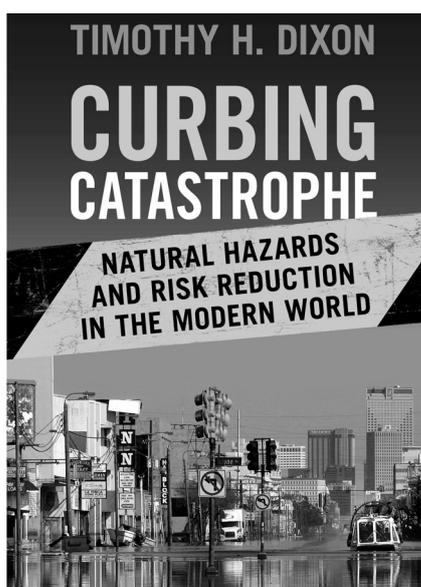


Curbing catastrophe – natural hazards and risk reduction in the modern world, by Timothy H. Dixon, 2017. Cambridge University Press, Cambridge, UK. 300 pages. ISBN 978-1-107-03518-8.



Each and every week the media bring news of natural disasters that take place somewhere on our planet. Some of these receive global attention, such as the 2011 earthquake, tsunami and nuclear power plant failure in Japan, the 2010 Haiti earthquake or the 2004 Indian Ocean tsunami. In such cases, we repeatedly ask ourselves the same questions, ‘Could anything have been done to prevent these or is there anything we may do to do so in future?’. Timothy H. Dixon asked himself the same questions before writing the present tome.

The author is a highly experienced scientist who has been engaged in a number of studies related to natural hazards. For instance, he conducted research prior to the disasters associated with Hurricane Katrina (2005) and the 2010 Haiti earthquake. In both cases, he noted that scientists had knowledge of these hazards, but felt unable to do anything about them, because the general public had no idea and politicians focused on other problems. This experience led him to consider any improvement of communication amongst scientists, decision makers and members of local communities as the main method to reduce the impacts of catastrophes. Dixon finds

communication to be often weak on account of the poor ability of some scientists to get the message across clearly, which is also linked to insufficient interest on the part of the media, the general public and government officials alike. However, there is an additional important problem that affects the perception of information, i.e., time scales. To understand many of the natural hazards, inclusive of increased global warming, there is a need for thinking and acting on the longer term, i.e., longer than the life span of the average human being. Dixon has done a really good job so as to overcome communication problems, and his thought-provoking book certainly is a good example of the proper way of addressing the general public.

The book includes a preface, nine major chapters, a summary and recommendations, references and an index. Additional online supplementary material is also available (<http://labs.cas.usf.edu/geodesy/>). The preface outlines the three main themes of the tome, as related to natural and human-induced hazards, namely: the importance of communication, the importance of understanding long-term processes and time scales (longer than the general human life span) and the economic consequence of disasters.

Chapter 1 discusses examples of recent disasters as a starting point for discussions on the reasons for poor communication between scientists and society with regard to natural processes that lead to disasters. Dixon underlines that, to humans, long-term risks are of little interest. Disasters usually attract attention after they have actually struck, although, as Dixon notes, many of them could have been avoided.

The following chapter provides an easy-to-follow explanation of the basic processes behind the most disastrous hazards: earthquakes, volcanic eruptions, tsunamis, hurricanes and floods. The author concludes that disasters do not occur because earthly processes are completely unexpected, but because humans occupy areas prone to hazards and fail to take appropriate measures. Thus, Dixon

points out that natural and human-made disasters are not that different and often have common contributing factors, e.g., bad design, engineering and management, as well as human failure to consider the long-term scales.

In the next chapter, uncertainty surrounding scientific data and the way of data presentation is considered; non-scientists often have problems in understanding these. This is illustrated by the 2009 earthquake in the L'Aquila area of Italy, when scientists were being threatened by legal action. The focus also is on earthquakes in the next chapter, which discusses the 2011 earthquake in Japan and the concomitant nuclear power plant failure at Fukushima. Not only does this chapter constitute an instructive tale, it also shows how much could be done prior to a disaster in order to avoid it. Knowledge of the potential earthquake and tsunami was available at the time and had been communicated to the relevant authorities and nuclear power plant managers in Japan. Unfortunately, no appropriate action was taken. The author also demonstrates how scientists obtain data from previous earthquakes and tsunamis by using the geological record.

The following chapter (Chapter 5) clearly shows that this tome is not just a review of past disasters, but also provides a general forecast of high-probability future events. It documents a truly fascinating tale of ancient large earthquakes and tsunamis in the Cascadia region of the western United States; a region without any written history of such events, but of very likely occurrence in the near future. Presented in a similar manner are likely hazards to the city of Geneva (Switzerland) and Istanbul (Turkey), along with general advice on mitigation measures that could be taken.

Chapter 6 presents the concept of relative risk by comparison of consequences and costs of usage of various energy sources. Amongst them are nuclear power, solar power, oil and gas and coal. The use of the last-named is discussed from the perspective of negative impacts related to significant air pollution (e.g., with mercury). It is worth underlining, in the author's view, that the World Health Organisation had estimated that a total of 7 million people died in a single year (2012) from all types of pollution, largely due to the burning of fossil fuels. This is a large number, even in comparison with the most deadly earthquakes and tsunamis.

In the next chapter various aspects of coastal flooding are discussed, outlining factors that contribute to these, e.g., sea level rise and coastal subsidence. The story is based mostly on examples of hurricanes that hit the United States coastline, i.e.,

1900 Galveston, 2005 Katrina and 2012 Sandy. The author discusses various impacts of flooding and potential future scenarios. The latter are linked to the next (long) chapter that focuses on aspects of global warming and discusses these within the context of the main themes of the present tome: communication, long-term processes and economic impact. Global warming certainly is one of the most challenging environmental and public-policy issues in the world. However, it is not difficult to find many sceptics. The author stresses that, during discussions on how much modern, human-induced warming differs from earlier natural warming events, we often focus on temperature alone. However, what is unique to modern warming is the rate of change – much faster than previous warming episodes and too fast for numerous ecosystems to adapt.

The last two chapters outline specific solutions and recommendations at various levels. From advice on how to present scientific reports to the general public, through calls for transparency in the media and politics, to proposals of new, independent boards in order to control the development of the energy sectors.

From the above, it is clear that the present book concentrates on both natural and human-induced disasters and explores not only the science of disasters but also the politics and economics behind these. Such a comprehensive approach makes it thought provoking and inspiring. By arguing that many of the worst disasters can be avoided, the author calls for action and suggests several ways of taking action. Some of these are relatively easy and inexpensive, while others are perhaps wishful thinking, but show that there always is a way out.

This well-written book is not a textbook, nor a catalogue of natural disasters – there are many other books to cover such issues in a systematic way (my favorite being *Natural hazards: Earth's processes as hazards, disasters, and catastrophes* by Keller and DeVecchio, published in 2014). However, the reader may also find here a clear introduction in the scientific background of natural hazards, and carefully selected examples. The present book is intended for a general audience. However, I am of the opinion that it may be very fascinating in particular to scientists and students of the geosciences, political studies and journalism. I fully recommend it to anyone who is interested the future fate of our planet.

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