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Quantifying co-benefits and potential disbenefits of NBS for Disaster Risk Reduction: a practical framework for ex-ante assessment

Joy Ommer[1,2], Edoardo Bucchignani[3], Laura S. Leo[4], Milan Kalas[1], Saša Vranić[1], Sisay Debele[5], Prashant Kumar[5], Hannah L. Cloke[2], and Silvana Di Sabatino[4]

[1]KAJO s.r.o., Sladkovicova 228/8, 01401 Bytca, Slovakia
[2]Department of Geography and Environmental Science, University of Reading, Reading, United Kingdom
[3]C.I.R.A. Department of Meteorology, Capua CE, Italy
[4]Department of Physics and Astronomy (DIFA), Alma Mater Studiorum-University of Bologna, Bologna, Italy
[5]Global Centre for Clean Air Research (GCARE), Department of Civil and Environmental Engineering, Faculty of Engineering and Physical Sciences, University of Surrey, Guildford GU2 7XH, United Kingdom

Nature-based solutions are increasingly implemented to tackle disaster risk reduction and climate change adaptation. Their rising popularity over grey solutions is partially explained by their number of additional benefits (so called co-benefits) for the socio-ecological system (SES). Frameworks are available to monitor and assess co-benefits, however, these frameworks are lacking clear guidance and ex-ante quantification of co-benefits and potential disbenefits of NBS. Another limitation is the accessibility and quality (representativeness) of data for computing indicators, especially, going towards larger scales (regional, pan-European). To develop a comprehensive framework and method for assessing and estimating possible side effects in advance, this paper aligns to existing frameworks but goes beyond those by providing practical guidance on data sourcing (including possible proxy variables) and quantification of both co-benefits and disbenefits. The resulting framework will support decision-making on area specific suitability of NBS for disaster risk reduction. Furthermore, it will enhance the planners' knowledge and understanding of linked processes which can lead to potential positive and negative side effects; thus, this guidance will build a base for selecting suitable locations and NBS interventions.