Context and Foresight for Interpreting the Disasters of the Future

David E. Alexander
Institute for Risk and Disaster Reduction, University College London, London, United Kingdom

Abstract

This paper re-examines the theoretical basis of disaster studies in order to derive a more up-to-date, practical formulation that can better contribute to risk reduction and emergency planning. It begins by examining the role of context, defined as the amalgam of factors that constitute the milieu of disaster risk but do not directly influence it. The paper argues that the decision making involved in prevention, mitigation and response to disasters is a product of context, which is thus a vital ingredient in the model of disaster risk reduction. As change in the modern world is rapid and profound, there is a need to include foresight scenarios in emergency plans. The past may no longer be a reliable guide to future disasters. Given the momentous changes that are underway in the environment of disasters and risk reduction, it is necessary to re-examine fundamental concepts. Resilience, for example, may prove to be less useful as an operative variable than vulnerability. Complexity and instability will provide constraints and opportunities for the disaster risk reduction of the future.

I. Introduction

In relation to disasters, this paper examines three fundamental concepts: context, foresight and resilience. We live in an epoch of profound change. Some of this is the result of the development of powerful new technologies that human societies are struggling to assimilate. In the human ecological model of disasters (Barrows, 1923; White, 1974) there is a strong emphasis on adaptation to adversity in the social, economic and cultural functions of society. Seldom in human history has there been as great a need for adaptation as there is at present, but the pace of change continues to accelerate. The main purpose of this paper is to investigate how general processes of change in the world affect disaster risk reduction and cause a need for change in the way it is practised. The paper seeks to specify some of the ways in which that change must occur.

II. Context

With few, but notable, exceptions, early studies of the human impact of disasters tended to assume the primacy of hazard (or threat) over vulnerability. Indeed, for many years, 'natural hazards' were by far the dominant paradigm (White, 1974). In a linear model of causality, hazards materialised as impacts. To understand disasters it seemed to be enough to study hazards. The human element of their impacts would take care of itself or be dismissed as a mere consequence of living with hazards. There were exceptions (Prince, 1920), but for decades they gained less traction than did the hazards field.

Despite this, in 1923 a very prominent authority made a plea to work towards a 'human ecology' of hazards (Barrows, 1923), according to which people and their communities had to adapt to the threats and constraints posed by hazards. They had to understand natural phenomena and react to them in such a way as to boost safety and security. However, rather than throwing the emphasis onto vulnerability, this had the effect of increasing the

primacy of hazards because natural phenomena were seen to dictate the way that people adjust their lives and their risk-taking propensities.

A full 60 years later a major attempt was made to reverse the order of influences. Hazards trigger impacts, but these should be measured in terms of how they reveal human vulnerabilities: lives, well-being, livelihoods, property and environment. This was the 'radical critique' of Hewitt and his colleagues (1983). By introducing feedback and treating hazard impacts merely as the trigger of disaster the power to explain extreme events in terms of what they did to individuals and communities was increased. Nevertheless, the hazards paradigm survived the critique and has persisted in many quarters ever since. Its basis was the weak and very American model of man as rationalist, or to be more precise as 'optimiser' or 'satisficer' (Simon 1956) - and it was man, in a very unmodern view of gender. This also left no room for cultural differences and offered little opportunity to explore other ways of thinking about how people viewed the threat and impact of disaster (Butzer, 2012).

Despite the proposition that vulnerability is the essence of disaster risk, for half a century, disaster studies went ahead with a theoretical framework that was largely derived during the heyday of the natural hazards paradigm, the 1960s and 1970s. By the second decade of the 21st century, it risked being completely out of step with a world in which profound changes were taking place. The very least that had to happen was that complexity needed to be introduced into the model. In a society that is dependent on networks for the dissemination of information, commerce and social relations, the disruption of those networks would cause effects to proliferate in the form of cascades of impact (Alexander and Pescaroli, 2019).

Notwithstanding the huge strides that have been made in modelling cascading disasters, systemic risks, coincident impacts and other such mechanisms, there is still a missing element, and that is context (Paul, 2011).

We can define 'context' as the social, economic, cultural, psychological and environmental milieu that surrounds disaster risk and to some degree interacts with it. If necessary, we can disaggregate different types of context. However, overall it should be considered as the sum of elements that have no direct causal relationship with disaster but, paradoxically, are (or should be) essential to any attempt to explain it. Thus context governs or channels the decision making and the actions or reactions that occur in response to disasters or disaster risk (Lavel, 2012).

Unfortunately, it is rare to see context taken fully into account in investigations of disasters. One of the most persistent attitudes is that all we need is to supply decision makers with information on how to reduce disaster risk and it will be reduced. On the contrary, despite enormous increases in the availability of know-how over the years, there has been a failure to bring disaster risk under control. Knowledge may be an essential ingredient of disaster risk reduction but evidently it is not the key. Despite this, there are few studies of why knowledge is not utilised when it is there and ready to provide the solutions to problems. Some of the existing research deals with corruption and its effects (e.g., Escaleras et al., 2007). In fact, corruption is one of the most powerful forms of context because it is insidious and occult, and it debilitates any attempt to make progress in promoting safety against major hazards (Sanderson wt al., 2022).

Having briefly considered the theoretical basis of context in disaster studies, let us now address some of the realities in the modern world.

III. Disasters and the End of the Second Age of Enlightenment

We live in the New Baroque Age. This is the result of remarkable parallels between the culture that gave rise to the original Baroque period and present-day society. My understanding of the Baroque comes from the work of a Spanish historian (Maravall, 1986) who was one of the few people to analyse Baroque culture. The Baroque, which lasted from the early 1600s to the mid-1700s and ended with the Rócoco phase, was fuelled by the tension of opposites. Perhaps the greatest contrast, and the source of much tension and change, is that between extreme wealth and extreme poverty (Allegre, 2007).

It was therefore a culture of great contrasts but also great creativity that stemmed, at least in part, from those contrasts (Topazio, 1977). There are parallels in the 21st century (Gray, 2007). I am not arguing that history repeats itself. Clearly it does not, but it does seem to have its own Circadian rhythms.

The idea of a New Baroque Age was intended to be a key to the interpretation of what is going on in our world, including in disaster studies. However, in the middle of the 2010s, things began to change. The old Baroque partially coincided with the Age of Enlightenment (Whatmore 2023). What we are now seeing is the end of the Second Age of Enlightenment.

As argued above, we cannot understand disasters without understanding their context (Meyer 2008). The degree of influence of context is often fundamental and sometimes overwhelming. For long, we have underestimated or ignored the role of context. For instance, it does not appear in any direct form in the ressure-and-release (PAR) model (Wisner et al., 2004), which is the popular theoretical framework for understanding disasters. To understand disasters we need to look wider than root causes, dynamic pressures and unsafe conditions. We need to look at how society functions. We need to do so because disaster is a social phenomenon and we must try to understand why decisions are made in certain ways. The connection with the ingredients of the PAR model is at first analysis tenuous, but in reality it is profound as we cannot separate decisions and their consequences from the context in which they are made. To do so would be to interpret them as irrational (Slovic et al., 2000).

IV. Foresight

Because we are dealing, not merely with the present, but with the future, we need to exercise foresight. That is not a question of predicting the future but of identifying and evaluating trends and weak signals which could become important. I recall that in the 1960s, when I was finishing school, society's preoccupations were radically different to those that prevail now. Issues that are taken for granted as important now were then unconsidered. To have raised them would have led to ridicule--and in fact in some cases it did. The lesson here is that what concerns us now may not exactly coincide with the main preoccupations in a future moment. Over time, society's priorities shift.

The end of the Second Age of Enlightenment involves rising tension, proliferating authoritarianism (erroneously supposed to be a remedy to the tension but instead fuelling it) and something called anomie (Marks, 1974). Long ago, the French sociologist Emile Durkheim resurrected this ancient word in his investigation into labour (Durkheim 1893). With respect to disasters, we can regard anomie as a loss of the faculty of governance as a result of the abandonment of standards and principles. It is a route to anarchy and incapacity. Governance, a word that in the 14th century simply meant 'government', has accumulated overtones of the public or private corporate control of events and processes. Anomie can be regarded as lack or failure of governance, the system by which our lives are directed (whether democratically or not). It is a consequence of the abandonment of moral purpose.

Consider the current state of society. The birth of social media in the late 2000s was heralded with great optimism (Alexander, 2014). Some still regard the present day as a "golden age of communication", given the ease with which one can achieve interaction with other people--at least for those with free access to the technological means of communicating. Since the mid-2010s social media have been generating 'parallel realities'. A simple mechanism is at work. If enough people espouse an idea, it may not become true in any objective sense, but the idea may acquire a life of its own that invites people to believe it. These 'alternative realities' have begun to proliferate and their "realness" is a function of their ability to disrupt. Hence, simply because something is clearly untrue does not mean that it should not be taken seriously. The power of misinformation is compounded enormously by the ability of modern networks to spread it, and by their relative or absolute lack of governance. There is a robust positive feedback mechanism (i.e., one which is self-reinforcing) by which misinformation or disinformation consolidates itself by inculcating belief among ever more of the credulous. Meanwhile, conditions deteriorate (Venegas-Vera et al., 2020).

Let us start with the United Kingdom. The journalist Rafael Behr (2023) commented rather ironically that British culture is noted for its stoical indifference to suffering--especially the suffering of other people. For decades in Britain there has been a process of transferring wealth from the poor to the rich. There are now 14.4 million people who are poor, including many children. They are often hungry, cold and diseased. Forty per cent of them, including a million children, are destitute, defined as being unable to purchase all the basic necessities of civilised life. This situation has been repeatedly denounced by the United Nations (Alston 2019) but it has continued to worsen. Meanwhile the number of billionaires domiciled in Britain continues to rise. In 2023 there were 177, 24 more than in 2020.

Moving to continental Europe, it is probable that Hungary's espousal of fascism merits ejecting the country from the European Union. The main argument against doing so is that this would be a victory for Russia and would enable the dictatorship of Vladimir Putin to gain a bridgehead in central Europe. A lack of unity between neighbouring countries not only points to a dangerous growth of opposing purposes but also to a failure to govern to the same standards, or in some cases any positive standards at all. It also weakens the collective effort to bring the problem of disasters under control (Dhungana and Curato 2021).

A possible consequence of the deterioration of standards is the growth of an economy that would exploit such a situation. At the global scale, the virtually limitless demand for narcotic drugs has led to a parallel economy of exceptional ruthlessness. Cocaine, for example, devastates tropical environments, especially species-rich rainforests. It kills and impoverishes farmers, starts and propagates wars, and leads to phenomenally high murder rates. Cocaine itself is a highly persistent toxin that contaminates aquatic environments. Hence it is not unreasonable to argue that unregulated cocaine use is, among other things, murder by proxy (Arias and Grisaffi 2021).

About one fifth of the global economy is illicit, and the drug trade represents slightly less than half of that. However, wealth acquired illegitimately is cycled back into the regular global economy by laundering it. With its lax controls, London is the money laundering capital of the world and is further enhanced in this role by its connection to the 12 British territories that are tax havens, including some of the most successful of the 87 such places. In London, 4,629 mafia groups have been identified and the total annual throughput of laundered money is about £90 billion (NCA 2020). The mafias of organised crime thrive by the parallel activities of unfettered criminal activity and apparently legitimate investment in 'clean' activities.

Democracy is in serious retreat around the world. In fact, the bases of organised crime are now more powerful and more stable than those of democratic institutions. In Britain, for example, the country lacks a constitution and an elected upper house. Politics are riddled with corruption and as a result there is very little public trust in politicians. In other countries, a leader can dominate by providing governance (of a sort) for criminal syndicates, corrupt government and the owners of extreme wealth, sometimes labelled oligarchs. These three pillars may be sufficient to rule and run a vast piece of territory autocratically. Meanwhile, the number of fully democratic countries has diminished from 27 to 23, less than 12 per cent of the world's nations. This is important because the governance of disasters depends on human rights, which guarantee access to knowledge and ability to act in favour of disaster risk reduction. Too often the forces that combat disasters are seen as rival forces to those of repressive regimes.

During the Covid pandemic, billionaires enriched themselves at the rate of 24 per cent per year. We are now on the way to the first trillionaire. The imbalance in the global distribution of wealth has not only increased continuously since 1970-1973, in doing so it has accelerated the wealth differential between the extremely rich and the rest of us (Konings et al., 2021). In a decade the number of fully democratic countries in the world has declined from 29 (14.9%) to 23 (11.7%) (Shenkkan and Repucci, 2019). Moreover, COVID-19 was responsible for a significant increase in authoritarianism, repression and human rights violations in 88 countries (45.1%) ((Clay et al., 2022; Chiozza and King, 2022; Elshobake, 2022)). Democracy is important to disaster risk reduction because it allows access to information on disasters and the ability to act in order to reduce their impacts. Lack of democracy reduces a population's resilience.

In 2023 the UK House of Lords set up a select committee to look into British assessment of risk and planning to manage it (House of Lords 2021). In the gathering of knowledge and opinion for the committee's report, 94 witnesses were interviewed. Most of them were public administrators, risk managers, heads of industry and

politicians. Four were novelists. Herein is a lesson. The novelist Frederick Forsyth (who was not one of those interviewed) wrote a spy thriller called *Icon*. This lengthy peroration detailed with surprising accuracy what would happen in Russia over the period 2022-2024: a failed coup d'etat, political incarcerations and assassinations, massive corruption, autocracy and kleptocracy, private armies, and so on. The surprising thing is that it was written and published in 1996 (Forsyth 1996).

Forsyth's foresight was the result of encyclopaedic knowledge of strategic factors at the world scale, very diligent research and absolute precision in writing the story. As with the testimony of the novelists interviewed by the parliamentary committee, it demonstrates that even fiction has a role in seriously assessing the future.

In the context of future disasters, foresight involes the creation (more or less rigorously) of scenarios of future events for the purposes of planning risk reduction and disaster response, as well, perhaps, as recovery processes. There are at least 35 methodologies that can be employed to deliver foresight. They include, for example, counter-factual analysis (Woo, 2018), a structured way of asking "what if?". We need to develop scenarios for possible future events, in suites that vary from 'best case' to worst case'. The scenarios should use systems theory as a means of ensuring formal rigour and should include response as well as the impact of extreme events (Alexander, 2016, Ch. 6).

The process of feeding scenarios into emergency plans provokes some difficult decisions, for example, regarding the size of event for which one can plan. The tendency in emergency planning is to make provision for the sort of event that occurs about once in a decade, or at most, once or twice in a century. It is time to revisit this strategy in the light of the increasing frequency and magnitude of adverse events. Although preparing for enormous events is neither practicable nor affordable, something more can be done and the benefits are bound to outweigh the costs. Such is the velocity of change in threats and hazards that the demonstration of this is likely to occur sooner rather than later.

Rapid change is creating a situation in which there are no longer fixed points on which to base our analysis. Hence, major concepts need to be re-evaluated. One of these is resilience.

V. Resilience

Resilience is an ancient concept, one in fact whose history extends over at least 2090 years (Alexander 2013). It was first used in a scientific manner in the English language in 1625 (Bacon 1624, p. 245). It became popular in disaster risk reduction between 1981 and 2003. Now there are resilience officers in many organisations and it is the official goal of numerous bodies, entire countries even.

The problem is that resilience is an illusion.

Here, I am not trying to discredit attempts to protect people and things against disaster. They are usually perfectly legitimate and justified. However, resilience is a concept that on several levels does not work.

Many studies of resilience in disaster risk reduction use the formulation provided by the Canadian-US ecologist Crawford Stanley Holling (Holling 1973). Indeed, not a few authors have credited Holling with having *invented* the concept of resilience (which at the time was at least 2030 years old). Holling wrote his seminal paper

at a time when two developments were causing much debate in the field of ecology. One was James Lovelock's Gaia hypothesis. Although Lovelock did not publish his full manifesto until 1979 (Lovelock 1979), he did produce papers on aspects of the theory from the beginning of the 1970s. The essence of Gaia is that the earth's natural living systems tend towards equilibrium. They invoke homeostasis. In the early 1970s this idea was much tested on small tropical islands. These have the advantage of rapid vegetative growth and the fact that they are open systems for energy, but not for mass. Holling evoked homeostasis in his formulation. However, once the concept was transferred to social science it met a situation in which systems do not tend towards equilibrium. They suffer constant shocks and they trend. The concept of resilience has been widely misused in disaster studies. Hence its interpretative power is severely limited.

That is one way in which resilience is illusory. Consider a very simple example of another. In the late 2020s a large undersea earthquake occurs off the eastern coast of Honshu roughly at the latitude of Tokyo. A six-metre tsunami is generated. Warning, evacuation and systems of robust sea walls substantially limit the damage and toll of casualties. in fact, the damage and casualties are mainly the result of the shower of long-range missiles launched by North Korea, and the fallout of the Chinese reconquest of Taiwan and some peripheral Japanese islands.

The ability to counter the effect of disasters is a function of the tension of opposites: factors that create vulnerability and those that reduce it (hence the New Baroque Age). The wild card in this process is perception, which can go either way. Gentle reader, you may imagine where it is going during a period of history in which anomie looms. Confirmation of this can be found in the introduction to the midterm review of the Sendai Framework for Disaster Risk Reduction. The head of UNDRR, Ms Mami Mizutori, wrote that in parts of the world progress has stalled and in some cases gone backwards (Mizutori, 2023, p. 5).

I would argue that, in disaster risk reduction, resilience needs a homeostatic mechanism in order to function. If the determinants of stability keep changing (i.e., things trend upwards or downwards) that mechanism is easily lost. For a start 'bounce back' becomes impossible. 'Bounce forward' may be attainable, but only if it is based on highly successful foresight (Manyena et al., 2011).

Dealing with disaster then becomes a matter of constant adaptation, coupled with some 'hardening' in order to resist impacts. The creation of high sea walls along the east coast of Honshu is 'hardening' on an impressive scale that few other countries can or would support with adequate resources (Haphuriwat and Bier 2011).

Resilience should be dispensed with because it gives an illusory sense that safety and security are within our grasp. What, then, is the alternative? The answer is to return to a concept that was paramount for three quarters of the last 40 years: vulnerability. Those of us who have a vested interest in keeping disasters neutral and apolitical tend to cleave to the study of hazards, which in Hewitt's seminal work of 1983 was shown to be the trigger but not the essence of disaster (Hewitt 1983).

Over the years, vulnerability as a concept has had a rougher ride than have hazard and threat. In part this is because much more has been invested in hazard control, while at the same time the factors that create vulnerability have prospered and proliferated. In part it is because we have taken far too narrow a view of

vulnerability. What we need to do is to distinguish *specific vulnerability* (e.g., to floods) from *general vulnerability* (to all other negative threats) and then conjoin them. General vulnerability becomes a context for specific vulnerability. In other words, it is of relatively little use to make a person safe against floods if the person is homeless, unemployed and in poor health. The exercise is likely to fail on the grounds that the safety provided is outweighed by the other threats and hazards that the person undergoes.

VI. Conclusions

In 1953, when I was born, the population of the world was 2.6 billion people. This means that the global total has increased more than threefold during the seven decades that I have been alive. This alone is a major driver of change. It also is a force that impels conflict, competition for resources and exploitation. There is no doubt that the world is becoming more unstable. Hence, as we study disasters or try to reduce their impact we need to think very carefully along two parallel lines. One concerns the role of stability (or more likely *instability*) in the process of providing safety. The other relates to how we may visualise the future, conceived as the environment in which we will have to operate. What constraints and opportunities will it provide, especially in the light of the changing salience of hazards and threats?

There is commonly a tendency "to plan for the disasters of the past rather than those of the future". We need to accept that the former will not be a reliable guide to the latter. This means that we will need to employ all possible means to create the scenarios that enable emergency planning to make us ready to respond to the challenges and disaster impacts that have yet to come.

References

Alexander, D.E. 2013. Resilience and disaster risk reduction: an etymological journey. *Natural Hazards and Earth System Sciences* 13(11): 2707-2716.

Alexander, D.E. 2014. Social media in disaster risk reduction and crisis management. *Science and Engineering Ethics* 20(3): 717-733.

Alexander, D. and G. Pescaroli 2019. What are cascading disasters? *UCL Open: Environment* 2019;(1):03: 1-7.

Alexander, D.E. 2016. *How to Write an Emergency Plan*. Liverpool University Press, Liverpool, 268 pp.

Allegre, M. 2007. Extreme poverty in a wealthy world: what justice demands today. In T. Pogge (ed.) *Freedom from Poverty as a Human Right*. Oxford University PressNew York: 237-254.

Alston, P. 2019. Visit to the United Kingdom of Great Britain and Northern Ireland, Report of the Special Rapporteur on extreme poverty and human rights. United Nations Human Rights Council, Geneva, 21 pp.

Arias, E.D. and T. Grisaffi (eds) 2021. *Cocaine: From Coca Fields to the Streets*. Duke University Press, Raleigh, North Carolina, 371 pp.

Bacon, Francis. 1625. *Sylva Sylvarum, or of Natural History in ten Centuries*, Lee, W., London.

Barrows, H.H. 1923. Geography as human ecology. *Annals of the Association of American Geographers* 13: 1-14.

Behr, R. 2023. Mired in trivia, British political discourse is utterly unfit for times of war. Guardian, 10 October 2023.

Butzer, K.W. 2012. Collapse, environment, and society. *Proceedings of the National Academy of Sciences* 109(10): 3632-3639.

Chiozza, G. and J. King 2022. The state of human rights in a (post) COVID-19 world. *Journal of Human Rights* 21(3): 246-262.

Clay, C.K., M. Abdelwahab, S. Bagwell, M. Barney, E. Burkle, T. Hawley, T.K. Rowden, M. LaVelle, A. Parker and M. Rains 2022. The effect of the COVID-19 pandemic on human rights practices: findings from the Human Rights Measurement Initiative's 2021 Practitioner Survey. *Journal of Human Rights* 21(2): 313-333.

Dhungana, N, and N. Curato 2021. When participation entrenches authoritarian practice: ethnographic investigations of post-disaster governance. *International Journal of Disaster Risk Reduction* 59: 102149, 1-11.

Durkheim, E. 1893. *De la division du travail social*. Presses Universitaires de France, Paris. Translated by W.D. Halls 1997 as *The Division of Labour in Society*. Free Press, New York.

Elshobake, M.R.M. 2022. Human rights violations during the COVID-19 pandemic. *International Journal of Human Rights in Healthcare* 15(4): 324-339.

Escaleras, M., N. Anbarci and C.A. Register 2007. Public sector corruption and major earthquakes: a potentially deadly interaction. *Public Choice* 132: 209-230.

Forsyth, F. 1996. *Icon.* Corgi Books, London, 544 pp.

Gray, J. 2007. *Enlightenment's Wake: Politics and Culture at the Close of the Modern Age*. Routledge, Abingdon, UK, 320 pp.

Haphuriwat, N. and V.M. Bier 2011. Trade-offs between target hardening and overarching protection. *European Journal of Operational Research* 213(1): 320-328.

Hewitt, K., ed. 1983. *Interpretations of Calamity: From the Viewpoint of Human Ecology*. George Allen and Unwin, London, 320 pp.

Holling, C.S 1973. Resilience and stability of ecological systems. *Annual Reviews of Ecological Systems* 4:1-23.

House of Lords 2021. *Preparing for Extreme Risks: Building a Resilient Society*. HL Paper no. 110. Select Committee on Risk Assessment and Risk Planning, House of Lords, London, 127 pp.

Konings, M., L. Adkins, G. Bryant, S. Maalsen and L. Troy 2021. Lock-in and lock-out: COVID-19 and the dynamics of the asset economy. *Journal of Australian Political Economy* 87(1): 20-47.

Lavell, A. 2012. Reflections: advancing development-based interpretations and interventions in disaster risk: Some conceptual and contextual stumbling blocks. *Environmental Hazards* 11(3): 242-246.

Lovelock, J. 1979. *Gaia: A New Look at Life on Earth*. Oxford University Press, Oxford, 176 pp.

Lustig, P. 2015. *Strategic Foresight: Learning from the Future*. Triarchy Press, Charmouth, Dorset, UK, 188 pp.

Manyena, S.B., G. O'Brien, P. O'Keefe and J. Rose 2011. Disaster resilience: a bounce back or bounce forward ability? *Local Environment* 16(5): 417-424.

Maravall, J.A. 1986. *Culture of the Baroque: Analysis of a Historical Structure*. Theory and History of Literature Series. University of Minnesota Press, Minneapolis, 330 pp.

Marks, S.R. 1974. Durkheim's theory of anomie. *American Journal of Sociology* 80(2): 329-363.

Meyer, R. 2008. Why we still fail to learn from disasters. In E. Michel-Kerjan and P. Slovic (eds.) *The Irrational Economist: Future Directions in Behavioral Economics and Risk Management*. Public Affairs Press, New York: 186-199.

Mizutori, M. 2023. *The Report of the Midterm Review of the Sendai Framework for Disaster Risk Reduction, 2015-2030.* United Nations Office for Disaster Risk Reduction, Geneva, 118 pp.

NCA 2020. *National Strategic Assessment of Serious and Organised Crime*. UK National Crime Agency, London, 66 pp.

Paul, B.K. 2011. *Environmental Hazards and Disasters: Contexts, Perspectives and Management*. Wiley, New York, 334 pp.

Prince, S. 1920. *Catastrophe and Social Change: Based Upon a Sociological Study of the Halifax Disaster*. Studies in History, Economics and Public Law no. 94. Colombia University Press, New York, 151 pp.

Sanderson, D., S.S. Patel, M. Loosemore, A. Sharma, K. Gleason and R. Patel 2022. Corruption and disasters in the built environment: a literature review. *Disasters* 46(4): 928-945.

Shenkkan, N. and S. Repucci 2019. Democracy in retreat. *Journal of Democracy* 30(2): 100-114.

Simon, H.A. 1956. Rational choice and the structure of the environment. *Psychological Review* 63: 129-138.

Slovic, P., H. Kunreuther and G.F. White 2000. Decision processes, rationality and adjustment to natural hazards, In P. Slovic (ed.) *The Perception of Risk*. Routledge, Abingdon, UK: 1-19.

Topazio. V.W. 1977. Culture and the Age of Enlightenment. *Rice University Studies* 63(1): 125-133.

Venegas-Vera, A.V. G.B. Colbert and E.V. Lerma 2020. Positive and negative impact of social media in the COVID-19 era. *Reviews in Cardiovascular Medicine* 21(4), 561-564.

Whatmore, R. 2023. *The End of Enlightenment: Empire, Commerce, Crisis*. Penguin, Harmondsworth, 476 pp.

White, G.F. (ed.) 1974. *Natural Hazards: Local, National, Global*. Oxford University Press, New York, 288 pp.

Wisner, B., P. Blaikie, T. Cannon and I. Davis and 2004. *At Risk: Natural Hazards, People's Vulnerability and Disasters* (2nd edition). Routledge, London, 496 pp.

Woo, G. 2018. Counterfactual disaster risk analysis. *Variance: Journal of the Casualty Actuarial Society* 10(2): 279-291.