

Selected research highlights

Coastal flooding is a potential threat to 20% of global GDP



Coastal flooding may be a threat to assets worth up to 20% of global GDP by 2100, or USD 14.2 trillion. This is included in [a study published in the Nature journal 'Scientific Reports'](#), co-authored by IVM's Sanne Muis.

The regions that will be mostly affected are, according to the authors, north-west Europe, south and south-east Asia, the north-east USA and north Australia. The findings show that, without investments in coastal defences or greenhouse gas emission reductions, coastal flooding can have major impacts on global population and economy. By the end of this century, the land area affected may increase by 48% and the number of people exposed to coastal flooding may increase to 287 million (4.1 % of global population). This is a result of tide and storm events as well as projected regional sea level rise.

The authors combined global data on water levels during extreme storms with projections of sea level rise under different climate scenarios. They used these data to model the maximum sea level that can occur in 2100 and combined this model with topographic data to identify regions at risk of coastal flooding. Using data on population and GDP in the affected areas they were able to estimate the number of people and assets at risk.

Ambitious and interlinked goals needed to protect biodiversity

Global biodiversity policy is at a crossroads. Recent global assessments of living nature and climate show worsening trends and a rapidly narrowing window for action. The Convention on Biological Diversity (CBD) has recently announced that none of the 20 Aichi targets for biodiversity it set in 2010 has been reached and only six have been partially achieved. Against this backdrop, nations are now negotiating the next generation of the CBD's global goals, due for adoption in 2021, which will frame actions of governments and other actors for decades to come.



In response to the goals proposed in the draft post-2020 Global Biodiversity Framework (GBF) made public by the CBD, an international team of biodiversity experts, including IVM's Peter Verburg, has urged negotiators to consider three points that are critical if the agreed goals are to stabilize or reverse nature's decline. First, multiple goals are required because of nature's complexity, with different facets (genes, populations, species, deep evolutionary history, ecosystems, and their contributions to people) having markedly different geographic distributions and responses to human drivers. Second, interlinkages among these facets mean that goals must be defined and developed holistically rather than in isolation, with potential to advance multiple goals simultaneously and minimize trade-offs between them. Third, only the highest level of ambition in setting each goal, and implementing all goals in an integrated manner, will give a realistic chance of stopping — and beginning to reverse — biodiversity loss by 2050.

The team's recommendations were published in [Science](#).

FEATURED RECENT PUBLICATIONS

Dissertations:

Dennis Wagenaar (2 September 2020): [Capturing Complexity: Transferable flood impact models with Machine Learning](#).

Marleen de Ruiter (17 September 2020): [Dynamics of Vulnerability: From single to multi-hazard risk across spatial scales](#).

Jens de Bruijn (29 September 2020): [Natural Hazards in a Digital World: Algorithms for using social media in disaster management](#).

Lisa Sanderink (9 October 2020): [Energising a renewable future: Institutional interactions in the climate-energy nexus and their implications for structure, coherence and effectiveness](#).

Sarah Wolff (14 December 2020): [Mapping ecosystem services demand and its influence on land use change across space and time: Conceptual and methodological contributions](#).

Piero Morseletto (17 December 2020): [Targets for Environmental Governance](#).

Selected journal articles:

Blasch, J., van der Kroon, B., van Beukering, P., Munster, R., Fabiani, S., Nino, P., & Vanino, S. (2020). Farmer preferences for adopting precision farming technologies: a case study from Italy. *European Review of Agricultural Economics*, 1–49. <https://doi.org/10.1093/erae/jbaa031>

Bloemendaal, N., de Moel, H., Muis, S., Haigh, I. D. & Aerts, J. C. J. H. (2020). Estimation of global tropical cyclone wind speed probabilities using the STORM dataset. *Scientific Data*, 7, 1–11. [377]. <https://doi.org/10.1038/s41597-020-00720-x>

De Luca, P., Messori, G., Faranda, D., Ward, P.J. & Coumou, D. (2020). Compound warm-dry and cold-wet events over the Mediterranean. *Earth System Dynamics*, 11(3), 793–805. <https://doi.org/10.5194/esd-11-793-2020>

de Ruig, L.T., Haer, T., de Moel, H., Botzen, W. & Aerts, J.C.J.H. (2020). A micro-scale cost-benefit analysis of building-level flood risk adaptation measures in Los Angeles. *Water Resources and Economics*, 32, [100147]. <https://doi.org/10.1016/j.wre.2019.100147>

Debonne, N., van Vliet, J., Ramkat, R., Snelder, D. & Verburg, P.H. (2021). Farm scale as a driver of agricultural development in the Kenyan Rift Valley. *Agricultural Systems*, 186, [102943]. <https://doi.org/10.1016/j.agsy.2020.102943>

Duijndam, S. & van Beukering, P. (2020). Understanding public concern about climate change in Europe, 2008-2017: The influence of economic factors and right-wing populism. *Climate Policy*. <https://doi.org/10.1080/14693062.2020.1831431>

Climate policy can benefit from observing human behaviour during COVID-19 crisis



The COVID-19 pandemic and climate change share several striking similarities in terms of causes and consequences, and in terms of human behavioural biases towards them. How can we learn from the COVID-19 pandemic experience to make better choices for climate policy? This is discussed in an article by Wouter Botzen, Sem Duijndam, and Pieter van Beukering recently published in [World Development](#).

The COVID-19 and climate crisis share many similarities in terms of causes, such as unsustainable transport and food systems, and consequences, including health risks. By disproportionately affecting deprived communities both problems also intensify existing world inequalities. In addition, both problems can be characterized as low-probability-high consequence risks, which are associated with various behavioural biases that imply that individual behaviour deviates from rational risk assessments by experts and optimal preparedness strategies. In their research, Wouter Botzen and colleagues discuss six important risk-related behavioural biases in the context of individual decision making about these two global challenges to derive lessons for climate policy.

One of these lessons is the need to develop communication strategies that stress the consequences of risks associated with climate change and COVID-19 to ensure that individuals start and keep paying attention. One reason for the high public support for the COVID-19 lockdown measures is the reality of immediate health risks. Therefore, climate communication strategies that emphasize health risks, in particular, may be effective in enhancing support for climate policy. The article also discusses how more sustainable behaviour can be stimulated using communication policies, regulations, and financial incentives that work with, instead of against, the identified behavioural biases. In order to prevent that these policies increase existing world inequalities, securing basic needs and providing financial support for underprivileged people is imperative.

International cooperative initiatives on biodiversity

Bending the curve on biodiversity loss requires everyone to chip in. Luckily, there has been an explosion in the number of cities, regions, companies, indigenous peoples' and civil society organizations, engaging in biodiversity. They join hundreds of international 'cooperative initiatives' for biodiversity, creating new opportunities for a broader 'whole of society' approach to global biodiversity governance, beyond the Convention on Biological Diversity. We know little, however, about the impacts of international cooperative initiatives on biodiversity governance.



IVM researchers Katarzyna Negacz, Oscar Widerberg and Philipp Pattberg, in cooperation with Marcel Kok (Netherlands Environmental Assessment Agency, PBL), have investigated the accountability of international and transnational cooperative initiatives in global biodiversity governance.

The report entitled '[Monitoring, reporting and verification of international cooperative initiatives for biodiversity](#)', analyses how accountability is operationalized across 99 international and transnational biodiversity initiatives, focusing on whether monitoring, reporting and verification (MRV) frameworks are in place. The somewhat surprising results show that more initiatives than expected have monitoring and reporting practices in place. The report is a deliverable of the project '[Global Biodiversity Governance Beyond 2020: The Role of International Cooperative Initiatives](#)'.

Eilander, D., Couason, A., Ikeuchi, H., Muis, S., Yamazaki, D., Winsemius, H.C. & Ward, P.J. (2020). The effect of surge on riverine flood hazard and impact in deltas globally. *Environmental Research Letters*, 15(10), 1–12. [104007]. <https://doi.org/10.1088/1748-9326/ab8ca6>

Funke, N., Huitema, D., Petersen, A. & Nienaber, S. (2020). The Roles of Experts and Expert-Based Information in the Advocacy Coalition Framework: Conceptual and Empirical Considerations Based on the Acid Mine Drainage Case Study in Gauteng, South Africa. *Policy Studies Journal*. <https://doi.org/10.1111/psj.12409>

Hagedoorn, L.C., Koetse, M.J., Van Beukering, P.J.H. & Brander, L.M. (2020). Time equals money? Valuing ecosystem-based adaptation in a developing country context. *Environment and Development Economics*, 25(5), 482–508. <https://doi.org/10.1017/S1355770X20000108>

Hermwille, L. (2020). Hardwired towards transformation? Assessing global climate governance for power sector decarbonization. *Earth System Governance*. <https://doi.org/10.1016/j.esg.2020.100054>

Malek, Ž. & Verburg, P.H. (2020). Mapping global patterns of land use decision-making. *Global Environmental Change*, 65, 1–16. [102170]. <https://doi.org/10.1016/j.gloenvcha.2020.102170>

Nowicki, S., Koehler, J.K.L. & Charles, K. (2020). Including water quality monitoring in rural water services: why safe water requires challenging the quantity versus quality dichotomy. *npj Clean Water*, 3(14), [14]. <https://doi.org/10.1038/s41545-020-0062-x>

Schulze, K., Malek, Z. & Verburg, P.H. (2020). The Impact of Accounting for Future Wood Production in Global Vertebrate Biodiversity Assessments. *Environmental Management*, 66(3), 460–475. <https://doi.org/10.1007/s00267-020-01322-4>

van den Bergh, J. & Botzen, W. (2020). Low-carbon transition is improbable without carbon pricing. *Proceedings of the National Academy of Sciences of the United States of America*, 117(38), 23219–23220. <https://doi.org/10.1073/pnas.2010380117>

Ward, P.J., De Ruiter, M.C., Mård, J., Schröter, K., van Loon, A., Veldkamp, T., von Uexkull, N., Wanders, N., AghaKouchak, A., Arnbjerg-Nielsen, K., Capewell, L., Carmen Llasat, M., Day, R., Dewals, B., Di Baldassarre, G., Huning, L.S., Kreibich, H., Mazzoleni, M., Wens, M. (2020). The need to integrate flood and drought disaster risk reduction strategies. *Water Security*, 11, [100070] <https://doi.org/10.1016/j.wasec.2020.100070>

Wolff, S., Meijer, J., Schulp, C.J.E. & Verburg, P.H. (2020). Contextualizing local landscape initiatives in global change: a scenario study for the high forest zone, Ghana. *Regional Environmental Change*, 20(4), 1–17. [115]. <https://doi.org/10.1007/s10113-020-01701-x>

APPS, TOOLS, MODELS AND DATA

Platform on new clean energy communities
As part of the IVM-led NEWCOMERS project, an online platform for education, awareness-raising, and networking, focusing on new clean energy communities, energy transitions and related topics, has been launched. 'Our Energy' offers short, interactive, multimedia presentations to educate, advise and inspire its users about energy and energy-related topics.

Education news

First edition of online summer school on global energy transition at IVM

25 students from 15 countries received their certificates for successful participation in IVM's first online summer school 'The Global Energy Transition in a Fossil World'. The two-week course was organized by Dr Stephan Slingerland (EPA) and Dr Julia Blasch (EE) and introduced students to the leading theories, concepts, proposed solutions and current governance efforts regarding the global energy transition. The course was organized as a series of lectures and online excursions, in which students had the chance to meet important stakeholders of the energy transition in the Netherlands. Requirements to receive the certificate were participation in the online discussions, a short group presentation and a short essay. Although the online setting was a consequence of travel and contact restrictions due to the pandemic, many students appreciated the setting as it allowed them to follow the course next to other activities and obligations in their home countries. For the IVM team it was a great experience to share interesting discussions with a varied group of students from all fields and backgrounds.

Prizes, awards and grants

Nadia Bloemendaal and **Gabriela Guimarães Nobre** have been successful in the Allianz Climate Risk Research Award competition.

Gabriela Guimarães Nobre has reached sixth place with her research on improving the understanding of linkages between climate extremes and weather-related impacts of floods and droughts. Nadia Bloemendaal won third place with her research on tropical cyclone risk under climate change. The essays of both researchers have been included in a compendium, which can be found [here](#).



Nadia Bloemendaal, **Ivan Haigh**, **Sanne Muis**, **Hans de Moel**, and **Jeroen Aerts** have won the RDNL [Dutch Data Prize 2020](#) in the category technical and exact sciences with their STORM dataset on tropical cyclones.

Anne Van Loon has received a positive decision on her [ERC Starting Grant](#) proposal. The PerfectSTORM ('STORYlines of futuRe extreMes') project will provide five years of funding for research on droughts and floods.

Upcoming events

Friday 5 February, 11.45h: [PhD defence Niels Debonne](#). Thesis title: 'New actors and scales of agriculture: A land system science perspective'.

IVM (Institute for Environmental Studies), Vrije Universiteit Amsterdam produces two newsletters per year to promote and communicate its research activities. They present a series of articles of our researchers on their newest findings in the fields of Chemistry and Biology, Economics, Policy and Governance, and Water and Climate Risk. You are receiving this newsletter because you have been in contact with us recently or in the past. Should you not wish to receive our information in the future please unsubscribe by [clicking here](#) (send the resulting e-mail as it is). If you receive our newsletter indirectly you can subscribe by [clicking here](#) (send the resulting e-mail as it is). For more information please visit our website www.ivm.vu.nl or contact us through info.ivm@vu.nl

Impact of climate change on agriculture

A new software application AIRCCA assesses the impacts of risks and climate change for rainfed maize, wheat and rice yields on a global scale. This model has been developed by Francisco Estrada, Wouter Botzen, and Oscar Calderon-Bustamante and was recently published with an [article](#) in the Journal of Spatial Economic Analysis.

Estimating climate change related river flood damage

IVM's Predrag Ignjačević, Wouter Botzen, Francisco Estrada, Onno Kuik, Philip Ward and Timothy Tiggeloven developed a river flood risk model, CLIMRISK-RIVER, and introduced it into an existing climate-economy integrated assessment model (IAM). It operates on a local scale and can project climate change-related river flood damage for various socioeconomic, climate and flood adaptation scenarios. Their results are published in [Environmental Modeling & Software](#).

STAFF AND ORGANISATIONAL NEWS

Appointments

IVM director Prof. **Pieter van Beukering** was appointed as holder of the portfolio 'Economy' at the [Wadden Academy](#). The appointment will take effect on 1 January 2021 and is for a period of five years.

Philipp Pattberg was appointed as director of the interfaculty [Amsterdam Sustainability Institute \(ASI\)](#) per 1 July 2020.

Hello and goodbye

Over the past months, IVM welcomed a large number of new staff members:

[Johanna Koehler](#) joined IVM as an Assistant Professor of Environmental Policy and Governance. [Sippora Zoutewelle](#) was appointed as the coordinator of the [Amsterdam Sustainability Institute](#). In the framework of the [NEWAVE](#) project, three new PhD students have begun their work at IVM: [Dona Geagea](#), [Stewart Motta](#), and [Nina Valin](#).

[Alessia Matano](#) started as a junior researcher in the Water and Climate Risk (WCR) section. [Marte Siebinga](#) is a new research associate in WCR.

[Ileen Streefkerk](#) and [Rhoda Odongo](#) are new PhD students in the WCR section and [Teun Schrieks](#) in the EE (Environmental Economics) section. All three of them will be working on the [Down2Earth](#) project. [Marijn Ton](#) and [Lars Tierolf](#) also started their PhD careers in WCR, working on the [COASTMOVE](#) project.

The EE staff was furthermore expanded by the arrival of [Elvia Rufo Jimenez](#) as a PhD student and [Lotte van Oosterhout](#) as a junior researcher.

In the Environmental Geography (EG) section, [Camille Venier Cambron](#) is a new PhD student studying biodiversity conservation in times of climate change.

[Ana Cassanti](#), a new lecturer at IVM, will be supporting courses such as Energy and Climate Governance, Food Governance & Sustainability, GIS, and others.

Sean Goodwin left IVM for Spain to start with his PhD research.