

Sustainability

The world is facing enormous challenges in terms of diminishing resources, increasing population, and extreme weather events. Concurrently, technology is rapidly advancing, cities are growing larger and denser, and the population is ageing. These challenges are recognized by countries around the world, across all levels of income, with varying capacity to address them. The global impact of fire is staggering, in particular in the Global South. In the Global North, the cost of fire is estimated to 1-2% of the Gross Domestic Product (GDP) [1]. While this is down from a high of over 7% in the 1980's, clearly these costs are not sustainable.

The International Panel for Climate Change (IPCC) recently issued a series of reports [2-4] where they identified that: it is unequivocal that human influence has warmed the atmosphere, ocean and land; the scale of recent changes across the climate system are unprecedented; and, human induced climate change is already evident in terms of extreme weather. The picture of climate change that is painted is alarming and likely to have significant impacts on the fire safety situation in both the Global North and South. There is a pressing need to understand the implications of climate change on fire safety, not least for the most vulnerable communities.

Fire Safety and Sustainability

Within the built environment, steps towards achieving increased sustainability include, e.g., reducing materials, energy and waste, and utilizing more renewable resources. Strategies for these include, e.g., increased use of timber, increased thermal insulation, and increased passive ventilation. Holistic models that consider sustainability and fire safety from all dimensions, i.e., economic, ecological and social, are needed. Models have been developed to incorporate these various dimensions of sustainability [5], but they have yet to be applied to fire science. How will climate change increase fire risks? How will the use of new materials, new building practices and the emergence of new products and services in support of energy and resource sustainability change the nature and magnitude of fire risk? These are all questions which require answers.

One size does not fit all

The IFSC focus, in the context of fire safety and sustainability, is multi-faceted with activities in all ongoing themes. In addition to activities taking place concerning affordable housing, wildfires, fire risks in the Global South and education, this theme will focus on understanding the nexus of sustainability and fire resilience in terms of contextual implications of sustainable and fire resilient communities [6]. In doing so, the IFSC recognises the need to develop solutions that are context dependent, based on connections between people, geographical place and organisations and regulations surrounding them [7].

- [1] Zhuang J., Payyappalli V.M., Behrendt A., and Lukasiewicz K., *Total Cost of Fire in the United States*. 2017. NFPA Research Foundation, FPRF-2017-21, p. 55, <https://www.nfpa.org/News-and-Research/Data-research-and-tools/US-Fire-Problem/Total-cost-of-fire-in-the-United-States> [Accessed October 2022].
- [2] IPCC, *Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. 2022. Cambridge University Press, DOI: 10.1017/9781009325844.
- [3] IPCC, *Climate Change 2022: Mitigation of Climate Change. Working Group III Contribution to the IPCC Sixth Assessment Report*. 2022. Cambridge University Press, DOI: 10.1017/9781009157926.
- [4] IPCC, *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. 2021. Cambridge University Press, DOI: 10.1017/9781009157896.
- [5] Mazzi A., *Chapter 1 - Introduction. Life cycle thinking*, in *Life Cycle Sustainability Assessment for Decision-Making*, J. Ren and S. Toniolo, Editors. 2020, Elsevier. p. 1-19, DOI: 10.1016/B978-0-12-818355-7.00001-4.
- [6] Meacham B.J. and McNamee M.M., *Sustainable and Fire Resilient Built Environment*, in *Handbook of Fire and the Environment: Impacts and Mitigation*, B.J. Meacham and M.M. McNamee, Editors. 2022, Springer, DOI: 10.1007/978-3-030-94356-1_13.
- [7] Young B. and Lange D., *Analysing community resilience through the connections to people, place and other*. Fire Technology (under review), 2023, DOI: NA.