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## Cycles of change: enhancing collaboration and communication in Norwegian municipalities to strengthen heritage preparedness for extreme events

### Abstract

This article considers the development of a framework to collaboratively identify and address the most pressing needs for application of climate change research to the preservation of cultural heritage in Norway. Its focus is on historic wooden buildings, at increased risk from fire and flood due to climate change. Drawing from the field of translational research, the MICHON project identified the need for targeted, systematic knowledge networks in preparedness planning for cultural heritage environments. This was developed through a combination of desk-based research and extensive collaboration with Norwegian municipalities, fire brigades and local communities. The process has included evaluation of policy and practice in diverse case sites to frame a networking methodology that builds on Lean Construction and the backwards planning method. The interaction between researcher and practitioner has been at the forefront of the project and the iterative design has already shown transformative impacts to both practice and research.

### Keywords

disaster preparedness; cultural heritage; preventive work; interdisciplinary planning; network; backwards planning

### Introduction

Climate change impacts and extreme weather events are among the most significant and fastest growing threats to cultural heritage globally, as acknowledged and emphasised by the international cultural heritage community.<sup>1</sup> Numerous scientific publications underline the need for interdisciplinary research to mitigate risks in terms of both increasing the understanding of the impacts of climate change on cultural heritage and also effective decision making.<sup>2</sup> Despite the explicit needs conveyed in the literature, existing national and local disaster preparedness and response mechanisms do not usually include heritage expertise in their operations.<sup>3</sup>

A significant challenge in the work towards strengthening society, and heritage specifically, against climate-related hazards is the gap between research and practice. The European Commission states the importance of translating the results of academic research on climate change impact into guidelines for stakeholders, including urban planners, conservation practitioners, cultural heritage owners and managers.<sup>4</sup> The extent to which the results of academic research influence local or regional management of cultural heritage, however, is seldom known. Elena Sesana et al.<sup>5</sup> point out that knowledge is available at both international and national levels, but the flow of such information down to the local management scale is interrupted. To bridge this gap they suggest that further development and dissemination of research, knowledge, guidelines, and adaptive and mitigation measures, is needed. As well as requiring interdisciplinary

1 Cf. for example, ICOMOS, *Resolution 19GA 2017/30—Mobilizing ICOMOS and the Cultural Heritage Community to Help Meet the Challenge of Climate Change* (2017), 18–20, [www.icomos.org/images/DOCUMENTS/General\\_Assemblies/19th\\_Delhi\\_2017/19th\\_GA\\_Outcomes/GA2017\\_Resolutions\\_EN\\_20180206finalcirc.pdf](http://www.icomos.org/images/DOCUMENTS/General_Assemblies/19th_Delhi_2017/19th_GA_Outcomes/GA2017_Resolutions_EN_20180206finalcirc.pdf) (accessed 2 September 2023).

2 Sandra Fatoric and Erin Seekamp, 'Are Cultural Heritage and Resources Threatened by Climate Change? A Systematic Literature Review', *Climatic Change* 142, 1, no. 17 (2017): 227–54.

3 Cf. UNESCO, 'Reducing Disaster Risk at World Heritage Properties' (2021), <https://whc.unesco.org/en/disaster-risk-reduction/#need> (accessed 2 September 2023).

4 Cf. Alessandra Bonazza et al., *Safeguarding Cultural Heritage from Natural and Man-Made Disasters. A Comparative Analysis of Risk Management in the EU* (Brussels: European Commission, 2018), 32.

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5 Elena Sesana et al., 'Adapting Cultural Heritage to Climate Change Risks: Perspectives of Cultural Heritage Experts in Europe', *Geosciences* 8, no. 8 (2018): 305, <https://doi.org/10.3390/geosciences8080305> (accessed 2 September 2023).

6 See, for example, ICCROM, 'First Aid and Resilience for Cultural Heritage in Times of Crisis (FAR), ICCROM Programme' (2023), <https://www.iccrom.org/what-we-do/programmes/first-aid-and-resilience-cultural-heritage-times-crisis-far/our-approach>; ICCROM, 'Climate, Culture, Peace' (2022), <https://custom-eur.cvent.com/CABD8F5ECAB94065919D73EE0472667D/files/be8251dd112f4b82b3de08763d9a16c8.pdf> (both accessed 2 September 2023).

work and knowledge beyond conservation, these complex matters of protecting heritage from extreme events require engagement from all levels of management.

Whilst initiatives to promote cross-sectoral collaboration do exist,<sup>6</sup> a cluster of related gaps remains between the proposed international information and its implementation in Norwegian municipalities. Understanding the causes of these gaps, and determining the most impactful ways of addressing them, involves considering the organisational and political contexts as much as the expected climate changes. Describing these necessary efforts for Norwegian conservation is potentially beneficial for other countries.

### Aims of the article

This article will demonstrate how networking and knowledge mobilisation are both significant and urgent needs for Norwegian Disaster Preparedness before then considering how knowledge can be applied to specific contexts that vary according to the degree of risk, resources and organisational capacity.

In so doing, the article presents the background for the project and the challenges of including built heritage in disaster preparedness work. By considering the challenges defined through the project, the authors discuss how their proposed framework can help build the networks necessary to implement knowledge on climate change and consequent disaster risks. The article sets out an example of how such a framework can work as a planning tool for increasing heritage resilience in a changing climate, and how planning and delivering exercises have provided new pathways for introducing interdisciplinary work and bridging research and practice.

### MICHON project

The MICHON project (Mitigation Measures for Cultural Heritage from Natural and Anthropogenic Extreme Hazards) was developed by The Norwegian Institute for Cultural Heritage Research (NIKU) to help built heritage become an integrated part of disaster preparedness work at the municipal level in Norway. NIKU sought to bridge the gaps between the needs of society regarding extreme events, managing cultural heritage in a changing climate, and the resources, knowledge and systems for handling it at the municipal level. The project was funded for 3 years as a part of NIKU's prioritised strategic research programmes for 2021–2023 (Research Council of Norway). As a research project, MICHON focussed on how and why research did or didn't reach practitioners, and how to develop a credible, lasting pathway for this. This article outlines some of the core elements.

### Background: the Norwegian challenges

In developing the project, specific contextual factors informed the project design.

According to the Intergovernmental Panel on Climate Change (IPCC), extreme weather and climate events such as heat waves, flooding, droughts and forest fires will occur more often and become stronger than before.<sup>7</sup> Research indicates that extreme weather events might become more frequent and/or intense with human-induced climate change.<sup>8</sup> For Norway, some of the main climate change challenges are linked to increased temperatures and more precipitation, resulting in more frequent and more powerful and extreme flooding events caused by rainfall, but also increased possibilities of drought events and forest fires. Inger Hanssen-Bauer et al. suggest that more frequent and stronger

7 IPCC, *Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Geneva: IPCC, Geneva, 2023): 1–34, <https://www.ipcc.ch/report/ar6/syr/>

intense rainfall events may pose special challenges, especially in small and steep rivers, causing urban flooding events.<sup>9</sup> As for more recently built environments, built cultural heritage environments too will be largely affected by climate change impacts (Fig. 1).<sup>10</sup>

Norway has over 350 municipalities, stretching over different geographical regions and with large variations between populations (~200 to >700,000 inhabitants). The municipal administrations vary accordingly, with the smallest municipalities having one worker responsible for culture, libraries and heritage, including the preservation of built heritage. In contrast, in a large municipality there will typically be a department for heritage with a conservation officer and some will even have staff with doctorates working on climate change and adaptation. The public administration system is also sector-based, and this can be problematic when dealing with complex matters like climate change, cultural heritage and disaster preparedness work. Existing climate-change-related networks are directed at the largest municipalities that are already more robust and have more knowledge on how to plan for the impacts of climate change on cultural heritage environments. However, the majority of Norwegian municipalities are medium to small.<sup>11</sup> Such networks mainly deal with climate adaptation of the built environment, and disaster preparedness towards extreme events to which they might be subjected, whereas preparedness related to cultural heritage rarely seems to be a topic.

Until the Norwegian Government White Paper in 2023,<sup>12</sup> there had been no mention of cultural heritage in policy documents regarding climate-related disaster risks and preparedness. The 2023 White Paper concluded that:

‘central to the government’s work to help prevent and reduce the loss of and damage to the cultural environment due to climate change, is ensuring coordinated spatial planning, and ensuring that cultural environment is included as an integral part of climate adaptation and preparedness work.’<sup>13</sup>

Whilst this is a welcomed addition for the heritage sector, much is required to see this enacted. In their *Climate Strategy for Cultural Heritage Manage-*



**Fig. 1** During the extreme weather called ‘Hans’, the eastern part of Norway was flooded, and several heritage buildings were affected. Here from Drammen, August 2023. Photo: Jani Causevic, NIKU, 2023.

[downloads/report/IPCC\\_AR6\\_SYR\\_SPM.pdf](#) (accessed 5 September 2023).

**8** Rongbin Xu et al., ‘Wildfires, Global Climate Change, and Human Health’, *The New England Journal of Medicine* 383 (2020): 2173–3181, <https://www.nejm.org/doi/full/10.1056/NEJMsr2028985> (accessed 5 September 2023).

**9** Inger Hanssen-Bauer et al., *Climate in Norway 2100—A Knowledge Base for Climate Adaptation*, The Norwegian Environment Agency, report no. 1/2017. ISSN 2387-3027.

**10** Sesana et al., ‘Adapting Cultural Heritage to Climate Change Risks’.

**11** Cecilie Flyen et al., ‘Municipal Collaborative Planning Boosting Climate Resilience in the Built Environment’, *International Journal of Disaster Resilience in the Built Environment* 9, no. 1 (2018), <https://doi.org/10.1108/IJDRBE-10-2016-0042> (accessed 5 September 2023).

**12** *Changing Climate—Together for a Climate-resilient Society*, White Paper to the Storting (Norwegian Parliament) from the Ministry of Climate and Environment, 2023 (in Norwegian), <https://www.regjeringen.no/content/assets/1008d2a2e92c4384890817fae9fca1d4/no/pdfs/stm202220230026000dddpdfs.pdf> (accessed 2 September 2023).

**13** *Changing Climate—Together for a Climate-Resilient Society*, authors translation.

14 The Directorate for Cultural Heritage, *Climate Strategy: The Climate Strategy for Cultural Heritage Environment Management* (The Norwegian Directorate for Cultural Heritage, 2021), [http://www.riksantikvaren.no/wp-content/uploads/2021/08/RA\\_Klima\\_strategi\\_2021.15.08-oppslag\\_150dpi.pdf](http://www.riksantikvaren.no/wp-content/uploads/2021/08/RA_Klima_strategi_2021.15.08-oppslag_150dpi.pdf) (accessed 20 May 2023).

15 Nancy Bell, personal communication with Joel Taylor (2020).

16 Cf. for example, Clemens Blümel et al., *In Search of Translational Research: Report on the Development and Current Understanding of a New Terminology in Medical Research and Practice* (Berlin: Berlin Institute of Health, 2015), [https://www.bihealth.org/fileadmin/publikationen/dateien/iFQ-BIH-Report\\_2015\\_web.pdf](https://www.bihealth.org/fileadmin/publikationen/dateien/iFQ-BIH-Report_2015_web.pdf) (accessed 5 September 2023).

17 Jonathan Breckon and Jane Dodson, *Using Evidence: What Works? A Discussion Paper* (London: NESTA, 2016), <https://www.bl.uk/britishlibrary/~media/bl/global/social-welfare/pdfs/non-secure/u/s/i/using-evidence-what-works.pdf> (accessed 5 September 2023).

18 Cf. for example, Kathy Eljiz et al., 'Improving Knowledge Translation for Increased Engagement and Impact in Healthcare', *BMJ Open Quality* 9, (2020), <https://pubmed.ncbi.nlm.nih.gov/32943430/> (accessed 15 June 2023).

19 See, for example, Wilfred Carr and Stephen Kemmis, *Becoming Critical: Education, Knowledge and Action Research* (London: Routledge, 1986); Richard Sagor and Charlene Williams, *The Action Research Guidebook: A Process for Pursuing Equity and Excellence in Education*, 3rd edn (Thousand Oaks, CA: Sage, 2016).

20 Cf. Bruno De Oliveira, 'Participatory Action Research as a Research Approach: Advantages, Limitations and Criticisms', *Qualitative Research Journal* 23, no. 3 (2023): 287–97, <https://doi.org/10.1108/QRJ-08-2022-0101> (accessed 3 June 2023).

ment, the Norwegian Directorate for Cultural Heritage states that climate change is a huge challenge for heritage environments in Norway, requiring both mitigation and adaptation measures, in addition to disaster preparedness plans.<sup>14</sup> The importance of increased cooperation between heritage management and disaster preparedness units is also stated.

In this way, the MICHON methodology had to enable ways of understanding disaster preparedness for built heritage whilst avoiding assumptions about the nature of public administration in the various municipalities it is meant to serve.

### MICHON's methodological approach

A theoretical framework behind MICHON was translational research, a field that focusses on the meaningful application of research into results in practice. Originating in the medical sciences, it has only recently been applied to conservation.<sup>15</sup>

Translational research acknowledges the many gaps and boundaries between the laboratory and practice. A particular distinction is between innovation gaps, relating to the maturity of a scientific development, and implementation gaps, which are connected to actual application of research.<sup>16</sup> Due to the range of sources and fields that contribute to understanding climate-related impacts on cultural heritage—not always created for conservation—understanding the interventions that would most likely impact practice leads to a focus on implementation gaps. By considering the needs of varied practitioners as a starting point, an overview of the conditions necessary for the burgeoning research connected to climate change to reach policy and practice was sought. 'In other words, what sort of evidence is useful for the frontline—not for the researcher.'<sup>17</sup> As such, this involves better understanding the areas of need for the specific context.

A guiding principle in knowledge translation is the importance of 'involving knowledge users in the research process'.<sup>18</sup> Because of the challenges of knowledge management being addressed, the project embodied a hands-on approach and sought collaboration from outside academia at all stages. Consequently, a Participative Action Research (PAR) methodology was applied to engender co-design with communities of practitioners, residents and disciplinary experts through planned, iterative engagement and dialogue, linked together through critical reflection (Fig. 2).<sup>19</sup>

This balance of power and lack of pre-determined direction meant that time was dedicated to listening and redefining steps through co-design. Whilst such an explicitly participatory approach can limit the academic output of a research project,<sup>20</sup> there were several reasons to accept this. The urgent problem was not the amount of academic information available but the extent to which it reached decision makers. Secondly, the project here will also include explicit studies of the translation of existing research into practice and the interaction provided essential insight to those parallel studies, in turn providing more robust methods for listening and engaging with practitioners. The main goal of this research was to support practice rather than add to the literature whose impact on this context was not fully understood.

The democratising impact of PAR can generate knowledge that is meaningful and relevant to those who are affected but can also draw limits on the validity of research, given the focus on experiential knowledge.<sup>21</sup> The intention of applying a democratic methodology, however, was to build capacity beyond the project timeframe.

The methodological approach was set in motion by choosing collaborative municipalities. Three municipalities collaborated in the project which



Fig. 2 The Action Research cycle, adapted from Sagor and Williams, *The Action Research Guidebook*.

ultimately led to four case-study sites that represented different geographical areas, different sizes of municipalities and different rapid-onset hazards exacerbated by climate change, namely fire and flood. The four case-study sites included the Krambu-quarter and the iconic piers along the Nidelva waterways in Trondheim; Drangsholtmyra and Knarestad—situated along the Topdal river in the Kristiansand region (both large municipalities with more than 20,000 inhabitants); and an area of densely packed wooden buildings in the city centre of Lillesand (a medium-sized municipality of between 5000 and 20,000 inhabitants). The project was presented to the collaborating practitioners, and the municipalities identified their challenges and needs for the chosen sites. Flood and fire were selected as the two hazards for particular focus, based on existing climate change predictions and the risks associated with the cultural heritage in the selected areas.

The key methods undertaken for the work were a series of practical workshops and tabletop exercises in collaboration with the participating Norwegian municipalities (Fig. 3), which are elaborated on later in this article. With fire departments and local communities, MICHON co-developed interactive events between the practitioners in different disciplines and sectors. The application of these methods is the focus of this article.

To contribute to this cycle of engagement, the methods used comprised of making field notes from the workshops, semi-structured interviews with municipal workers, and workshops with municipality staff and resident owners (Fig. 3). Interviews included staff from the collaborating municipalities but also other practitioners to ensure representation was not limited to personnel involved in the case studies alone.

Desk-based research, drawing from fields outside conservation, addressed ways of supporting knowledge mobilisation and also pragmatic mitigation strategies, which included traditional, historic methods of mitigating fire and flood. The desk-based work on knowledge translation provided ways of progressing discussion, and also gave a rigour and structure to the interactive aspects of the project.

### Challenges of the research methodology

Whilst such an explicitly participatory approach can limit the academic output of a research project, a notable challenge was not the amount of academic information available but rather to what extent what was available reached decision makers. Further, the interactions the authors engaged in with the decision makers provided essential insight and relevance to other aspects of the MICHON research, including developing more formal studies of translational issues.

Supporting practice is wide-ranging, with many groups involved in different methods. Decisions about the most effective ways to disseminate information (without limiting existing channels) had to be determined, as well as navigating the specific challenges of engaging with groups whose primary function, or indeed interest, is not necessarily heritage. Whilst this sharing of power reduces the agency of the researcher and can, in principle, compromise scientific priorities,<sup>22</sup> a key aim was to ensure participation and independence, not least because the project had a specific endpoint.

22 De Oliveira, 'Participatory Action Research as a Research Approach'.

### Planning and theory: mapping the needs for including built heritage in Norway's disaster preparations

In Norway, the issues of disaster preparedness and mitigating heritage loss lay within the responsibility of three separate ministries: the Ministry of Justice and Public Security, the Ministry of Climate and Environment, and the Ministry of Culture and Equality, and thereby three underlying directorates.

Furthermore, a recent change in governance—the so-called the Regional Reform—meant that numerous responsibilities shifted from the three directorates to regional and municipal levels.<sup>23</sup> However, the large amount of information about the risks and hazards for cultural heritage and guidance material for climate adaptation in Norway is often overwhelming for caseworkers in municipal administrations to navigate.<sup>24</sup> The Office of the Auditor General of Norway states in their investigation of 2022 that the Norwegian authorities do not have a sufficient overview of climate risks to secure existing buildings and infrastructure,<sup>25</sup> and several reports and assessments underpin the challenges of municipal work for adapting to a changing climate.<sup>26</sup> International climate researchers have commented on Norway's slow adaptation when it comes to extreme weather events such as flooding,<sup>27</sup> and this was evidenced during the flooding of Eastern Norway in August 2023.

To get an overview of risks and framing the issues of mitigating heritage values, municipalities are encouraged to apply Risk and Vulnerability Analysis (RVA) that enables one to make preparedness plans, at the municipal or county level. The work includes prioritising measures to prevent risks from becoming disasters, followed by an action plan.

Legislative amendments to the Norwegian Planning and Building Act in 2010 meant that local authorities were mandated with the task of conducting RVAs related to climate change and including the results and action plan in their municipal planning.<sup>28</sup> National authorities then initiated two climate-related networks to strengthen the municipalities' climate competence, although these networks only included a few Norwegian municipalities (representing 10–15 of a then-total of 430 municipalities). Beyond

23 *Assignments for the New Regions*, White Paper to the Storting (Norwegian Parliament) from the Ministry of Local Government and Regional Development, 2019 (in Norwegian), <https://www.regjeringen.no/no/dokumenter/meld.-st.-6-20182019/id2616180/?ch=1> (accessed 2 September 2023).

24 See Åshild Lappegaard Hauge, Gro Sandkjær Hanssen, and Cecilie Flyen, 'Multilevel Networks for Climate Change Adaptation—What Works?', *International Journal of Climate Change Strategies and Management* 11, no. 2 (2018): 215–34, <https://doi.org/10.1108/IJCCSM-10-2017-0194> (accessed 5 September 2023).

25 Office of the Auditor General of Norway, *Riksrevisjonens undersøkelse av myndighetenes arbeid med å tilpasse infrastruktur og bebyggelse til et klima i endring (Survey of Norwegian Authorities' Work with Adaptation of Infrastructure and Built Environment to a Changing Climate)*, Document 3:6, 2021–2022 (Oslo, 2022) (in Norwegian), <https://www.riksrevisjonen.no/global>



**Fig. 3** During the desktop exercise in Kristiansand. Photo: Torleif Jacobsen, Kristiansand Municipality, 2023.

this, there were no funds or other specifically directed measures to raise any climate-change-related competencies of the municipalities.<sup>29</sup> Cultural heritage was not highlighted in these networks.

Another government White Paper stresses the needs for RVAs for cultural environment regarding a climate in change, but implementation of measures depends on the separate actions of the counties and municipalities.<sup>30</sup> In the 11 Norwegian publicly available RVAs for disaster preparedness at county level, there is an absence or only a minimal focus on cultural heritage as a topic in six of the documents. The case is very similar at the municipal level. When carrying out RVAs, municipal administrations use the existing guide from the Norwegian Directorate for Civil Protection.<sup>31</sup> This guide presents four types of value and it is the third—the impact on nature and the environment—which includes cultural heritage but to what extent this is followed up by the municipality depends on the heritage knowledge of its staff.

To sum up, there is an untapped potential for Norwegian municipalities to strengthen their heritage disaster preparedness through better collaboration through networks that activate and share existing knowledge of built heritage and the risks faced due to climate change.

### Participatory approaches: networks

The value of good networks is not a new observation. Actual evidence of the benefits of interactions, however, is hard to find—partly because their value is assumed, eliciting fewer studies, and partly because they are a means of facilitating other measurable outcomes, so usually used in connection with another activity or goal.<sup>32</sup> It is also because there are many different kinds of networks, all with different functions.

The range of networks can be varied, with different aims, make-up, resources, knowledge gaps and outcomes. To parse out this broad but essential concept, different kinds of networks that were identified in the MICHON project are noted in Table 1.

[assets/rapporter/no-2021-2022/dokument-3-6-2021-2022—undersokelse-av-myndighetenes-arbeid-med-klimatilpasning-av-bebyggelse-og-infrastruktur—endelig.pdf](#) (accessed 5 September 2023).

<sup>26</sup> See, for example, Mikkel Vindegg et al., *Barrierer for klimatilpasning på lokalt og regionalt nivå* (Barriers Towards Climate Adaptation at Local and Regional Levels) CICERO Report 03/2022 (Oslo, 2022) (in Norwegian), <https://www.vestforsk.no/sites/default/files/2022-05/CICERO%20Rapport%202022%2003%20-%20m%20partnere%20-%20web.pdf> (accessed 5 September 2023); Torbjørn Selseng, Berit Johanne Skogvang, and Carlo Aall, *Spørreundersøkelse til norske kommuner om status for 2021 i arbeidet med klimatilpasning* (Survey to Norwegian Municipalities about the 2021 Status for the Work with Climate Adaptation), Vestlandsforskning Report 10/2021 (Sogndal, 2021) (in Norwegian), <https://www.ks.no/globalassets/fagomrader/samfunnsutvikling/klima/KTP-kommuneundersokelsen-10122021.pdf> (accessed 5 September 2023).

<sup>27</sup> Cf. for example, NRK Norwegian Broadcasting Corporation, 'Dansk klimaekspert: Noreg har ein stor jobb framfor seg' ('Danish Climate Research: Norway has a Big Job Ahead') (11 August 2023), [https://www.nrk.no/norge/dansk-klimaekspert\\_-noreg-har-ein-stor-jobb-framfor-seg-1.16507234](https://www.nrk.no/norge/dansk-klimaekspert_-noreg-har-ein-stor-jobb-framfor-seg-1.16507234) (accessed 5 September 2023).

<sup>28</sup> Ministry of Local Government and Regional Development, *Plan- og bygningsloven* (*The Planning and Building Act*) (Oslo, 2010), <https://lovdata.no/dokument/NL/lov/2008-06-27-71> (accessed 5 September 2023).

<sup>29</sup> Flyen et al., 'Municipal Collaborative Planning'.

<sup>30</sup> 'New Goals for Norway's Cultural Environment Policy', White Paper to the Storting (Norwegian Parliament) from the Ministry of Climate and Environment, 2020 (in Norwegian), <https://www.regjeringen.no/no/dokumenter/meld.-st.-16-20192020/id2697781/> (accessed 5 September 2023).

<sup>31</sup> The Norwegian Directorate for Civil Protection, *Veileder til helhetlig risiko- og sårbarhetsanalyse i kommunen* (*Guide to Comprehensive Risk and Vulnerability Analysis in the Municipality*), revised version (2022) (in Norwegian), [https://www.dsb.no/globalassets/dokumenter/veiledere-handboker-og-informasjonsmaterieill/veiledere/veileder\\_helhetlig\\_ros\\_01-22.pdf](https://www.dsb.no/globalassets/dokumenter/veiledere-handboker-og-informasjonsmaterieill/veiledere/veileder_helhetlig_ros_01-22.pdf) (accessed 5 September 2023).



32 Breckon and Dodson, *Using Evidence*.

33 Rohit Jigyasu and Vanicka Arora, *Disaster Risk Management of Cultural Heritage in Urban Areas: A Training Guide* (Kyoto: RitsDMUCH, 2013).

34 Sherry R. Arnstein, 'Ladder of Citizen Participation', *Journal of the American Planning Association* 35, no. 4 (1969): 216–24, <https://www.tandfonline.com/doi/abs/10.1080/01944366908977225> (accessed 5 September 2023).

35 Cf. Flyen et al., 'Municipal Collaborative Planning'; Hauge, Hanssen, and Flyen, 'Multilevel Networks for Climate Change Adaptation'; Åshild Lappegard Hauge et al., 'User Guides for Climate Adaptation of Buildings and Infrastructure in Norway—Characteristics and Impact', *Climate Services* 1 (2017): 23–33.

36 Hauge, Hanssen, and Flyen, 'Multi-level Networks for Climate Change Adaptation'.

37 Cf. David Alexander, *Principles of Emergency Planning and Management* (Oxford: Oxford University Press, 2002); Rohit Jigyasu, 'Sustainable Post-disaster Reconstruction through Integrated Risk Management: The Case of Rural Communities in South Asia', *Journal of Research in Architectural Planning* 3 (2004): 32–43.

38 Cf. Lee Boshier, Ksenia Chmutina, and Dewald van Niekerk, 'Stop Going Around in Circles: Towards a Reconceptualisation of Disaster Risk Management Phases', *Disaster Prevention and Management* 30, no. 4/5 (2021): 525–37, <https://doi.org/10.1108/DPM-03-2021-0071> (accessed 5 September 2023).

In order to clarify the term 'network', **Table 1** illustrates the different kinds of networks identified as relevant to the Norwegian situation with a short description of their qualities, an indication of their presence in the Norwegian context (based on the author's investigations), and the stages in the disaster cycle to which they are most closely connected (see **Fig. 4**).<sup>33</sup> Community-related networks are not regularly present and have largely been identified through the literature, noting levels of citizen autonomy following Sherry Arnstein's 'Ladder of Citizen Participation'.<sup>34</sup>

These networks have been parsed out based on their roles, but also the kinds of intervention or support that can contribute to deeper knowledge management in context. This allowed the specific qualities of networks to be noted, with the intention of highlighting those which can help foster other networks (in this case, interdisciplinary municipal collaboration which can improve conditions for other networks and build on the successful examples that exist). Given the challenges identified, several different, connectable networks are required. This requires an initial focus which can then be cultivated outwards.

As noted, publicly initiated climate networks have mainly been directed at the largest municipalities, benefitting the most well-resourced municipalities before the medium-sized and small municipalities.<sup>35</sup> In terms of these networks achieving their principal goals, Åshild Lappegard Hauge et al. defined a set of critical factors for making the networks successful.<sup>36</sup> Their criteria for success include the importance of equality in the partnership, mutual trust and respect, and the recognition that all participants have important knowledge to share. Furthermore, that political commitment and anchoring of network participation within the home organisation is considered highly important to mandate resources and acceptance to participate while underwriting an obligation to pursue the results. Political commitment within the home organisation is therefore vital, especially to implement developments in a network through an explicit strategy: agreement to participate is one thing, obligation to pursue the results is another.

### Engagement through the MICHON project

The Action Research approach enabled all participants in the MICHON project—both communities of practitioners and disciplinary experts—to engage in different ways. To an extent, the cyclical nature of the MICHON approach reflects conceptual depictions of disasters as cycles in that the focus on the benefits of preparation, continual feedback and reflection from events is just as crucial as the traditional focus on the event (see **Fig. 4**).<sup>37</sup> The conceptual depiction of disasters as cyclical has undergone a degree of criticism since improvement should lead respondents to outside the cycle of repetitive events.<sup>38</sup> In terms of policy and resource allocation, the emphasis on pre- and post-disaster periods still connects with the need for knowledge management to evolve and for new information and perspectives to be integrated. Further, the distinctions between researcher and participant are blurred through interaction and feedback loops that foster resilience and mutual support.

### MICHON workshops and exercises

To explore the potential for networks and their roles in mediating climate adaptation knowledge, a process to foster reflection and learning for municipal workers, building owners in the community and researchers was initiated.

The first steps were introductory meetings with the county and municipality administration and the fire departments. The work was anchored politically by using the opportunity to inform respective city councils about the

**Table 1** An overview of networks that mobilise knowledge related to cultural heritage, categorised by their involvement with municipalities, the stage(s) of the disaster cycle in which they are mainly involved and their current status in Norway.

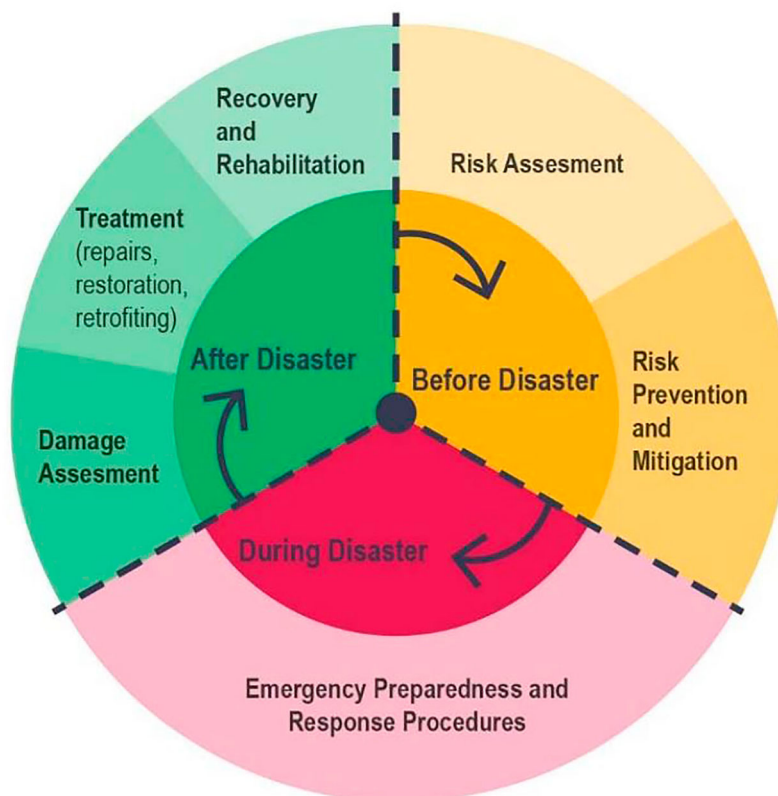
	Type	Qualities	Main disaster cycle stage	Presence in Norwegian municipalities	MICHON recommendation
Municipal networks, which may vary include county-wide network	Intra-dept (Fire, planning, heritage, technical dept)	Knowledge about different types of existing technical equipment and resources. Discussing risks according to risk and vulnerability analysis and undertaking tabletop exercises.	During	Not found	In project
	County-based	The county includes municipalities and experts for sharing knowledge and experience within climate adaptation Nettverk klimatilpasning Trøndelag   Statsforvalteren i Trøndelag.	Pre	Exist but not common	Increased focus on heritage and extreme events
	Area-based	Sharing experiences and knowledge about similar (same) risks. Addresses liminal spaces at municipality borders. Limited knowledge sharing.	Pre & Post	Common	Share knowledge in other networks, including community
	Resource-based	Sharing knowledge about specific interventions or challenges (e.g. population density). Increases division between rich & poor/ small & large municipalities.	Pre & Post	Common	Share knowledge in other/additional networks
	Competence-based (hazard)	Sharing of scientific knowledge about a specific risk. Can be international. Emphasis on phenomenon. Implicit bias to municipalities with specialists (i.e. resources). Difficult to convert to action for municipalities.	Pre & Post	Sporadic presence, based on individuals	Greater inclusion and awareness of needs across country
	Competence-based (activity)	Expert groups engaging in mitigation and salvage of important heritage items during/after an event. Example: KKO—Nettsted for samlingsforvaltning (samlingsnett.no).	During & Post	Two defined groups in Norway, limited to museums	Recommend for cultural heritage in general
Interface between community and municipality	Volunteer experts	Scientific expertise can contribute to risk assessment. Potential for co-design and co-creation, but not necessarily decision-making power. Not always inclusive.	Pre	Not found	In project. Partnership with professional groups
	Volunteer actors (response)	Near-by neighbours and local communities can assist in early-stage firefighting if call-out times are long due to the distances in rural communities. Delegated power and/or partnership. This can potentially be dangerous.	During	Exist in some areas	Hoses for local volunteers for early stage of events
	Volunteer actors (mitigation)	Watering houses and passageways as a fire spreads, rather than fighting fires, and equipment is maintained through other non-emergency uses. <sup>a</sup> Not always applicable to each context, but Norwegian examples exist (e.g. Skudeneshavn). Actors might be hand-picked by an authority.	During	Exist in some areas but not common	Municipalities review potential for adding infrastructure
	Local values	Adjustment of plans for specific areas based on community values. Greater social cohesion and potential for different communities to be engaged and can lead to partnership and negotiated decision-making. Lack of interest or uneven interest from the community occurs. <sup>b</sup>	Pre	Not found	Formal, repeated interactions with community members
	Local knowledge	Proactive consultation can make adjustments to existing plans, based on local details like access routes, and potential co-creation of maps. <sup>c</sup> Community involvement can be limited to feedback on specific information (consultation, tokenism).	Pre	Exist in some areas	Municipalities share good practice
	Informing/ feedback	Closer links between practitioners and communities. Potential for anecdotal information. Limited interaction or understanding of the other party.	Pre & Post	Not found	Formal, repeated interactions with community members
Independent of municipality	Academic networks	Bi-directional clusters of networks or channels that provide novel information or evaluation. Direct relevance can vary in agendas (novelty vs applicability, context) and cycles of time. Example: Knowledge Action Network on Emergent Risks and Extreme Events—Reducing Disaster Risks under Environmental Change (risk-kan.org). Can be international and influence decision-making (independent or in partnership with municipality).	Pre	Not found	Municipal representatives in existing networks. Closer cooperation in research-to-practice
	Community practices	Community resilience developed through traditions and practices that complement built heritage. <sup>d</sup> Does not involve professional bodies (i.e. led by communities; citizen control), so contribute to social sustainability significantly. Changes over time may be uneven, such as demographic shifts.	Pre & Post	Not found	Informal support

Notes: <sup>a</sup> Cf. for example, Kenzo Toki, Takeyuki Okubu, and Kazuyuki Izuno, 'Protection of Cultural Heritages from Post-Earthquake Fire', in *13th World Conference on Earthquake Engineering*, Vancouver, BC, Canada, 1–6 August, Paper No. 2781 (2004); Newman et al., *Resilient Cultural Heritage*.

<sup>b</sup> Cf. for example Solinska-Novak et al., 'An Overview of Serious Games for Disaster Risk Management'; Mínguez García, 'Understanding and Communicating Risk to Cultural Heritage'.

<sup>c</sup> Alejandro Martínez, 'Engaging Local Professionals for the Conservation of the Built Environment: The Japanese "Heritage Manager" System', in *ICOMOS 19th General Assembly and Scientific Symposium "Heritage and Democracy"*, New Delhi, India, 13–14 December 2017 (2018).

<sup>d</sup> Aparna Tandon, 'Post-disaster Damage Assessment of Cultural Heritage: Are We Prepared?', in *ICOM-CC 18th Triennial Conference Preprints Copenhagen*, ed. Janet Bridgland (Paris: International Council of Museums, 2017), [https://www.icrom.org/sites/default/files/2017-12/tdandon\\_2017\\_post-disaster\\_damage\\_assessment\\_icomcc\\_2017.pdf](https://www.icrom.org/sites/default/files/2017-12/tdandon_2017_post-disaster_damage_assessment_icomcc_2017.pdf) (last updated 2 September 2023).



**Fig. 4** The Disaster Cycle, depicting three phases of rapid-onset events: pre-disaster, during and post-disaster.

project. Next steps were to build trust and foster participation among owners of historic buildings in the project areas. This involved open community meetings to raise awareness of the project and issues and get feedback from building owners and other members of the local community, and workshops attended by building owners, municipal and county management, county governors in charge of disaster preparedness and experts in fire mitigation and local floods. This provided an opportunity to agree a common understanding of heritage values, risks and vulnerabilities, possible mitigation strategies and different responsibilities.

This iterative process of capacity building for knowledge management has involved incremental stages that gradually developed a corpus of professionals in the municipalities involved who can take ownership of knowledge management activities at the end of the project. These people were identified through collaboration between the Norwegian Institute for Cultural Heritage Research (NIKU) and the municipalities to form the beginning of a larger cluster of related networks, with the discussions and exercises part of the Action Research cycle (see Fig. 2). As well as directly influencing practice around any urgent issue, the opportunity to transform and refine research directions has allowed meaningful collaboration to continue and evolve.

The findings from the workshops undertaken in the project highlight some significant differences between the municipalities participating in the study. These differences are mainly linked to the size of the municipalities, affecting the availability of resources and competence, the vulnerability of professional environments (e.g. staff turnover), cross-sectoral communication and communication between administrative and political

personnel, decision-making processes, and intra-municipal collaboration. These findings are supported by other research on challenges linked to climate adaptation processes in Norwegian municipalities.<sup>39</sup> Smaller municipalities tend to have fewer human and economic resources, less collaborative planning, more vulnerable professional environments, and thus less access to expertise in necessary areas of competence than the larger municipalities. However, these smaller municipalities seem to have easier decision-making processes due to less cluttered communication lines between administration and politicians. Common to all the municipalities involved in the four case studies for the MICHON project is that cross-sectorial collaboration needs to be further developed and supported so as to initiate planning that incorporates the need for disaster preparedness for cultural heritage environments. Communication and collaboration between local authorities and owners and users of the cultural heritage environments also needs further development.

In the introductory meetings—both physical and online—followed by collaborative inspections of the case-study sites—discussions touched upon the challenges, lack of systems and cooperation, and examples of good practice. Questions emerged around how communication lines and role definition could be defined in emergency plans that would meet the needs for preserving heritage values in each scenario. By connecting departments that do not normally cooperate, questions were raised that have already affected salvage and mitigation plans for scenarios where there are plausible multi-hazards, such as storm surges and high waterflow in areas where heritage buildings are situated. These discussions developed and fed into the choice of disaster exercise, and hence filled further gaps by collaborating on the necessary preparations. The need to undertake an exercise, and define its desired outcomes, came from the participants themselves. This was derived from meetings about obstacles, challenges and lessons learnt from previous events. Consequently, NIKU functioned as an external mediator, catalysing collaboration across different invisible borders. Because NIKU's involvement in the project has a limited lifetime, the iterative process was designed to be transformative to all parties (including NIKU), so networks could become completely self-determined and research directions grounded in relevant challenges.

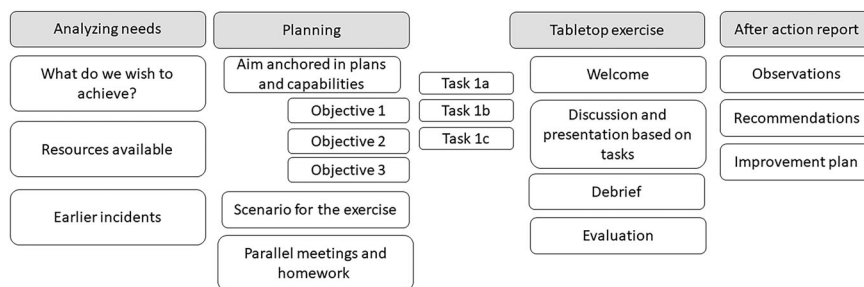
### Tabletop exercises

Participants in the working groups in all three municipalities involved chose tabletop exercises as the most needed and most relevant type of exercise. Their selections were supported by identifying viable options through desk-based research during the planning stages. The applicability of tabletop exercises and disaster games identified became another example of the research providing structure and system to the needs identified by practitioners.<sup>40</sup> Tabletop exercises are discussions that consider a prepared directive followed by a collection of important information. Such exercises are referred to with several different names, such as discussion exercise, dilemma exercise or seminar exercise. A discussion exercise is a form of practice where all the participants gather in a common room, and all communication takes place in this room. The scenario entries are provided orally or on paper or a screen. No measures should be taken physically, and there is no contact made outside the room. The participants must therefore not simulate, for example, a meeting in crisis management, but talk through both specific and generic issues related to the scenario they are presented with by a discussion leader. This is a common and effective way of undertaking exercises for disaster management; however, this is seldom done in Norway with the purpose of mitigating damage to cultural heritage.

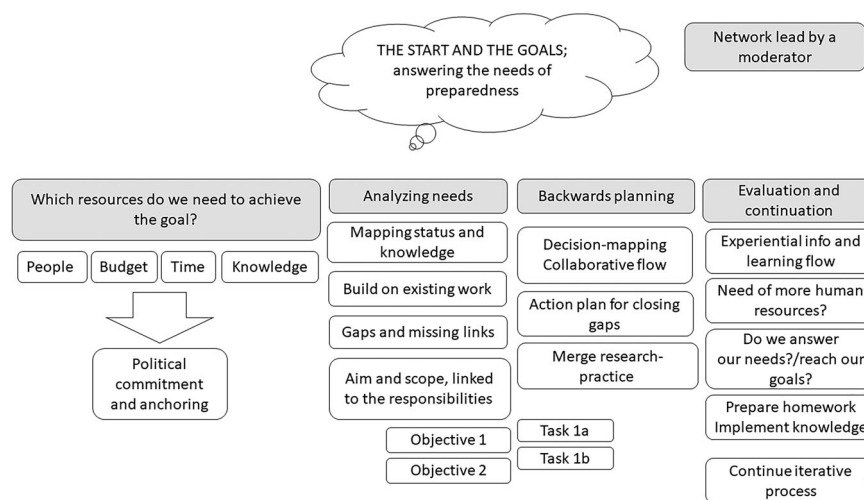
39 Flyen et al., 'Municipal Collaborative Planning'.

40 Cf. for example, James Newman et al., *Resilient Cultural Heritage: Learning from the Japanese Experience* (Washington, DC: Global Facility for Disaster Reduction and Recovery, 2020); Aleksandra Solinska-Novak et al., 'An Overview of Serious Games for Disaster Risk Management—Prospects and Limitations for Informing Actions to Arrest Increasing Risk', *International Journal of Disaster Risk Reduction* 31 (2018): 1013–29; Bárbara Mínguez García, 'Understanding and Communicating Risk to Cultural Heritage: The Future of Preserving the Past', in *8th International Conference on Building Resilience: Risk and Resili-*

ence in Practice: Vulnerabilities, Displaced People, Local Communities and Heritages, Lisbon 2018 (2019): 229–34.



**Fig. 5** Designing tabletop exercises, based on the handbook of the Norwegian Directorate for Civil Protection and from the workshop of Andor Vince.



**Fig. 6** Framework for working with Norwegian Disaster Preparedness for cultural heritage, explaining how to rig a network and carry out an iterative and interdisciplinary preparedness planning process to achieve identified goals based on Backwards Planning and tabletop exercises. Copyright: NIKU.

There is a systematic and constructive way of designing a tabletop exercise as used in the preparation of the MICHON exercises. Figure 5 shows the preparation undertaken for the exercises and is drawn on general guidance from the Norwegian Directorate for Civil Protection,<sup>41</sup> but modified to include specific heritage-based details, based on a method outlined by Andor Vince.<sup>42</sup> Important for the planning is that there is a role for the exercise leader and the exercise facilitator. The leader should have a well-grounded background and experience, and understand the organisation, the challenges and needs for the topic to be discussed. The exercise facilitator may well be a person from outside the organisation, without any related disciplinary background, to help ensure neutrality.

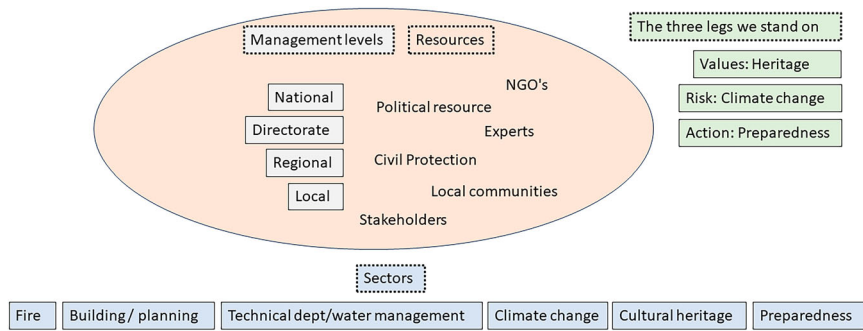
Based on the preparation, implementation and results from the workshops and tabletop exercises, a proposed framework for collaboration is suggested below.

### Presentation of results; proposed framework

Based on the problems framed through extensive dialogue and policy review, the need for systematic networking and knowledge mobilisation was prioritised. Figure 6 draws upon project findings from desk-based research and exercise methods to systematise the creation of a working

<sup>41</sup> Cf. The Norwegian Directorate for Civil Protection, *Metodehefte: Diskusjonsøvelse (Handbook in Planning, Execution, and Evaluation of Exercises)* (2016), <https://www.dsb.no/veiledere-handboker-og-informasjonsmaterieill/metodehefte-diskusjonsovelse/> (accessed 23 May 2023).

<sup>42</sup> Andor Vince, *Leading and Facilitating Tabletop Exercises in Emergency Response*, Online Workshop, Heritage Collections Care Consultancy, New Zealand, 2023.



**Fig. 7** Coordinating levels, sectors and resources that are relevant for interdisciplinary preparedness planning process. Copyright: NIKU.

group/network with a clear and definite goal for the group. This will be elaborated below.

The goals of the group are determined as the driver for the network from the beginning. **Figure 7** shows the need for coordinating the different sectors and resources, and offers a framework that can be used in all management levels.

### Application of the framework

Despite variations of risk, resources and organisational capacity, municipalities can frame their needs in terms of the network’s target and goal. It has been apparent in MICHON that the planning and making exercises have been a new way of introducing interdisciplinary work and bridging the gaps between research and practice. This process in itself yields benefits.

When looking at the use of the proposed network in terms of ‘protecting built heritage from extreme events at the municipal level’, it should be introduced when starting work on RVAs in the municipalities. Commitment and anchoring among both political and administrative levels are imperative to ensure acceptance for carrying out the network and implementing the results in preparedness planning.

The municipal (or regional or national) administration worker that has heritage included in their work tasks, is proposed to present this form of working. There are similarities between preparing a tabletop exercise (see **Fig. 5**) and structuring a transdisciplinary working group or network. Although a tabletop exercise has an end, it is still a part of the cyclical working of Action Research (see **Fig. 2**). Exercises will therefore be a part of the ongoing work of emergency planning by keeping the focus on the agreed priorities over time and through resource exchange within the organisation and as applied across the networks.

Planning the tabletop exercise provided some lessons, not least the many benefits to having an external exercise facilitator. Perhaps most important is having in-depth knowledge of heritage disaster preparedness and not knowing all the players of the exercise personally. Therefore, when creating the network there should be a moderator, who may or may not be from outside the organisation.

The framework of the transdisciplinary network here is internal to the municipality, but is flexible enough to broaden when this is needed, such as filling knowledge gaps by working effectively across groups consisting of several municipalities, or other management levels. These methods have also been used with community residents.<sup>43</sup> Since the framework is partly based on the tabletop exercises, an example of an undertaken exercise is given below.

**43** Cf. Newman et al., *Resilient Cultural Heritage*; Solinska-Novak et al., ‘An Overview of Serious Games for Disaster Risk Management’.

### Example of undertaken tabletop exercise; flooding of the Topdal river

Results from the workshops and cross-sectoral meetings in 2022 formed the background for planning the exercise. In all three planning meetings, the municipal worker responsible for disaster preparedness, the municipality's technical department, its preventive and active fire departments including the salvage team, and The City Antiquarian, were all represented. The aim of the exercise was to gain insight into, and collaboratively develop, new routines for communication and cooperation from early warning to the flood's peak level, and any implications, with a focus on historic buildings, adaptation and mitigation. Hence, two objectives were formulated:

- (1) Establish a common understanding of roles and tasks in events involving historical buildings.
- (2) Increase knowledge to minimise damage to heritage buildings during floods.

In addition to involving those planning the exercise, members of the municipal crisis management team participated. Through evaluation of the exercise, including feedback of the observers, the main outcomes were a common understanding of the need for more preventive work in the case of safeguarding heritage, changes in preparedness plans and systems so heritage knowledge is included, and consideration of improvement to internal communication systems to better gain a holistic and effective means of knowledge acquisition during an event.

### Backwards planning as the basis for the framework

Another novel aspect of the network is the explicit use of 'backwards planning'. This was inspired by the concept of 'Reverse phase scheduling', or 'backwards planning' (*bakoverplanlegging* in Norwegian), used in Lean Construction (Fig. 6)—a project planning method to increase efficiency and decrease waste that was developed by a Japanese car production model in the 1980s. The method offers a stepwise approach to identifying and targeting risks, requirements, aims, decision-making processes, and to map and support interfaces and communication between the participating actors. The backwards planning technique starts planning at the end of the project and maps out the processes on which it depends when going forward.<sup>44</sup>

Backwards planning was chosen as a method because it is well suited for interdisciplinary communication, a key need in the Norwegian context. It has theoretical roots in developments around the concept of 'Prospective Hindsight', which illustrated that providing a certain outcome could improve critical thinking when planning for it.<sup>45</sup> The rationale in this context is compelling because the concept is theoretically robust enough to satisfy the opposing ideas of how people process information, namely naturalistic models emphasising expert intuition and bounded rationality models that emphasise cognitive limitations.<sup>46</sup> Prospective Hindsight and related strategies are also pertinent to the varied kinds of decision makers and decision making involved in mitigating these risks, which includes firefighting—the principal subject of Gary Klein's study of intuitive successes for his work on Naturalistic Decision Making<sup>47</sup>—and long-term planning, which can be susceptible to a range of biases and cognitive limitations.<sup>48</sup>

Building on the criteria of success described by Hauge et al.,<sup>49</sup> the framework model builds on local knowledge about historic events and experiences from the past linked to new knowledge concerning how to meet cross-sectorially defined needs. Further, the network is based on

<sup>44</sup> Cf. for example, Bo Terje Kalsaas, ed., *Lean Construction—Forstå og forbedre prosjektbasert produksjon (Lean Construction—Understand and Improve Project Based Production)* (Bergen, Norway: Fagbokforlaget, 2017), 36–42; Iqbal Shakeri, Khashayar Asadi Boroueni, and Homan Hassani, 'Lean Construction: From Theory to Practice', *International Journal of Academic Research* 7, no. 1 (2015): 129–36, doi: 10.7813/2075-4124.2015/7-1/B.22.

<sup>45</sup> See, for example, Deborah Mitchell, J. Edward Russo, and Nancy Pennington, 'Back to the Future: Temporal Perspective in the Explanation of Events', *Journal of Behavioral Decision Making* 2 (1989): 25–38.

<sup>46</sup> Cf. Daniel Kahneman and Gary Klein, 'Conditions for Intuitive Expertise: A Failure to Disagree', *American Psychologist* 64, no. 6 (2009): 515–26,

parallel planning processes and dissemination of knowledge and information in the participating disciplines/sectors/municipalities. Interdisciplinary cooperation will contribute to a more holistic approach to safeguarding preparedness planning for cultural heritage environments. Backwards planning will contribute to achieving an overview of the necessary decisions needed to reach the set target(s), and of the contributions necessary over a given timespan from the various agencies, sectors and actors participating in the network (see Fig. 6). Evaluation of the network will ensure that the wanted achievements are met, or that a necessary change of course is implemented.

### Discussion of results

The sectorised nature of the systems of management in Norway complicates the issues of working with disaster preparedness for cultural heritage, as there are few platforms where knowledge mobilisation related to cultural heritage is apparent. This gap contributes to a lack of communication across sectors. This is not a challenge limited to Norway, and the issue of networking and including varied professions to agree upon appropriate solutions is expressed in many research projects and reports around the world. Currently, the inclusion of heritage, especially built heritage, in these networks and platforms is reliant on personal interests and personal connections of members rather than effective systems. It is, however, not sufficient to express the need for co-working and call for the design of a system that implements the necessary connection of management levels, responsibility and knowledge of cultural heritage, a system that could contribute to a broader spectrum of societal resilience over time.

A characteristic of the challenges encountered and the specific blocks to integrating preparedness scenarios was often due to insufficient infrastructure to realise knowledge. The separate ecosystems of knowledge including heritage management, flood physics, fire safety and climate change prediction, along with policy statements, form a huge amount of information to synthesise for conservation. Whilst there is a need for conservation research to ensure its relevance, the diversity of sources means that there must also be emphasis placed on the conditions that support the reception and application of that knowledge.

The framework presented here is not intended as a passive vessel. Like the depiction of rapid-onset events, there is a cyclical or fluid character to the development of networks which is intended to provide support in different directions. Carla Green et al. stress the need to design and implement research with stakeholders if research is to be taken up.<sup>50</sup> Furthermore, for the diffusion of knowledge to be effective, research needs to be undertaken collaboratively, in co-production by both academics and practitioners.<sup>51</sup>

Creating access to knowledge or space for cooperation is not enough to see development. This has been evident in the MICHON project in several ways. For example, one municipality has systems for mapping heritage value which, through Google search, can be viewed in multi-layered maps. It was argued by the heritage experts that this could be used by the firefighters if they needed a quick overview for determining which buildings to prioritise in a flood-prone area. The fire department, however, considered this solution too complicated to use during an event. They need systems that are manageable in their work situation, easily accessible and stripped of unnecessary information. The prioritisation of important historic buildings must be made to the fire brigade before a disaster—not during, and not by using any kind of overloaded map.<sup>52</sup>

<https://doi.org/10.1037/a0016755> (accessed 5 September 2023).

**47** Gary Klein, *Sources of Power: How People Make Decisions* (Cambridge, MA: MIT Press, 2017).

**48** Cf. Kahneman and Klein, 'Conditions for Intuitive Expertise'; Daniel Kahneman, *Thinking Fast and Slow* (New York: Girard Strauss, 2011).

**49** Hauge, Hanssen, and Flyen, 'Multi-level Networks for Climate Change Adaptation'.

**50** Carla Green et al., 'Approaches to Mixed Methods Dissemination and Implementation Research: Methods, Strengths, Caveats, and Opportunities', *Administration and Policy in Mental Health and Mental Health Service Research* 42 (2015): 508–23, <https://link.springer.com/article/10.1007/s10488-014-0552-6> (accessed 5 September 2023).

**51** Janet Heaton, Jo Day, and Nicky Britten, 'Collaborative Research and the Co-production of Knowledge for Practice: An Illustrative Case Study', *Implementation Science* 11, no. 20 (2015): 1–10, <https://implementation.science.biomedcentral.com/articles/10.1186/s13012-016-0383-9> (accessed 5 September 2023).



52 Cf. Jordan Ferraro and Jane Henderson, 'Identifying Features of Effective Emergency Response Plans', *Journal for the American Institute for Conservation* 50, no. 1 (2011): 35–48.

Through exercise planning, a common understanding of each need during an extreme event emerges, and this is an important step to achieve effective solutions and cooperation during an event. One of the outcomes of the preparatory work was to make a salvage plan for a flood-prone area, which will function as a tool for the municipality to perform mitigation measures and salvaging. This is an example of cooperation where a common understanding of both heritage values and risks at city level grow through planned engagement and dialogue. The information or the plans created are not the sole outcome. The common understanding and need for each other to create good systems for the salvage in case of flood is an important outcome as well. Tailoring the network to agree on the common goal is effective and fosters knowledge mobilisation.

### **Difficulties in executing exercises and applying proposed framework**

Workshops and exercises depend on engagement from several groups of people. In this case, cooperation from professions outside the heritage sector was necessary. For many of them, heritage lay outside their main responsibilities and assignments. Another interest group needed for the workshops was the owners and managers of historic buildings. In some cases, heritage values were peripheral to the main interests of the local community. This work required a stage of planning and theory (see Fig. 3).

The challenges of reaching out to relevant communities and people, either through their work responsibility or their ownership, limited the possibilities of interacting in discussions. In the cases where a large group was engaged, there were challenges in the different groups in finding common ground, and in maintaining consistent interest. A reason for this is that the topic crosses fields of interest and responsibility. However, it was through these discussions that shared goals for different parties were identified and addressed.

Another limitation is the need for following up the measures that were discussed in the workshops as many of the measures can be seen as additional work outside a particular member of staff's responsibilities. NIKU's external and temporary role meant that it could not assume nor confer responsibilities, underlining the need for democratic participation and ensuring ownership by working with practitioners at every stage.

Although the authors advocate for the use of frameworks for cooperation, they will never solve everything. Building these kinds of network is never a challenge-free process, and successful communication is person-dependent. To see the process as a cycle is therefore important as several iterations are needed before its true value is revealed. During these iterations, those involved get to know each other and one other's professions and responsibilities. To get both exercises and networks in general to function in an effective way for heritage, all involved must agree on the importance of including cultural heritage in disaster preparedness work. This is, however, not always the case. As stated earlier, the application of the systematic framework should be introduced when working with Risk and Vulnerability Analysis (RVA), but who should present this and coordinate it will vary with context and needs. In the absence of a clear candidate for coordinating, an external moderator can be a way of achieving a collective understanding of heritage values. This often requires some funding, which might be problematic for many municipalities. However, it seems that time is a more limited resource than money. Establishing a network or planning a transdisciplinary exercise can be seen as an additional assignment and therefore might not be prioritised. This is a reason for needing political support, which is a criterion for success. Political support in the beginning of the MICHON project has see-

mingly served as a catalyst in highlighting the focus on cultural heritage environments as a focus area in preparedness efforts of the participating municipalities. However, political backing is not the whole answer; it always comes back to personal interest and commitment. Involving people who are interested in the topic, and engaging them in a manner that fosters cooperation, is fundamental.

What has been reported here reflects early stages in using the framework, which has been led by the decision to target professional groups from the outset. This focus was based on developing a framework that was reproducible for different municipalities by determining a common element, rather than assuming citizen engagement, and providing a coherent arena for external viewpoints to be included in the continuing cycles of preparation. As municipalities continue to prepare, they will have the agency to expand the range and purposes of networks for knowledge mobilisation through support, without controlling or impinging on the independence of any public initiative or community practice.

### Practical recommendations

Working across sectors on extreme events, disaster preparedness and protecting heritage should be a part of the municipality's everyday focus, and a normal part of the machinery. It is a never-ending work, gaining new experiences through sudden events, and the need for incorporating them alongside updated climate projections, research, laws and regulations. In this way, working on this topic has many parallels to the exercises. It is not enough to do it once and think that the job is done. Relations and new staff are also reasons to keep turning the wheel, as is often the case within the security and preparedness sector.

Based on the proposed framework, the authors consider several recommendations for future work:

- (1) Establish a network with a moderator that includes relevant staff from disaster preparedness, heritage, fire department, technical department and water engineering.
- (2) Match areas with high risks and high heritage values and find common aims and objectives for the work. What are the needs for disaster preparedness to secure prioritised local heritage?
- (3) Include earlier work and latest relevant climate information. Look at the missing links for what is needed to reach the common goal.
- (4) Share maps, lists of resources and systems for action. Sharing opens up a common understanding of the likely challenges, needs and possibilities.
- (5) Keep focussed on learning from co-participants and be open to new ways of understanding needs for preparing, cooperating and mitigating.
- (6) Heritage workers should take an active role in communicating values. Other professions are eager to learn and understand.
- (7) Community networks can involve a wide range of expertise and have benefits and agendas beyond the priorities of government or municipal work.

### Conclusions

The pathways for a range of evidence and guidance from different disciplinary frameworks involve a range of gaps and translational challenges with no consistent way of engaging or monitoring evidence use. Consistent development of networks is a crucial and missing part of this translation.

The MICHON project reveals numerous benefits of providing systems of collaboration for including built heritage in municipal disaster preparedness work by merging research and practice. The proposed framework

and exercises provide a holistic approach and facilitate municipal administrations to include heritage in preparedness plans and when an event occurs. This cross-sectoral way of working helps improving communication lines, including knowledge at crucial stages and implementing needed measures.

Whilst there are many kinds of networks, with different aims and implications, determining a way forward for Norwegian municipalities has focussed on embedding a robust networking practice for cross-sectoral networks within municipalities. In doing so, the conditions for different networks that involve different kinds of citizen participation can be supported more proactively.

The networking plan offered here has been designed to work for a range of contexts, to build capacity to allow autonomy, and for researchers to contribute to and support evidence-based action rather than attempt to initiate or control it.

Backwards planning was selected as a method to create context-sensitive networks for the different municipalities in the four case studies. Whilst theoretically robust enough to work in different arenas, the emphasis on results-based management in the face of uncertainty provides the different practices and information needs of the municipalities to address the varied challenges of climate change impacts on their heritage.

Because the role of external agencies like NIKU cannot be sustained indefinitely, the cyclical approach to research is intended to allow new information, alliances and practices to be introduced. It also has a transformative impact on research since new directions are forged through dialogue and continual engagement with those who use the evidence. From design to implementation, the networking practices initiated for the benefit of practitioners are already shaping the direction of future research in risk mitigation.

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## Sammendrag

«Cycles of change»; forsterking av samhandling og kommunikasjon i norske kommuner for å styrke arbeidet med beredskap for kulturminner ved akutte hendelser»

Artikkelen tar for seg utviklingen av et rammeverk for å identifisere og adressere de viktigste behovene for anvendelse av klimaendringforskning for bevaring av kulturarv i Norge. Fokuset er på historiske trebygninger, med økt risiko for brann og flom på grunn av klimaendringene. Med translasjonell forskning som metodisk utgangspunkt, identifiserte MICHON-prosjektet behovet for målrettede, systematiske kunnskapsnettverk i beredskapsplanlegging for kulturmiljøer, i tillegg til gjennomføring av øvelser. Dette er utviklet gjennom en kombinasjon av litteraturgjennomgang

og omfattende samarbeid med norske kommuner, brannvesen og lokalsamfunn. Prosessen har inkludert evaluering av politikk og praksis på ulike områder for å lage et rammeverk for en nettverksmodell og som bygger på metodene for samarbeid som Lean Construction og bakoverplanlegging. Samspillet mellom forskning og praksis har vært utforsket i prosjektet, og den iterative fremgangsmåten har allerede vist gode effekter på tvers av fagfelt.

## Résumé

«Cycles de changement: renforcer la collaboration et la communication dans les municipalités norvégiennes pour améliorer la préparation du patrimoine face aux événements extrêmes»

Cet article envisage le développement d'un cadre permettant d'identifier et de répondre de manière collaborative aux besoins les plus urgents pour mettre en application la recherche sur le changement climatique, pour la préservation du patrimoine culturel en Norvège. Il se concentre sur les bâtiments historiques en bois, exposés à un risque accru d'incendie et d'inondation en raison du changement climatique. S'inspirant du domaine de la recherche translationnelle, le projet MICHON a identifié le besoin d'avoir des réseaux de savoirs ciblés et systématiques dans la planification de la préparation de l'environnement du patrimoine culturel. Il a été

mis au point grâce à une association de recherches documentaires et d'une collaboration étendue aux municipalités norvégiennes, aux pompiers et aux communautés locales. Le processus a inclus l'évaluation de la politique et de la mise en œuvre dans divers sites étudiés pour élaborer une méthodologie de mise en réseau qui s'appuie sur une gestion allégée (Lean) et une méthode de rétroplanning. L'interaction entre le chercheur et le praticien a été au premier plan du projet et la conception itérative a déjà produit des transformations à la fois sur la pratique et la recherche.

### Zusammenfassung

„Zyklen des Wandels: Verbesserung der Zusammenarbeit und Kommunikation in norwegischen Gemeinden zur Stärkung der Vorsorge bei Extremereignissen im Bereich Kulturgut“

Dieser Artikel befasst sich mit der Entwicklung eines Rahmens zur gemeinsamen Identifizierung und Bewältigung der dringendsten Bedürfnisse bei der Anwendung der Klimawandelforschung zur Erhaltung des kulturellen Erbes in Norwegen. Der Schwerpunkt liegt auf historischen Holzgebäuden, die aufgrund des Klimawandels einem erhöhten Risiko durch Feuer und Überschwemmungen ausgesetzt sind. Ausgehend vom Bereich der translationalen Forschung wurde im Rahmen des MICHON-Projekts der Bedarf an gezielten, systematischen Wissensnetzwerken für die Bereitschaftsplanung im Bereich des kulturellen Erbes ermittelt. Dies wurde durch eine Kombination aus Sekundärforschung und umfassender Zusammenarbeit mit norwegischen Gemeinden, Feuerwehren und den Gemeinschaften vor Ort entwickelt. Der Prozess umfasste die Bewertung von Politik und Praxis an verschiedenen Fallbeispielen, um eine Netzwerkmethodik zu entwickeln, die auf Lean Construction und der Methode der Rückwärtsplanung aufbaut. Die Interaktion zwischen Forschern und Praktikern stand im Vordergrund des Projekts, und das iterative Design hat bereits transformative Auswirkungen sowohl auf die Praxis als auch auf die Forschung gezeigt.

### Resumen

“Ciclos de cambio: Mejorando la colaboración y la comunicación en los municipios noruegos para fortalecer la prevención de riesgos del patrimonio ante fenómenos extremos”

Este artículo examina el desarrollo de un marco para identificar y abordar en colaboración, las necesidades más apremiantes en cuanto a la aplicación de la investigación sobre el cambio climático a la conservación del patrimonio cultural en Noruega. Se centra en los edificios históricos de madera, expuestos a un mayor riesgo de incendio e inundación debido al cambio climático. Basándose en el campo de la investigación traslativa, el proyecto MICHON identificó la necesidad de redes de conocimiento específicas y sistemáticas relativas a un plan de preparación de emergencia para entornos de patrimonio cultural. Esto se desarrolló mediante una combinación de investigación documental y una amplia colaboración con municipios noruegos, cuerpos de bomberos y comunidades

locales. El proceso ha incluido una evaluación de las políticas y la prácticas en diferentes emplazamientos para delimitar una metodología de trabajo en red basada en 'Lean Construction' y el método de planificación retrospectiva. La interacción entre los investigadores y los profesional practicante ha estado al frente del proyecto y este proceso de diseño iterativo ya ha mostrado efectos transformadores tanto en la práctica como en la investigación.

### 摘要

“周期变化：挪威市政当局为强化遗产的极端事件预防能力而加强合作与交流”

本文探讨了一个框架制定，以共同确定和满足挪威在文化遗产保护方面应用气候变化研究的最迫切需求。文章的关注点是历史悠久的木质建筑，由于气候变化，这些建筑面临火灾和洪水的风险越来越大。MICHON项目借鉴了转化型研究的经验，确定了在文化遗产环境的防灾规划中建立有针对性且系统的知识网络的必要性。通过案例研究以及与挪威市政当局、消防队和当地社区的广泛合作，该项目得到了发展。这一过程包括对不同案例场所的政策和实践进行评估，以构建一种基于精益建设和逆向策划法的网络方法。研究人员与实践者之间的互动一直是该项目的重中之重，而迭代设计已显现出对实践和研究的变革性影响

### Biographies

Nina Kjølseth Jernæs holds a master's degree in Fine Arts Conservation and has worked at NIKU as a paintings conservator since 2008, with an additional role as a researcher since 2016. Nina's main areas of work are preventive conservation, condition assessments, salvage, damage limitations and interdisciplinary projects related to climate change and extreme events on cultural heritage.

Cecilie Flyen holds a master's degree in Architecture, and has worked as a senior researcher at NIKU since 2022. Her main competencies cover climate change adaptation of the built environment and cultural heritage buildings, climate change mitigation, cultural heritage sustainability, climate behaviour, decision processes, governance and public administration, and legal framework and policy instruments. Cecilie has long experience on national and international research projects and has been working within research since 2001 (and a senior researcher since 2008). She also has experience as a professional architect prior to her research career.

Joel Taylor is a researcher involved in conservation, sustainability and the role of heritage in society. He has previously worked at University College London, Institute for Sustainable Heritage, English Heritage, and the National Museums and Galleries of Wales (UK), the University of Oslo (Norway) and the Getty Conservation Institute (GCI) in the US. He has a PhD in Conservation, and his research interests include preventive conservation, conservation theory, sustainability and intergenerational justice, decision making, and the social role of conservation.