



Global Peatland Hotspot Atlas:
The State of the World's Peatlands in Maps
Download the full Global Peatland Hotspot Atlas here



Global greenhouse gas emissions from peatland

GHG emissions from degraded peatlands, estimated at around 1,940 Mt CO₂e annually, account for approximately 4% of global anthropogenic GHG emissions. Water levels play a crucial role, with deeper drainage leading to larger greenhouse gas emissions.



© 2024 United Nations Environment Programme
ISBN: 978-92-807-4197-1
Job Number: DEP/2684/NA
DOI: <https://doi.org/10.59117/20.500.11822/46635>

This publication may be reproduced in whole or in part and in any form for educational or non-profit services without special permission from the copyright holder, provided acknowledgement of the source is made. The United Nations Environment Programme would appreciate receiving a copy of any publication that uses this publication as a source.

No use of this publication may be made for resale or any other commercial purpose whatsoever without prior permission in writing from the Secretariat of the United Nations. Applications for such permission, with a statement of the purpose and extent of the reproduction, should be addressed to: unep-communication-director@un.org.

Disclaimers:

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory or city or its authorities, or concerning the delimitation of its frontiers or boundaries.

Some illustrations or graphics appearing in this publication may have been adapted from content published by third parties to illustrate the authors' own interpretations of the key messages emerging from such third-party illustrations or graphics. In such cases, the material in this publication does not imply the expression of any opinion whatsoever on the part of United Nations Environment Programme concerning the source materials used as a basis for such graphics or illustrations.

Mention of a commercial company or product in this document does not imply endorsement by the United Nations Environment Programme or the authors. The use of information from this document for publicity or advertising is not permitted. Trademark names and symbols are used in an editorial fashion with no intention on infringement of trademark or copyright laws.

The views expressed in this publication are those of the authors and do not necessarily reflect the views of the United Nations Environment Programme. We regret any errors or omissions that may have been unwittingly made.

The boundaries and names shown, and the designations used on the maps provided in this publication do not imply official endorsement or acceptance by the United Nations.

© Maps, photos and illustrations as specified

Suggested Citation

United Nations Environment Programme (2024). Global Peatland Hotspot Atlas: The State of the World's Peatlands in Maps. Visualizing global threats and opportunities for peatland conservation, restoration, and sustainable management. Nairobi.

Production

United Nations Environment Programme (UNEP).
<https://www.unep.org/resources/report/global-peatland-hotspot-atlas-2024>

Supported by:

The Global Peatland Hotspot Atlas is a product supported by the Michael Succow Foundation, partner in the Greifswald Mire Centre, under the umbrella of the Global Peatlands Initiative: Assessing, Measuring and Preserving Peat Carbon project (GPI project) which is funded by the International Climate Initiative (IKI) of Germany.

Supported by:



based on a decision of the German Bundestag



Acknowledgements

The United Nations Environment Programme (UNEP) would like to thank the Greifswald Mire Centre (GMC) for the access to their Global Peatland Database (GPD) and for the production of the Global Peatland Map and all Thematic Maps.



UNEP would also like to thank the Global Peatlands Initiative (GPI) Team for the overall coordination of this Atlas.

Authors

Alexandra Barthelmes (GMC/DUENE e.V.), Cosima Tegetmeyer (GMC/DUENE e.V.), Hans Joosten (GMC/University of Greifswald), Patrick Scheel (UNEP).

Production, Coordination and Review

Patrick Scheel (UNEP), Jan Peters (GMC/MSF), Dianna Kopansky (UNEP).

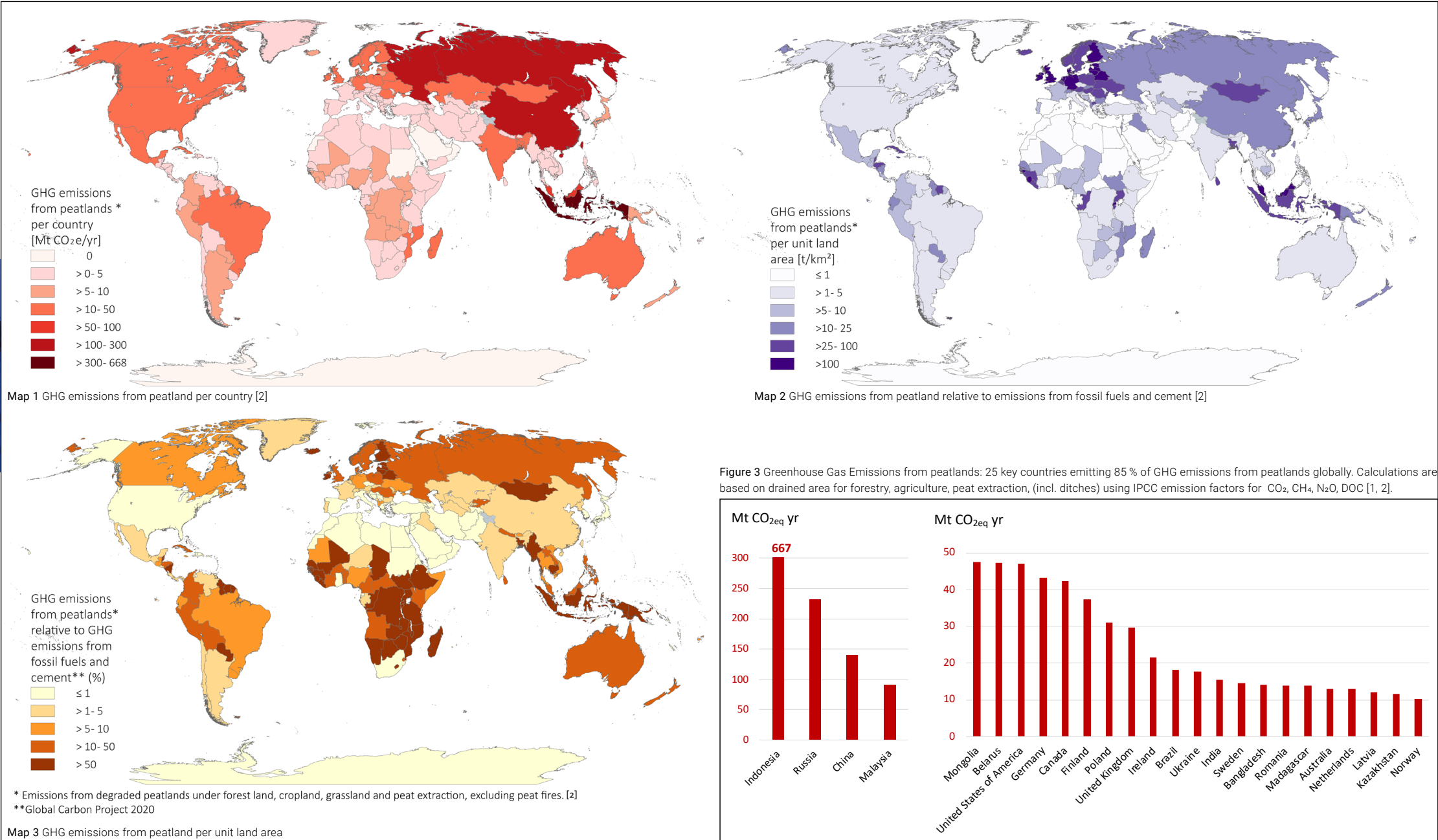
Design and layout

igel+ente, Büro für Gestaltung, Fotografie und Kommunikation Greifswald, Germany
Anna Knüppel & Michael Schröder (www.igelundente.de)
Nora Prinz (www.noraprinz.de)

Thanks also to:

Caroline Borowski, Martha Burckhardt, the Global Peatland Database mapping team, the contributors of the UNEP 2022 Global Peatland Assessment, Susan Gardner, Jane Muriithi, Mónica López Conlon, Cisca Devereux, and Fabrice Inkonyo

Global greenhouse gas emissions from peatland



Degraded mountain peatland, UK © H. Joosten



Smallholder farm, Indonesia © S. Page



Degrading peatland, Iceland © H. Joosten



Degrading peatland, North Korea © H. Joosten



Degrading forested bog, Canada © M. Garneau



Horticulture on degrading peatland, UK © S. Page

GHG emissions from degraded peatland, estimated at around 1,940 Mt CO₂e annually, account for approximately 4 % of global anthropogenic GHG emissions. Water levels play a crucial role, with deeper drainage leading to larger greenhouse gas emissions.

GHG emissions from degraded peatlands under forest land, cropland, grassland and peat extraction (excluding peat fires) are estimated at around 1,940 Mt CO₂e per year, which is about 4 % of total global anthropogenic GHG emissions. Indonesian peatlands emit almost 668 Mt CO₂e per year, followed by the Russian Federation and China with about 230 Mt CO₂e and 140 Mt CO₂e per year, respectively (Figure 3; Map 1 [1, 2]). These three countries contribute half of the total annual GHG emissions from drained organic soils. However, Indonesia is making major efforts to rewet peatlands, which is not yet included in the data presented

here. 85 % of global peat-related GHG emissions are caused by 25 UNFCCC member states that each emit more than 10 million tons of CO₂e per year. These countries are mainly located in Europe, Asia and North America. Madagascar is the only African nation represented, with no countries from South America included. However, this may change with increasing knowledge about peatland distribution and condition increases. Map 3 shows countries with high emissions per unit total national land area, likely indicating a high density of deeply drained peatlands. Map 3 compares emissions from peatlands with emissions from fossil fuels and

cement. It highlights countries where emissions from peatlands contribute significantly to the national GHG budget and should be considered their NDC strategies.

Water plays a crucial role in peatland GHG emissions. There is a clear relationship between mean annual water levels and annual emissions (CO₂, CH₄ and N₂O). The deeper a peatland is drained, the greater the release of greenhouse gases (Figure 1). In the context of climate change mitigation, the optimal mean annual water level depth ranges between 10 and 0 cm below the surface. At higher levels of flooding, CH₄ emissions increase.

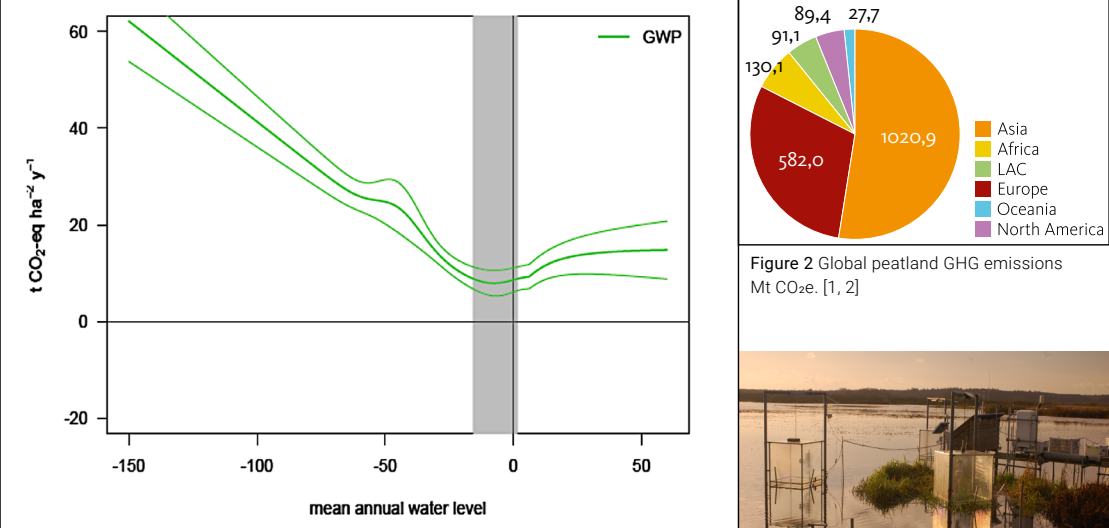


Figure 1 Relationship between mean annual water level (in cm to surface) and GHG emissions in peatlands in temperate Europe.



GHG measurements in peatland, Germany © H. Joosten

Sources: 1. UNEP (2022) Global Peatlands Assessment – The State of the World's Peatlands: Evidence for action toward the conservation, restoration, and sustainable management of peatlands. Main Report. Global Peatlands Initiative. United Nations Environment Programme, Nairobi. 2. Greifwald Mire Centre (2022) Country-wise Global Peatland Emission Database. Statistics for (drained) peatlands and regions.