Deliverable 2.6

ARCHE SRIA and its Synthesis

Funded by
the European Union

UK Research
and Innovation

Project identification

Project Full Title	Alliance for Research on Cultural Heritage in Europe
Project Acronym	ARCHE
Grant Agreement	101060054
Starting Date	September 1st, 2022
Duration	37 months

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Funded by UK Research and Innovation (UKRI) under the UK government's Horizon Europe funding guarantee [grant number 10044438].

Deliverable presentation

Deliverable no.	2.6
Deliverable Name	ARCHE SRIA and its Synthesis
Work Package no.	2
Lead Beneficiary	MUR
Type	R – Report, Document
Dissemination Level	PU – Public
Due Date (month)	M30

Citation

ARCHE Consortium. 2025. *ARCHE SRIA and its Synthesis.*

Abstract

Based on the outputs of the extended version of the "Key Messages and Preliminary Findings of ARCHE SRIA", revised to incorporate inputs from public consultation and consultation with policy-makers, this document delivers the final ARCHE SRIA and its synthesis.

Revision history and list of contributors

Version	Date	Authors	Description
20	14/11/2024	L. Spini (CNR)	Zero draft of Extended Version of D2.5
21	15/11/2024	V. Virgili (CNR)	Extended Version of D2.5
22	10/01/2025	Co-chairs and members of RGs	Revised version on the basis of RG inputs
23	27/01/2025	Co-chairs	Revised version
24	28/01/2025	M. Grano (CNR)	Edited version
25	14/02/2025	Editorial Board members	Revised version
26	19/03/2025	Editorial Board members	Revised version incorporating RCH new MS and ACs inputs
27	02/05/2025	A. Heritage and K. Warren	Revised version
28	07/05/2025	Editorial Board members	Revised version
29	16/05/2025	E. Stegmeijer, E. Röell	Reviewing
30	21/05/2025	Editorial Board members	Final version

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Executive Summary

Context

The Strategic Research and Innovation Agenda (SRIA) of the Alliance for Research on Cultural Heritage in Europe (ARCHE) is built on extensive stakeholder consultation, the achievements of the Joint Programming Initiative on Cultural Heritage and Global Change (JPI CH) created in 2010 and its 2020 SRIA, and on the 2022 joint JPI CH - JPI Climate White Paper on *Cultural Heritage and Climate Change*. It also takes into account the latest strategic recommendations from key international conventions and policy documents.

The ARCHE SRIA has been developed by the cultural heritage and climate communities, engaging a broad and diverse range of stakeholders and key organisations, to strengthen interdisciplinary cooperation in cultural heritage research. It is designed to foster close cooperation and synergies at European and international levels.

The ARCHE SRIA reflects the evolution of the cultural heritage research landscape since the launch of the 2020 JPI CH SRIA, aligning research priorities with today's challenges. It presents an integrated strategy for research to highlight the multiple roles that cultural heritage can play in a society facing global environmental and socio-political crises and challenges.

Principles, Cross-Cutting Themes and Priorities

Based on these foundations, three Priority Areas and three Cross-Cutting Themes have been identified to address key policy challenges and research and innovation opportunities.

The **Priority Areas** are:

- Cultural Heritage and Environment: Strengthening Resilience through Risk Assessment and Management, Climate Mitigation and Adaptation.
- Cultural Heritage and Society: Enhancing the Resilience of Society.
- Cultural Heritage and Governance: Seizing Opportunities towards Sustainable Development.

Each of these Priority Areas includes a number of Core Themes that aim to develop innovative and transdisciplinary research within cultural heritage and in related fields.

The **Cross-Cutting Themes** will enhance the impact of cultural heritage research within the Priority Areas, ensuring that it generates evidence-based policies and strategies to safeguard and develop cultural heritage as a resource for building societal resilience and achieving climate neutrality:

- Communication, Education and Public Engagement
- Science, Technology and Innovation
- Science, Policy and Society Interface

The following set of seven **Research and Innovation Principles**, aligned with the *European Code of Conduct for Research Integrity*, will guide the implementation of the Priority Areas and Cross-Cutting Themes:

- Diversity, Equity and Inclusion
- Capacity Building and Learning Opportunities
- Digital Pathways
- Minimised Environmental Footprint of Research Activities
- Collaborative Research Across Disciplines and Sectors
- Open Science and Open Innovation
- Complementarity and Additionality with Existing Initiatives

Implementing the ARCHE Strategic Research and Innovation Agenda

The ARCHE SRIA will be implemented by the ARCHE partners through joint activities and new opportunities will be sought with other initiatives and countries, in keeping with the 2024 *Vision and Mission for the ARCHE Alliance*:

- **Vision**

  By 2040, ARCHE will have created new opportunities for Cultural Heritage research collaboration which will have resulted in the strengthened ability to respond to societal challenges and an improved quality of life.

- **Mission**

  ARCHE will co-create multidisciplinary joint research funding actions, knowledge exchange and capacity building activities in order to strengthen the resilience of cultural heritage in Europe during the twin digital and green transition. Through a unique partnership of funding agencies, ministries, researchers, practitioners and citizens, common opportunities and challenges will be addressed, societal resilience will be strengthened and research impact will be scaled up.

The ARCHE project considers that the impact of the funded projects is a priority and will work to ensure a wide dissemination and communication of all its activities. The ARCHE partners will work together to ensure that project outputs and programme deliverables associated with the SRIA are not lost or forgotten, and that new activities and projects prioritise accessibility and longevity of findings, data and tools.

1. Introduction

Building on the achievements of the Joint Programming Initiative on Cultural Heritage and Global Change (JPI CH), this Strategic Research and Innovation Agenda (SRIA) of the Alliance for Research on Cultural Heritage in Europe (ARCHE) responds to the evolution of the cultural heritage research landscape since the 2020 JPI CH SRIA – notably the development of the heritage science field of study –, aligning research priorities with today's pressing challenges.

The ARCHE SRIA is a tool developed by the cultural heritage and climate communities to strengthen cooperation in cultural heritage research, transcending disciplinary, sectorial, and geographical boundaries. By engaging a broad and diverse range of stakeholders, including researchers, heritage practitioners, policy- and decision-makers, and citizens, the SRIA promotes inclusive collaboration and a shared vision. It also engages key organisations, such as government bodies, intergovernmental organisations (IGOs), non-governmental organisations (NGOs), and research funders, to enhance coordinated action.

The SRIA adopts the following definitions of cultural heritage:

> Cultural heritage consists of the resources inherited from the past in all forms and aspects - tangible, intangible and digital (born digital and digitised), including monuments, sites, landscapes, skills, practices, knowledge and expressions of human creativity, as well as collections conserved and managed by public and private bodies such as museums, libraries and archives. [Council of the European Union, *Council conclusions of 21 May 2014 on cultural heritage as a strategic resource for a sustainable Europe,* art. 2, (2014/C 183/08)].

The SRIA endorses a holistic view of cultural heritage. It is a key instrument for cultural heritage research that will also guide the activities of the European Partnership for Resilient Cultural Heritage (RCH), developed within the ARCHE project. The RCH Partnership will address two main challenges:

- the underdeveloped research and limited evidence regarding the impact of climate and environmental change on cultural heritage and corresponding adaptation strategies;
- the need to increase the understanding and recognition of how cultural heritage can inform policies and guide implementation measures towards a more resilient society, including the role of traditional and local knowledge.

Based on these foundations, and following extensive stakeholder consultation, three research Priority Areas have emerged (see I.3.):

1) Cultural Heritage and Environment: Strengthening Resilience through Risk Assessment and Management, Climate Mitigation and Adaptation.
2) Cultural Heritage and Society: Enhancing the Resilience of Society.
3) Cultural Heritage and Governance: Seizing Opportunities towards Sustainable Development.

Each of these Priority Areas includes a number of Core Themes that aim to develop innovative inter- and transdisciplinary research within cultural heritage, and in related fields such as climate science.

1.1. Cultural Heritage in a Changing Context

Cultural heritage is embedded in an increasingly dynamic and uncertain context shaped by geopolitical crises and climate change, pollution and biodiversity loss (the Triple Planetary Crisis). Powerful – and often unprecedented – global shifts are reshaping the landscape of relative certainties that the world has been accustomed to for some time. Changing regional and global power dynamics, environmental breakdown paired with resource scarcity, demographic transformations, and technological revolutions, are driving momentous changes in behaviours, lifestyles, practices, values, governance and policies. In this context, cultural heritage faces new and growing threats and can be misused but, at the same time, can offer ways to address societal challenges and build resilience.

The ARCHE SRIA presents an integrated strategy for research to derive evidence-based solutions to address these issues and to further highlight the multiple roles that cultural heritage can play in a society facing global environmental and socio-political challenges. The SRIA addresses cultural heritage as part of complex systems made of interlinkages of places, cultural expressions and human-nature interactions. It therefore places emphasis on considering cultural heritage in context, in relation to its physical environment and socio-cultural setting, particularly regarding the impact of human activities on the planet.

Climate change is a direct threat to cultural heritage. Global warming, sea level rise, and the increased frequency and intensity of extreme weather events, to mention just some of the pressing climate effects, are damaging and destroying cultural heritage, especially in urban, coastal and inland areas, and mountainous and polar regions. At the same time, cultural heritage is also at risk from maladaptation, where the unintended consequences of climate action can have an adverse impact. There is a need to enhance value-led research, and to accelerate evidence-based policy to address these challenges through international cooperation as well as place-based actions. Furthermore, innovative solutions for mitigation and adaptation

strategies resulting from cultural heritage and climate research can be of use in responding to threats and destruction brought about by the current crises.

Cultural heritage is a source of knowledge and creativity for addressing climate change, geopolitical crises and broader societal challenges. For example, historical practices can be applied in contemporary settings; past and contemporary cultural heritage, including Indigenous and community knowledge, can be used to foster climate action by engaging society; historical data can be used to analyse past (deep and recent) and current climate trends, formulate hypotheses for the future, improve climate models and mitigate climate effects on cultural heritage; and the development of cultural heritage preservation materials and technologies can be transferred to or inspire other industries that require sustainable solutions.

Cultural heritage, as a global public and social good that is closely linked to people's identity, plays a key role in fostering resilient societies. It can serve as a means for community building, engagement and dialogue, for intergenerational understanding, for fostering a new balance between specialists and civil society, and for developing a sense of belonging through creating inclusive shared narratives.

In this context, an integrated and strategic approach is needed in order to address both the risks and opportunities regarding climate change and cultural heritage. Such an approach can also provide solutions to improve societal well-being and resilience and to develop new opportunities for sustainable cultural heritage management. The skills and experience of the heritage sector have important insights to share on the holistic assessment of conservation issues, using multi-disciplinary and cross-sectorial approaches, value-based judgements and minimising interventions. Hence, heritage research can make a key and direct contribution to longstanding global efforts towards addressing climate change, and to provide innovative pathways towards achieving the objectives of the 2015 *Paris Agreement* and attaining climate neutrality by 2050.

The ARCHE SRIA provides a framework for a comprehensive and holistic scope of action, ensuring all aspects of cultural heritage are addressed through a coordinated strategy promoting resilience and sustainability. It also focuses on the use and management of cultural heritage in the face of environmental and sustainability challenges. To achieve this, it embraces an inter- and transdisciplinary approach providing an effective collaborative and participatory framework for heritage and climate professionals (including researchers, practitioners, policy and decision-makers) and citizens. This approach also engages technological and research infrastructures, cultural and creative industries (CCIs), and cultural and education institutions, including galleries, libraries, archives and museums (GLAMs).

1.2. The European and International Context and Collaboration

The SRIA is based on extensive stakeholder consultation and builds on the 2022 joint JPI CH - JPI Climate *White Paper on Cultural Heritage and Climate Change*. It reflects strategic recommendations from key policy documents, including the United Nations *Pact for the Future* (2024) – which builds on the commitments of the *2030 Agenda for Sustainable Development* and its Sustainable Development Goals (SDGs) –, the *Kunming-Montreal Global Biodiversity Framework* (2022), the *Paris Agreement* (2015) and the *Sendai Framework for Disaster Risk Reduction* (2015). Additionally, it is rooted in European frameworks, such as the *Horizon Europe Strategic Plan 2025-2027,* and in European Union cultural policies. It is also aligned with key international conventions, such as the Council of Europe *Landscape Convention* (2016), the *Faro Convention* (Council of Europe, 2005), the *Convention for the Safeguarding of the Intangible Cultural Heritage* (UNESCO, 2003) the *Indigenous and Tribal Peoples Convention* (International Labour Organisation, 1989), the *Convention for the Protection of the Architectural Heritage of Europe* (Council of Europe, 1985) and the *World Heritage Convention* (UNESCO, 1972).

With the aim of positioning cultural heritage research within a globally inclusive framework, the SRIA lays the groundwork for coordinated European actions with an international reach and ensures that research and innovation continue to shape a sustainable and resilient future for cultural heritage.

The SRIA is designed to foster cooperation with European initiatives, including the *New European Bauhaus*, the *Cultural Heritage Cloud* (ECCCH) and the *European Institute of Innovation & Technology's Knowledge and Innovation Community on Culture & Creativity* (EIT C&C). It also promotes engagement with other JPIs, particularly the JPI Climate, and European Partnerships. Moreover, it encourages synergies with European Research Infrastructures, such as the *European Research Infrastructure for Heritage Science* (E-RIHS), the *Digital Research Infrastructure for the Arts and Humanities* (DARIAH) and the *Common Language Resources and Technology Infrastructure* (CLARIN), as well as the *European Open Science Cloud* (EOSC), whose services and access to data play a key role in accelerating the advancement of research and innovation. In addition, the SRIA builds on the outcomes of projects funded under European Union Research and Innovation Framework Programmes with a focus on cultural heritage, social transformation and green transition.

The SRIA strongly encourages collaboration with ministries, funding agencies, and professionals (researchers, practitioners, policy and decision-makers) citizens, industries, including SMEs, and other stakeholders engaged in cultural heritage and

climate change, from within Europe and beyond. It takes into account ongoing collaborative research mechanisms that enable equitable partnerships, as well as the results of ARCHE workshops engaging non-European stakeholders in Australia, Brazil, Canada, China, Egypt, India, Japan, Mexico, New Zealand, Singapore, South Africa, South Korea, Thailand, and the United States. At the European level, it encourages developing collaboration with South-Eastern European countries, to ensure broader inclusivity, given the current higher participation from Central and Western European countries.

1.3. Creating the ARCHE Strategic and Research Innovation Agenda

The process to develop the ARCHE SRIA began in October 2022 with a foresight analysis to determine future needs corresponding to longer-term trends, and their implications for cultural heritage research and innovation. An expert stakeholders' workshop held in April 2023, attended by more than 80 participants from 24 countries worldwide, fed into the ARCHE *Report on future trends on Cultural Heritage R&I*.

A further three stakeholders' virtual workshops were then organised between June and September 2023 to develop a shared Vision and Mission for ARCHE as well as the key recommendations for the ARCHE SRIA. Each workshop used a different methodology: Driver mapping, SWOT Analysis (of the existing JPI CH 2020 SRIA), and Visioning. The resulting *Vision and Mission for the ARCHE Alliance* was made public in April 2024:

- **Vision**
  By 2040, ARCHE will have created new opportunities for Cultural Heritage research collaboration which will have resulted in the strengthened ability to respond to societal challenges and an improved quality of life.

- **Mission**
  ARCHE will co-create multidisciplinary joint research funding actions, knowledge exchange and capacity building activities in order to strengthen the resilience of cultural heritage in Europe during the twin digital and green transition. Through a unique partnership of funding agencies, ministries, researchers, practitioners and citizens, common opportunities and challenges will be addressed, societal resilience will be strengthened and research impact will be scaled up.

In October 2023, ARCHE partners were invited to join four Working Groups tasked with identifying the main SRIA Priority Areas and Themes. They were provided with background materials, including outputs from the four preceding workshops. Additional opportunities to discuss the SRIA's development were created at ARCHE

Stakeholders' workshops in Berlin, Florence and Vienna and at other online and physical workshops (Madrid, Rome, Paris and Ljubljana). At the workshop "Towards the ARCHE SRIA" held in Florence on 25 September 2024, an online public consultation on the draft SRIA themes was launched, receiving 240 responses from 27 countries. The consultation also gathered feedback on the document "D2.5 ARCHE SRIA Key Messages and Preliminary Findings", which was later expanded to collect further inputs from the ARCHE community. Four Reviewer Groups were established to incorporate the consultation responses into the SRIA, drawing on quantitative and qualitative text analyses of the responses to the survey. Further consultations were also conducted with Member States and Associated Countries.

An Editorial Board was convened in November 2024 to incorporate additional feedback and to finalise the SRIA text.

2. Principles, Cross-Cutting Themes and Priorities

The SRIA outlines key policy challenges and research and innovation opportunities through three Cross-Cutting Themes and three Priority Areas, underpinned by a set of Research and Innovation Principles that will guide their implementation.

2.1. The SRIA Research and Innovation Principles

The SRIA aligns with and upholds the principles and practices set out in the *European Code of Conduct for Research Integrity*. The following underlying research and innovation principles strengthen the resilience of cultural heritage and create added value for the whole of society by driving the development of new knowledge (including materials, technologies, methods and processes).

- **Diversity, Equity and Inclusion**

Diversity, equity and inclusion are essential to ensure cultural heritage research serves as a resource for critical thinking, plural narratives (even when dissonant or contested), democratic values and transition to a more just society. Inclusive participatory models (e.g. co-creation and co-development), intergenerational equity, ethnic and geographical diversity and a comprehensive gender lens should be integrated into research practices.

- **Capacity Building and Learning Opportunities**

A new generation of cultural heritage research and innovation actors across Europe and beyond should be supported through capacity building and learning opportunities. In particular, early career researchers should have the opportunity to develop their skills and competencies. Intergenerational and cross-disciplinary collaboration and exchange should be encouraged, including with practitioners to leverage their experience-based knowledge. Life-long learning should also be encouraged so that researchers benefit from career development opportunities and strategies at all stages of their professional life.

- **Digital Pathways**

Digital technologies and tools, including human-centred artificial intelligence, should be integrated within the study, documentation, diagnosis, conservation, and transmission of cultural heritage. Adopting a critical digital studies approach ensures these tools and outputs are accessible, sustainable, ethical and environmentally responsible, in line with green digitisation principles.

- **Minimised Environmental Footprint of Research Activities**

The environmental footprint of cultural heritage research and policy measures should be minimized by promoting energy efficiency and digital sufficiency, reducing mobility-related emissions and compensating residual emissions. Efforts must align with the net zero research principle and the European Union's goal of carbon neutrality by 2050, including a 55% reduction in greenhouse gas (GHG) emissions by 2030.

- **Collaborative Research Across Disciplines and Sectors**

Research and innovation should be inter- and transdisciplinary, cross-sectorial and collaborative, engaging heritage and climate professionals, public organisations, NGOs, and other private associations and institutions. Bottom-up and curiosity-driven research should span disciplinary, conceptual, theoretical, methodological and international boundaries. An integrative approach should explore all forms of cultural heritage and their interfaces with their natural and cultural landscapes.

- **Open Science and Open Innovation**

Open Science and Open Innovation enhance accessibility, transparency and collaboration, accelerating research outcomes and applications. Implementing the FAIR principles ensures data use, reuse, and reproducibility. Cooperation with data-sharing initiatives and infrastructures, such as the European Open Science Cloud (EOSC), the Cultural Heritage Cloud (ECCCH), and E-RIHS DIGILAB should strengthen open access and interoperability.

- **Complementarity and Additionality with Existing Initiatives**

Researchers should collaborate with and use existing networks platforms and infrastructures to ensure resource efficiency, complementarity and avoid duplication of efforts, whilst also considering which new initiatives and developments might be needed to address current gaps, building on existing research.

2.2. Cross-Cutting Themes for Enhancing Cultural Heritage Research Impact

Cultural heritage plays a vital role in contributing to just, transformative and sustainable social change. Three Cross-Cutting Themes — Communication, Education and Public Engagement (CEPE), Science, Technology, Innovation (STI), and Science, Policy and Society Interface (SPSI) — have been identified to enhance the impact of cultural heritage research. Together these themes ensure that research supports evidence-based policies and strategies to safeguard and develop cultural heritage as a resource for building societal resilience and achieving climate

neutrality, addressing current global challenges and contributing to the United Nations *Sustainable Development Goals* (2015) and *Pact for the Future* (2024).

Communication, Education and Public Engagement

Communication, education and public engagement are key to mobilizing broader support and maximizing the impact of cultural heritage research. Therefore, effective communication channels, formal and informal education opportunities and stakeholder engagement strategies must be developed. Lifelong learning, inter- and trans-disciplinary capacity development and cross-cultural and multi-stakeholder dialogues are indispensable for reinforcing and increasing the role of cultural heritage as a resource for societal resilience within the context of climate change and, more broadly, of geopolitical crises.

This theme aims to:

- Develop impact-driven measures to enhance communication and knowledge exchange, whilst fostering the inclusion of different fields of cultural heritage and climate change expertise, and to support ongoing collaboration with diverse actors (e.g., local and Indigenous communities, GLAMs and other cultural heritage institutions) in both research and outreach activities.
- Establish cultural heritage as a strategic resource for education, training and transmission of knowledge and skills to foster dialogue, mutual understanding, identity continuity and change, inclusivity, resilience, and dynamic cultural exchange.
- Promote the development of co-designed and co-created solutions through effective public engagement and place-based initiatives with the aim of strengthening mitigation, adaptation, and recovery efforts whilst also building societal resilience.
- Recognise and foster cultural heritage assets as pathways to sustainability, engaging citizens' hearts and minds.

Science, Technology and Innovation

Science, technology and innovation are key to addressing the effects of climate change on cultural heritage, the impact of cultural heritage research on the climate crisis and its role in building societal resilience. This theme supports the implementation of STI within cultural heritage research, emphasizing equitable participation, sustainable practices and the engagement of diverse disciplines, methods and stakeholders. It encourages the development and application of 'green' practices within the cultural heritage sector. Furthermore, it underlines the value of developing shared research infrastructures and technologies to support cultural heritage research.

This theme aims to:

- Promote the development of new materials, including those based on historical and heritage knowledge, following a Safe and Sustainable by Design (SSbD) approach, technologies, methods and processes, including mobile instruments, remote analysis, non-destructive and non-invasive techniques.
- Design research for equitable and participatory accessibility and discoverability, including focusing on interoperability to enable integration across disciplines and maximize reuse.
- Identify the potential and ethical implications of applying existing, new, and emerging technologies, tools, and methods for climate change mitigation, adaptation, recovery, foresight, and resilience, considering factors such as age, gender, language, socio-economic background, and spiritual orientation.
- Foster collaboration with research infrastructures and other structuring initiatives at the European level.

Science, Policy and Society Interface

To effectively feed into evidence-based policy and practice, research must be designed from the outset to address policy needs and include diverse actors at every stage. This calls for stakeholder engagement initiatives, bringing together scientists, policy makers and society (including rights holders from marginalized and underrepresented groups) to co-produce equitable, effective and sustainable interventions, whilst respecting intellectual property rights.

This theme aims to:

- Enable coordinated, impact-oriented research at the intersection of cultural heritage and climate research, society, and policy, creating productive interactions at local, regional, national, and international levels that value and generate scientifically robust and socially relevant knowledge.
- Promote, monitor and assess the role that cultural heritage plays in supporting value-based climate solutions and accelerating the implementation of net zero policies.
- Enhance trust, dialogue and multi-stakeholder partnerships on cultural heritage and climate action to foster societal resilience and attain sustainable development.

2.3. The SRIA Priority Areas

The ARCHE SRIA has three Priority Areas:

- Cultural Heritage and Environment: Strengthening Resilience through Risk Assessment and Management, Climate Mitigation and Adaptation.
- Cultural Heritage and Society: Enhancing the Resilience of Society.
- Cultural Heritage and Governance: Seizing Opportunities for Sustainable Development.

2.3.1. Cultural Heritage and Environment *Strengthening Resilience through Risk Assessment and Management, Climate Mitigation and Adaptation*

Worldwide, the effects of climate and environmental change are negatively impacting tangible and intangible cultural heritage. The predicted changes in climate parameters, including temperature and precipitation extremes, rising sea levels and increasing severe weather events, mean that cultural heritage is facing new and growing threats. Moreover, various climate impacts interact, leading to compound events and cascading effects.

Considering the vast diversity of cultural heritage and the various risks it faces, coordinated assessment and strategies are urgently needed to understand these threats better and collaboratively develop high-quality, sustainable solutions. However, cultural heritage is not just a casualty of climate change but also a catalyst for action through culture and nature-based responses and solutions.

This Priority Area focuses on safeguarding and sustaining cultural heritage, whilst enhancing its role in adaptation and mitigation. It calls for inter- and transdisciplinary and cross-sectorial research, particularly bringing together cultural heritage and climate research, to promote the development of diverse adaptive solutions that are sensitive to specific territorial, ethnic, economic and social contexts.

Priority Area A addresses the following core themes:

- **A.1. Impact assessment and risk management**

Climate change directly threatens tangible and intangible cultural heritage exposing it to increased risks. In addition to these destructive impacts, measures for climate mitigation (e.g. energy transition) and adaptation (e.g. water management) can also affect cultural heritage – both positively and negatively. It is, therefore, necessary to integrate cultural heritage awareness into climate mitigation and adaptation strategies and risk management plans. This requires a holistic evaluation of risks, to build evidence-based solutions and inform long-term planning. The

development of digital technologies for modelling, simulation and prediction can play a key role in this task.

This theme aims to:

- Explore direct and indirect climate change impacts in different geographical contexts and assess specificities and commonalities.
- Develop common effective risk assessment methodologies and management measures that respond to specific local and regional vulnerabilities and priorities.
- Enhance long-term preventive conservation to counter the environmental impacts of climate change.
- Investigate digital technologies (including AI) for data and metadata collection, modelling, simulation and prediction, and develop simulation-based decision support systems.

A.2. Role of cultural heritage in climate change adaptation and mitigation strategies

Cultural heritage, including Indigenous and community knowledge, offers valuable resources and insights for climate change adaptation and mitigation efforts, including through reinforcing traditional practices, and guiding nature-based solutions. It also deepens our understanding of the diverse societal impacts of climate change, whilst historical and heritage knowledge can inform strategies and actions in response to these challenges.

This theme aims to:

- Leverage cultural heritage (in all its forms, including historical knowledge) to support climate mitigation and adaptation strategies. This also includes the application of circular economic principles—such as sustainable design, resource reuse, and waste reduction—to both natural and built assets, such as historic landscapes, water management systems, and architectural structures.
- Explore ways to integrate cultural heritage perspectives into climate research and policies.
- Evidence the value of cultural heritage for raising awareness about climate change, inspiring climate action, and encouraging environmentally sustainable practices.
- Explore practices, such as curated decay, arising from inevitable change and strategies for raising awareness and building resilience as a basis for future sustainable solutions.

A.3. Innovative and green solutions

Significant unrealised opportunities exist for applying innovative, circular and green solutions in cultural heritage preservation, conservation, use and management. These include reducing the carbon footprint of cultural heritage research and operations, and developing improved and more sustainable conservation methods and materials. Work in this area also includes the development of integrated expertise across geographical areas and sectorial disciplines, such as 'eco-cultural' skills training for practitioners.

This theme aims to:

- Develop sustainable adaptive strategies to respond to the effects of climate change on cultural heritage conservation and management, including green technologies and industries, new eco-friendly materials, advanced diagnostics, as well as evidence-based norms, standards and policies, derived from dedicated research.
- Promote cultural heritage conservation and management as a driver for societal and technological innovation in circular and green practices, including use, re-use and ecological revitalisation of cultural heritage.
- Develop sustainability analysis tools to support evidence-based decision making for environmentally friendly solutions and decarbonising heritage operations.
- Develop integrated expertise in 'eco-cultural' skills within heritage, also through providing skills training for practitioners.

A.4. Rediscovering human-environment interactions

Understanding how people have historically interacted with their environment can provide valuable insights for developing practical solutions to protect cultural heritage and societies from climate change. Eco-cultural approaches, such as biocultural heritage and cultural ecosystem services, that recognise the interconnectedness between human culture and the environment can also meaningfully contribute to meeting net zero targets whilst reconciling these with biodiversity goals and helping communities adapt to new realities. The design and implementation of these adaptive responses should involve local and Indigenous communities in a co-creative approach, respecting their cultural and environmental rights. This theme also addresses ecosystems and animal rights, extending the scope beyond a purely human-centric approach to embrace more-than-human perspectives. Working in this way can help strengthen people's resilience, enabling them to respond to climate change in different contexts, from the built environment to rural landscapes.

This theme aims to:

- Promote the rediscovery and renewal of nature-culture interlinkages through dialogue and engagement with local and Indigenous communities to identify culture and nature-based solutions for climate change mitigation and adaptation.
- Enhance knowledge of human-nature interactions within cultural heritage landscapes to contribute to broader ecosystem resilience and sustainable use.
- Engage heritage sites, conservation organisations, GLAMs, CCIs and other organisations in addressing, as much as possible in an integrated and systematic way, the exposure and vulnerability of cultural heritage within its natural and cultural landscape.

A.5. Climate change through the lens of cultural heritage

Cultural heritage preserves evidence of past climate change, documenting how environments and ecosystems have evolved. It also highlights the challenges of conserving and transmitting heritage in times of rapid change. Considering climate change within cultural heritage practice and discourse, – including new heritage forms it creates, for instance in recovery after a disaster –, can amplify climate action. This exemplifies the capacity of cultural heritage to adapt and reflect the evolving needs and concerns of society.

This theme aims to:

- Advance the understanding of how cultural heritage reflects climate change.
- Recognise climate and climate change as part of cultural heritage by exploring the climate-related dimensions of cultural heritage.
- Explore how the impacts of climate change, along with mitigation and adaptation efforts, can lead to altered and new forms of heritage.
- Support citizen science and civil society initiatives that engage people in cultural heritage conservation and monitoring efforts.

2.3.2. Cultural Heritage and Society *Enhancing the Resilience of Society*

Global mobility, through tourism, migration and displacement, is transforming how cultural heritage is produced, accessed, and valued, with the shifting balance between "locals" and "transients" adding further complexity to the meanings and uses of heritage. At the same time, conflict and other complex crises—many of which are rooted in climate change—are exerting both immediate and long-term pressures on communities and their cultural heritage. Against this backdrop, cultural heritage nevertheless remains a powerful source of individual and community

wellbeing, potentially positively contributing to notions of identity, sense of belonging and social cohesion. However, it can also be used for divisive purposes.

In light of these challenges, coordinated research is urgently needed to understand how these changes are reshaping cultural heritage values and vulnerabilities, and how to harness cultural heritage as a force for resilience. This requires recognising communities as custodians within a complex ecosystem of heritage users, and reinforcing their role in defining and safeguarding their cultural environments.

This Priority Area B focuses on unpacking the dynamics between complex crises, societal change and cultural heritage. It considers the short- and long-term consequences of geopolitical crises, conflicts and climate change on cultural heritage and how these in turn affect communities – with a view to finding ways to mitigate these impacts, particularly in situations of loss. This Priority Area also examines how cultural heritage – including traditional knowledge and practices – can be a resource for community resilience, and explores how cultural heritage contributes to well-being and quality of life, in order to find ways to enhance these contributions. Finally, it considers how cultural heritage contributes to critical thinking and resilience, particularly among young people, to find ways to adapt and build more desirable futures in the face of ongoing global change.

Priority Area B addresses the following core themes:

B.1. Addressing the loss and damage of cultural heritage

Cultural heritage has always suffered damage and loss, from violent destruction to the slow, inevitable decay due to the passing of time. However, the current crises affecting our societies — many of which are rooted in climate change — will have more profound and lasting effects. Managing this inevitable loss is therefore crucial and requires collective input from all relevant stakeholders on how we define, manage and accept loss, determine what to save, address grief and re-imagine heritage care. At the same time, adapting to new climate realities can give rise to new forms of heritage and trigger creative and innovative responses, ultimately enhancing societal resilience.

This theme aims to:

- Investigate innovative approaches for managing unavoidable cultural heritage loss due to climate change.
- Explore the potential of digital tools, such as virtual reality and AI, to document, preserve, and reimagine vulnerable cultural heritage.
- Support communities in building their resilience through preserving the richness and diversity of their cultural landscape and heritage *in situ* and *in vivo,* and in dealing with loss, including creating new heritage values.

- Improve decision-making and management of change particularly for heritage at risk (e.g. digitization, (selective) letting go, adjusting, relocating, replicating), and for the whole heritage sector.
- Engage GLAMs, CCIs and other cultural organisations in addressing the exposure and vulnerability of cultural heritage.

B.2. Cultural heritage, geopolitical crises, conflicts and climate change

Geopolitical crises, climate challenges, large-scale movement and displacement of people, and demographic shifts have been identified as having important and lasting consequences on cultural heritage. In such highly charged contexts, too often cultural heritage is turned into a tool for divisive political purposes. Cultural heritage can also be a positive force: promoting dialogue, trust, relations and ultimately well-being, opening new channels for cultural and science diplomacy, and strengthening democratic processes for peacebuilding. In addition, cultural heritage can help address social inequalities and promote inclusion, particularly for marginalised groups such as refugees and minorities.

This theme aims to:

- Examine the links between cultural heritage, geopolitical crises and climate change.
- Explore how to operationalise the notion of climate justice and heritage reparations.
- Design practical, research-based solutions for restoring and reclaiming damaged and illegally seized cultural heritage.
- Highlight the cultural heritage dimensions within demographic change, large-scale migration and forced displacement of people, and preserve the memory and identity of communities put at risk by these changes.
- Champion cultural heritage as a catalyst for resilience and positive change, particularly in times of crises.

B.3. Traditional knowledge and practices as resources for the resilience of societies

Intangible heritage, such as traditional knowledge, practices and expressions, remains critically under-explored as a resource for societal resilience and is too often absent from policies intended to build resilience in the face of major crises such as climate change. Our societies are witnessing the worldwide disappearance of languages, traditional skills and knowledge, oral traditions — particularly those of local and Indigenous communities — and, with this, the impoverishment of the cultural diversity of the world. Urgent action is needed to halt this loss and transmit to future generations the rich living cultural heritage of these communities.

This theme aims to:

- Explore minority and endangered languages, and support their continuity and role as vehicles for preserving intangible cultural heritage.
- Further the use of traditional knowledge and practices as resources to strengthen societal resilience in the face of present and future challenges.
- Foster the active participation of local and Indigenous communities in the co-creation of resilient strategies, encouraging exchange and collaboration throughout the research process.
- Examine the processes by which local and Indigenous cultural heritage is identified, used and preserved and ways in which its loss can be restored or compensated.

B.4. The role of cultural heritage in fostering well-being and quality of life

The climate crisis—and the extreme events it fuels—threatens people's living environments and cultural heritage, undermining their health and quality of life. Ensuring everyone's right to access and engage with cultural heritage is vital for wellbeing, fostering trust, social cohesion and resilience. However, safeguarding cultural heritage is not enough, it must be actively harnessed to help mitigate and respond positively to these threats. To do so effectively, a clear, systematic understanding of how heritage can be mobilised to enhance wellbeing and quality of life is required.

This theme aims to:

- Deepen understanding of the importance of cultural ecosystem services and find ways to tackle their loss.
- Enhance the role of cultural heritage for mitigating eco-anxiety and in triggering collective action.
- Evidence how heritage contributes to wellbeing, and include cultural heritage in indices and frameworks, in particular those concerning quality of life and wellbeing.
- Create platforms and spaces for complementary technologies and creative industries to address diverse discourses and policies on well-being and quality of life through the lens of cultural heritage.

B.5. Cultural heritage and critical thinking

Cultural heritage is a strategic resource for critical thinking within the context of global changes, addressing the plurality and diversity of discourses and policies, including those regarding difficult, dissonant, or contested cultural heritage. It contributes to education by promoting critical thinking and resilience especially among young people. It provides a space for dialogue and mutual understanding,

for shaping identities, for enabling continuity and change, and for fostering inclusivity, societal resilience and dynamic cultural exchanges. It is also a catalyst for cultural diplomacy. The potentially excluding effects of cultural heritage should be taken into consideration as well.

This theme aims to:

- Raise awareness of the climate crisis and other challenges to cultural heritage, through research dissemination and dialogue with communities, and mobilise communities to build positive futures.
- Facilitate forums for discussing crises, advancing adaptation strategies and informing policymakers and the public about cultural heritage-based actions that support sustainable futures.
- Examine how narratives around cultural heritage can be manipulated to spread misinformation or disinformation.
- Investigate the links between climate activism and cultural heritage, and how this shapes cultural heritage identification, use, and preservation.
- Promote cultural diplomacy in policies, particularly those concerning climate change.

2.3.3. Cultural Heritage and Governance *Seizing Opportunities for Sustainable Development*

Worldwide, shifts in government mandates and the role of expert domains, citizens, and the market, are exposing critical gaps and inadequacies in cultural heritage and climate governance. As a result, the full potential of cultural heritage to contribute to a just and sustainable future risks remaining unrealised. Robust, inclusive and sustainable governance frameworks are needed to channel actions and resources towards research, conservation, preservation, interpretation and valorisation of cultural heritage. These frameworks also require tools and mechanisms to ensure the stable participation of stakeholders, and for monitoring and impact assessment to maintain the relevance of policies. Such measures are essential to unlock the full potential of cultural heritage to mitigate and adapt to the effects of climate change and ensure that communities benefit from the positive results of these activities.

Priority Area C focuses on strengthening cultural heritage governance and management to better harness cultural heritage for a just, resilient, and climate neutral future. It examines how to integrate heritage into broader sustainability and development frameworks, and promote sustainable eco-friendly practices within the heritage sector. This priority theme also explores climate impacts on heritage access and use, and the application of holistic economic models to capture heritage's socio- environmental benefits and advance more sustainable, climate positive

approaches to consumption. Finally, it addresses the intersection of climate justice and heritage rights—analysing how climate threats undermine those rights, to leverage cultural heritage for transformative solutions, and embed intergenerational equity.

Priority Area C addresses the following core themes:

C.1. Cultural heritage and sustainable governance frameworks

Recent key policy documents, such as the United Nations 2024 *Pact for the Future*, address the need to transform global governance to tackle current and foreseeable challenges. However, cultural heritage needs to be better recognised and integrated within such frameworks as an important resource for sustainable governance and development at all decisional levels.

This theme aims to:

- Explore, assess, evaluate and promote the integration of cultural heritage into existing governance and development frameworks at all levels, from local to international.
- Embed cultural heritage research into policy development related to climate change, and prioritise risks and responses according to the magnitude and severity of impacts, to develop appropriate decision frameworks and management strategies.
- Enable further research and policy analyses on the recognition of cultural heritage within sustainability frameworks.
- Foster inter-regional and transnational exchanges to improve coordination of efforts to achieve sustainability of cultural heritage resources.
- Advocate for the recognition and preservation of cultural heritage as a global public and social good and a 'commons' within climate action frameworks.

C.2. Making the governance of the cultural heritage sector sustainable and climate-neutral

The development of adaptive governance, use and management practices (e.g., sustainable use and reuse, resilient infrastructures and green conservation approaches) that take into account the environmental impact of cultural heritage, is crucial for ensuring the sustainability and durability of the cultural heritage sector. At the same time, it is essential to strengthen the commitment of the cultural heritage sector to addressing the climate emergency, by demonstrating the positive contribution of cultural heritage to mitigation and adaptation strategies and solutions. This requires the engagement of all stakeholders to guarantee durability and long-term credibility.

This theme aims to:

- Explore the environmental impacts of cultural heritage management, preventive conservation and maintenance.
- Develop governance and management plans and practices, risk assessment frameworks and standards in the cultural heritage sector, including curated decay and adaptation to attain climate neutrality.
- Evidence the role of cultural heritage as a basis for new solutions in management and policy in other sectors.

C.3. Connection between climate change and cultural heritage use

Climate change impacts the use and democratisation of cultural heritage. To mitigate these impacts, improved inclusive and participatory approaches and frameworks, that enable effective stakeholder engagement, are needed. This requires transdisciplinary, practice-led research and public-private partnership. In particular, inclusive access to cultural heritage must be broadened to encompass physical and digital facilities and information.

This theme aims to:

- Enhance the use of and accessibility to cultural heritage through physical and digital means, furthering visitor experience through new technologies and taking into account the impacts of climate change.
- Engage a wide range of stakeholders in the private and public sectors through effective participatory governance approaches, taking into account their different needs and requirements, to co-develop resilient accessibility schemes for cultural heritage.
- Explore and develop mediation processes to promote physical and digital accessibility and use of cultural heritage.
- Elaborate on the necessity of developing sustainable tourism and limiting the carbon footprint of the cultural heritage sector.

C.4. Economics of cultural heritage for climate action

The climate crisis calls for the application of alternative economic frameworks and approaches that address the shortcomings of traditional models by incorporating social and environmental considerations, shifting away from a purely growth-centric approach fuelling increased consumption. These tools can also find positive application for managing and safeguarding cultural heritage resources, and in turn, can contribute to the general rethinking of resource management to promote climate positivity and alternative approaches to consumption. There is also an urgent need to understand the economic implications of the impacts of climate change and climate action measures on cultural heritage, also in terms of their social and

environmental outcomes. Similarly, it is also of key importance to better understand the economic value of cultural heritage for climate action.

This theme aims to:

- Assess the impact of the cultural heritage sector on the economy and the impact of the economic transformations required by climate action on cultural heritage.
- Provide cost-benefit analysis of the socio-economic and environmental outcomes of heritage-based solutions.
- Explore and promote how cultural heritage can inform the development of alternative approaches to consumption, and the implementation of innovative business models, such as circular economy and circular design, based in particular on long-term patterns of human adaptation to climate change.
- Promote heritage-led innovation and cross-sectoral collaboration to advance sustainable practices for cultural heritage governance and management.

C.5. Relations between climate justice and the right to cultural heritage

Fairness, equality, climate and social justice, and human rights are central to addressing climate change. Cultural heritage as a fundamental right and a global public and social good has a role to play in reducing inequities in climate action — including intergenerational ones —, and in promoting climate and social justice.

This theme aims to:

- Deepen the understanding of the adverse effects of climate change on cultural rights (such as access to cultural heritage) and propose effective integrated solutions, including furthering legal routes to reparations.
- Highlight the transformative potential of rights-based approaches within cultural heritage as vital tools for addressing climate challenges.
- Establish mechanisms to promote intergenerational equity and cultural rights through rights-based approaches to cultural heritage.

Annexes

Annex 1 – Acronyms

AI	Artificial Intelligence
ARCHE	Alliance for Research on Cultural Heritage in Europe
CBD	Convention on Biological Diversity
CCIS	Cultural and Creative Industries and Sectors
CH	Cultural Heritage
DRR	Disaster Risk Reduction
EDI	Equity, Diversity and Inclusion
EU	European Union
GLAMs	Galleries, Libraries, Archives, Museums
HCAI	Human Centred AI
IPCC	Intergovernmental Panel on Climate Change
JPI CH	Joint Programming Initiative on Cultural Heritage and Global Change
RCH	Resilient Cultural Heritage
RDG	Restricted Drafting Group
SDG	Sustainable Development Goal
SRIA	Strategic Research and Innovation Agenda
SSbD	Safe and Sustainable by Design
R&I	Research and Innovation
STI	Science, Technology and Innovation
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization

Annex 2 - Glossary

Adaptation
The process of adjusting to current or expected climate change impacts. In human systems, the aim of adaptation is to reduce risks, increase resilience or seize on beneficial opportunities. In natural systems, human intervention may facilitate adjustments to expected climate change impacts (OFFICE FOR CLIMATE EDUCATION).

Adaptive release
A proposed term for the active decision of accommodating and interpreting "the dynamic transformation of a heritage asset and its associated values and significance".[1]

Bio-cultural heritage
"Refers to the knowledge and practices of Indigenous people and their biological resources, from the genetic varieties of crops they develop, to the landscapes they create."[2]

Build back better (BBB)
The use of the recovery, rehabilitation and reconstruction phases after a disaster to increase the resilience of nations and communities through integrating disaster risk reduction measures into the restoration of physical infrastructure and societal systems, and into the revitalisation of livelihoods, economies and the environment.

> **Annotation:** The term "societal" will not be interpreted as a political system of any country (UNITED NATIONS OFFICE FOR DISASTER RISK REDUCTION [2]).

Capacity
The combination of all the strengths, attributes and resources available within an organisation, community or society to manage and reduce disaster risks and strengthen resilience.

> **Annotation:** Capacity may include infrastructure, institutions, human knowledge and skills, and collective attributes such as social relationships, leadership and management.[3]

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[1] For further details, see: DESILVEY, C., FREDHEIM, H., FLUCK, H., HAILS, R., HARRISON, R., SAMUEL, I. and BLUNDELL A. (2021).
[2] INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT (n.d.).
[3] UNITED NATIONS OFFICE FOR DISASTER RISK REDUCTION [2], (n.d.).

Circular economy
A model of production and consumption,[4] which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible. In this way, the life cycle of products is extended and waste is minimised.[5]

Climate
An average pattern of weather conditions – such as temperature, precipitation, humidity, wind, air pressure – for a particular region over a long period of time (months, years, decades, centuries or more) (OFFICE FOR CLIMATE EDUCATION).

Climate change
Climate change refers to several global phenomena, for example: changes in temperature, precipitation, extreme events, sea level rise and ocean acidification. The term is most used to describe the current human-induced climate change that started around 1850 due to an increase in the global average temperature. The term "global warming" is also used (OFFICE FOR CLIMATE EDUCATION).

Climate justice
This term is used to acknowledge the social and political dimensions of the challenges associated with climate change, rather than considering only their environmental dimension. It relates the differences observed between those more responsible for climate change and those more affected by its consequences, to the notion of justice (in particular, social and environmental justice) (OFFICE FOR CLIMATE EDUCATION).

Climate neutrality
The term refers to the idea of achieving net zero greenhouse gas emissions by balancing those emissions, so they are equal to, or less than, the emissions removed, as well as accounting for regional or local biogeophysical effects of human activities, such as changes in surface albedo or local climate. In basic terms, it means we reduce our emissions through climate action to ensure no net effect on the climate system.[6]

Commons
Traditionally, in Europe, since medieval times, the term "commons" refers to the land that a community shares in common and the way in which it manages it. Recently, the term has come to be used for a broader set of domains, such as knowledge

[4] For further details, see EUROPEAN PARLIAMENT (2016).
[5] EUROPEAN PARLIAMENT (2023).
[6] For further details, see UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (2021).

commons, digital commons, urban commons, health commons, cultural commons, etc.[7]

Conservation (of cultural heritage)
The conservation of cultural heritage refers to the measures taken to extend the life of cultural heritage whilst strengthening the transmission of its values and significance. In the domain of cultural property, the aim of conservation is to maintain the physical and cultural characteristics of the object to ensure that its value is not diminished and that it will outlive our limited time span.[8]

Coping capacity
The ability of people, organisations and systems, using available skills and resources, to manage adverse conditions, risk or disasters. The capacity to cope requires continuing awareness, resources and good management, both in normal times as well as during disasters or adverse conditions. Coping capacities contribute to the reduction of disaster risks.[9]

Cultural ecosystem services
The nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences.[10]

Cultural Heritage
Cultural heritage consists of the resources inherited from the past in all forms and aspects - tangible, intangible and digital (born digital and digitised), including monuments, sites, landscapes, skills, practices, knowledge and expressions of human creativity, as well as collections conserved and managed by public and private bodies such as museums, libraries and archives. It originates from the interaction between people and places through time and it is constantly evolving. These resources are of great value to society from a cultural, environmental, social and economic point of view and thus their sustainable management constitutes a strategic choice for the 21st century.[11]

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[7] International Association for the Study of Commons (n.d.).
[8] ICCROM (2007), UNESCO (1988), UNESCO Institute for Statistics (2009).
[9] United Nations Office for Disaster Risk Reduction [2].
[10] Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services [2] (n.d.).
[11] Definition of cultural heritage mentioned in Council of the European Union (2014) and recalled in European Commission, Directorate-General for Education, Youth, Sport and Culture (2019).

Sub-terms:

- **Tangible (movable and immovable)**

It refers to physical artefacts produced, maintained and transmitted intergenerationally in a society. It includes artistic creations, built heritage such as buildings and monuments, cultural landscapes and other physical or tangible products of human creativity that are invested with cultural significance in a society.[12]

- **Intangible cultural heritage**

The practices, expressions, knowledge and skills that communities, groups and sometimes individuals recognise as part of their cultural heritage. Also called living cultural heritage, it is usually expressed in one of the following forms: oral traditions; performing arts; social practices, rituals and festive events; knowledge and practices concerning nature and the universe; and traditional craftsmanship.[13]

- **Digital heritage**

Digital heritage consists of unique resources of human knowledge and expression. It embraces cultural, educational, scientific and administrative resources, as well as technical, legal, medical and other kinds of information created digitally, or converted into digital form from existing analogue resources. Where resources are "born digital", there is no other format but the digital object.[14]

Disaster risk

The potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity.

> **Annotation:** The definition of disaster risk reflects the concept of hazardous events and disasters as the outcome of continuously present conditions of risk. Disaster risk comprises different types of potential losses which are often difficult to quantify. Nevertheless, with knowledge of the prevailing hazards and the patterns of population and socioeconomic development, disaster risks can be assessed and mapped, in broad terms at least. It is important to consider the social and economic contexts in which disaster risks occur and that people do not necessarily share the same perceptions of risk and their underlying risk factors.[15]

[12] RICHES RESOURCES (2014).
[13] UNESCO (1972).
[14] UNESCO (2009).
[15] FREEMAN (1984).

Disaster risk reduction (DRR)

The prevention and reduction of new and existing disaster risks and the management of residual risk, all of which contribute to strengthening resilience and the achievement of sustainable development.

> **Annotation:** Disaster risk reduction is the policy objective of disaster risk management, and its goals and objectives are defined in disaster risk reduction strategies and plans. Disaster risk reduction strategies and policies define goals and objectives across different timescales and with concrete targets, indicators and time frames. In line with the Sendai Framework for Disaster Risk Reduction 2015-2030, these should be aimed at preventing the creation of disaster risk, the reduction of existing risk and the strengthening of economic, social, health and environmental resilience. A global, agreed policy of disaster risk reduction is set out in the United Nations endorsed Sendai Framework for Disaster Risk Reduction 2015-2030, adopted in March 2015, whose expected outcome over the next 15 years is: "The substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries" (UNITED NATIONS OFFICE FOR DISASTER RISK REDUCTION [2]).

Extreme weather events

Unusual weather events that can have a high negative impact on humans and nature, for example tornadoes, storm surges, landslides, droughts and heatwaves (OCE, Office for Climate Education).

FAIR

1. Findable: Date should be easy to find.
2. Accessible: Users should know how to access the data, including authentification and authorization.
3. Interoperable: Data should be integrated with other data.
4. Reusable: The ultimate goal is to optimize data reuse.

Gender lens

Gender lens takes the existing differences between women and men into account when analysing a situation or when developing specific approaches or programmes.[16]

[16] UNITED NATIONS ECONOMIC AND SOCIAL COMMISSION FOR WESTERN ASIA (n.d.).

Global environmental change
This term refers to the alterations in our planet caused by human activities and population growth, such as climate change, marine pollution, ozone layer depletion, soil degradation, and urbanisation. These changes pose threats to human health, including impacts on food and water quality, air pollution, disease transmission, and extreme weather events.[17]

Global public goods
They are those that are available to all ("non-excludable") and that can be enjoyed over and over again by anyone without diminishing the benefits they deliver to others ("non-rival"). The scope of public goods can be local, national, or global.[18]

Greenhouse gases (GHG)
Greenhouse gases cause the greenhouse effect. They include water vapour, carbon dioxide, methane, nitrous oxide and ozone (OCE, Office for Climate Education).

Hazard
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 (UNITED NATIONS OFFICE FOR DISASTER RISK REDUCTION [2]).

Heritage
The term 'Heritage' encompasses both natural and cultural heritage, according to the World Heritage Convention; UNESCO, 1972.[19]

Heritage science
Drawing on diverse humanities, sciences and engineering disciplines, heritage science is an umbrella term encompassing all forms of scientific inquiry into human works and the combined works of nature and humans that are of value to people. Heritage science focuses on enhancing the understanding, care, sustainable use and management of tangible and intangible heritage to enrich people's lives today and in the future.[20]

[17] AI generated definition based on TONG, S. and EBI, K. (2019).
[18] INTERNATIONAL MONETARY FUND (2021).
[19] For further details, see UNESCO (1972).
[20] ICCROM (n.d.).

Landscape
Landscape means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors.[21] **Cultural Landscapes** are combined works of nature and human kind, they express a long and intimate relationship between peoples and their natural environment.[22]

Mitigation
Human intervention to reduce global warming by reducing greenhouse gases (GHG) emissions or by enhancing GHG sinks.[23]

Open Innovation
Open Innovation is based on the fundamental idea that useful knowledge is now widespread throughout society. No one organisation has a monopoly on great ideas, and every organisation, no matter how effective internally, needs to engage deeply and extensively with external knowledge networks and communities. An organisation that practices open innovation will utilise external ideas and technologies as a common practice in their own business and will allow unused internal ideas and technologies to go to the outside for others to use in their respective businesses.[24]

Open Science
Open science is an approach to research based on open cooperative work that emphasises the sharing of knowledge, results and tools as early and widely as possible. It is mandatory under Horizon Europe, and it operates on the principle of being 'as open as possible, as closed as necessary'.[25]

Place-based approach
A collaborative, long-term approach to build thriving communities delivered in a defined geographic location. This approach is ideally characterised by partnering and shared design, shared stewardship, and shared accountability for outcomes and impacts.[26]

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[21] Council of Europe (2016).
[22] UNESCO World Heritage Convention (n.d.).
[23] European Environment Agency (2024).
[24] European Commission (2025).
[25] European Commission, European Executive Research Agency (n.d.),
[26] Analysis and Policy Observatory (2019).

Preventive conservation

All measures and actions aimed at avoiding and minimising future deterioration or loss. They are carried out within the context or on the surroundings of an item, but more often a group of items, whatever their age and condition. These measures and actions are indirect – they do not interfere with the materials and structures of the items. They do not modify their appearance. Examples of preventive conservation are appropriate measures and actions for registration, storage, handling, packing and transportation, security, environmental management (light, humidity, pollution and pest control), emergency planning, education of staff, public awareness, legal compliance.[27]

Resilience

The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management (UNITED NATIONS OFFICE FOR DISASTER RISK REDUCTION [2]).

Stakeholder

Any group or individual who can affect or is affected by the achievement of the organisation's objective.[28]

Safe and Sustainable by Design (SSbD)

The safe and sustainable by design framework is a voluntary approach to guide the innovation process for chemicals and materials. It aims to:

- steer the innovation process towards the green and sustainable industrial transition
- substitute or minimise the production and use of substances of concern, in line with, and beyond existing and upcoming regulatory obligations
- minimise the impact on health, climate and the environment during sourcing, production, use and end-of-life of chemicals, materials and products

The framework is composed of a (re-)design phase and an assessment phase that are applied iteratively as data becomes available.

The (re-)design phase consists of the application of guiding principles to steer the development process. The goal, the scope and the system boundaries – which will frame the assessment of the chemical or material – are defined in this phase.

[27] INTERNATIONAL COUNCIL OF MUSEUMS, COMMITTEE FOR CONSERVATION (2008).
[28] FREEMAN (1984).

The assessment phase comprises of 4 steps: hazard, workers exposure during production, exposure during use and life-cycle assessment. The assessment can be carried out either on newly developed chemicals and/or materials, or on existing chemicals and/or materials to improve their safety and sustainability performance during production, use and/or end-of-life.

Sustainable development
Development that meets the needs of the present generations without compromising the ability of future generations to meet their own needs.[29]

Sustainable management
It is defined as the application of sustainable practices in commerce, agriculture, environment, production, and other fields by management in a manner that is beneficial to present and future generations.[30]

Vulnerability
Sensitivity of a population when exposed to climate change hazards and their consequences. Example: a low-lying region with coastal protection infrastructures and resources is less vulnerable to sea level rise than a low-lying region with no coastal protection infrastructures and few economical resources (OFFICE FOR CLIMATE EDUCATION). The conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards (UNITED NATIONS OFFICE FOR DISASTER RISK REDUCTION [2]).

> **Annotation:** For positive factors which increase the ability of people to cope with hazards, see also the definitions of "Capacity" and "Coping Capacity" in UNITED NATIONS OFFICE FOR DISASTER RISK REDUCTION [2].

[29] UNITED NATIONS (1987).
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