

## ***Interactive comment on “Review article: Natural hazard risk assessments at the global scale” by Philip J. Ward et al.***

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Received and published: 10 February 2020

Thank you for the opportunity to review this valuable & timely effort. For myself & my colleagues at the World Bank, this catalogue will be useful to support and employ risk analytics at global scale. For each of the hazards, the overview of the current state of disaster risk modeling is detailed and comprehensive, and the article's structure will make it a handy reference.

In the discussion of future research challenges & opportunities in section 4, I suggest that the authors include as a subsection a brief mention of work on socio-economic vulnerability and resilience to disasters, at global level. Although socio-economic characteristics are typically left out of the canonical hazard/exposure/vulnerability heuristic

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(line 44), state-of-the-art risk analytics are increasingly moving to include them, as described by the authors throughout the text.

For example, socio-economic heterogeneities are noted as relevant inputs to drought (lines 316, 344) and wildfire risk (lines 346, 356-8), and would likely also be useful to develop representations of landslides (lines 520-24). Deep interdependencies between these hazards' impacts and socio-economic risk factors may be one reason that modeling of these hazards is still relatively rudimentary, suggesting an opportunity for further research.

Similarly, for hazards that have proved more tractable including flooding and earthquakes: the efficacy of DRR measures can depend greatly on socio-economic feedbacks including risk perception (lines 645, 753), social vulnerability (734), and resilience (740). Incorporating these datasets and dynamics will be essential to the development of CBA tools.

As risk analytics achieve greater spatial resolution and theoretical sophistication, socio-economic information layers are increasingly relevant for risk analytics, and essential for DRR applications (even apart from political economy considerations). For these reasons, and to summarize as an opportunity for research the point made throughout the text, I recommend that the authors include a brief note in Section 4. I know that the authors are familiar with this area from their own research, and I suggest as well my colleagues' work on the subject at global scale.

2 additional notes: (line 297) "is" misspelled as "us" (lines 792 & 795) replace "between" with "among"

Ward PJ, Jongman B, Aerts JCJH, Bates PD, Botzen WJW, Diaz Loaiza A, Hallegatte S, Kind JM, Kwadijk J, Scussolini P and Winsemius HC (2017) A global framework for future costs and benefits of river-flood protection in urban areas. *Nature Climate Change* 7, 642–646.

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Hallegatte S, Bangalore M and Vogt-Schilb A (2016) Assessing socioeconomic resilience to floods in 90 countries. World Bank Policy Research Working Paper No. 7663. The World Bank, Washington, DC. Available at <https://ssrn.com/abstract=2781020>.

Hallegatte S, Vogt-Schilb A, Bangalore M and Rozenberg J (2017) Unbreakable: Building the Resilience of the Poor in the Face of Natural Disasters. Washington, DC: World Bank.

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2019-403>, 2019.