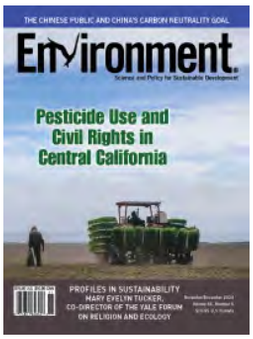

Routledge
Taylor & Francis Group

Environment: Science and Policy for Sustainable Development

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/venv20

Visualizing Disaster Risk Reduction to Inspire Positive Action

Ilan Kelman

To cite this article: Ilan Kelman (2024) Visualizing Disaster Risk Reduction to Inspire Positive Action, Environment: Science and Policy for Sustainable Development, 66:6, 37-44, DOI: 10.1080/00139157.2024.2395798

To link to this article: https://doi.org/10.1080/00139157.2024.2395798

© 2024 The Author(s). Published with license by Taylor & Francis Group, LLC

Published online: 17 Oct 2024.

Submit your article to this journal

View related articles

View Crossmark data

Full Terms & Conditions of access and use can be found at https://www.tandfonline.com/action/journalInformation?journalCode=venv20

Visualizing Disaster Risk Reduction to Inspire Positive Action

Figure 1. Disaster risk reduction (DRR) through COVID-19 instructions at Naples airport, Italy. Similar signage could be seen globally.

by Ilan Kelman

Disasters are easy to visualize and to illustrate: collapsed infrastructure and destitute, hurt, or grieving people. That depiction of disaster aftermath is real and important, although often both sensationalized and sanitized.[1] It rarely indicates what ought to be done about disasters in order to avoid them: namely, disaster risk reduction (DRR) to prevent disasters and lessen their impacts, involving mitigation, preparedness, communication, planning, and especially vulnerability reduction. Typical visual representations of disasters don't show decades of disaster risk science or demonstrate how and why DRR ought to be enacted.[2,3,4]

DRR encompasses a broad remit of policies and actions. They range from infrastructure planning, design, construction, maintenance, and decommissioning through to law promulgation, monitoring, and enforcement. DRR seeks a baseline of social change favoring the poor, marginalized, and oppressed. Many examples have been documented of specific DRR approaches averting a major calamity or reducing its impacts.[5] Visualizing these examples requires text, since photographs offer so much yet so little in communicating specific messages.[6]

Undamaged infrastructure alongside people pursuing their regular lives are usual outcomes when a hazard manifests itself and vulnerability had been reduced beforehand. A disaster was avoided. DRR can be seen in boys and girls learning and playing in school,[7] a functioning and widespread healthcare system,[8] and transparent and honest politics.[9] DRR is not necessarily any more than supporting health and safety—or development, sustainability, and livelihoods.[10,11] DRR is about improving people's day-to-day lives, livelihoods, and lifestyles so that a hazard does not undermine these hard-won achievements. Within this context, photos of people evacuating, being safely sheltered, or instructed how to stay safe can be helpful for these DRR visualizations,

yet do not tell the DRR full story. Avoiding tropes such as "women as victims" is crucial.[12]

This photo essay examines images conveying DRR actions other than response once a hazard occurs (e.g., shuttering windows, receiving vaccinations, or enacting drop-cover-hold during an earthquake). This photo essay asks: How could photos demonstrate DRR before a hazard appears? Each image and caption is intended to be standalone, while the order of the photos narrates an implicit story.

Ilan Kelman

Figure 2. Directions for evacuation in northeastern Japan. Almost identical signs in English are seen along the Pacific Northwest coast of the United States, which is seismically very similar.

Ilan Kelman

Figure 3. A green wall in Rotterdam, the Netherlands, illustrates DRR in absorbing air pollution. The viewer requires prior knowledge of pollution's impacts[13] to understand this DRR contribution. The image does not show an unintended consequence: that during droughts the vegetation dries up and can be a major fire hazard for the building.

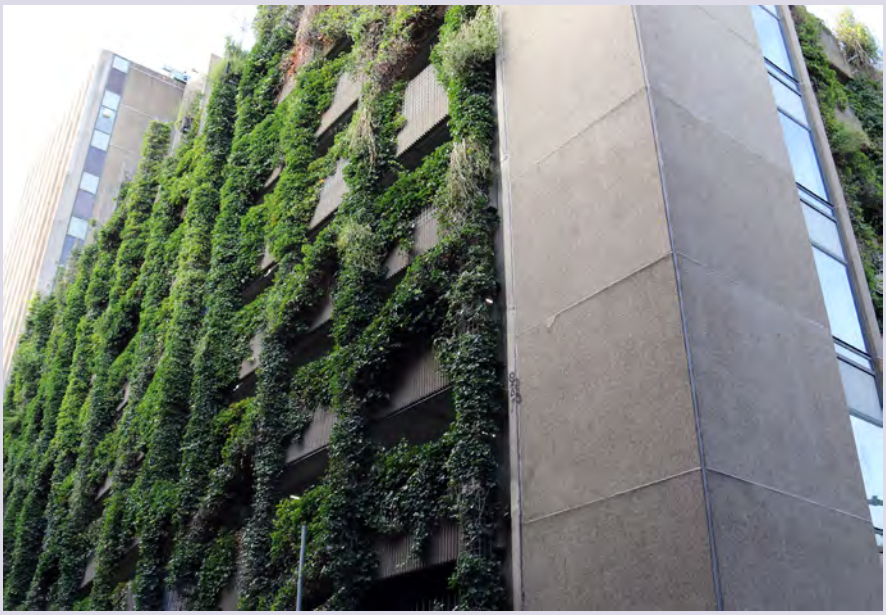

Figure 4. Liechtenstein's fences countering avalanches and blowing snow. Around a hundred people die annually in avalanches in the European Alps,[14] with blowing snow remaining a major hazard for roads.[15] Fences are a common DRR approach, preferably coupled with other actions such as land use changes and evacuation.[16]

Ilan Kelman

Figure 5. A house near Nederland, Colorado, United States, adopted advice from a local group called Wildfire Partners to implement DRR measures for wildfires. Examples are closing or covering wall and roof gaps where embers could drift in, using fewer combustible materials for the house and its features such as the deck, storing woodpiles away from the home, and favoring less combustible vegetation around the house. This house survived the 2016 Cold Springs fire, which swept around it and burned neighboring properties.

Ilan Kelman

Ilan Kelman

Figure 6. In 1954, Hurricane Hazel killed more than 80 people around Ontario, Canada. Around one-third of the deaths were along Toronto's Raymore Drive when houses were destroyed by floods as the Humber River swelled from the rain. In the aftermath, Toronto did not rebuild properties in this floodplain.

Ilan Kelman

Figure 7. A school near Quito, Ecuador, sits in the shadow of an active volcano. The children are taught about the volcanic hazards and what to do when warnings are received. The focus is on hazard identification to know the dangers and on safe evacuation, most notably avoiding zones through which volcanic mudflows (lahars) or ash-and-gas clouds (pyroclastic density currents) would be most likely to flow.

Figure 8. Aotearoa New Zealand's national museum in Wellington, *Te Papa Tongarewa Museum of New Zealand*, uses base isolators to reduce any earthquake shaking experienced by the building. Seismicity is a major hazard for the city, with *Te Papa* flagged as an important building in the context of earthquake safety.[17] One of the base isolators is viewable by the public as an educational display. DRR considerations include the museum's safety from the shaking it would receive, possible liquefaction (when the ground becomes liquid during an earthquake, toppling buildings), and perhaps seiching (when an earthquake sloshes a body of water, here Lambton Harbour, leading to severe coastal flooding).

Ilan Kelman

Figure 9. This building in Sendai, Japan, was structurally engineered to deal with earthquake shaking. One design feature seems visible and clear.[18] Shaking in three dimensions has to be considered. Furthermore, much earthquake-related damage or damage prevention occurs due to hidden features, such as the quality and quantity of cement and rebar for reinforced concrete.[19]

Ilan Kelman

Ilan Kelman

Figure 10. Singapore's Marina Barrage is intended to be DRR through blocking storm surge flooding and controlling reservoirs behind it for freshwater flooding and drought. The absence of small-scale floods and droughts means that DRR measures tend to lapse, so when a large-scale flood or drought occurs, damage is typically greater than would have occurred without the barrage.[20,21] This is not an argument against large structures for DRR. The case here is for explicitness about their impacts and incorporating behavioral changes with the engineering.

Conclusion

The most effective DRR measures enfold into day-to-day life and should become regular and accepted contributors to it.[27,28,29] While corresponding images might seem ordinary and unexciting, portrayals of people from around the world not just surviving but thriving with their environment should be inspiring. DRR is entirely connected to and embedded within wider lifelong processes, often expressed by terms such as

Figure 11. Mangroves in Tonga are DRR by absorbing wave energy, including from sea flooding and tsunamis, although their effectiveness is contextual.[22] When touted as "bioshields," they might induce the same false sense of security as is often observed with the construction of levees, dikes, dams, and barrages.[23,24] In Tonga, mangroves supply traditional medicines, yielding health risk reduction, an example being *Inocarpus fagifer* found along mangrove swamp edges, the bark of which contributes to an infusion for burns and an infusion to help babies with diarrhea.[25] They can also be a source of disease-carrying vectors, with an example being *Aedes* mosquitoes transmitting dengue and Zika viruses.[26]

Ilan Kelman

"development" and "sustainability,"[30,31,32] a point fundamental to some policy.[33,34] Healthy, safe, secure, and sustainable living, livelihoods, and lifestyles are DRR in action.

ORCID

Ilan Kelman http://orcid.org/0000-0002-4191-6969

Ilan Kelman

Figure 12. In south London, UK, the local council left low-lying land as a nature reserve, park, and playground. After heavy rain, the area stores water until it can safely drain, stopping surrounding houses from flooding. The photo illustrates this situation, yet conveys a flooded playground more than DRR. The photo cannot explain how equitable this action is, such as whether or not wealthier areas within a local authority are favored. The photo offers the visible outcome of DRR, but not the social processes enhancing or limiting it.

Ilan Kelman is a professor of disasters and health at University College London, England, and a professor II at the University of Agder, Kristiansand, Norway. His overall research interest is linking disasters and health, integrating climate change into both. Three main areas are (i) disaster diplomacy and health diplomacy (https://www.disasterdiplomacy.org), (ii) island sustainability focusing on safe and healthy living and livelihoods (https://www.islandvulnerability.org), and (iii) risk education for health and disasters (https://www.riskred.org).

© 2024 The Author(s). Published with license by Taylor & Francis Group, LLC

This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial License (http://creativecommons.org/licenses/by-nc/4.0/), which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent.

NOTES

1. F. Hanusch, "Sensationalizing Death? Graphic Disaster Images in the Tabloid and Broadsheet Press," *European Journal of Communication* 28, no. 5 (2013): 497–513.
2. K. Hewitt, ed., Interpretations of Calamity from the Viewpoint of Human Ecology (London: Allen & Unwin, 1983).
3. J. Lewis, *Development in Disaster-Prone Places: Studies of Vulnerability* (London: Intermediate Technology Publications, 1999).
4. B. Wisner, P. Blaikie, T. Cannon, and I. Davis, *At Risk: Natural Hazards, People's Vulnerability and Disasters*, 2nd ed. (London: Routledge, 2004).
5. "Disasters Avoided," https://disastersavoided.com.
6. L. Pozzer-Ardenghi and W.-M. Roth, "Making Sense of Photographs," *Science Education* 89, no. 2 (2005): 219–41.
7. B. Wisner, *Let Our Children Teach Us! A Review of the Role of Education and Knowledge in Disaster Risk Reduction* (Geneva, Switzerland: UNISDR [United Nations International Strategy for Disaster Reduction], 2006).
8. N. Wright, L. Fagan, J. M. Lapitan, R. Kayano, J. Abrahams, Q. Huda, and V. Murray, "Health Emergency and Disaster Risk Management: Five Years into Implementation of the Sendai Framework," *International Journal of Disaster Risk Science* 11, no. 2 (2020): 206–17.
9. J. Lewis, "Housing Construction in Earthquake-Prone Places: Perspectives, Priorities and Projections for Development," *Australian Journal of Emergency Management* 18, no. 2 (2003): 35–44.
10. J. I. Uitto and R. Shaw, *Sustainable Development and Disaster Risk Reduction* (Tokyo: Springer, 2016).
11. J. Mercer, "Disaster Risk Reduction or Climate Change Adaptation: Are We Reinventing the Wheel?," *Journal of International Development* 22, no. 2 (2010), 247–64.
12. M. Childs, "Not Through Women's Eyes: Photo-Essays and the Construction of a Gendered Tsunami Disaster," *Disaster Prevention and Management* 15, no. 1 (2006): 202–12.
13. L. Calderón-Garcidueñas, "21.8 Million People Inside the Most Effective Pollution Exposure Chamber," *Environment: Science and Policy for Sustainable Development* 65, no. 5 (2023): 31–34.
14. F. Techel, F. Jarry, G. Kronthaler, S. Mitterer, P. Nairz, M. Pavšek, M. Valt, and G. Darms, "Avalanche Fatalities in the European Alps: Long-Term Trends and Statistics," *Geographica Helvetica* 71, no. 2 (2016), 147–59.
15. Z. Xie, W. Ma, Y. Ma, Z. Hu, G. Sun, Y. Han, W. Hu, R. Su, and Y. Fan, "Decision Tree-Based Detection of Blowing Snow Events in the European Alps," *Hydrology and Earth System Sciences* 25, no. 7 (2021): 3783–804.
16. S. Fuchs, M. Thöni, M.C. McAlpin, U. Gruber, and M. Bründl, "Avalanche Hazard Mitigation Strategies Assessed by Cost Effectiveness Analyses and Cost Benefit Analyses—Evidence from Davos, Switzerland," *Natural Hazards* 41, no. 1 (2007): 113–29.
17. T. Hoang, I. Noy, O. Filippova, and K. Elwood, "Prioritising Earthquake Retrofitting in Wellington, New Zealand," *Disasters* 45, no. 4 (2021): 968–95.
18. R. Spence and E. So, Why Do Buildings Collapse in Earthquakes? Building for Safety in Seismic Areas (Chichester, UK: Wiley Blackwell, 2021).
19. Lewis, note 9.
20. D. Etkin, "Risk Transference and Related Trends: Driving Forces Towards More Mega-Disasters," *Environmental Hazards* 1, no. 2 (1999): 69–75.
21. G. A. Tobin, "The Levee Love Affair: A Stormy Relationship," *Water Resources Bulletin* 31, no. 3 (1995): 359–67.
22. D. E. Marois and W. J. Mitsch, "Coastal Protection from Tsunamis and Cyclones Provided by Mangrove Wetlands—A Review," *International Journal of Biodiversity Science, Ecosystem Services & Management* 11, no. 1 (2014): 71–83.
23. Etkin, note 20.
24. Tobin, note 21.
25. W. A. Whistler, *Tongan Herbal Medicine* (Honolulu, HI: Isle Botanica, 1992).
26. ESR, "Healthy Tonga Tourism. A Guide to Mosquito-Borne Disease Control for Tourist Accommodation Businesses in Tonga," ESR—Institute of Environmental Science and Research, Auckland, New Zealand, 2015.
27. Hewitt, note 2.
28. Lewis, note 3.
29. Wisner, note 4.
30. Hewitt, note 2.
31. Lewis, note 28.
32. Wisner, note 4.
33. UNDP, *Reducing Disaster Risk: A Challenge for Development*, (New York: UNDP [United Nations Development Programme], 2004).
34. UNISDR, *Living with Risk* (Geneva, Switzerland: UNISDR [United Nations International Strategy for Disaster Reduction], 2004).

Additional Resources

RADIX: Radical Interpretations of Disasters, "Home for Radical Interpretations of Disasters and Radical Solutions," https://www.radixonline.org.

United Nations Office for Disaster Risk Reduction, https://www.undrr.org.