

Selected research highlights

Protecting infrastructure against natural disaster damage can save billions



IVM's **Elco Koks** is one of the authors of a recent [article in Nature Communications](#), presenting a global multi-hazard risk analysis of road and railway infrastructure assets. The authors estimate that about 27% of all global road and railway assets are exposed to at least one hazard and some 7.5% of all assets are exposed to a 1/100 year flood event.

Global Expected Annual Damages (EAD) due to direct damage to road and railway assets range from 3.1 to 22 billion US dollars, of which about 73% is caused by surface and river flooding. Global EAD are small relative to global GDP (some 0.02%). However, in some countries EAD reach 0.5 to 1% of GDP annually, which is the same order of magnitude as national transport infrastructure budgets. A cost-benefit analysis suggests that increasing flood protection would have positive returns on around 60% of roads exposed to a 1/100 year flood event.

How non-state actors could 'bend the curve' of biodiversity loss

Recent scientific reports highlight the urgent need to stop biodiversity loss. Governments have failed to implement their commitments under the Convention on Biological Diversity (CBD), with dire consequences for the health of our planet. Ongoing negotiations for a new 'global post-2020 strategy' under the CBD present a window of opportunity to turn the tide.

Researchers from PBL and IVM suggest that a groundswell of cities, regions, companies, and civil society organizations could help 'bend the curve' on biodiversity loss. By mapping and analysing more than 300 international initiatives, they show that thousands of cities, regions, indigenous peoples and local communities, companies, and civil society organisations already engage in conservation and other biodiversity-related activities. Harnessing this 'bottom-up' movement could generate new momentum in the CBD negotiations. At this point, leadership is needed to take the process forward.

The policy brief '[Opportunities for the Action Agenda for Nature and People](#)' by Marcel Kok (PBL), **Oscar Widerberg**, **Katarzyna Negacz**, Cebuan Bliss, and **Philipp Pattberg** (IVM) is an outcome of the BioSTAR-project (Global Biodiversity Governance Beyond 2020: The Role of International Cooperative Initiatives) which is a collaboration between the Institute for Environmental Studies (IVM) and the Netherlands Environmental Assessment Agency (PBL).

Urbanization causes indirect loss of natural areas

Global losses of natural area are primarily attributed to cropland expansion, whereas the role of urban expansion is considered minor. However, urban expansion can induce cropland displacement, potentially leading to a loss of forest elsewhere. The extent of this effect is unknown. A recent [article in Nature Sustainability](#) by IVM's **Jasper van Vliet** shows that indirect forest losses, through cropland displacement, far exceed direct losses from urban expansion. On a global scale, urban land increased from 33.2 to 71.3 million hectares (Mha) between 1992 and



Featured recent publications

Dissertations:

Willem Verhagen (14 June), [Managing our land for multiple ecosystem services](#) – Identifying priority areas and actions to maintain and restore ecosystem services across Europe.

Jarl Kind (19 June), [Drowning by Numbers](#) – Social Welfare, Cost-Benefit Analysis and Flood Risk Management.

Eleni Dellas (24 June), [Sharing Scarce Resources](#) – Membership and allocation in permit trading schemes.

Reinhard Prestele (28 June), [Linking land use and climate](#): the key role of uncertainty and spatial location.

Christine Ornetsmüller (20 September), [Advancing the Representation of Human Dimensions in Large-scale Land Use Models](#) – Case studies for Laos.

Harun Kiruki (5 November), [Fuel at crossroads](#): the role of charcoal making in rural livelihoods, woodland change and ecology.

Inaugural address:

Philip Ward (8 November), [Bending the trend: Towards sustainable flood and drought risk solutions through understanding global disaster risk](#).

Selected journal articles:

Englhardt, J., de Moel, H., Huyck, C.K., de Ruiter, M.C., Aerts, J.C.J.H. & Ward, P.J. (2019). [Enhancement of large-scale flood risk assessments using building-material-based vulnerability curves for an object-based approach in urban and rural areas](#). *Natural Hazards and Earth System Sciences*, 19, 1703–1722.

Hickmann, T., Widerberg, O., Lederer, M. & Pattberg, P. (2019). [The United Nations Framework Convention on Climate Change Secretariat as an orchestrator in global climate policymaking](#). *International Review of Administrative Sciences*.

Hwang, I.C., Tol, R.S.J. & Hofkes, M.W. (2019). [Active Learning and Optimal Climate Policy](#). *Environmental and Resource Economics*, 73(4), 1237–1264.

Kiruki, H., van der Zanden, E.H., Zagaria, C. & Verburg, P.H. (2019). [Sustainable woodland management and livelihood options in a charcoal producing region: An agent-based modelling approach](#). *Journal of Environmental Management*, 248, 109245.

Koks, E.E., Rozenberg, J., Zorn, C., Tariverdi, M., Voudoukas, M., Fraser, S.A., ... Hallegatte, S. (2019). [A global multi-hazard risk analysis of road](#)

2015, leading to a direct loss of 3.3 Mha of forest and an indirect loss of 17.8 to 32.4 Mha. In addition, this urban expansion led to a direct loss of 4.6 Mha of shrubland and an indirect loss of 7.0 to 17.4 Mha. Guiding urban development towards more sustainable trajectories can thus help preserve forest and other natural area at a global scale.

Benefits of investing in nature: the case of the Haringvliet estuary



Photo: Natuurmonumenten

With the 'Dream Fund' project (in Dutch: Droomfondsproject) Haringvliet six Dutch nature organizations invest in Haringvliet's nature, landscape and recreational infrastructure with the idea that a simultaneous improvement of the natural environment of Haringvliet and its recreational use benefits the local economy and regional quality of life. In a study estimating the effects for People, Planet and Profit, the

Institute for Environmental Studies, Blueconomy and

Wageningen University jointly conclude that improvements in the natural environment, better recreational opportunities and a more open dam system in the Haringvliet are beneficial for nature and people.

> [Read more](#)

Education news

Three ERM students investigated value of lagoon on Sint Maarten

The Simpson Bay Lagoon – a Caribbean gem, hub of commerce and activity, and environmental disaster zone all at once – has been the focus of three master students in the ERM (Environment and Resource Management) course. They worked together to research the value of one of the largest inland lagoons in the Caribbean from various angles: social, environmental and economic. Anne Molenaar, Anna Fralikhina and Sem Duijndam reported their findings in their final theses and graduated on 16 September, together with some 50 other ERM students.



> [Read more](#)

Successful IVM Summer Course 'Energy Transition in a Fossil World'



The IVM Summer Course 'Energy Transition in a Fossil World', held from 8 to 19 July 2019, was attended by a broad mix of students from all over the world with an interest in energy transition as well as by practitioners with a long-standing career in energy issues. Guest lecturers and IVM speakers gave the participants a broad overview of all key aspects of the global energy transition, varying from social and geopolitical issues to technical and economic insights.

A variety of work forms assured that the participants did not only receive information, but could also apply it in practice. The four excursions, to Shell, Friends of the Earth Netherlands, the Ministry of Economic Affairs and Climate and to the Amsterdam Energy Cooperative Zuiderlicht, were highly appreciated by the participants.

"Coming from a science background, the course gave me an essential insight into the political, economic and psychological aspects of the energy transition, both through lessons from a wide variety of experts in the field, and from lively debates with my fellow classmates. I could not recommend this summer course more!" (Raoul Rutter, Austria)

"I found the course extremely engaging and inspiring. It was remarkably well structured, covering the most pressing topics, challenges and dilemmas, giving voice to different and prominent actors in Energy Transitions, and promoting a critical analysis through exciting discussions so that we could get a clear insight of our preferred path towards ET. The excursions were an important plus, where we could see the reality of what was learned and discussed in the classroom." (Ana Morgado, Portugal)

"The course was information-packed and inspirational with many top notch guest speakers and different angles to energy transition. After the course I feel I have a better

and railway infrastructure assets. Nature Communications, 10, 2677.

Malek, Z., Douw, B., van Vliet, J., van der Zanden, E. & Verburg, P.H. (2019). Local land-use decision-making in a global context. *Environmental Research Letters, 14*(8).

Morrison, T.H., Adger, W.N., Brown, K., Lemos, M.C., Huitema, D., Phelps, J., ... Hughes, T.P. (2019). The black box of power in polycentric environmental governance. *Global Environmental Change, 57*, 1–8.

Orsini, A., LePrestre, P., Haas, P., Brosig, M., Pattberg, P.H., Widerberg, O.E., ... Chandler, D. (2019). Complex Systems and International Governance. *International Studies Review.*

Pfleiderer, P., Schleussner, C.-F., Kornhuber, K. & Coumou, D. (2019). Summer weather becomes more persistent in a 2 °C world. *Nature Climate Change, 9*, 666–671.

Robinson, P.J. & Botzen, W. (2019). Economic experiments, hypothetical surveys and market data studies of insurance demand against low-probability/high-impact risks: A systematic review of designs, theoretical insights and determinants of demand. *Journal of Economic Surveys.*

Schrodt, F., Bailey, J.J., Kissling, W.D., Rijdsdijk, K.F., Seijmonsbergen, A.C., van, D. Ree, Hjort, J., Lawley, R.S., Williams, C.N., Anderson, M.G., P. Beier, van Beukering, P., ..., Field, R. (2019). Opinion: To advance sustainable stewardship, we must document not only biodiversity but geodiversity. *Proceedings of the National Academy of Sciences of the United States of America, 116*(33), 16155-16158.

Verburg, P.H., Alexander, P., Evans, T., Magliocca, N.R., Malek, Z., Rounsevell, M.D.A. & van Vliet, J. (2019). Beyond land cover change: towards a new generation of land use models. *Current Opinion in Environmental Sustainability, 38*, 77-85.

Staff and organisational news

New faces at IVM (plus familiar ones)

Sem Duijndam joined the Environmental Economics (EE) section as a junior researcher. He will mainly work on the CLAIM project (on solutions for marine plastic pollution).

Bianca Vermeer also joined EE as a PhD student. She will be working on the NEWCOMERS project (on new clean energy communities).

Marije Schaafsma returned to IVM's EE section. She already worked at IVM as an environmental economist between 2005 and 2010, and has meanwhile held positions in the UK at the Universities of East Anglia, Cambridge and Southampton.

Cornelia Fast joined the Environmental Policy Analysis (EPA) section as a junior researcher for the ACTS research project (Action for Climate Transformation in Sweden).

Xiaoran Li is a new PhD student in EPA. She will study China's new role in governing global climate change, and especially its multi-level climate governance situated at different policy levels.

Sadhana Nirandjan started as a PhD student at the Water and Climate Risk (WCR) section. Her research will focus on the risks of coastal flooding on critical infrastructure along the European coast.

understanding of the different players in the energy sector, energy policy as well as the scale and magnitude of change needed to meet the climate targets. All of this is vital for a journalist today.” (Linda Vettanen, Finland)

IVM in the spotlight

Dim Coumou on heat waves

In the wake of record breaking summer temperatures, IVM’s Dim Coumou explained the link between climate change and the pronounced increases in heat waves around the globe, among others on [Dutch television](#) and in the [New York Times](#).



Prizes, awards and grants

The American Geophysical Union (AGU) has awarded **Jeroen Aerts** the Gilbert F. White award in recognition of his original contributions to the natural hazards and disaster risks field. **Sanne Muis** is a recipient of the Natural Hazards Focus Group Award for Graduate Research.

> [Read more](#)

A poster by **Jantsje Mol, Wouter Botzen, Julia Blasch** and **Hans de Moel** was nominated for the ‘best poster award’ at the 2019 SPUDM (Subjective Probability, Utility, and Decision Making) conference. The topic of the poster is ‘[Insights into flood risk misperceptions of homeowners](#)’.

Elco Koks has been awarded a prestigious Veni grant, funded by the Dutch Research Council (NWO). Elco will use the € 250,000 grant to work on improving resilience of global trade to climate extremes.



> [Read more](#)

Jeroen van den Bergh received an honorary doctorate from The Open University of the Netherlands (OU), in recognition of his pioneering contributions to the debate about environmental policy which relies on profound insights obtained by combining elements from behavioural and evolutionary economics with environmental economics. The honorary doctorate was conferred on 26 September 2019, during the celebration of the OU’s 35th anniversary.

At the Foodvalley Summit ‘The Protein Plan(et)’ in Wageningen a ‘Green Protein Lifetime Achievement Award’ was granted to IVM’s **Harry Aiking**.



Paolo De Luca started at WCR as a postdoc position, funded by the [TiPES project](#). The focus of his research will be understanding the causes, mechanisms and impacts of tipping points and associated extremes in the Earth’s system, with a focus over the Mediterranean.

Iris Manola also returned to IVM (WCR section). She worked at IVM already as a postdoctoral researcher between 2015 and 2017. She is now working on LAMACLIMA project and she aims to investigate how land cover changes influence large scale atmospheric variability, using climate models.

Rhian Ebrey is a new junior researcher in WCR. She is working on climate adaptation modelling, focussing on biodiversity and city models. She is also supporting the coordination of the master’s programme Global Environmental Change and Policy.

Raed Hamed also joined as a PhD student at WCR. His research will focus on climate risks for global agricultural production and consequences for the European economy.

Leen Felix joined the Environmental Geography (EG) section as a PhD student on the [Terranova project](#). Her research topic is ‘Trade-offs between culture and nature in landscape development’.

Vita Bakker also joined EG as a PhD student. She will be working on the project ‘Guiding human settlements towards sustainable development’.

IVM is moving

In January 2020, IVM will be moving to a new office on Vrije Universiteit campus. Our new premises will be in the brand new ‘NU’ building, on the 8th floor. Sustainable building materials, maximum energy and water efficiency and a green roof are among the building’s key features.



Upcoming events

Friday, 15 November 2019, 11:45h, Aula Vrije Universiteit Amsterdam: [PhD defence Gabriela Guimarães Nobre](#). Thesis title: ‘*Floods, droughts and climate variability*’.

IVM (Institute for Environmental Studies), Vrije Universiteit Amsterdam produces three 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