further reading:  
SHELTER Project

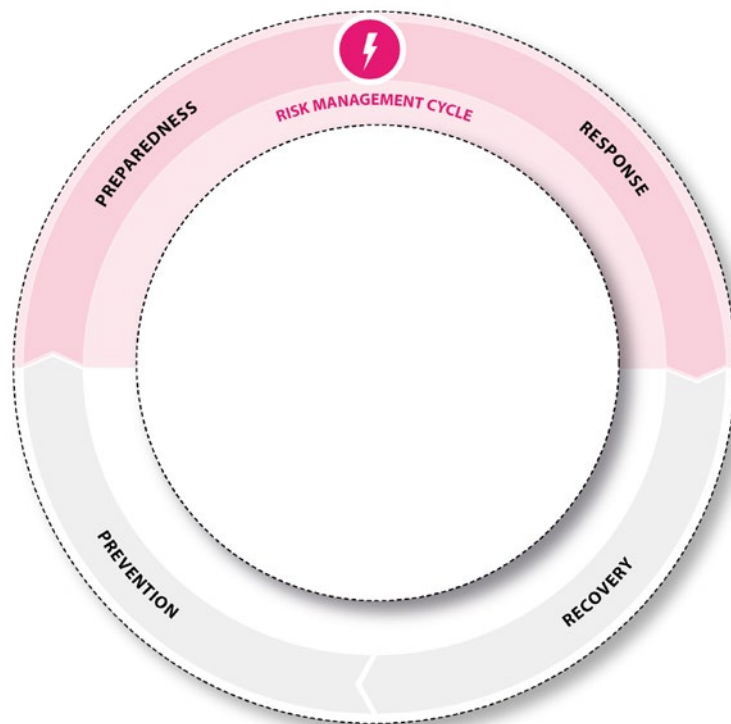


Fig. 8: The Risk Management Cycle (RHA 2022)

agement and reduces its benefits. Integrated Risk Management should thus strive to cover the whole cycle.

The Risk Governance Cycle (cf. fig. 9) offers another way to capture the overall nature of risk management. Instead of focusing on the different risk management steps, this approach looks behind the scenes, with the steps divided into scientific analysis and expert activity on the one hand and normative and political decisions on the other. These Risk Governance Cycle steps take place within the above-mentioned stages of risk management and thus form the basis for each of the Risk Management Cycle steps. The key message here is that risk management is built on both interdisciplinary expertise and political and legal decisions. These factual (analytical) and normative steps are closely interlinked and require careful attention, as the respective interdisciplinary and transdisciplinary dialogues require consistent **risk governance**.

With regard to risk governance, the International Risk Governance Center (IRGC) report particularly emphasises the need for transparent, systematic and accountable governance modes (IRGC 2017, 6). As risk management cannot rely on expert knowledge alone, it needs best-informed political will and decision-making. The steps of the Risk Governance Cycle include the following (adapted by the authors, based on IRGC 2017):

- **Scoping.** This step is dedicated to problem framing, based on the screening of threat signals and relevant legal and scientific conventions. This helps narrow down the risks and objects of protection that are to be addressed, the relevant territorial boundaries and how this should be done. This step also includes screening all relevant stakeholders whose views may affect the definition and framing of the risk management task. The step leads to the predefinition of the envisioned scope and content of Integrated Risk Management. Ultimately, scoping is a normative and fact-based risk management step (also known as 'pre-assessment' in the Risk Governance Cycle of IRGC 2017).
- **Objective and target definition.** Usually, this step is sidelined and adumbrated as a minor remark within the scoping step. However, defining the objectives and targets for Integrated Risk Management is key. Not only does this clarify the various perspectives on risks (risk perceptions) and objects of protection (e.g. social and economic concerns), but the defined objectives and targets also form the baseline for any risk assessment, measure assessment and monitoring. It is an important normative step and deserves special attention.
- **Risk assessment.** This step involves the identification of hazards and the ex-

Index:  
Risk governance

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Risk assessment

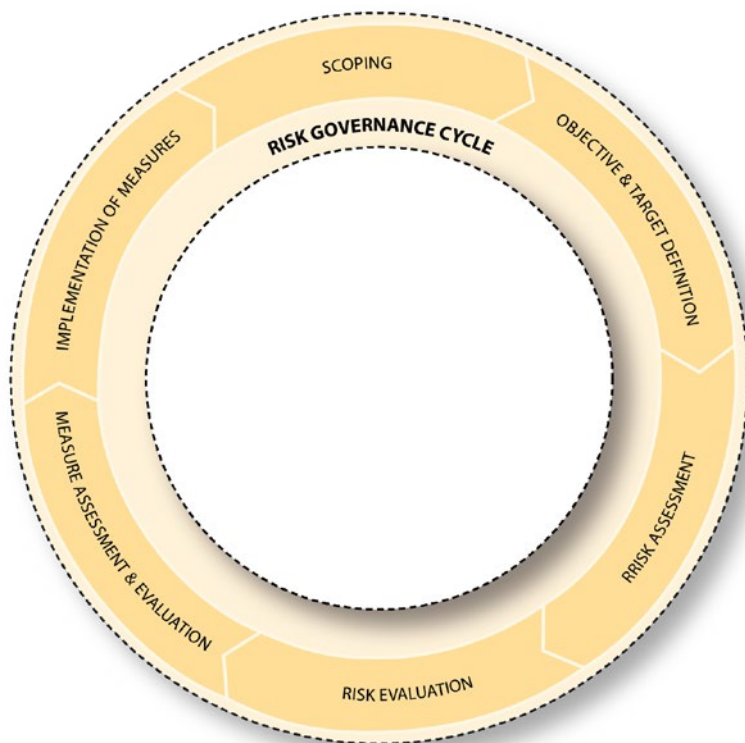


Fig. 9: The Risk Governance Cycle (RHA 2022, based on IRGC 2017)


tent to which an object of protection is exposed and vulnerable to them. Ultimately, this factual (analytical) step establishes the risks that need to be considered as part of risk management. There are several methodological approaches to doing so, each with its own strengths and weaknesses, particularly with regard to cultural heritage.

- **Risk evaluation.** The normative step of risk evaluation comprises judgements about the seriousness of risks, the acceptability of residual risk and the need for risk reduction measures, based on the risk assessment data and against the baseline of the previously defined objectives and targets of risk management.
- **Measure assessment and evaluation.** Closely linked to risk assessment and evaluation, this factual (analytical) and normative step is about the identification, evaluation (judgement) and, therefore, the selection of measures to 'prevent and reduce risks' and damage (Sendai Framework 2015, 6). Various optional measures need to be checked, i.e. assessed and judged, to determine the extent to which they help meet the envisioned objectives of risk management. This step also addresses questions about the acceptability of residual risks, costs of implementation and unintended effects.
- **Implementation of measures.** This final step means the implementation of the previously selected measures, but also includes control and monitoring as well as the feedback loop. Consequently, it is both a factual (analytical) and a normative step, since the quality and effectiveness of the chosen measures need to be regularly assessed, judged and communicated to the key responsible actors (experts and decision-makers) in risk management.

### 3.2 The Risk Governance Framework

Figures 10 and 11 show the **Risk Governance Framework** to which this Guidance Paper refers. It is explicitly based on the aforementioned Risk Management Cycle and Risk Governance Cycle and takes account of the key messages of both models. In addition, these figures highlight a third important aspect of the Guidance Paper's Risk Governance Framework – namely **the wheel of actors**. The key message here is that Integrated Risk Management is dependent upon a complexity of actors who are either experts or decision-makers from different fields of professional expertise and who offer different capacities and resources. The transparent, systematic and accountable management by these actors and of their respective responsibilities, duties and rights within Integrated Risk Management is crucial for its success.

Figure 11 includes the two major groups of actors. The first are **experts**, who can be authorised by legislation. They are given the legal responsibility to take care of different stages and steps in risk management. This group of actors should ideally include the aforementioned target groups of this Guidance Paper – namely local heritage experts and risk experts. As local administration representatives (e.g. in the fields of civil protection, spatial planning, monument conservation, etc.), they are legally empowered as sectoral and disciplinary experts. In addition, external experts and local experts contribute to the process. External experts are mostly contracted either as independent consultants or as scientists at research institutes. They can support local Integrated Risk Management by plugging local gaps in expertise, e.g. in risk assessment or heritage management. Finally, local experts are pertinent local residents, property owners and civil society groups specialised in a topic relevant to Integrated Risk Management. They deserve special attention, as

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Risk Governance  
Framework

they are often marginalised or forgotten about in the practice of risk management.

The second major group are the **decision-makers**. As outlined above, there are several risk management steps during which normative judgements and decisions are required. Given that urban development in Europe is largely based on parliamentary democracy, the decision-makers in such a far-reaching topic as Integrated Risk Management should also be democratically legitimised. In some professional (disciplinary) fields of risk management, such as spatial planning, these decision-makers are the local parliaments. In urban planning issues, they are familiar with critical debates and conflict management, citizen participation and the principles of good governance in general. In other professional fields relevant to risk management, such as disaster management, democratic debates and decision-making routines are less common and less regulated by legislation. Nevertheless, recent evidence shows the possibility, value and necessity of normative debates in these fields (STRENCH and CHEERS). Ultimately, Integrated Risk Management must ensure that judgement and decision-making processes are transparent and democratically accountable (cf. chapter 5 Evaluating risk).

and duties) differ depending on the risk management stage and step (cf. chapter 6 Managing risk).

### 3.3 Core topics for guidance


The Risk Governance Framework (cf. fig. 11) contains the following **three core topics for guidance**:

- Understanding risk
- Evaluating risk
- Managing risk

These topics are inherent to every stage of risk management. Nevertheless, to date, they still represent the **key challenges of Integrated Risk Management**. Analysing, assessing and understanding the risks is as essential – and yet as difficult – as judging and evaluating the need for action and suitable tangible steps. While guidance is needed for the first of these topics – the understanding and assessment of risks – because a substantial body of literature may overwhelm and a high pace of innovations in the field may discourage beginners, quite the opposite is the case for evaluating risk, since the normative, political moments in risk management are broadly missing from the available guidance books.

Successful Integrated Risk Management must clarify, organise and regulate the respective responsibilities of the actors – i.e. duties and rights of participation in the process – as early and transparently, systematically and accountably as possible. The identification of legally authorised actors (either experts or decision-makers) is as important as the identification and involvement of further actors (as experts or co-decision-makers). The coordination and collaboration of these actors requires care, especially since the possibilities open to them and their tasks (their rights

The topic of managing risk comprises the complex processes of the various actors' cooperation and coordination as well as the organisation of appropriate measures. Both aspects call for a systematic overview along with guidance, because only vague statements or an overwhelming quantity of literature are available. Given this unbalanced state of knowledge and instructions, this Guidance Paper proceeds to elaborate on the three key challenges of Integrated Risk Management: understanding risk, evaluating risk and managing risk.

 Further reading:  
STRENCH and  
CHEERS

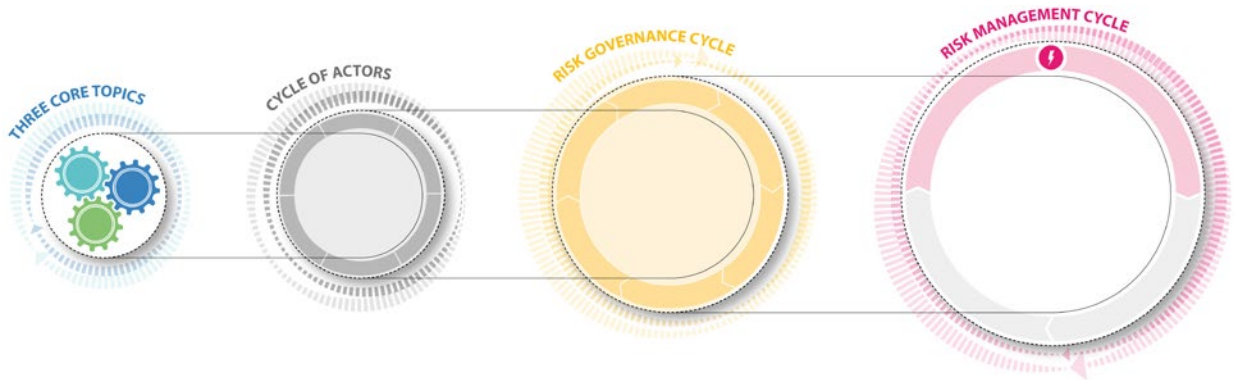


Fig. 10: The components of the Risk Governance Framework (RHA 2022)

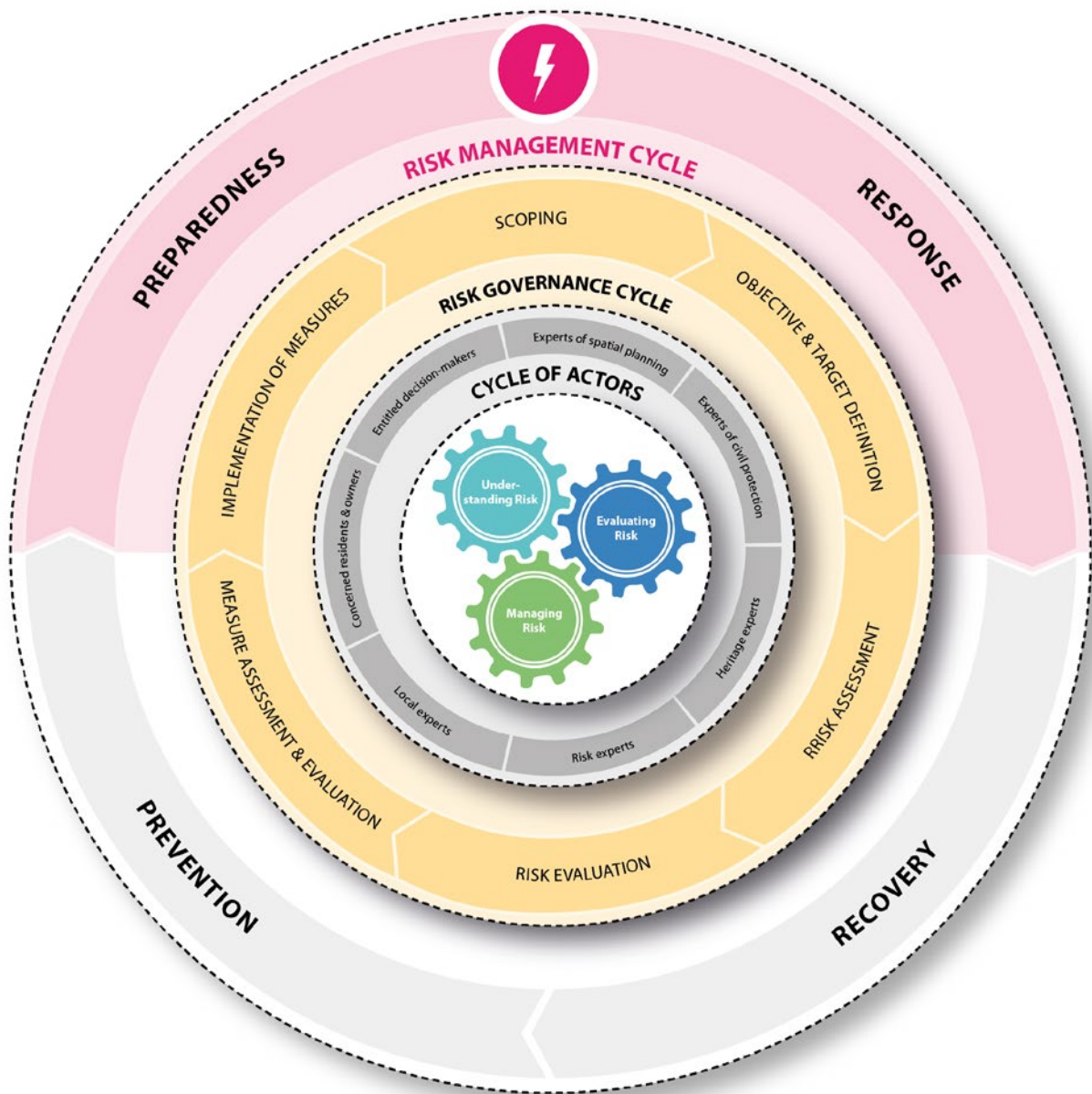


Fig. 11: The Risk Governance Framework (RHA 2022)

## 4 Understanding risk

### 4.1 Basic knowledge

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### 4.2 Guiding principles

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Fig. 12: Historical structures in Pompeii, Italy (Reicher 2022)

To successfully reduce and manage risks, it is essential to first understand them. Thus, useful guidance on Integrated Risk Management must also explain the next step, which is risk assessment. This implies clarifying the different assessment methods, i.e. their underlying principles and their merits and limitations for analysing the hazard-dependent and heritage-specific susceptibilities, coping capacities and, ultimately, risks. This chapter aims to provide a brief overview of the **key concepts and challenges of risk assessment**. Subsequently, three guiding principles will help address these challenges.

**4.1 Basic knowledge**

Generally speaking, hazards pose a risk to human beings and their properties. As figure 13 shows, risk is a function of a hazard (or hazards) and of vulnerability. These

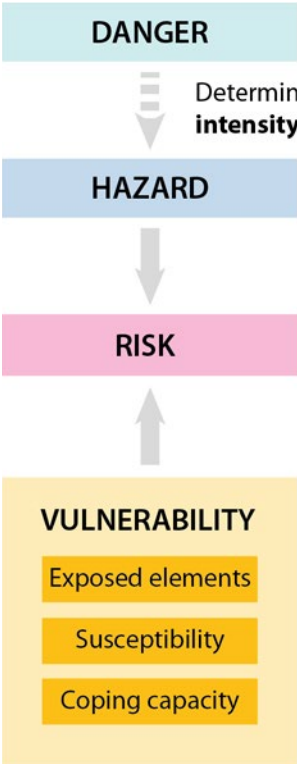


Fig. 13: Risk as a function of hazard and vulnerability (RHA 2022)

terms can be explained as follows (UN-DRR 2017):

**Hazards** are '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' (ibid, 18). They can be natural (associated with natural phenomena), anthropogenic (induced by human activities and choices) or socio-natural (associated with a combination of natural and anthropogenic factors, including environmental degradation and climate change).

**Vulnerability** is determined by 'physical, social, economic and environmental factors or processes [that] increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards' (ibid, 24). Elements that influence vulnerability are:

- **Susceptibility:** the characteristics of a system or physical structure/building that make it vulnerable to the effects of a hazard. The age of the building, the materials used and its mobile elements are decisive factors.
- **Exposure:** 'the situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas' (ibid, 18). The situation of cultural heritage with its tangible and intangible features is also relevant here.
- **Coping capacity:** 'is the ability of people, organisations and systems using available skills and resources to manage adverse conditions, risks or disasters.

Index: Hazard

Index: Vulnerability

Index: Susceptibility

Index: Exposure

Index: Coping capacity



Index:  
Onset events (rapid  
and slow)

The capacity to cope requires continuous awareness, resources and good management, both in 'peace time' as well as during disasters or adverse conditions. Coping capacities contribute to the reduction of disaster risks' (ibid, 12) and increase the ability of people to cope with hazards. In general, 'capacity may include infrastructure, institutions, human knowledge and skills, and collective attributes such as social relationships, leadership and management' (UNDRR 2017, 12). Coping refers to the ability to respond immediately to an event, for instance the ability of a fire department to react (cf. ibid, 12).

All three elements that affect vulnerability are interrelated and operate as a complex, but also have individual characteristics. The boundaries of their definitions are uncertain, so attempts to outline them may compromise the ultimate goal of reducing vulnerability.

**Risk** is determined probabilistically as a function of hazard and vulnerability, including exposure, susceptibility and coping capacity, and is defined as potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or community in a specific period of time. Apart from this general definition, the UNFCCC refers to two different groups of onset climate change events and their adverse effects differentiated by the respective temporal scale. On the one hand, long-term processes such as rising sea levels, increasing temperatures or land and forest degradation are defined as 'slow onset events [that] evolve gradually from incremental changes occurring over many years or from an increased frequency or in-

tensity of recurring events, whereas a rapid **onset event** may be a single, discrete event that occurs in a matter of days or even hours' (UNDRR 2017, 14).

In applying this understanding of risk, it is important to consider the social and economic contexts in which disaster risks arise and to acknowledge that people do not necessarily share the same perceptions of risk and the underlying risk factors. It is important to bear in mind that **risk is a socially constructed concept**; this plays an important role in estimating and reducing risk in local communities, since their specific historical, socio-political and economic contexts must be taken into account (see chapter 3.2 Risk Governance Framework).

In respect of the characterisation of risk, Annex III No. 3 of the Environmental Impact Assessment (EIA) Directive (2014/52/EU) is very helpful. This directive is well known in EU cities and sets out criteria for the significance of a construction project's impacts on the environment. These criteria include, for example, the magnitude and spatial extent (No. 3a) and the possibility of effectively mitigating the impact. These criteria must be taken into account in the **Environmental Impact Assessments**, which are required prior to the approval of any individual project in order to examine the project's effect on the environment. In the context of Integrated Risk Management, these criteria could also be used to record and characterise the significance of risks in a systematic, transparent and detailed manner.

The central challenge of understanding risk, and thus of risk management, is to



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Risk



identify the **main driving forces behind a risk** to control or influence them (UNDRR 2017, 24). The combination of forces (processes and factors) must therefore receive special attention. For example, economic growth and population concentration in threatened areas increase their vulnerability, even if the hazards in these areas are no more frequent than before. This interplay of natural and human-made factors is the main cause of the rapidly increasing damage caused by extreme events around the world.

With regard to cultural heritage, risk assessment is specifically challenging for a number of reasons. One challenge concerns the **scale dependence** of risk assessment. In general, the factual assessment step refers to all spatial levels, but it needs to be carried out with varying degrees of precision, depending on the spatial level in question. This scale dependence of analyses is also required by the aforementioned regulation on Environmental Impact Assessments (Directive 2001/42/EC). Article 5(2) on the 'environmental report' clearly states: 'The environmental report [...] shall include the information that may reasonably be required taking into account [...] level of detail in the plan or programme [...] and the extent to which certain matters are more appropriately assessed at different levels in that process in order to avoid duplication of the assessment.' There needs to be specific coordination and cooperation at each spatial level, i.e. at the international and national levels as well as the site level, and this also holds true for cultural heritage management.

However, although the multi-level demands of effective risk management that

takes account of cultural heritage are often acknowledged, there is a tendency to refer only to one spatial level of cultural heritage – most frequently to single cultural heritage sites only. In the main, risk management experts are aware of the scale dependence of risk assessment methods and approaches, but heritage experts often are not. Therefore, the role of the different spatial levels and approaches to risk assessment for cultural heritage needs clarification and elaboration. While hazard assessments can take place at both national and local levels, the assessment of the vulnerability of cultural heritage can only take place at site level due to the need to consider the specific features of a heritage asset or site. Consequently, the identification and characterisation of risk(s) as the final output of the assessment and the choice of risk management measures need to be determined for each site individually.

A major challenge for risk assessment is the fact that **there is no absolute certainty**. This topic of uncertainty is gaining in importance, especially in view of advancing climate change that calls the appropriateness and reliability of observation data from past events into question. Given the increasing uncertainty, existing methods must be checked and reviewed to ascertain whether they are still suitable for identifying natural risks (see chapter 4.2 → Principle 1: 'No safety, no certainty').

Looking at the hazard factor of risk assessment, the following shortcomings and challenges can be observed (see chapter 4.2 → Principle 2: 'Specificities of hazards'):

- The impacts of hazards on cultural heritage can be very heterogeneous. Specific methods that are carefully tailored to the individual case are therefore called for. This is a difficult task, especially for local practitioners, since there is a big knowledge gap between risk experts familiar with the different methods of risk assessment on the one hand and heritage experts and local practitioners on the other.
- Relevant observation data as input for the risk assessment are often missing, especially when it comes to human-made (technical) hazards.
- Even when all data are available, there is often still no common language or technical interface for the exchange of digital information. Although the exchange and flow of data is a crucial point in risk management, an abundance of data is still hard to access, mainly due to different formats and the lack of available (open source) software for multi-hazard modelling.
- Currently, the coping capacities of different cultural heritage types are rarely considered in vulnerability assessments. There is often little knowledge about how to analyse and describe the coping capacities of cultural heritage.

Guiding principles for strengthening the understanding of risk are introduced and explained below, complete with details about overall factors to consider when assessing risk.

## 4.2 Guiding principles

---

### Principle 1: 'No safety, no certainty'

**A basic understanding of risk identification methods and the corresponding specificities of different risks is an essential requirement.**

One general finding as regards understanding risk is that we need to acknowledge the very nature of it, namely that there is no absolute safety and no absolute certainty. Even though the availability of data is key and a large amount of data about hazards already exists, such hazards can always occur unexpectedly. Furthermore, due to climate change, probabilistic data from past events on which experts rely no longer accurately represent the present and future; the frequency and severity of extreme weather events are increasing.

What are the consequences for risk assessment, and how can we deal with uncertainty? Due to the changing climate, retrospective observation data are tending to become less and less reliable, and prospec-

Besides the hazard assessment, the vulnerability assessment also needs to be methodologically improved to enhance the evaluation of the unique features of cultural heritage (see chapter 4.2 → Principle 3: 'Specificities of vulnerabilities'):

- The susceptibility is, to a large extent, dependent on the impact of various hazards on a heritage site. The vulnerability assessment must therefore be site-specific and adjusted to the individual case.

tive climate change scenarios show a very broad range of possible future conditions, which are highly dependent on the input data and the selection of climate change scenarios. Given that risks cannot reliably be predicted, a change in mindset is needed, since the wrong understanding of risk is a risk in itself. Failure to understand the nature of risk – in other words, uncertainty – might result in the wrong reduction measures being selected, which might in turn give rise to a false sense of safety. Instead, we should opt for a **change in methodology towards a more scenario-based approach** so as to identify a range of potential events. The selection of suitable measures should then target these scenarios instead of preparing for a single expected case.

Furthermore, a regular revision of risk assessments and the adaptation of measures in the sense of **'continuous improvement'** are recommended because this allows the changing effects of ongoing climate change to be taken into account. Risk assessment should therefore be revised and controlled in predefined time periods. This could also be done in conjunction with processes that already exist, such as the regular revision of heritage site management plans. The city of Bratislava is a good example when it comes to the continuous improvement of risk assessment.

### Principle 2: 'Specificities of hazards'

**Specific vulnerabilities of different types of cultural heritage to different risks and specific coping strategies need to be taken into account – as does the specific potential of cultural heritage, such as intangible heritage.**

One main observation in research and science are the **different needs of various actors**. While local practitioners often feel overwhelmed by the complexity and lack of usability of information about hazards, some risk management experts describe the opposite, emphasising the need for further and more detailed information. Consequently, any information needs to be tailored to the intended target audience.

At the same time, risk experts point to the lack of skills among local practitioners, citing issues such as insufficient knowledge about the different risk methodologies and their respective merits and shortcomings. Information about risk assessment therefore needs to be collected and disseminated in municipalities to bundle the most important and directly usable information. To this end, experts should advise municipal decision-makers on risk management, based on data sets that are as complete and integrated (inter-sectoral) as possible.

This shows that the understanding of risks (e.g. through the practice-oriented 'translation' of expert information) and capacity building of local practitioners and politicians need to be increased. Although local practitioners and politicians are not expected to become risk assessment experts, they should nevertheless know the basics of each method to enable them to make informed and independent decisions. Despite being users of risk assessments, all too often they are afraid of the complexity of the methodology and data or lack the relevant interest. At the same time, risk assessment experts might sometimes have a tendency to conceal the limits and uncertainty of their data and methods.

## TØNSBERG, NORWAY



Fig. 14: Tønsberg Fortress in Tønsberg, Norway (iStock.com/nedomacki)

### Lessons learnt

- Risk assessment was conducted through scenarios and very precise data analysis
- Modelling and overlay of climate atmospheric data and the specifics of cultural heritage
- Easy-to-use tool for decision-makers and other stakeholders (based on potential threats and modelling the impact of strategies) has been developed

### Setting

The medieval ruins in the Viking city of Tønsberg, which include the castle ruin 'Tunsberghus', are considered particularly vulnerable to landslides and rockfalls, which may intensify due to climate change. The H2020 HYPERION project is developing a combination of existing and new tools and models that will be tested in Tønsberg and three other sites under similar threat (Rhodes, Granada and Venice).

### Learning moment

The HYPERION research project represents an innovative approach to risk assessment, with which atmospheric modelling for climate change scenarios is carried out on a very fine scale of 1 km<sup>2</sup>. This will provide a quantitative and qualitative impact assessment of estimated microclimatic and atmospheric stressors.

It will be accompanied by hygrothermal and structural/geotechnical analyses of cul-

tural heritage sites so that potential damage under different scenarios can be assessed. This analysis incorporates numerous factors such as climate zone, microclimatic conditions, petrographic and physical/mechanical properties of building materials, historical data of structures, effects of previous restoration processes, and ecological/physical properties of the environment.

Finally, the data collected via sensors will be fed into a Decision Support System to develop appropriate adaptation and mitigation strategies. A 4D visualisation tool (3D plus time) will ultimately be created that can be used to assess potential damage and risk and can be easily used by all relevant stakeholders. Using this vulnerability map, local governments will be able to assess threats from climate change and natural hazards, visualise the built heritage and cultural landscape under future climate scenarios, model the impacts of different adaptation strategies, and ultimately prioritise restoration efforts to optimally allocate resources both pre- and post-event.

Against this background, the example of the HYPERION project (see case study on Tønsberg) is of particular interest. It shows how interactive digital tools can improve the accessibility of data, not only for risk management experts, but for all actors.

Each threat requires specific methods to assess the related risk. This fact is supported by the heterogeneous impacts of the various hazards on cultural heritage outlined by the ICOMOS 2019 report. This makes the assessment of multi-risks particularly difficult. Multi-risks are understood to be events in which various hazards occur at the same time or as a consequence of one other, such as an earthquake and the subsequent eruption of a volcano.

What are the different options for risk assessment? To provide an overview, the most important methodological approaches will be presented in the paragraphs that follow. The assessment should take place in a probabilistic way, which means that the risk of a specific hazard will be quantified. As shown in figure 15, the approaches to risk assessment can roughly be divided into the Quantitative



Fig. 15: Methods of risk assessment (RHA 2022)

Risk Assessment, the Event Tree Analysis, the Risk Matrix Approach and the Indicator-based Approach.

Quantitative Risk Assessment was established as a basis for calculating the economic efficiency of protective measures and is also used to calculate premiums in the insurance industry. In practice, Quantitative Risk Assessments are primarily developed for natural hazards for which corresponding time series from past events are available. Their results are usually very reliable and valid, but not easy for non-experts to understand. Furthermore, they cannot capture intangible factors (van Westen, Greiving 2017).

Major accident hazards (e.g. in relation to chemical industry facilities and traffic accidents) are usually investigated using deterministic Event Tree Analyses, since there is a lack of comparable cases from the past. With this approach, all conceivable accident sequences are examined, and the overall risk is determined by summing up the consequences of individual accident sequences. This approach makes it possible to assess risks without empirical data, but it is highly dependent on the judgements of individual experts (van Westen, Greiving 2017).

The Risk Matrix Approach is a qualitative method to risk assessment. Qualitative approaches are scale-dependent and only express relative ratios between areas or objects under investigation in a specific study area. However, by using

Further reading: HYPERION Project

Further reading: van Westen, Greiving 2017.

Index: Risk assessment

normalised indicators, it is also possible to capture intangible factors. An advantage of this approach is that it is easy to understand, but the mixing of analysis and value levels can lead to controversy. The Risk Matrix Approach is used, for example, for hazard zone maps in several European countries such as Austria, France, Italy and Switzerland. Hazard zone maps establish binding restrictions on the usability of areas for settlement purposes, depending on the hazard level and the vulnerability of different land use types.

Another qualitative method is the **Indicator-based Approach**, which is mainly applied at global or national level. Due to the size of the study areas, proxy indicators are used. These include, for example, the number of exposed people to assess the human vulnerability, the percentage of built-up areas to evaluate the economic vulnerability and the GDP per capita as a proxy for the coping and adaptive capacities. These proxy indicators help determine a given risk or make study areas such as nation states or countries comparable with each other. This ap-

<p><b>QUANTITATIVE RISK ASSESSMENT</b></p> <ul style="list-style-type: none"> <li>+ Scale-independent results</li> <li>+ Informs cost-benefit analyses</li> <li>- Only informed by statistics from past events</li> <li>- No consideration of intangible elements</li> <li>- Results not easy for non-experts to understand</li> </ul>	<p><b>EVENT TREE ANALYSIS</b></p> <ul style="list-style-type: none"> <li>+ Enables risk assessment without empirical data</li> <li>+ Consideration of complex cause-effect chains</li> <li>- Deterministic approach (no probabilities)</li> <li>- Selection of events and consequences dependent on experts' judgements</li> </ul>
<p><b>RISK MATRIX APPROACH</b></p> <ul style="list-style-type: none"> <li>+ Easy understanding and visualisation in risk maps</li> <li>+ Possible integration of quantitative assessments</li> <li>+ Consideration of desired safety level</li> <li>- Controversy through mixing of analysis and value levels</li> </ul>	<p><b>INDICATOR-BASED APPROACH</b></p> <ul style="list-style-type: none"> <li>+ Full consideration of intangible elements</li> <li>+ Possible integration of future changes</li> <li>- Highly scale-dependent results</li> <li>- Need for normative judgements, due to aggregation and weighting of indicators for a composite risk index</li> </ul>

Fig. 16: Advantages and disadvantages of the different risk assessment methods (RHA 2022)

proach can also include intangible elements and future changes. However, the results are highly scale-dependent, and aggregating and weighting indicators is not an objective process, but requires normative judgements (van Westen, Greiving 2017).

Which aspects should be taken into consideration when choosing a risk assessment method? As outlined above and summarised in figure 16, the various approaches have different advantages and disadvantages. For this reason, the decision to use a particular method should always be based on the specific local circumstances, e.g. the type of hazard or the availability of resources for risk assessment. Another important factor is the defined objectives and targets of protective measures. For more information on this topic, see chapter 5 on evaluating risk.

### Principle 3: 'Specificities of vulnerabilities'

**It must be recognised that, even with the best data and preparation, hazard events can still occur unexpectedly. As a result of climate change, data based on probabilities and past events are no longer reliably representative, and this increases uncertainty.**


Risks are not only dependent on the specificities of hazards, but also on the vulnerabilities of a heritage site. The **vulnerability** of cultural heritage can only be determined on a case-specific basis, and it also varies according to the different types of hazards to which an object or site is exposed. Experimentally or empirically derived, standardized damage


functions for specific building types or age classes do not suffice here. When assessing the susceptibility of cultural heritage sites, their inventory particularly needs to be considered.

The evaluation of war damage in the Croatian city of Vukovar is a good example of how historical buildings and monuments can be considered within a risk assessment. For example, a special typology of historical building elements was introduced in the Act on the Determination of War Damage. Compared to the 'standard calculations' usually applied, this enabled war-related damage to be evaluated much more precisely.

The **susceptibility** of the various forms of heritage to the impacts of flooding, wind pressure, ground acceleration, thermal effects, etc. is to a great extent dependent on the specific hazard. The indicators and methods for analysing and describing the exposure of cultural heritage, its susceptibility and the coping capacities differ, depending on whether the threat takes the form of earthquakes or flooding, for example.

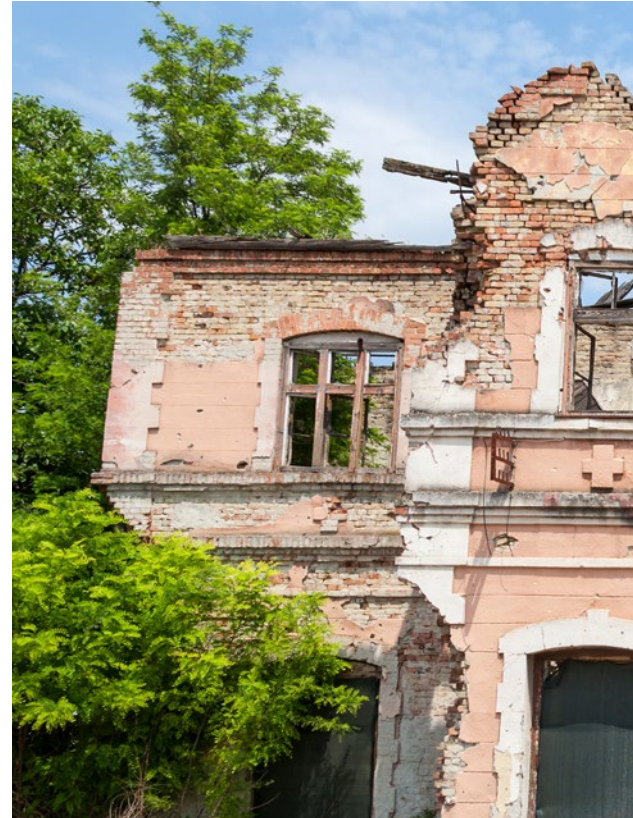
How can heritage experts better contribute to the risk assessment data and available methods? With regard to the example of urban historical districts, **the main challenge for assessing the susceptibility of the cultural heritage relates to the prevalence of two rough forms of data.** The first of these involves data on 'annualised average losses', calculated from observed series of monetary costs caused by hazards (cf. chapter 4.1). However, in the case of cultural heritage, the monetary costs for monuments and monument sites are often unknown.

 Index:  
Susceptibility

 Index:  
Vulnerability

## Lessons learnt

- Methodology for cost evaluation of post-war reconstruction that takes special features of historical structures into account
- Holistic urban planning is essential for the overall adequate restoration of a spatial structure
- Quality criteria are vital when selecting architects and construction companies – cost is not the only factor that matters



### Setting

Until 1991, the Croatian city of Vukovar was one of the richest municipalities of the former Yugoslavia and an important tourist attraction, with its rows of houses dating from the 18th century and Eltz Castle situated directly on the riverbank of the Danube. In 1991, Vukovar sustained massive damage during armed conflict and a three-month siege. Cultural heritage assets – historical buildings and monuments in the historic city area – were largely destroyed.

### Learning moment

To evaluate the damage caused by war and determine the costs of reconstruc-

tion, Croatia developed a systematic approach, taking account of the local context and structural specifics of the historic buildings and monuments. Since the materials, structures and construction techniques used rarely correspond to those described in the 'standard calculation', a special typology of historic building elements was introduced in a clause in Section 5 of the Act on the Determination of War Damage. The Act provides for the following three methods of recording, evaluating and calculating war-related damage to historic buildings:

- A schedule of services in cases where the required documentation for the historic buildings is available.





Fig. 17: Vukovar railway station, badly damaged during the battle of 1991. Vukovar, Croatia (iStock.com/BalkansCat)

- A **general evaluation method** in cases where it is not possible to work with a schedule of services due to a lack of documentation or difficulty in identifying original building components. The method involves recording the total area and the corresponding current construction cost per unit for each historic building.
- A **building element method**, which is used to evaluate damage to individual building elements and their respective share in the total construction costs.

The amounts of damage calculated in this way were then added to the real costs caused by preventive technical protection measures and immediate preventive measures in each individual case. Actu-

al reconstruction has taken place since 1998. However, the model used in this process has been criticised in part as being incomplete and disorganised. For example, it is not based on a holistic urban planning procedure, e.g. according to the model of international experience of major reconstructions after the Second World War. In many places of destruction, for example, individual housing estates of rural typology have been built that do not relate to the former historical structures. Failure to enforce planning regulations and set proper priorities has also been observed. In addition, the quality of the work carried out is said to be relatively low overall due to tenders being awarded to the architects and construction companies offering the lowest prices.

A second possible set of data that relates to the Indicator-based Approach to risk assessment (cf. chapter 4.1) encompasses **proxy indicators**, which are used to approximate (measure or categorise) factors that are not directly measurable themselves. In the case of historical urban districts, the most commonly used proxy indicators are age of construction and type of construction. These indicators incorporate monuments and valuable heritage ensembles only, and thus neglect the intangible values of monuments and ensembles, reducing monuments to their tangible building stock. Moreover, consideration should be given to the fabric and furnishings of buildings that are historically valuable but do not yet have heritage protection status.

In addition, vulnerability should not only be defined by the susceptibility of an object or site, but also by the local **coping capacity** (of the site or object itself and of the emergency management in place). Intrinsic features of a heritage site, such as its state of conservation and maintenance, and extrinsic features all influence its coping capacities and thus its vulnerability.

In terms of coping capacity, the importance of **local cooperation** should be underlined – the better and the more regular the local cooperation between the city administration, civil protection forces and property owners, the higher the coping capacity of a heritage site or object will be. Consequently, heritage property owners' awareness of the need for risk management and their willingness to implement it for their property could serve as an indicator for the cop-

ing capacity of the heritage object or site in question – and the greater the awareness and risk management investments are, the higher the coping capacities are, too. The examples of the archaeological and UNESCO World Heritage Sites of Pompeii, Herculaneum and Torre Annunziata near Naples, in Southern Italy, demonstrate how local coping capacity can be increased through the involvement of volunteers. The volunteers in this case took part in a three-day training session run by archaeologists. Among other things, they learnt the procedure to be followed at the site in the event of an emergency and how to handle and secure fragile artefacts. The knowledge and skills gained were subsequently consolidated through repeated sessions that involved a variety of scenarios and took place at different sites.

Importantly, the vulnerability of a cultural heritage site largely determines the real consequences of an extreme event. In contrast to various hazards (such as volcanic eruptions, earthquakes or storms) that cannot be mitigated at all, the vulnerability of a site can be lessened through risk reduction measures that are applied to the area or the object of protection. In doing so, **the potential of cultural heritage for risk reduction itself** needs careful consideration. Traditional knowledge of historical construction methods and building materials may, in some cases, result in the development of historical buildings and sites that themselves are highly adapted to local, frequently occurring hazards. At local level, this potential should be identified, acknowledged and exploited more effectively.

### Lessons learnt

- Involvement of volunteers can be useful, especially when resources are limited
- Success factors for effective public relations were determined
- Regular repetition of training and exercises is necessary



Fig. 18: Historical theatre in Pompeii, Italy (Anastasova 2022)

### Setting

The archaeological sites of Pompeii, Herculaneum and Torre Annunziata near Naples (Southern Italy) are recognised by UNESCO as World Heritage. The eruption of Mount Vesuvius in 79 AD completely covered the ancient Roman cities in ash and thus preserved them for posterity. Nevertheless, the sites are still threatened by many risks today, such as volcanic eruptions, earthquakes and fire hazards.

### Learning moment

The chief archaeologist, Prof. Guzzo, developed an artefact contingency plan with the assistance of a consultant and a team of local volunteers. Given the large number of artefacts and the lack of internal support staff, the assistance of volunteers proved highly valuable. However, volunteers can only be truly helpful if they are properly trained. For this reason, a training session involving more than 50 volunteers, mainly from local universities, was

organised in 2007, and effective outreach was conducted. Archaeologists from the Department of Art and History conducted the three-day training session. Topics were notification techniques and the clothing to be worn in emergency situations, arrival at the World Heritage Site and movement within the site, handling fragile artefacts such as ceramics, statues, frescoes and objects made of iron, glass and bronze, classification of artefacts in relation to recovery, and setting up areas for cleaning and packaging recovered objects for further restoration. A successful simulation exercise was conducted involving security forces, firefighters, archaeologists, first aid teams and the entire team of trained volunteers.

Additional simulation exercises were scheduled at six-month intervals following the first exercise. The training was repeated in Herculaneum, Oplontis and in the Boscoreale Museum with different scenarios (fire, explosion hazard, etc.) to consolidate the basic knowledge of all participants.

## 5 Evaluating risk

5.1 Basic knowledge

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5.2 Guiding principles

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Fig. 19: Bratislava Castle, Bratislava, Slovakia (iStock.com/holgs)

## 5.1 Basic knowledge


Integrated Risk Management builds on the alternation of factual and normative steps, as outlined in chapter 3 (see also chapter 3.2, fig. 11). While chapter 4 elaborated on the challenges of factual analysis and thus risk assessment, this chapter aims to sensitise readers to the **normative dimension of Integrated Risk Management**. It provides information on the challenges of evaluation and guidance on dealing with them.

Generally speaking, there are three steps in Integrated Risk Management that especially require evaluations in terms of normative judgements and decisions. These are the steps of **risk evaluation, measure evaluation and objective and target definition** (cf. chapter 3.2, fig. 11). The first two steps build on the factual data revealed by risk and measure assessments. Users are encouraged to judge these data and decide whether measures should be taken and, if so, which ones. The step of objective and target definition establishes the normative basis. It requires clear decisions and statements about **objects of protection** that are (not) considered in local risk management, **stakeholders** whose perspectives on risks and measures should (not) be directly incorporated in local risk management, and statements about the **priorities** pursued by local risk management. The step of objective and target definition is therefore of high political importance; it establishes the normative basis for any risk evaluation, measure evaluation and monitoring activity in Integrated Risk Management. However, previous research reveals that there has hitherto been insufficient guidance on and a lack of attention to these normative risk management steps. Critical shortcomings and challenges apply to

all three of the aforementioned steps, i.e. risk evaluation, measure evaluation, and objective and target definition.

In practice, therefore, the objects of protection should be clearly defined in Integrated Risk Management. Cultural heritage has been broadly sidelined here, although it is an important resource that deserves protection as shown in chapter 1. It is to be noted that there are neither clear standards nor routines according to which cultural heritage is taken into account in risk management.

Flood prevention management in Germany (as part of Integrated Risk Management) is an example of this. The consideration of cultural heritage as an object of protection varies widely among the German federal states and municipalities, even though they all implement Directive 2007/60/EC on the management of flood risks (corresponding German act: Wasserhaushaltsgesetz 2010). While in the state of Baden-Württemberg, for example, flood risk maps show UNESCO World Heritage Sites and – at municipal level – monuments of special significance ('Denkmale mit besonderer Bedeutung' according to section 12 of the Monument Protection Act Baden-Württemberg), this is not the case in the state of North-Rhine Westphalia (Wieland 2012; Ruland, Hascher 2015; MUKÉBW 2011). Here, state-protected monuments are only considered at local level in large cities such as Cologne; in medium and small-sized cities, flood risk and management maps do not consider cultural heritage at all. Moreover, there is no German example in which the consideration of cultural heritage goes beyond the mere listing of state-protected monuments. This example illustrates both the question about what should be defined as objects of protection in Integrated Risk Management that includes cultural herit-

 Further reading:  
Sendai Framework  
2015

age, and the necessary leeway to do so at regional and municipal levels.


The German example also recalls the recent and important pleas of risk management experts, namely to explore and record those forms of cultural heritage that are of symbolic criticality to local lay communities and could be added to state monument lists. Integrated Risk Management needs to take into account the different stakeholders' perspectives on cultural heritage, acknowledging that local communities do not represent homogeneous groups. So far, however, this has proved a procedural-methodological and political challenge in practice, where the involvement of local stakeholders beyond the legally required forms of cooperation in risk management is rare (for details, please see chapter 5.2 Principle 4: 'Suitable forms of coordination and collaboration'). Guidance on how to incorporate local stakeholders' perspectives into the evaluation steps of Integrated Risk Management is of the utmost importance.

A third key challenge in Integrated Risk Management relates to the definition of priorities. An experienced practitioner in civil protection stated in an interview: 'You need to remember that there can only be one number one priority in the event of an emergency! You need to decide what to safeguard first, second, etc. and where the probability of loss increases in consequence.' This applies to all phases of risk management, i.e. not only during the event, but also in prevention and recovery. Integrated Risk Management needs to define its priorities, and this is linked to the definition of its overall goal. Acknowledging that risk management in general strives to reduce risks and build

resilience (cf. Sendai Framework 2015, 6), the definition of the overall goal in Integrated Risk Management therefore needs to clearly inform the formulation of local benchmarks. A mindful local debate about what exactly resilience means can be useful. An important question to answer is: which state of (urban) environment and society does the local Integrated Risk Management strive to maintain during and regain after a disturbance?

The term **resilience** covers a wide conceptual breadth that proposes two different approaches to answering the above question and thus clarifying the goal of local Integrated Risk Management. Generally speaking, resilience is defined as the robustness of a system in the face of a disturbance, but there are more nuances to consider (Davidson et al. 2016). In a narrow and static understanding – e.g. in engineering-based definitions – resilience means the ability of a system to rapidly return to its previous state and functions after a disturbance. Opting for this understanding of resilience would mean designing and implementing local Integrated Risk Management with the goal of 'bouncing back'. This would mean all activities at the stages of prevention, preparedness, etc. (fig. 20) being dedicated to maintaining the urban environment's current state and ability to bounce back after a disturbance. The investments would certainly be high, although Integrated Risk Management would need to acknowledge that there is 'no safety' (see chapter 4.2 → Principle 3: 'Specificities of vulnerabilities'). Insidious changes that call for adaptive responses and potential leeway for improving the current state of the urban environment would explicitly be ignored.


 Index:  
Resilience

 Further reading:  
Davidson et al.  
2016

A different view of the goal of Integrated Risk Management is offered by the adaptive understanding of resilience – as underlined in socio-ecological definitions, for example (Davidson et al. 2016). Here, resilience expresses a system's ability to adapt to multiple equilibria after disturbances, namely by 'bouncing forward' while maintaining the system's 'core identity'. Similarly, the transformative perspective defines resilience as a system's ability to transform quickly after a disturbance. However, bouncing forward describes the system's capacity to react with new inventions, as it no longer relies on past events and past systemic features. Opting for this understanding of resilience in local Integrated Risk Management offers leeway and differentiation for measures and investments. It also underlines the potential of risk management to achieve more

sustainability, as UN-Habitat proposes. The latter defines 'urban resilience' as the 'measurable ability of any urban system, with its inhabitants, to maintain continuity through all shocks and stresses, while positively adapting and transforming toward sustainability' (UN-Habitat 2021). At the same time, it requires a careful and explicit debate about many more critical normative questions, such as:

- What are the urban functions and patterns that constitute the local 'core identity' to protect, maintain and bounce back to? Which role does local heritage play here?
- What are the acceptable levels of risk, e.g. which recurrence interval of floods needs to be prepared for, also bearing in mind that protec-

 Index:  
Urban resilience (cf.  
UN-Habitat 2021)

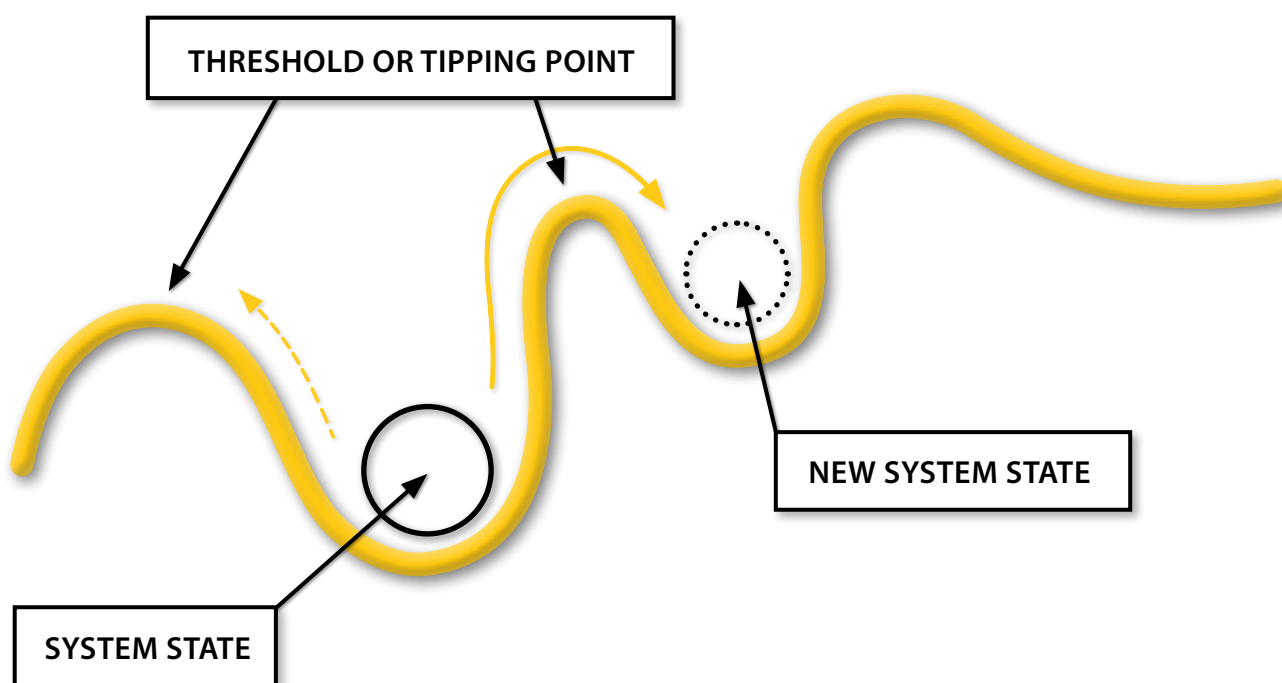


Fig. 20: Resilience as the ability of a system to adapt to a new equilibrium after a disturbance ('bouncing forward') (RHA 2022)

tion against extreme events may be neither technically possible nor economically justifiable?


- What are the acceptable levels of change in functions, materiality and patterns? What are the limits to the usability of cultural heritage and other critical infrastructures, and which measures of adaptation are thus acceptable? The adaptive understanding of resilience also encourages the re-discovery of the local heritage's inherent robustness to disturbances, e.g. due to historical construction techniques.

The need to raise and answer these normative questions in local risk management practice also becomes evident in various EU acts of legislation. The European Framework Directive SEVESO III (2012/18/EU) provides one example. It aims at the prevention of major technical accidents (i.e. human-made hazards). Article 13 highlights the necessity of ensuring 'appropriate safety distances'. This requires judgements and decisions as regards the question of what is 'appropriate' for which object of protection and the respective acceptable levels of risk. Likewise, the EU Environmental Impact Assessment Directive (2014/52/EU), in Annex III No. 3, requires users to specify the impact of a project on the environment (including cultural heritage) and its associated risks. This requirement calls for the analysis (assessment) of potential consequences and judgements about the 'cumulative' (systemic) impacts and risks; the question about what levels of change in the environment are accepted (locally) is thus implied.

In sum, the practices, EU regulations and research (e.g. IRGC 2017) underline the

importance of, and need for, normative judgements and decision-making in risk management. To date, however, risk management guidance has not focused sufficiently on issues of evaluation. This chapter thus proposes three guiding principles for Integrated Risk Management:

- Integrated Risk Management needs to set up a clear system of targets. This serves as the explicit normative basis for the various judgements and decisions intrinsic to risk management, but has hitherto been broadly missing. The target system needs to operationalise cultural heritage as an object of protection and resource and relate to the local understanding of resilience (see chapter 5.2 → Principle 4: 'Objectives and targets').
- Integrated Risk Management requires a debate about and definition of the protection-worthiness of assets and the processes of weighting and prioritising them. This helps deal with the conflicts that can characterise judgements and decision-making in risk management. Little attention has hitherto been paid to ways of understanding, preventing and/or minimising these conflicts (see chapter 5.2 → Principle 5: 'Conflicts of integration').
- Judgements and decisions in Integrated Risk Management need to follow a set of quality standards that has been openly debated and in which transparency, democratic legitimacy and accountability play a major role. The current literature offers numerous and important recommendations on how to broadly involve local stakeholders in judgements and decisions, but often fails to provide a nuanced under-

 Further reading:  
IRGC 2017



standing of how to achieve this with a high standard of quality or any guidance in this respect (see chapter 5.2 → Principle 6: 'Inclusiveness and democratic legitimisation').

## 5.2 Guiding principles

### Principle 4: 'Objectives and targets'

**In Integrated Risk Management, clear objectives must be formulated as a basis for assessing and deciding on any management measures, in order to be able to designate both the objects of protection to be considered and the desired level of protection.**

As mentioned above, Integrated Risk Management requires an explicit normative basis for the various judgements and decisions intrinsic to it. The Risk Governance Framework therefore proposes the step of objective and target definition (cf. chapter 3.2, fig. 11), which must set out the aforementioned minimum of key normative statements. These include the objects of protection which are (not) considered in local risk management, the definition of the stakeholders whose perspectives usually do (not) matter in local risk management, and statements about the priorities pursued by local risk management. The priorities of Integrated Risk Management should be concluded from the locally adopted understanding of resilience as outlined above.

Ultimately, the definition of a clear objective-target system can be a suitable way to capture – organise, document and communicate – all these important normative statements that are key to Integrated Risk Management. While good and best practices for objective-target systems in

Integrated Risk Management have hitherto often been missing, some available guidance documents and policy papers put forward the following three general recommendations:

Firstly, Integrated Risk Management needs to develop a consistent and hierarchical objective-target system. While the objective defines the general orientation of risk management, the targets specify the objective in a workable way. They serve as a basis for judgements and decision-making about risk management activities and enable monitoring of the risk management achievements (see chapter 6.2 → Principle 10: 'Quality assurance'). The objective and subordinated targets mirror the locally developed understanding of resilience. The Sendai Framework (2015) – although it does not address the local level – is an example of such a hierarchical normative system, which is common in spatial planning.

Secondly, the target system should contain content-related objectives as well as procedural targets. The latter define the qualities with which Integrated Risk Management processes should run at local level. For risk evaluation processes and beyond, it is crucial that judgements and decision-making processes are carried out in a transparent, consistent and integrative manner. To this end, the procedural targets of Integrated Risk Management need to define these process qualities and outline how they are achieved locally. They should communicate, for example, which stakeholders and actors need to be involved in evaluations and assessments and which rules and tools serve to regulate the integration of stakeholders' views (see chapter 5.2 → Principle 5: 'Conflicts of integration') and their interactions (see chapter

6.2 → Principle 7: 'Suitable forms of co-ordination and collaboration'). The Risk Governance Framework by the IRGC (2017) constitutes helpful further reading with regard to procedural standards for Integrated Risk Management.


Thirdly, the target system should contain **content-related targets**, which need to be specific to each object of protection and differentiated according to the respective stage of risk management (i.e. prevention, preparedness, response or recovery; cf. chapter 3.2, fig. 11). The content-related targets should also be adjusted in line with the local understanding of resilience; when the perception and, therefore, the objective of risk management are clear, concise targets for Integrated Risk Management can be formulated. This may pose significant disciplinary challenges, as is particularly evident in the branch of monument and heritage preservation. Here, subscribing to a specific understanding of resilience involves touching upon points that are critical and yet have received little attention. The definition of risk management targets for cultural heritage needs to address and respond to the following points:

- The **scope of protection for the cultural heritage at risk**. This question about the scope of protection arises from the different understandings of resilience, since the resilience concept proposes two normative options for target definition. Does the local target involve striving for the 'total protection' of cultural heritage sites and objects, since any loss of heritage or any reconstruction is unacceptable? Or, alternatively, does the local target involve pursuing a nuanced system of differentiated protection levels, where loss, damage and

thus adaptive transformation after the disaster are acceptable to some degree?

- The **rules for differentiation**. If the latter local target definition applies, what are the rules that steer (explain and justify) the differentiation of protection levels among heritage sites and objects in a transparent and consistent manner? For example, do local targets follow the rationale whereby the highest protection is dedicated to UNESCO World Heritage only, or is the same level of protection also afforded to heritage listed as state monuments or heritage that is of the highest local, emotional and economic popularity, for example? To date, papers and scientific literature on risk management have rarely addressed the question of rules. However, the definition of, and rationale behind, local targets for cultural heritage in Integrated Risk Management would certainly benefit from the consideration of both the accumulation of significant heritage assets and the specific vulnerabilities of the heritage towards risks. The THREAT (culTural Heritage Risk EvaluATIion) tool developed in the CHEERS Interreg project operationalises a similar approach when elaborating on the risk management stages of preparedness and response (cf. Sourcebook CHEERS, further reading on vulnerability assessments for cultural heritage – STRENCH, ARCH D.5.2).

Apart from these disciplinary points for debate and clarification, the definition of content-related targets in Integrated Risk Management also poses interdisciplinary challenges. In this context, the systemic nature of cultural heritage comes into focus, namely the fact that cultural heritage is not only an issue of monument conser-

 Further reading:  
Sourcebook  
CHEERS, STRENCH,  
ARCH D.5.2

vation, but also plays a role in urban planning, nature conservation, flood management planning, social planning, etc. At the intersections of these sectoral planning processes, it is important to develop a joint understanding of the resilience concept and the underlying rationalities and reasoning. The interdisciplinary debates need to come up with integrative answers; the intersectoral targets need to reflect joint statements about the levels of the risks taken into account and any residual risks, about the priorities for protecting the different assets and about the rules for integrating and weighting them. Thus, if the discipline of monument and heritage preservation responds to these requirements, it can help better position the interests of heritage in local risk management.

### Principle 5: 'Conflicts of integration'

**The protection-worthiness of the assets and the technical and political determination of protection priorities in Integrated Risk Management based on this must be discussed in transparent and consistent consideration and prioritisation processes.**

Careful debate and definition of objectives and targets in Integrated Risk Management may be accompanied by **conflictive judgements and decisions**. They can occur at any step and stage of risk management, e.g.:


- At the **scoping** step regarding the question about which assets of the (urban) environment are worthy of consideration and protection in risk management.
- At the **target definition** step that involves defining and differentiating between the protection levels for assets.

- At the **measure assessment and evaluation** step that involves selecting precise measures for reducing risk and thus addressing questions of costs and selective resource allocation, even though a residual risk will always remain.

To date, guidance papers have largely paid little attention to the conflicts inherent in the judgements and decisions in risk management in general and in the new approach of Integrated Risk Management in particular. A significant number of conflicts in Integrated Risk Management arise from the necessity for integration. The following two recommendations can help better capture the nature of these conflicts and thus deal with them.

Firstly, conflicts in Integrated Risk Management emerge in relation to questions of **protection-worthiness**. Protection-worthiness means that people attribute values to the objects and assets in their (urban) environment, and these various values make the objects and assets worthy of protection. However, the perspectives of (local) stakeholders on assets and values are manifold and conflicting. Thus, Integrated Risk Management needs to clearly define the assets worthy of protection by revealing the values and public interests linked to them. A first challenge in Integrated Risk Management is to agree on how to do this.

In the case of cultural heritage, for example, values are regularly linked to tangible and intangible assets and are often not easy to quantify. In towns and neighbourhoods, there are also historical sites, objects, routines (practices and functions), etc., which are important to local people and the communities' core identities, but may not (yet) be listed as state-protected monuments. Integrated Risk Management

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Protection-worthiness

should capture all this and thus pursue a broader, comprehensive understanding of cultural heritage (cf. chapter 1.4). Integrated Risk Management should therefore combine two modes of revealing values and local interests attributed to cultural heritage and other objects of protection. Firstly, it has to consider and build on respective disciplinary laws and listings of worthy objects and assets, since these laws reflect a minimum set of values and public interests in certain objects and assets by their very existence. Secondly, Integrated Risk Management should launch broader local debates about further critical assets and objects worthy of protection in the event of an emergency.

Taking the example of German cities, this recommendation means considering state-protected monuments in Integrated Risk Management. German laws on monument conservation themselves use the concept of protection-worthiness. The heritage experts in public authorities identify the values embodied in cultural heritage and issue the statements of public interest. Since they are the legally appointed public advocates, further local debate about the protection-worthiness of monuments by law is not considered necessary. However, broader public and participatory debates will certainly help identify further heritage of symbolic criticality to communities; the debates will allow the monument lists to capture the core identities of local communities, which are built on broad understandings of culture and heritage. Moreover, public debates will shed light on the many implicit conflicts inherent in the different perspectives on heritage.

At the same time, public participatory debates about the protection-worthiness

of critical assets in Integrated Risk Management have so far rarely been tested in practice, since its definition poses methodological challenges. In this vein, the Interreg project CHEERS proposes a relevant new tool – ATTACH (evAluaTion Tool for Alpine Cultural Heritage). This approach is a local participatory process involving disciplinary experts and societal representatives (i.e. mayors, property owners, civic associations), who jointly discuss and agree upon the protection-worthiness of local heritage. It includes defining the values and assets and assigning them a weight (cf. Sourcebook CHEERS 2011, 41 pp.). In this project, the worthiness of listed monuments is not questioned, but is instead enriched by local perspectives on further valuable forms of heritage which are not (yet) officially listed. Developed for the risk management stages of preparedness and response only, the tool can also inspire participatory forms of risk evaluation beyond these phases. The broad experiences of participatory urban planning in Europe create awareness of the multiple risks and common pitfalls of stakeholder involvement. Ultimately, actors in Integrated Risk Management need to take an explicit and conscious decision about how to define the objects and assets worthy of protection. Ideally, Integrated Risk Management will rely on the legally defined, disciplinary statements on the protection-worthiness of assets and on broader participatory debates.

In addition to these conflicts relating to the various (local) perspectives on protection-worthiness, conflicts in Integrated Risk Management also arise in relation to the prioritisation and weighting processes. Integrated Risk Management thus needs to clearly define the processes of

ranking values, assets, measures, etc. This is relevant for many steps as outlined in chapter 1. The aforementioned objective and target definition is one of them – this is a process of prioritisation that involves upgrading, downgrading or excluding certain envisioned states of assets (e.g. types of heritage) and thus options for activities. Setting priorities is conflictual, since it implies the selective allocation of attention and (economic) resources.

The prioritisation and weighting processes are inherent in both **disciplinary and interdisciplinary debates**. A clear set of principles and rules about assigning weights to assets and activities is needed for all sectoral fields affected by Integrated Risk Management. It is also needed for the discipline of monument conservation and heritage management, in which the European context displays a broad array of differentiated traditions regarding the ranking of heritage and the acceptance of measures such as heritage reconstruction and loss. Monument conservation laws in the EU provide a first glimpse, with some laws differentiating between monuments of local, regional and national significance, and others, such as the German legislation, stating the equal significance and protection-worthiness of any monument. Consequently, the scope and quality of disciplinary challenges for setting priorities and defining weighting and prioritisation principles differ among European heritage managers and monument conservators. However, such disciplinary 'rules of the game' (as also mentioned in chapter 5.2 – Principle 4: 'Objectives and targets') need to be developed if local approaches are to integrate cultural heritage into risk management.

In addition to disciplinary debates, the prioritisation and weighting processes also require interdisciplinary debates and clarification. The example of Notre-Dame in Paris may shed some light here. When the fire broke out in 2019, the taken-for-granted rule of 'Don't risk life for material damage' was adapted, with firefighters putting themselves in mortal danger to rescue the monument. The fixed rule of the firefighting sector was locally adapted and rapidly reconfigured during the disaster (cf. chapter 5.2 – Principle 4: 'Objectives and targets').

Ideally, such weighting of interdisciplinary priorities should take place in advance, i.e. in 'peace time'. Such a conscious definition of balanced targets and integrated measures for risk reduction needs care and is often complicated due to the different disciplinary backgrounds as regards knowledge, ways of thinking, reasoning and arguing. The various legal regulations relevant to Integrated Risk Management can also complicate the discussion, since they broadly differ in clarity about protection priorities and modes, and how to negotiate and specify them. For example, civil protection legislation prioritises 'human lives first', but is often vague about the ranking of cultural heritage. This legislation often also prescribes a top-down approach to decision-making, which has a rather demotivating effect in respect of local and participatory debates about how to rank cultural heritage among the mandatory targets and measures for risk reduction (cf. expert interview Anna Kaiser). In contrast, spatial planning legislation often lacks any explicit consideration of risk management and the associated priorities. In many cases, such legislation offers great legal leeway for weighting different interests at local level.

## Principle 6: 'Inclusiveness and democratic legitimisation'

**Common quality standards for assessment and decision-making processes must be developed, with transparency, democratic legitimacy and accountability playing an important role.**

Although risk management faces various pleas to broadly involve local stakeholders, a nuanced understanding of how to achieve this in risk evaluation and guidance on the subject are rare. There is a pressing need for basic quality standards that could steer the normative steps in Integrated Risk Management. These standards should be debated in risk management as early as possible (e.g. during the scoping step) and fixed as procedural targets in the objective and target definition step (cf. chapter 5.2 – Principle 4: 'Objectives and targets').

Risk management guidelines such as the IRGC 2017 propose several valuable quality standards. Based on these and on the series of expert interviews, the following standards are recommended:

- Transparency and consistency. These procedural qualities have been men-

tioned in chapter 5.2 – Principle 4: 'Objectives and targets' and Principle 5: 'Conflicts of integration'. Essentially, the standard of transparency means making any normative decision (including the underlying arguments and presumptions) explicit and thus democratically debatable. This applies, for instance, to the 'rules of the game' such as the selection of objects of protection, the differentiation of protection levels, and the weighting and definition of priorities. The standard of consistency means, on the one hand, taking a consistent approach to this. On the other hand, it refers to the need for permeability, i.e. ensuring coherence between the steps and stages in Integrated Risk Management. An example of this is the transmission of targets. Since the major responsibilities change between the different risk management stages – e.g. spatial planning is key to risk prevention, whereas civil protection is key to risk preparedness and response – there is a real danger of disintegrated targets. The permeability or consistency of the Integrated Risk Management process can be advanced by fixing joint, integrated targets in the different sectoral planning instruments

and by ensuring a steady local interdisciplinary dialogue of coordination and cooperation (cf. chapter 6.2).

- **Comprehensiveness and clarity of data.** Judgements and decision-making in risk management should be based on the most comprehensive and most comprehensible data accessible. Both standards deserve special attention and care, because neither incomplete nor poorly understood data can inform balanced judgements and decision-making. Communicating complex issues such as risk assessment is often difficult. However, interdisciplinary translations are both urgently needed and possible, as risk management expert Dr. Giulia Pesaro stated at a project workshop: 'Of course, we can't simplify the complexity of risk management, but it is just a question of translation (...) We can involve the people and make it understood'. The aforementioned tools of ATTACH (evAluaTion Tool for Alpine Cultural Heritage, cf. chapter 5.2 – Principle 5: 'Conflicts of integration') and THREAT (culTural Heritage Risk EvaluATion, cf. chapter 5.2 – Principle 4: 'Objectives and targets') are attempts of the CHEERS project in this regard and enable

complex topics such as the protection-worthiness of heritage and the overall risk evaluation (judgement) to be discussed with external experts, local experts and local laypersons.

- **Democratic legitimacy and accountability.** Finally, Integrated Risk Management must ensure that actors of democratic legitimacy, who are accountable for the process, make the final judgements and decisions in risk management, based on a common consensus. One example is the case of Bratislava (cf. chapter 4.2 – Principle 3: 'Specificities of vulnerabilities'), which involved the normative discussions being held at the flooding risk prevention stage. Using the instruments and procedures of spatial planning, legally entitled local experts and external experts first set the aims and priorities for risk prevention, thus successfully overcoming the 'sectoral silo thinking' in city administration. Subsequently, locally elected political bodies – the parliament and mayor – discussed the plans. Furthermore, the broader public, namely the local groups of actors considered the 'most affected population groups', was involved in the discussion. The city parliament then made the final decision.

## Lessons learnt

- Coordinated and collaborative approach to risk assessment based on qualitative and quantitative methods
- Risk assessment (and risk management) as an ongoing learning and development process at local level with significant international support (expertise and funding)
- Involvement of the local public – especially vulnerable groups – both in the risk identification phase (via the impact chains tool) and in legitimising the programme of measures



### Setting

Bratislava, Slovakia's capital, is located on the Danube. The medieval core of the city was awarded protected-monument status in 1954. The enactment of a monument zone protecting the wider city core followed in 1992. The old town is one of the country's main tourist attractions. Over the past ten years, the city has been vulnerable to heat waves, drought, river and heavy rain flooding, and other extreme weather events.

### Learning moment

In 2008, the city of Bratislava included climate change adaptation as a priori-

ty in the city's central strategic document – the Social and Economic Plan. Since then, the city has been a partner in many research projects in the thematic field, including the Horizon2020 project RESIN. Within the project, Bratislava further developed its methodology and capabilities in the field of vulnerability assessment with a focus on heat waves and floods as hazards induced by climate change.

A particular focus has been put on the impacts and risks for the population and critical infrastructure (roads and built-up areas). It is noteworthy that the city's risk assessment consists of a qualitative and quantitative part and explicitly in-





Fig. 21: View over historical and modern Bratislava, Slovakia (iStock.com/AleksandarGeorgiev)

volves local stakeholders and experts via workshops, which particularly included vulnerable population groups such as elderly and young people.

The risk assessment has involved use of a comprehensive map of the impacts of climate change on the city. As a strategic planning basis for various city administration processes and tasks, it is today, for example, the basis for the 'Action Plan for Adaptation to the Negative Impacts of Climate Change on the Territory of the Capital of the Slovak Republic in 2016-2020,' which was approved not only by the City Council, but also by the councils of all city districts (RESIN 2016) in a public participation process. The city has since

begun implementing adaptation options. It has succeeded in anchoring the importance and processes of risk assessment and resilience adaptation in local policy and in the various administrative sectors, and in bringing them to the attention of interested professional audiences. However, various challenges remain, including in respect of the availability (or lack) of data and the ability to conduct a risk assessment at local level (both in terms of skills and resources). In addition, the current risk assessment approach still needs to address the specific reference to cultural heritage, and the whole disaster risk management cycle needs to be carried out in an integrative and collaborative way (cf. ongoing ARCH project).

## 6 Managing risk

6.1 Basic knowledge

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6.2 Guiding principles

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Fig. 22: Old town and dome of Florence, Italy (Justen 2018)


## 6.1 Basic knowledge


**Risk management** is defined by UN-DRR (2009) as 'the systematic process of using administrative directives, organisations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster'.

Previous research has shown that, in Integrated Risk Management approaches, the **cooperation between different actors** at various spatial and technical levels of risk management is not yet sufficiently comprehensive or integrated. This is particularly evident in the establishment and implementation of measures decided upon by democratically legitimised actors in previous steps (cf. chapter 5). In practice, shortcomings often relate to both the **intersectional coordination and the collaboration of actors**. This also includes the involvement of local communities. In stating this, **coordination** is defined as the mandatory cooperation among actors determined by laws and formal regulations. An example is the intersectoral cooperation in urban land use planning; often, a central/superior entity is responsible for the coordination of the processes. **Collaboration** – in contrast – means voluntary cooperation among actors. This is not defined by laws and formal regulations, but non-binding policy papers and guidelines do recommend it. Collaboration is therefore often based on informal institutions and routines. Finally, a key request for guidance relates to detailed information – which is often lacking – about who should be involved

and how at which phase of Integrated Risk Management and for which purpose. **Inclusive collaboration and coordination** should become a key standard for Integrated Risk Management processes, even though site-specific circumstances and constellations are often complex and call for individual consideration. This chapter therefore aims to provide more clarity about the relevant group of actors and trace the development of a common and inclusive risk management process.

On each spatial level, **specific forms of coordination and cooperation processes** need to be introduced. This means that risk management at international level involves and requires different actors (e.g. authorities and organisations) compared to risk management at national or local level. The interests of various actors in the heritage (expert) community need to be considered. However, although the importance of this multi-level governance approach for effective risk management is widely acknowledged, specific recommendations for Integrated – i.e. heritage-sensitive – Risk Management are missing. Available guidance often only refers to one spatial level (the level of single cultural heritage sites in most cases) or remains vague about how the approaches to Integrated Risk Management should actually differ at the various spatial levels. Consequently, the awareness and knowledge of heritage experts regarding the scale dependence of risk management methods and measures need to be expanded. Overall, roles and responsibilities need to be clearly distributed within the different phases of the overall risk management process so that **clarity and**

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awareness as regards different roles and responsibilities can be enforced.

Furthermore, a high level of variation is observed in terms of the scope and quality of the consideration existing guidance documents give to both risk management per se and its interconnection with the protection of cultural heritage. To ensure the inclusion of cultural heritage requirements and thus the integrated character of risk management processes and measures, the enhanced use of quality assurance mechanisms is suggested.

With regard to the step of managing risk, the shortcomings and possible solutions, in the form of key principles, can be summarised as follows:

- Firstly, risk management approaches are often not inclusive. All actors should be involved in different and suitable forms of coordination and collaboration (see chapter 6.2 → Principle 7: 'Suitable forms of coordination and collaboration').
- Secondly, all groups of actors contribute to the Integrated Risk Management process in different ways, according to their respective roles and responsibilities. One task is to improve clarity and raise awareness of these, thereby contributing to the transparency and efficiency of the process (see chapter 6.2 → Principle 8: 'Roles and responsibilities').
- Thirdly, the decision about Integrated Risk Management measures needs to take local circumstances and potential

heritage-related conflicts into account (see chapter 6.2 → Principle 9: 'Definition of measures').

- Finally, the scope of interconnection between risk management and the protection of cultural heritage generally varies considerably in the existing guidance. To ensure integration, including through iteration in future processes, quality assurance measures can be implemented (see chapter 6.2 → Principle 10: 'Quality assurance').

## 6.2 Guiding principles

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### Principle 7: 'Suitable forms of coordination and collaboration'

**All actors concerned are to be involved in an inclusive process through suitable forms of coordination and collaboration.**

As previously stated, the inclusiveness of Integrated Risk Management generally needs to be improved. This means that all groups of actors should be involved in different and suitable forms of coordination and collaboration, so that every actor can contribute to the process appropriately.

For instance, including local communities can be an additional task. First and foremost, this involves ensuring appropriate resources for inclusive participation on equal terms and ongoing buy-in throughout the process on a permanent basis. Likewise, interests and concerns of local communities need to be ascertained and weighed up against each other, and subsequently communicated as part of the pro-

cess. At the same time, it is important to recognise where local community participation is most valuable, e.g. when it comes to defining goals and values rather than in the more technical phase of evaluation. There should also be greater awareness of more 'informal' **cooperation** between actors in addition to the 'formalised' coordination processes, which are often carried out with the help of a central or higher body and are not always sufficient. There is a need for coordination, particularly in terms of ensuring the conformity of risk management processes with legal regulations and clarifying the discussion, definition and clear communication of various rights and obligations of individual expert groups in the normative steps of risk management. Depending on local needs and the local context, these rights can range from information to discussion and from consultation to co-decision.

The World Heritage Management Plan of the Historic Centre of Florence (3rd update, published in 2022) can serve as a valuable example that underlines the challenge of coordination and collaboration in Integrated Risk Management; it contains a chapter on risk management but no guidance on how to implement it. Listing all the authorities which are somehow linked to risk management along with their responsibilities already poses a big challenge for local practitioners. Nevertheless, all the relationships between the different relevant plans, e.g. emergency planning, flood prevention planning and land use planning, should also be mentioned. In addition, a special feature of Florence is that the World Heritage Site includes many private proper-

ties and involves both local and national authorities, which illustrates the discrepancy in Integrated Risk Management between more comprehensive sites and single buildings.

#### **Principle 8: 'Roles and responsibilities'**

##### **Roles and responsibilities must be clarified and communicated transparently.**

Different actors have different skills and competences, and it is important to be aware of these when assigning responsibilities. In general, **these responsibilities should always be in accordance with the respective capacities.** Municipalities, especially smaller ones, might be overwhelmed by the complexity of Integrated Risk Management. As they often have only limited financial and personnel resources, new governance approaches are required in order to put Integrated Risk Management into practice. For example, these approaches might include inter-municipal cooperation or the creation of special organisations responsible for the protection of cultural heritage, such as professional associations, foundations with a focus on cultural heritage or higher-level authorities that also take on an advisory role. In the German federal states of North Rhine-Westphalia and Lower Saxony, the 'Landschaftsverbände' are a form of municipal association that represents the interests of cultural heritage protection. In other German states, state monument authorities take on this task. By **pooling resources**, they can perform duties that individual municipalities would not be able to handle and can also perform these activities in an overarching

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manner and with a significantly broader perspective. This requires the joint intent of several municipalities to fulfil a specific purpose. This principle could also be transferred to other countries if advisory authorities at a 'higher' level outside municipal boundaries have not yet been established there.

Furthermore, the aforementioned groups of actors have different roles and responsibilities in the risk management process that can vary from place to place and need to be clarified:

- **The group of (heritage) property owners** as a highly relevant group. Ideally, they launch risk management processes or at least actively take part in them. They are also often responsible for executive functions, such as day-to-day management, and for the implementation of measures and can thus have a considerable impact on the risks. However, they first need to be convinced of the benefit of preventive measures. Owners play a supporting and responsible role, as they are the ones who first and foremost have access to their property. This responsibility is even legally established in some countries. However, this ownership is often not publicly known or owners do not know how to respond to their responsibility. Through ongoing information and awareness-raising among local actors, 'capacity building' can thus be initiated and maintained locally in the long term.
- **Local heritage experts such as heritage site managers** who have to promote heritage-related risk management. Ideally, they combine local knowledge with the expertise of external experts, know the local actors involved and are in contact with those responsible in local politics and administration.
- **Local municipalities (i.e. municipal administrations and political bodies such as mayors)** are important for launching and/or advancing risk management processes. The case study of the city of Regensburg is a helpful example, showing how the city pushed forward and financed risk management planning by raising external funds and linking it to ongoing planning processes, i.e. the 'piggyback principle' (see Greiving et al. 2021 – scoping paper, chapter 5).
- **Higher-level administrations, such as regions or provinces**, which set the framework for the processes, e.g. through superordinate planning instruments and control mechanisms (counterflow principle). The regional level is particularly important because regional authorities usually possess knowledge about local characteristics and have more resources than single municipalities.
- **Civil society/residents**, i.e. those people who do not have an institutional or professional connection to risk management processes and have not received relevant training. If residents are to support the process during the response phase, training and institutional backing are important

requirements. They do not usually play a role in the technical phase of risk assessment and should not have overriding decision-making power in the normative phases of Integrated Risk Management (cf. chapter 5). However, the civil society's local knowledge should be used as a resource for consultancy and advice, e.g. during public hearings in respect of risk management plans. For example, in the case of the rebuilding of the Stari Most bridge in the city of Mostar, the local population demanded its reconstruction in its historical form, at the same location and using the original substance. For local residents, the bridge has a high symbolic value of 'reconciliation, international cooperation and coexistence of diverse cultural, ethnic and religious communities' in the Croat and Bosnian border region (see also chapter 5.2 → Principle 4: 'Suitable forms of coordination and collaboration'). By supporting citizen participation, the acceptance of decisions and Integrated Risk Management measures within civil society can be increased. In general, there are very rare experiences of civil involvement in risk management processes. In this regard, the good practice cases – in particular from Bratislava and Naples (cf. chapter 4) – could and should inspire further discussions.

- **External expert groups for Integrated Risk Management planning.** Local experts alone are often unable to run a complex (Integrated) Risk Management process. External advisors

and partnerships should therefore be brought together in expert groups. However, experiences in the case study cities have shown imbalances in the representation of disciplinary expertise in the expert groups, with only a few monument conservators and civil laypersons, for example. Social scientists, historians, etc. are often completely absent. Cultural institutions and foundations, professional associations and civil society institutions from the fields of both cultural heritage and risk management must meet in this context to exchange professional concerns and, above all, to understand each other's ways of working and thinking (cf. chapter 5).

**Key coordinators/officers or working groups for cultural affairs** could be further actors, who are integrated into the local administration or directly connected to it. These individuals or this team would serve as an initiator for integrating cultural heritage into risk management and as a key partner for cultural heritage in the event of an emergency, and would be the 'cultural heritage partner' working in close cooperation with the 'climate change adaptation officer', who receives ongoing training in the field of Integrated Risk Management. This partnership should have sufficient expertise in the field of risk assessment and management and would function as an 'information distributor' (this might also include cooperating with universities). In addition, to meet the need for resource efficiency, more regional support, e.g. through a 'mobile risk manager' for various municipalities, or a 'template' for a local expert

## MOSTAR, BOSNIA AND HERZEGOVINA



Fig. 23: Stari Most bridge. Mostar, Bosnia and Herzegovina (iStock.com/Ozbalci)

### Lessons learnt

- Architectural heritage as a symbolic-critical protected asset
- The need for debate on goals and values to involve local people and, in the case of UNESCO World Heritage Sites, international stakeholders. Relevance of the resilience concept with regard to cultural protection and care
- Need for an expanded risk management approach in terms of an all-hazard approach and taking all phases of the Risk Management Cycle into account

### Setting

Mostar is the largest city in Bosnia and Herzegovina. During the Bosnian War, parts of the historic city centre were destroyed. Croatian forces destroyed Mostar's landmark, the Stari Most bridge, in a targeted shelling that lasted several hours.

### Learning moment

The war was followed by activities to rebuild the Stari Most bridge and repair other historic buildings in the city centre, such as the Tabacica Mosque. The initiative and support by the population, which wanted a reconstruction that was true to the original, was of great importance. This symbolism of 'reconciliation, international cooperation and coexistence of diverse cultural, ethnic and religious communities' was given heritage and monument value by the international community when it inscribed Mostar's inner city and Stari Most on the UNESCO World Heritage List in 2004. In the justification of the OUV (Outstanding Universal Value) or the inscription criterion (vi) it says: 'With the

'renaissance' of the Old Bridge and its surroundings, the symbolic power and meaning of the city of Mostar – as an exceptional and universal symbol of coexistence of communities from diverse cultural, ethnic and religious backgrounds – has been reinforced and strengthened (...). The Old Bridge area is an outstanding example of a multicultural urban settlement'.

Today, the cultural heritage of Mostar is protected by a system of measures, planning and institutions, which are summarised, amongst others, in the World Heritage Management Plan. However, UNESCO's local monitoring and periodic reporting reveal the increasing importance of risks other than war, namely informal settlement construction and drought and floods as insidious climate-change-related threats to the city and cultural heritage. In recent years, several workshops and training sessions on disaster risk management have been conducted, but the results of these activities are not yet reflected in integrated planning, cooperation or implemented disaster risk management measures in urban spaces.



team that contains the necessary expertise and serves as a starting point for action, could be set up.

Moreover, when it comes to the distribution of tasks and competences between the actors, different scenarios are conceivable and should be discussed at local level. Either one larger team can take care of the assessment of all sites and hazards, or it can split up into smaller entities looking at different heritage and hazard types.

Furthermore, the spatial level dependency of Integrated Risk Management needs to be considered. Here, it becomes clear that roles and responsibilities must be defined both vertically (hierarchically) and horizontally (professionally). In addition, the exchange and flow of information between the different levels and areas of responsibility must be strengthened. The importance of cross-border cooperation should also be emphasised. For instance, the accessibility of data as well as the exchange and information flow between different countries and levels need to be enforced. Better regulation and harmonisation of this exchange is needed as different proceedings are often used on different spatial levels. The European Commission's Copernicus Emergency Management Service (EMS) can serve as a reference and resource for complete, cross-border mapping and interfacing of data on heritage and risk (cf. European Commission 2020, 3). The service assists EU member states and further authorised countries in managing natural or human-made disasters in both populated and non-populated areas by supplying maps based on satellite data and geo-information.


### Principle 9: 'Definition of measures'

**Appropriate protection measures must be selected and implemented, taking account of local conditions and possible conflicts with the requirements of cultural heritage.**

To implement effective Integrated Risk Management, appropriate measures for the respective stages of risk management (prevention, preparedness, response and recovery) must be developed, building on the protection objectives set up in the process of risk evaluation. These measures need to be tailored to the location as regards the characteristics and components of risk, the hazard the site is exposed to, and its (hazard-specific) susceptibility. During the phases of risk assessment and risk evaluation (cf. chapter 3.1), it is important to prepare a discussion, evaluation and the choice of appropriate measures.

The latter can be divided into long-term strategies and short-term measures. However, both should be coordinated and planned at an early stage, i.e. quick measures that affect the preparation and response phase should be coordinated in advance.

Short-term measures should primarily be understood as 'first aid'. In particular, a clear distribution of tasks and responsibilities is essential, and the sequence of actions and work steps must be clarified. This also shows the need for long-term planning as well as ongoing sensitisation of actors in the sense of 'training'. Such emergency plans, which

 Further reading:  
European  
Commission 2020

have been discussed, for example, within the framework of the Interreg project ProteCHt2save, contain central statements on participants, responsibilities and dependencies, protection goals and concrete measures as well as necessary sequences in a clear, tabular form.

Long-term strategies mainly concern spatial planning and the gradual implementation of structural changes to buildings and open spaces. Since many areas are already densely built up and historical city centres are often located on riverbanks, retreat from endangered areas or structural adjustments are of great importance in this context. In particular, in view of the aggravation caused by climate change, conflicts between settlement areas and hazards, such as flooding, will increase and make measures to adapt land use even more necessary in the future. These can be clustered into the following possible measure categories (Greiving, Ubaura and Tesliar 2016):

- Keeping hazard-prone areas free from urban development through differentiated decisions on land use (cf. chapter 5). This can mean keeping several areas exposed to hazards free from (further) development, or, if they are already developed, retreating from hazard-prone areas.
- Mitigating the susceptibility of land uses in respect of hazards, by adapting building structures or constructing protection structures such as dykes or retention ponds.

In Germany, one measure is the implementation of 'priority' and 'reserved' areas, which are defined, for example, in the Regional Plan of the Cologne administrative district. Many other European countries also have hazard zone plans. If the area in question has not yet been built on, the designation of hazard zones gives priority to certain spatial functions, such as flood protection, and prohibits any other function that could conflict with this priority function (in red zones). This can lead to restrictions on the designation of (future) settlement areas. Settlement is only permitted if appropriate building protection is realised (in yellow zones).

Communication within the process that is appropriate for the target group is of particular importance. Different levels of knowledge of the target audience must be taken into account, and the definitions of terms must be explained appropriately. Complex technical or scientific issues need to be described in a comprehensible way and thus made accessible to a broad public, including for the purposes of practical application. In addition, long-term continuity of communication must be ensured to maintain ongoing awareness of risk management and cultural heritage even in 'peace time'. Conceivable formats here include brochures that provide information on heavy rainfall events, for example. Explanations and illustrations of possible effects of structural measures on resilience can also show why certain adaptations may be useful. The organisation of a regular working group and recurring

### Lessons learnt

- Existence of several possibilities for implementing flood protection in regional planning
- The designation of reserve zones is more common than priority zones; the latter, in turn, entail greater restriction
- Land use restrictions and their justification depend on the severity and magnitude of the hazard in question

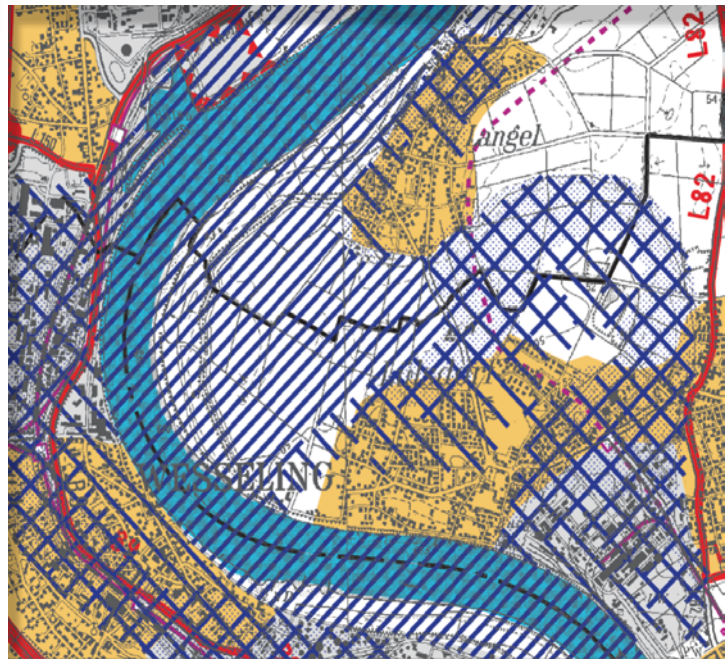


Fig. 24: Extract from the regional plan of the district of Cologne, Germany. Priority zones ('Überschwemmungsbereiche') in diagonal hatches, reserve zones in crosshatches (Bezirksregierung Köln 2006)

### Learning moment

The plan designates reserve zones and priority zones for areas that might be flooded by high tides of the river Rhine. The objective of these reserve zones is defined in the regional plan as follows: 'Potential flood areas (zones) as well as the extreme flood area of the Rhine, as far as it exceeds the 100-year flood area, are reserved areas for preventive flood protection. In these areas, special weight is to be given to the risk of flooding in further spatial use'. For priority zones, the following objective is formulated: 'The floodplains of watercourses are priority areas for preventive flood protection and as such are to be preserved and developed for the discharge and retention of floods. Floodplains – insofar as they are inundated by 100-year floods – are to be kept free of conflicting uses, in particular of additional building areas in urban land

use plans. In the event of abandonment of a built-up settlement use, a change of use is possible, provided that the retention volume is preserved or, if possible, increased.' Residential and industrial zones are more likely to be marked as reserve zones, but not as priority zones.

Both zone categories are designated on the evidence basis of flood hazard maps, which provide information about flood extent and depth. According to Greiving, Ubaara and Tesliar (2016), 'a differentiation into hazard intensity and frequency classes is desirable but not necessary in order to weigh up the given hazard against other concerns and interests: the greater the hazard, the more a land use restriction becomes justifiable. However, the given vulnerability of the different land use is usually not taken into account when designated either a priority or reserve zone.'

events are also conceivable. Training and exercises (e.g. organised by professional associations and foundations) can draw the attention of both owners and committed citizens and ensure they take on their share of adaptation measures.

The consideration and implementation of measures often harbours potential for conflict. In the course of the participation of relevant stakeholders, these conflicts must be renegotiated on the basis of the local hazard situation and the claims of the respective protected property. Frequent **areas of conflict** concern, for example:

- **Aspects of economic efficiency:** Measures must be economical if they are to be implemented and operated in the long term. At the same time, the social and economic aspects as well as the 'value' of cultural heritage (e.g. also in relation to tourism) must be considered. This can help put the investment for measures into perspective.
- **Time management:** Especially in the run-up to or directly after disaster events, protective measures often have to be implemented under high time pressure – sometimes at the expense of the original substance or of possible (structural) optimisations in terms of resilience. Here, a long-term strategy for improving resilience and ongoing training of local actors in the 'correct' handling of cultural heritage in the event of a disaster can reduce undesirable developments.
- **Impacts on the townscape:** Protective or adaptation measures to improve resilience (e.g. protective or retain-

ing walls, greening, unsealing, use of renewable energies) can affect the overall impact of the local situation. Individual frameworks with guidelines and objectives are necessary, but should also allow for flexibility.

- **Particular interests:** Individual divergent interests can delay or completely prevent the implementation of protective measures. Therefore, especially for municipalities as planning institutions, more personnel and technical support are needed for the development of legally sound guidelines. At the same time, this emphasises the need to negotiate decisions together on the basis of objective goals and criteria in an open and democratic process involving as many actors as possible, in order to ensure there is reasoning behind even 'unpopular decisions'.

#### **Principle 10: 'Quality assurance'**


##### **Successful Integrated Risk Management requires ongoing control and quality assurance measures.**

Due to the aforementioned evolution of the circumstances that an Integrated Risk Management process must consider, iteration (cf. chapter 7) and **continuous improvement** are highly relevant. In order to ensure these, certain tools for quality assurance can be used as support. These include check lists or the '**scorecard method**', which is known as a benchmark tool and used to define measures, effectuate comparisons between sites and evaluate progress. It is an instrument for planning and management that was initially used by businesses, governments

and non-profit organisations. Its main purpose is to specify intangible long-term strategic visions by means of measures. The choice of measures, in accordance with predefined objectives, needs to be facilitated (cf. Balanced Scorecard 2022). In terms of spatial planning and risk management, it may support the definition of appropriate and feasible prevention and/or mitigation measures on the basis of the objectives that have been agreed upon (cf. chapter 5). Furthermore, it may help with the evaluation of progress and the accomplishment of objectives. Features that should be taken into account and operationalised in the assessment include the authority responsible for realising the measure, the ability to meet the objective, the (geographical) localisation of the measure, the costs and timeframe for its realisation and its efficiency (cf. INCA Project 2008). By these means, measures can be assessed, compared and selected with regard to their appropriateness (cf. fig. 25).

Furthermore, the instrument of **Strategic and Environmental Assessment**, used for the monitoring of plans and programmes, has found its way into the legislation of EU member states on the basis of Directive 2001/42/EC of the European Parliament (cf. chapter 4.1).

This is the case in Germany, for instance, where cultural heritage is listed as an object of protection. Within the framework of strategic programmes and plans, environmental impacts must be examined, evaluated and weighed up before measures and projects are implemented. This is applied through ongoing monitoring even beyond a project's completion. Environmental impacts also include risks to cultural heritage, which must be assessed. In practice, this perspective is often neglected, even though it is regulated in legal frameworks. In this context, there is an opportunity to build on existing procedures to anchor risk management more strongly and with legitimacy in planning processes in the future.

 Further reading:  
INCA Project 2008

Example of an agreed objective	Possible mitigation measures		Indicators
Reduction of frequency and/or magnitude of event (water gauge or run-off in m <sup>3</sup> /s of e.g. the 1 in 100-year flood); 10% in 10 years	Improvement of retention capacity by/to approx. x m <sup>3</sup>	Through a steered retention area (alternative 1)	Realised storage capacity in m <sup>3</sup>
		Through decentralised retention in catchments (alternative 2)	Realised storage capacity in m <sup>3</sup>
	Improvement of existing levees	Improvement of protection level	

Fig. 25: Example of the context of objective, measure and indicator (RHA 2022, based on Greiving 2009)

## 7 Overarching principle: iteration

– Integrated Risk Management  
needs an iterative working mode



Fig. 26: Flood of the river Danube, Stone Bridge. Regensburg, Germany (Greiving 2021)

The core topics of Integrated Risk Management are finally linked by one **overarching principle**, namely that Integrated Risk Management needs an **iterative working mode**. This means that regular and occasional feedback loops must be part of Integrated Risk Management. This feedback must ensure both:

- The **coordination and coherence** between the different stages, steps and actors of risk management previously outlined (cf. chapter 3.2, fig. 11)
- The **monitoring and updating** of activities and contents in the different steps and phases of risk management

With regard to the latter – and since few risk management guidance documents stress the necessity of regularly updating assessments, evaluations and management activities (cf. e.g. ICOMOS 2019) – these iterative steps should be followed in Integrated Risk Management processes to ensure long-term updated risk protection.


However, critical questioning as to what remains valid and appropriate over time, the **potential revision (adaptation) of analyses, decisions and activities**, and adaptations over time are all required because the knowledge that underpins risk management is continually evolving and broadening. In this vein, EU Directive 2007/60/EC on the management of flood risks requires the regular revision and update of flood risk

assessment, evaluation and management every six years. Moreover, EU Directives 2001/42/EC and 2014/52/EU on Strategic and Environmental Impact Assessments prescribe the monitoring of mitigation measures. These EU regulations need to be considered in and carefully adapted to the Integrated Risk Management approach.

In the case of the insidious threats of climate change, for example, new knowledge resulting from improved modelling of climate change and measured changes must be taken into account. Regular updates of risk assessments, evaluations and management measures are needed. In this context, the case of the MOSE project in Venice, Italy, constitutes a critical example, showing that risk management measures need constant updates that take account of new knowledge about hazards, such as evolving forecasts about rising sea levels and storms. The MOSE project also shows that these updates must result in timely action to adapt the risk prevention measures accordingly. Due to rising sea levels and the difficulty of adapting constructions after their completion, there is a risk that MOSE will soon be obsolete.

Changes in the institutional context of risk management represent another set of causes that require occasional updates in local Integrated Risk Management. For example, changes in legislation and in the availability of human and financial resources must be taken into account.

 Index:  
Iteration

 Further reading:  
MOSE project

## 8 Outlook



Fig. 27: Canals and historical buildings. Venice, Italy (Klanten 2018)



As this publication shows, **cultural heritage is of crucial importance for strengthening resilience in European cities and a valuable resource for recovering from crises**. For instance, cultural heritage can be seen as a resource for building resilience as it may strengthen local identity, provide safeguarding or mitigate extreme climate conditions. Moreover, as an adaptive and responsive system, cultural heritage has adjusted to changing conditions over time and thus – importantly – already demonstrates its resilience. Therefore, protecting cultural heritage against disasters is of great importance.

The findings of the work on this topic presented in this publication contribute to a more **integrated approach to risk management** by anchoring disaster risk management in cultural heritage protection and promoting the cooperation of cultural heritage protection institutions with those in the field of hazard prevention. Furthermore, it offers an exchange platform for actors on different spatial levels – municipal, regional, national and international. It is of the utmost importance that this is put into action and implemented in daily local practice. The effectiveness of Integrated Risk Management relies on the commitment of the people involved. This is, in the end, a constituent element of urban resilience.

The **Urban Agenda for the EU** has provided valuable stimulus for the European discussion on resilience at the intersection of risk and heritage management. From this collaborative process, a valuable 'network of networks' has emerged. Moreover, while this publication already highlights new insights and offers valuable guidance to local stakeholders, many relevant issues

still need to be explored. For example, the Action Group identified skill and capacity building at local level as a high priority. In addition, follow-up processes should test and apply the insights gained in the joint process in municipalities, especially in smaller towns.

Thus, as the official term of the Partnership is nearing its end, the Action Group aims to continue its exchange, work and network. The framework of the Urban Agenda is well suited to this exploration, as it allows for a flexible, iterative process that can evolve and react to changing needs and priorities. Anybody interested in this European dialogue may join the Action Group.

What are some possible **follow-up steps**?

- An **exchange with the European Commission** on the Action's results and findings will help attract attention to the need to integrate heritage and risk management, especially in the fields of funding, regulation and knowledge exchange.
- A **handbook for local practice in Germany** will offer concrete guidance to local stakeholders. It will also explore 'simulation games' as a potential instrument for fostering cooperation between heritage and risk management stakeholders.
- The **New European Bauhaus**, which connects the European Green Deal with our living environment, offers synergies and a valuable debate on how we can transform our cities in a sustainable way and adapt them in the face of climate change.

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# Annex

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## List of abbreviations

- ATTACH – evAluaTion Tool for Alpine Cultural Heritage
- BBR – German Federal Office for Building and Regional Planning
- BBSR – German Federal Institute for Research on Building, Urban Affairs and Spatial Development
- BMWSB – German Federal Ministry for Housing, Urban Development and Building
- CCH – Culture and Cultural Heritage
- EIA Directive – Environmental Impact Assessment Directive
- EMS – Emergency Management Service
- GDP – Gross Domestic Product
- ICLEI – International Council for Local Environmental Initiatives
- ICOMOS – International Council on Monuments and Sites
- IRGC – International Risk Governance Council
- MUKEBW – Ministry of the Environment, Climate Protection and the Energy Sector Baden-Württemberg
- SHELTER – Sustainable Historic Environments hoListic reconstruction through Technological Enhancement and community-based Resilience
- UNDRR – United Nations Office for Disaster Risk Reduction
- UNESCO – United Nations Educational Scientific and Cultural Organization
- UNFCCC – United Nations Framework Convention on Climate Change

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## Workshops and conferences

- **Discussion DBU ICOMOS Workshop** (Workshop in support of the UNESCO-ICOMOS-IPCC International Meeting on Culture, Heritage and Climate Change in December 2021)  
Date: July 2021
- **Kick-off Session EU Task Force for Climate Neutral and Resilient Historic Urban Districts**, cooperatively organised by the EU projects ARCH, HYPERION and SHELTER  
Date: June 2021
- **International Workshop**, Bordeaux  
Date: September 2021
- **Simulation game**, Bad Münstereifel  
Date: April 2022

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