



## IMCG Bulletin: November 2016

### Word from the Secretary-General



[www.imcg.net](http://www.imcg.net)

Dear mire friends

November 2016 has given a new boost to international mire conservation. The United Nations have at UNFCCC CoP22 in Marrakesh announced the start of the Global Peatlands Initiative (GPI): “the largest effort on peat so far”. GPI aims to increase the conservation, restoration, and sustainable management of peatlands in countries with significant peat deposits. A policy brief for Marrakesh, produced and distributed by the Greifswald Mire Centre and Wetlands International, is attached to this Bulletin. November also provided important publications in high-level scientific journals that underline the enormous negative consequences of peatland drainage for climate change and human health. Read about this and more in this Bulletin.

The expertise and efforts of international mire experts and conservationists are ever more in demand. Therefore we proudly announce the upcoming publication in early 2017 of the IMCG European Mires Book, *the* authoritative overview on distribution, diversity, status and conservation of mires and peatlands in all countries of Europe. Not only relevant for Europe, but - because of the long history of peatland studies in Europe – a guiding framework for peatland classification, regionality, and conservation worldwide. An immense achievement on which very many IMCG members have worked over the past 26 years! Use the one-off opportunity to order your copy of the book for the special IMCG member discount!

Please continue your efforts for mire conservation and wise use: it is necessary more than ever! And share your ideas and experiences with your comrades-in-arms, by sending news and discussion items, relevant photographs and other December contributions (incl. your new papers to be included in the list) by 31 December 2016 to Hans Joosten at [joosten@uni-greifswald.de](mailto:joosten@uni-greifswald.de).

### IMCG News

#### **European Mires Book. In press! With temporary special discount for IMCG members!**

End of January 2017 it will be printed:

**Mires and peatlands of Europe. Status, distribution and conservation.** Edited by Hans Joosten, Franziska Tanneberger & Asbjørn Moen. With contributions of 132 authors. c. 730 pages, 205 figures, 218 tables, 112 colour photos, 21x28cm, c 2.5 kg, bound, English. Price: €94.00. See the summary table of Contents and some figures from the print proofs on the next pages.

All authors will receive a free copy. **IMCG members can order specially discounted copies** for the price of €69.00 + shipping charges (Germany €6.50, other EU-countries €12.20, other countries €14.40). From NOW until the end of January 2017. Order your copies directly at the publisher: [mail@schweizerbart.de](mailto:mail@schweizerbart.de) and mention your IMCG membership! **Use this one-off opportunity** to acquire this IMCG masterpiece.

# Mires and peatlands of Europe: Contents

Foreword by the Council of Europe

Foreword by the International Mire Conservation Group

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Poland  
Portugal  
Romania  
Russian Federation (Eur. part)

Serbia  
Slovakia  
Slovenia  
Spain  
Svalbard  
Sweden  
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Ukraine  
United Kingdom

Acknowledgements

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### References

Table 2.14: Characteristics of hydromorphic mire massif types (after Moen 1973, 1999, Rydin et al. 1999). Dark grey=fen, light grey=bog/hummock, white=hollows (incl. open water), horizontally striped=permafrost, dark circles=trees.

Degree of ombrotrophy of massif	Group	Subgroup	Massif (mesotope)	Site (microtope)	Feature (nanotope)	Name of mire type	Scheme
<b>Bog:</b> >80% ombrotrophic	<b>Raised:</b> distinctly raised over surroundings	<b>Typical:</b> With marginal forest and lagg	Completely domed	Open expanse, mire margin, lagg	Expanse with concentric arrangement of features	<b>Concentric raised bog</b>	
			Flattened dome, reflectional symmetry		Expanse with eccentric arrangement of features sloping into one direction	<b>Eccentric raised bog</b>	
			Flat expanse		Expanse without regular arrangement of features	<b>Plateau bog</b>	
		Little raised	Indistinct separation between expanse, margin and lagg	Expanse covered by trees	<b>Wooded bog</b>		
		<b>Oceanic:</b> No marginal forest, lagg incomplete	Completely domed	Open expanse, ± shrubby margin	No surface patterning in expanse	<b>Percolation bog</b>	
		Fully open complex of amalgamated domed massifs, without distinct borders in between	No clear differentiation in expanse, rand, and lagg	Expanse with hummock/hollows, partly regular features, may include pools/secondary lakes	<b>Atlantic raised bog</b>		
		Steeply domed	Relatively wide rand; narrow lagg along mineral ridge	Small expanse with irregular hummocks and hollows	<b>Rim raised bog</b>		

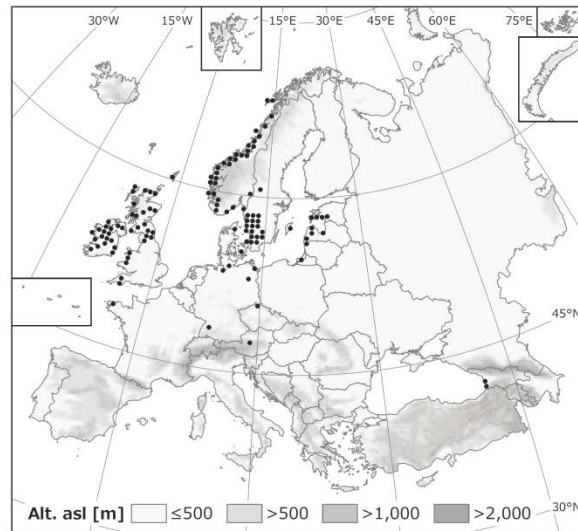
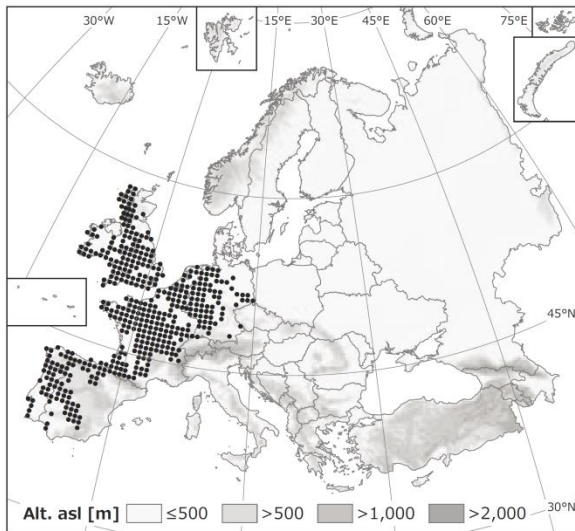


Fig. 4.11: Distribution of strongly western species: *Scutellaria minor* (left; modified after Meusel et al. 1965, 1978, and Meusel & Jäger 1992 and compiled by E. Welk) and *Sphagnum austini* (right; based on Dufort 2012, Flatberg 1984, 2013, Vellak et al. 2013, and I. Rove and D. Michaelis pers. comm.).

### Mires and Peat

The current Impact Factor of Mires and Peat is 1.095, so there is nothing anymore that should withhold you from submitting your next high-quality paper to your own scientific journal and reach a dedicated audience. Find the journal online at <http://mires-and-peat.net/>.

In November 2016 Mires and Peat has published the following articles:

- Cold storage as a method for the long-term preservation of tropical dissolved organic carbon (DOC). (S. Cook, M. Peacock, C.D. Evans, S.E. Page, M. Whelan, V. Gauci and K.L. Khoon) Volume 18: Article 25.

- Genesis and abiotic characteristics of three high-altitude peatlands in the Tien Shan Mountains (Kyrgyzstan), with focus on silty peatland substrates. (R. Müller, T. Heinicke, O. Juschus and J. Zeitz) Volume 18: Article 24.
- Regional patterns and controlling factors in plant species composition and diversity in Canadian lowland coastal bogs and lags. (S.A. Howie, H.J. van Meerveld and R.J. Hebda) Volume 18: Article 23.

Send your new manuscripts on any topic relating to mires, peatlands and peat to the Editor-in-Chief Olivia Bragg: [o.m.bragg@dundee.ac.uk](mailto:o.m.bragg@dundee.ac.uk)

### IMCG field symposium 'Mires of the Northern Part of European Russia' (22 July – 4 August 2017)

Tatiana Minajewa ([tania.minajewa@gmail.com](mailto:tania.minajewa@gmail.com))

Nadezhda Goncharova ([goncharova\\_n@ib.komisc.ru](mailto:goncharova_n@ib.komisc.ru))

Don't forget registering already with Tatiana in case you consider participating!

## News from the regions

### Global

#### Global Peatlands Initiative: new UN initiative to save lives and cut climate change by protecting peatlands

A new global initiative, launched on 17 November 2016 at the United Nations Climate Change Conference (COP 22) in Marrakech, aims to reduce global greenhouse gas emissions and save thousands of lives by protecting peatlands – the largest terrestrial organic soil carbon stock. According to the UN Environment Programme (UNEP), the Global Peatlands Initiative seeks to mobilize governments, international organizations and academia in an effort to protect peatlands, which contain almost 100 times more carbon than tropical forests.

Erik Solheim, head of UN Environment stressed that despite the Paris Agreement, global temperatures will rise over 3 degrees Celsius this century. "This will cause misery and chaos for millions of vulnerable people, so we cannot afford to let any opportunity to reduce emissions slip by," he added. He urged taking action through the Global Peatlands Initiative, as it is "critical we do not reach the tipping point that will see peatlands stop sinking carbon and start spewing it into the atmosphere, destroying any hope we have of controlling climate change."

UNEP said that peatlands are coming under increased threat from conversion for palm oil and pulp wood production, which may result in environmental problems such as enormous fires in Indonesia and Russia in recent years. In recent years, Indonesia has suffered from peat forest fires, resulting in greater emissions than the daily ones from the entire United States economy.

However, emission is not the only negative impact of peatland degradation. The 2015 peat fires in Indonesia may have indirectly killed up to 100,000 people through the toxic haze, in addition to causing \$16.1 billion in economic damage, according to recent studies.

Therefore, with support from over a dozen partners, a UN Environment team launched the largest effort on peat so far, called the Global Peatlands Initiative, which aims to increase the conservation, restoration, and sustainable management of peatlands in countries with significant peat deposits.

The initiative was launched at the Global Landscapes Forum, the leading side event of the UN's COP22 climate change talks. The Global Peatlands Initiative was founded by the governments of Indonesia, Peru, the Republic of Congo, UNEP, the UN Food and Agriculture Organization (FAO), the Joint Research Centre of the European Commission, CIFOR, Wetlands International, UNEP-WCMC, GRID-Arendal, Ramsar Convention on Wetlands, European Space Agency, WRI, Greifswald Mire Centre and StarVision/Satelligence. A webcast of the launch, with Jaime Webbe (UNEP), Erik Solheim (Executive Director UNEP), Martha Rojas-Urrego (Ramsar Secretary-General), and Nazir Foad (head of the Indonesian Peatland Restoration Agency BRG) can be found under: <http://unfccc.cloud.streamworld.de/webcast/global-peatlands-initiative-gpi>

News coverage on the Global Peatlands Initiative:

- <http://uk.reuters.com/article/uk-climate-peatlands-idUKKBN13C2H8>

- [http://www.business-standard.com/article/news-ians/un-environment-programme-launches-initiative-to-save-peatlands-116111701285\\_1.html](http://www.business-standard.com/article/news-ians/un-environment-programme-launches-initiative-to-save-peatlands-116111701285_1.html)
- <http://www.un.org/apps/news/story.asp?NewsID=55585#.WEFSsn3dl6c>
- <http://ens-newswire.com/2016/11/20/cop22-nations-hold-fast-to-paris-climate-accord/>
- <http://blog.cifor.org/46585/cop22-special-why-should-we-care-about-peat?fnl=en>
- [http://www.nature.com/news/malaria-vaccine-peatland-protection-and-a-string-of-satellites-1.21028?WT.mc\\_id=GPL\\_NatureNews](http://www.nature.com/news/malaria-vaccine-peatland-protection-and-a-string-of-satellites-1.21028?WT.mc_id=GPL_NatureNews)
- <http://www.digitaljournal.com/news/environment/global-peatlands-initiative-tackles-climate-change/article/480108>
- <http://newsdog.today/a/article/58337d861290715122482f8e/>
- <http://www.bignewsnetwork.com/news/249489823/new-peatland-coalition-targets-cutting-climate-change-saving-thousands-of-lives>
- <http://news.trust.org/item/20161117182958-ytmbn/>
- <http://www.indialivetoday.com/un-environment-programme-launches-initiative-to-save-peatlands/61911.html>
- <http://www.landscapes.org/glf-marrakesh/pressroom/united-nations-environment-announces-new-initiative-to-save-the-worlds-peatlands/>
- <http://www.ramsar.org/news/global-peatlands-initiative-launched-to-address-climate-change>
- <http://www.santabarbarapost.com/index.php/sid/249489823>
- <http://www.namnewsnetwork.org/v3/read.php?id=MzY5MDg4#>
- <http://www.scandinaviatimes.com/index.php/sid/249476469>
- <http://military-technologies.net/2016/11/30/new-peatland-coalition-targets-cutting-climate-change-saving-thousands-of-lives/>

The GPI and peatlands also featured on other side events in Marrakesh. See presentations under:

- <http://www.slideshare.net/FAOoftheUN/peatlands-data-and-information-what-we-know-and-what-we-need>
- <http://www.landscapes.org/big-win-3-investing-protecting-peatland-ecosystems/>

Keep also an eye on the GPI website: <http://www.globalpeatlands.org/>



*Crops on peatland in Ukraine. Photo: Hans Joosten*

### **Cropland on peat soil producing just 1% of crop calories is responsible for 32% of global cropland emissions**

How will we continue to feed the world while reducing climate-changing greenhouse gas emissions? With demand for food and fiber expected to grow as global population increases and people become richer, reducing GHG emissions from agriculture is imperative. Where do we start? To help answer this pressing question, researchers from the University of Minnesota Institute on the Environment used models and geospatial data to determine which crops and cropping practices are the biggest emissions culprits. In a paper

in Nature Climate Change (<http://www.nature.com/nclimate/journal/vaop/ncurrent/full/nclimate3158.html>) they report that peatland drainage and rice paddy cultivation together contribute about 80 percent of total global cropland GHG emissions. The study focused not only on total emissions but also on emissions intensity, which compares GHG emissions to the corresponding amount of calories produced. Emissions intensity metrics can highlight regions, management practices, and crops as potential foci for climate mitigation. The paper finds a global mean production intensity of  $0.16 \text{ Mg CO}_{2e} \text{ M kcal}^{-1}$ , yet certain cropping practices contribute disproportionately to emissions. Peatland drainage ( $3.7 \text{ Mg CO}_{2e} \text{ M kcal}^{-1}$ ), concentrated in Europe and Indonesia, accounts for 32% of global cropland emissions despite peatlands producing just 1.1% of total crop kilocalories. Methane emissions from rice ( $0.58 \text{ Mg CO}_{2e} \text{ M kcal}^{-1}$ ), a crucial food staple supplying 15% of total crop kilocalories, contribute 48% of cropland emissions, with outsized production intensity in Vietnam.  $\text{N}_2\text{O}$  emissions from N fertilizer application ( $0.033 \text{ Mg CO}_{2e} \text{ M kcal}^{-1}$ ) generate only 20% of cropland emissions. The study finds that current total GHG emissions are largely unrelated to production intensity across crops and countries. Climate mitigation policies should therefore be directed to locations where crops have both high emissions and high intensities: peatlands!

- [http://www.minnesotafarmguide.com/news/crop/study-looks-at-greenhouse-gas-emissions-from-crop-production/article\\_47f464ac-b0fb-11e6-adb0-6be2f8d94f1d.html](http://www.minnesotafarmguide.com/news/crop/study-looks-at-greenhouse-gas-emissions-from-crop-production/article_47f464ac-b0fb-11e6-adb0-6be2f8d94f1d.html)
- <http://www.mndaily.com/article/2016/11/rice-paddies-and-peatlands-contribute-to-global-greenhouse-gases>

### **UNFCCC Executive-Secretary and Ramsar Secretary-General advocate peatland protection**

In an article published just after UNFCCC CoP22 in Marrakesh, Martha Rojas-Urrego, the Ramsar Secretary-General, and Patricia Espinosa, the UNFCCC Executive Secretary, have stressed the importance of protecting peatlands for reducing carbon emissions. Some quotes:

“While the climate-change challenge is immense, so, too, is the opportunity to accelerate sustainable development and ensure a better future for everyone on the planet. Under the Paris agreement, governments have committed to reducing their carbon emissions drastically, in order to keep global warming below 2 degrees Celsius. The vast majority of signatory countries have already presented national action plans for achieving this goal, and these plans will become more ambitious over time. These Nationally Determined Contributions include renewable-energy targets and proposals for sustainable transportation, energy efficiency, and education. In addition, countries should consider adopting policies to manage natural capital better. The Paris agreement itself recognizes the important role that natural ecosystems play in limiting the amount of carbon in the atmosphere, and governments should not neglect such powerful tools.”

Governments will need to take action to conserve existing ecosystems in people-friendly ways. This is particularly true of wetlands, which include all land areas that are covered with water, either seasonally or permanently.

“Peatlands are particularly important. Though they cover only 3 percent of the world’s total surface area, they store twice as much carbon as all forests combined. Peatland soils are composed of carbon that has accumulated for thousands of years; and when peatlands are drained or burned, that carbon is released into the atmosphere. In fact, draining peatlands releases two times more carbon into the atmosphere than the aviation industry does.

In 2015, fires raged across Indonesia’s forested peatlands, raising concerns worldwide about how much carbon was being released into the atmosphere, to say nothing of the far-reaching health effects. Indonesia’s government estimates that peatland fires and deforestation alone account for more than 60 percent of the country’s total greenhouse-gas emissions.

Conserving and restoring peatlands could significantly reduce global  $\text{CO}_2$  emissions, which is why, in 2015, the Nordic Council of Ministers announced a commitment to preserve the region’s peatlands.

Almost half of Nordic countries' peatlands have been lost, and this ecosystem degradation contributes 25 percent of their total carbon emissions."

"The Paris agreement entered fully into force in less than a year. This indicates that there is global momentum for concrete action to address the causes of climate change, as well as its effects, such as the disastrous floods, water shortages, and droughts already afflicting many countries.

That sense of urgency is not surprising. According to UN-Water, 90 percent of all natural hazards are water-related, and they will increase in frequency and intensity as climate change worsens. But natural systems can mitigate them: wetlands act as sponges that reduce flooding and delay the onset of droughts; and mangroves, salt marshes, and coral reefs all act as buffers that protect against storm surges. And wetlands, oceans, and forests do far more than just absorb and store carbon; they also provide fresh water, and are a food source for nearly three billion people."

- <http://www.shanghaidaily.com/opinion/foreign-perspectives/Peatlands-could-help-reduce-carbon-emissions/shdaily.shtml>
- <http://www.livemint.com/Opinion/tXIXq3wPtxEErCij8CCxgM/Mother-nature-versus-climate-change.html>
- <http://www.irishexaminer.com/viewpoints/analysis/making-the-most-of-our-natural-capital-431093.html>
- <http://www.jordantimes.com/opinion/project-syndicate/mother-nature-vs-climate-change>

*"Only a few countries are currently including peatlands' management in their climate change national plans so more peatlands action is needed... Sufficient information is already available on the location and status of peatlands as well as on how to manage and restore them. Conservation of peatlands also supports adaptation and resilience as they regulate water and protects us from disasters."*

Martha Rojas-Urrego, Ramsar Convention Secretary General <http://newsdog.today/a/article/58337d861290715122482f8e/>



*Extensive pulp wood plantations on peatland in Sumatra (Indonesia). Photo: Hans Joosten*

### Reorganisation of the International Peatland Society

In recent years, the International Peatland Society (IPS) has discussed about where the society is heading in the next four years. The outcome of this discussion (which has led to a change from 'Peat' to 'Peatland' in its name) is the IPS Strategic Plan 2016 – 2020 (<http://www.peatsociety.org/sites/default/files/ipstrategy2016-2020june2015.pdf>). IPS recognizes that 'sustainable development' is often compartmentalized as an environmental issue, although it is intended to encompass all three pillars of sustainability and sustainable development, namely, the economy, the environment and society. To reflect the interdependence of the three pillars, IPS has abandoned its existing range of 10 commissions and installed three new ones.

- Peatlands and Economics (Chair Guus van Berckel) with as Expert Groups:
  - Peatlands for agriculture and forestry
  - Peat extracting techniques and technology
  - Peat for growing media and energy
- Peatlands and Society (Chair Marie Kofod-Hansen) with as Expert Groups:
  - Peatlands education, communication and publicity
  - Peatlands culture, human well-being and balneology
  - Peatlands and governance
- Peatlands and Environment (Chair Bernd Hofer):
  - Peatlands and climate
  - Peatland biodiversity (ecology, hydrology and geology)
  - Peatland restoration

<http://www.peatlands.org/about-us/commissions-and-scientific-advisory-board>

### 2016 is set to break even the temperature records of 2015.

It is very likely that 2016 will be the hottest year on record, with global temperatures even higher than the record-breaking temperatures in 2015. Preliminary data shows that 2016's global temperatures are approximately 1.2° Celsius above pre-industrial levels, according to an assessment by the World Meteorological Organization (WMO). <http://public.wmo.int/en/media/press-release/provisional-wmo-statement-status-of-global-climate-2016>

<http://unfccc.cloud.streamworld.de/webcast/us-secretary-of-state-john-kerry>

### Side Events at UNFCCC COP 22

#### Friday, 11 November 2016: Mapping and Understanding Mountains to Achieve the 2030 Agenda

The session, moderated by Simon Rietbergen, FAO, focused on mountain frameworks in the context of climate change. He stressed that food security in mountain areas has decreased over the last decade. Andrew Taber, Executive Director, Mountain Institute, said that mountains have an important economic role in tourism, mining and forestry, provide 60-80% of global freshwater, and shelter a quarter of global terrestrial biodiversity and forests. He noted mountains are recognized in 48 Intended Nationally Determined Contributions (INDCs) and three targets under two Sustainable Development Goals (SDGs). Stressing that even though 40% of people vulnerable to food insecurity live in mountains and that mountains are not mentioned in SDG 2 (zero hunger), he recommended specifically assessing the role of mountains across all the SDGs.

Tilman Hertz, International Climate Initiative, underscored the importance of ecosystem-based adaptation (EbA). He said EbA is a no-regrets measure that delivers many benefits, and is mentioned in 100 NDCs. He described EbA approaches in Chile to reduce avalanches, and in Nepal to reduce erosion rates near roads. He noted that eco-safe roads become cost effective in 12 years due to reduced maintenance costs.

Eric Chavez Betancourt, President, OIKOS, presented on the case of vicuñas in Peru for ecosystem conservation, poverty reduction, development, adaptation and mitigation. He highlighted how, brought back from the brink of extinction, vicuñas provide an opportunity for lifting one million people in Peru out of poverty. Additionally, he noted that protecting vicuñas' natural habitats, grasslands and wetlands provides key ecosystem services,

such as water provision and carbon fixation. He called for Reduced Emissions from Avoided Degradation (READ) to be considered alongside REDD+.

Faya Ahmed, Guinea, noted climate change impacts in Guinea's mountains, including disruptions in rainfall patterns and spread of diseases such as malaria. Ahmed stressed that those impacts are worsened by practices, such as unsustainable farming and forestry, and by the lack of local health services.

Charles Nyandiga, Small Grants Programme of the UN Development Programme and the Global Environment Facility (UNDP/GEF), underscored the central role of local communities in mountain conservation and adaptation strategies. He described examples of traditional crop usage to reverse agriculture degradation, agroforestry practices to reduce flooding and landslides, water management strategies to reduce water scarcity and ecosystem degradation, and ridge-to-reef strategies in Small Island Developing States (SIDS).

In the discussion, participants considered the importance of both EbA and community-based approaches.



*High mountain peatlands in Marcapomacocha, Peru. Photo: Hans Joosten*

## Asia

### **Indonesian fires exposed 69 million to 'killer haze'**

Wildfires in Indonesia and Borneo exposed 69 million people to unhealthy air pollution, new research has shown. A study, published in Scientific Reports ([http://www.nature.com/articles/srep37074?WT.feed\\_name=subjects\\_earth-and-environmental-sciences](http://www.nature.com/articles/srep37074?WT.feed_name=subjects_earth-and-environmental-sciences)), gives the most accurate picture yet of the impact on human health of the wildfires which ripped through forest and peatland in Equatorial Asia during the autumn of 2015. Lead author Dr Paola Crippa from Newcastle University, UK, said: "Our study showed that 69 million people living in Malaysia, Singapore and Indonesia were exposed to unhealthy air quality conditions during the time of the fires – that's more than a quarter of the local population. Our study estimated that between 6,150 and 17,270 premature deaths occurred due to breathing in the polluted air over that short two month period. To put this into perspective, we estimate that around 1 in 6,000 people exposed to the polluted haze from these fires died as a result. The uncertainty in these estimates is mostly due to the lack of medical studies on exposure from extreme air pollution in the area."

The study analysed the levels of particulate matter in the air during the two months of the fires. WHO air quality guidelines state that levels of PM<sub>2.5</sub> – the most dangerous of the tiny toxic particles – should not exceed 25 µg/m<sup>3</sup> in a 24 hour period. During the two month period, levels of PM<sub>2.5</sub> were on average above 70 µg/m<sup>3</sup> with peaks reaching 300 µg/m<sup>3</sup> in densely populated areas such as Singapore.

Professor Dominick Spracklen, a co-author of the study based at the University of Leeds, explained:

“If large fires occurred every year, repeatedly exposing the local population to polluted air, the number of deaths would rise substantially - to as many as 75,000. Our findings are consistent with a recent estimate of the number of deaths that occurred due to long-term exposure to air pollution from these fires.”

The team say it is imperative that action is taken to prevent forest fires and killer haze events in the future. Deforestation and drainage of peatlands makes for very susceptible conditions for fire and new efforts are needed to re-wet peatlands and reduce further deforestation in this region.

<http://environmentalresearchweb.org/cws/article/yournews/67066>



*Hani peatland (Jilin, China) with an area of 1678 ha and an altitude of 900 m a.s.l. Photo: Zhao-Jun Bu*

## China

### Jinlin Province of China finishes peatland carbon bank survey

Zhao-Jun Bu ([buzhaojun@nenu.edu.cn](mailto:buzhaojun@nenu.edu.cn))

As important carbon sequestration terrestrial ecosystems, peatlands have received much attention in China recently. In 2013, a governmental document ‘On Carrying out Carbon Bank Survey in Peatlands of China’ was developed and conveyed by State Forestry Administration. In 2014, Jilin Province was assigned to be one of the experimental units to firstly survey carbon bank of peatlands in China.

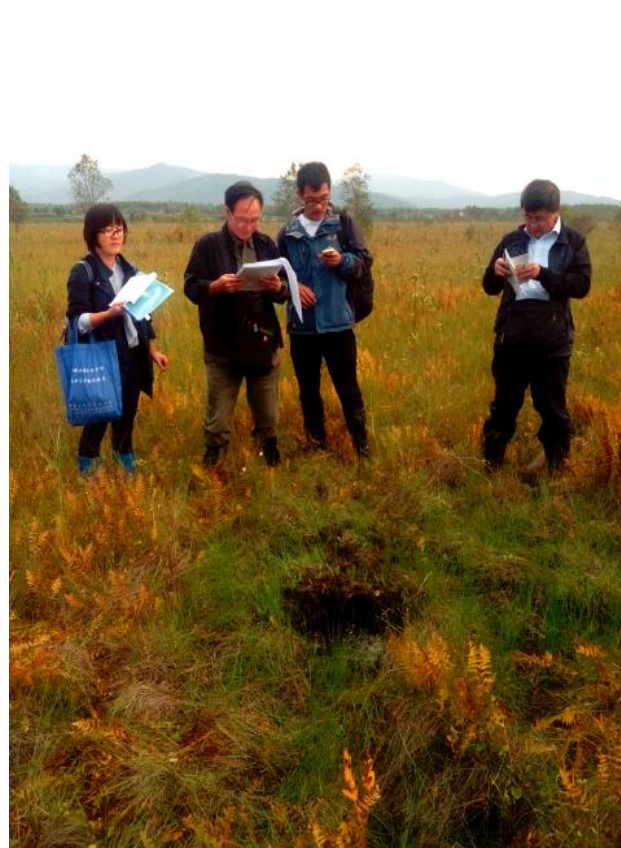


*Location of Jilin Province in China*

The Institute for Forestry Survey and Planning of Jilin Province was the main unit to carry out the investigation whereas the Institute for Peat and Mire Research and the Institute of Northeast Geography and Agricultural Ecology, Chinese Academy of Sciences, were responsible for scientific advisory and support. The studies started in 2014 and took 4 months of field survey. With remote sensing image interpreting, the investigators selected 3,392 mire patches, of which 1,015 patches of mires were investigated and checked in the field. Finally, 873 mires with an area greater than 1 hectare and with peat deeper than 30 cm were identified.

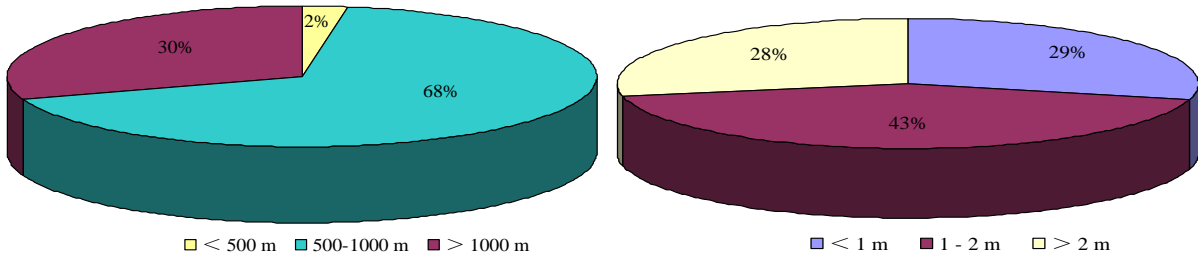


*Investigators taking a peat core in the mire*



*Survey data verification in the field*

In total, there are 23,000 ha of peatlands which accounts for only 1.2 % of the area of the province. The mires were found from the western part with the lowest altitude of 130 m a.s.l to the eastern part with the highest altitude of 1810 m a.s.l. Most peatlands are distributed in the eastern part on altitudes of 500-1000 m a.s.l.



*Altitudinal distribution of peatlands in Jilin Province*

*Peat depth spectrum of the peatlands in Jilin Province*

The average peat depth of each peatland is 0.3-6.3 m and that for whole the province is about 1.3 m. In total, Jilin Province store 18 million soil carbon.

In the province, 9,500 ha peatlands were endangered due to agricultural use, forestry drainage, grazing, construction, peat extraction, etc. while 4,600 ha peatlands were protected as nature reserves. In the future, more peatlands need to be protected and the protection of some peatlands needs to be upgraded.



Xinglong peatland (Jilin, China) with an area of 248 ha and an attitude of 645 m a.s.l.

## Indonesia

### Indonesia proposes three strategies to restore peatlands

The Indonesian Peatland Restoration Agency (BRG) has proposed three strategies to restore peatlands in Indonesia consisting of rewetting the areas through canal blockage and deep well construction, the replanting of peatland-friendly vegetation and the revitalization of livelihoods in areas surrounding peatlands through the development of paludiculture farming systems, fisheries and ecotourism.

The proposal was raised during the Conference of Parties (COP) 22 meeting in Marrakech, Morocco, showing Indonesia's commitment to follow up on last year's Paris agreement.

<http://www.thejakartapost.com/news/2016/11/11/indonesia-proposes-three-strategies-in-cop-22-to-restore-peatlands.html>

#### **Minister allows using village funds for restoring peatland**

Suprayoga Hadi, the Director General of the Ministry of Special Region Development, Underdeveloped Village Development and Transmigration, has announced that village funds may be used for the peatland restoration program. The village funds are allocated mainly for infrastructure projects and people empowerment.

"Infrastructure projects, such as canal blocking, storage reservoirs, irrigation pumps and drainage may use village funds. They will be pushed if villagers need them to restore peatland," Suprayoga said in Jambi on November 5, 2016. The Peatland Restoration Agency (BRG) is aiming to restore peatland in 2,945 villages in seven provinces. <http://en.tempo.co/read/news/2016/11/07/055818205/Minister-Allows-Peatland-Restoration-Using-Village-Funds>

#### **Jambi to build 72 villages as peatland restoration prototype**

Following the Peatland Restoration Agency (BRG) program, the provincial government of Jambi will build 72 villages as models to restore an estimated 150,000 hectares of forest and peatland. These villages, known as "peat villages", will be introduced to sustainable peatland management and encouraged to grow peat-friendly crops, such as coffee and pineapples, to be managed by the national and provincial BRG. "The development of the peat village will be effective to help conserve Jambi's critical peat and forest areas and it is expected to support rural development," Fachrori Umar, Jambi deputy governor, said on 6 November. "Jambi targets to restore 151,662 hectares of peatland over the next five years ... With the 72 peat village developments, we hope that this will promote the restoration," he added. The villages will begin developments in 2017.

<http://www.jakartaglobe.beritasatu.com/news/jambi-build-72-villages-peatland-restoration-prototype/>



*Pineapple cultivation on drained (?) peatland in Sumatra (Indonesia). Photo: Hans Joosten*

### **Palm oil industry under fire as Indonesia's haze drama continues**

Haze from slash-and-burn agricultural has returned to Southeast Asia this year. Is it enough to wait for regulators to bring the (mainly palm oil) culprits to justice? Asian resource legal experts Rick Beckmann and Kresna Panggabean enter the storm: <http://www.confectionerynews.com/Commodities/Indonesia-palm-oil-haze-drama-continues>



*Extensive young oil palm plantations in Sumatra (Indonesia). Photo: Hans Joosten*

"The President's commitment to this issue is clear. The saving of the peatlands, including those peatlands in the Leuser Ecosystem, is a non-negotiable." Minister Siti Nurbaya, November 1, 2016

[http://www.illegal-logging.info/sites/files/chlogging/RAN\\_Protecting\\_The\\_Leuser\\_2016.pdf](http://www.illegal-logging.info/sites/files/chlogging/RAN_Protecting_The_Leuser_2016.pdf)

### **Leuser despite moratorium still exploited by palm oil companies**

The Rainforest Action Network, a California-based environmental group, has released a report showing that palm oil companies operating in the Leuser Ecosystem in Aceh (Sumatra) are still clearing forests despite a national moratorium. The report titled "Protecting the Leuser Ecosystem" ([http://www.illegal-logging.info/sites/files/chlogging/RAN\\_Protecting\\_The\\_Leuser\\_2016.pdf](http://www.illegal-logging.info/sites/files/chlogging/RAN_Protecting_The_Leuser_2016.pdf)) states that Landsat satellite imagery showed palm oil concessionaires clearing 294 hectares of forest between July and September.

"While in July 2016, 38 hectares of forest were lost in Leuser concessions, this increased to 58 hectares in August 2016. September 2016 satellite analysis showed more than a threefold increase over the previous month, with a loss of 199 hectares of forest," the report says. According to the report, 7,187 hectares of forest and peatland were destroyed in Aceh province between January and September. After the moratorium was announced in April, a circular letter was distributed by the Aceh governor in June, proving that palm oil companies are still disregarding the order to halt forest clearance.

"It's hard to adequately express the importance of the Leuser Ecosystem, both to the millions of Acehnese people who depend on it for their livelihoods and clean water, but also for the entire world, as it regulates our climate and provides a home to the last wild populations of Sumatran elephants, orangutans, tigers and rhinos still coexisting in the wild," RAN forest campaigner Chelsea Matthews said in a statement.

"Halting the destruction of forests and peatlands – and stopping the forest fires, often intentionally set to aid the expansion of industrial palm oil development – will reduce Indonesia's carbon footprint, the severity of the annual haze crisis and secure the lives and livelihoods of countless communities," Matthews said.

As palm oil is in high demand in the food industry, RAN warned major global players such as PepsiCo, Kraft Heinz, Nissin Foods, Toyo Suisan and Tyson Foods and Snack Food 20 that they are at a high risk of sourcing palm oil that was grown at the expense of the Leuser Ecosystem. RAN also noted that three palm oil giants, Wilmar, Musim Mas and Golden Agri Resources, play a vital role in combating this issue as their suppliers are in the region, especially by pushing for sustainable palm oil practices, including traceability. "These companies control over 50 percent of the global market and have the ability to make huge impacts in their supply chains," the report said. <http://jakartaglobe.id/news/leuser-still-exploited-palm-oil-companies-despite-moratorium-ngo/>



*Rogue actor digging a drainage canal and clearing the Singkil peatland (Sumatra). August 14, 2016. Photo: Paul Hilton. From: [http://www.illegal-logging.info/sites/files/chlogging/RAN\\_Protecting\\_The\\_Leuser\\_2016.pdf](http://www.illegal-logging.info/sites/files/chlogging/RAN_Protecting_The_Leuser_2016.pdf)*

### **International Symposium towards National Scale Integrated Peatland Restoration Action**

Following the Presidential Regulation on the mandate of the Peatland Restoration Agency (BRG) to facilitate and coordinate the restoration of 2 million hectares of degraded peatlands in seven provinces up to 2020, BRG has done the first step action in mapping the priority peat restoration areas by zoning them into indicative protection zone and cultivation zone. BRG has started to facilitate peatland restoration in a number of provinces this year: Riau, Jambi, South Sumatra, South Kalimantan and Central Kalimantan, while learning from existing peatland restoration activities, including those practiced by traditional and local communities.

Having considered the challenging work to transform from pilot to massive peat restoration scale, BRG organizes an "International Symposium Towards National Scale Integrated Peatland Restoration Action" that will take place on Thursday and Friday / 15-16 December 2016, in Jakarta. For further information:

[peatlandindonesia2016@gmail.com](mailto:peatlandindonesia2016@gmail.com) Desi Mercyaningsih: +62 81210686712





*Illegally cut peat swamp wood from Sembilang National Park (Sumatra) transported via adjacent pulp plantation infrastructure. Photo: Hans Joosten Sept. 6, 2016.*

## Malaysia

### **Sarawak renames Tropical Peat Research Laboratory but persists in fallacies**

The government of Sarawak has always emphasised that development on peat soil, particularly for the palm oil industry, must be carried out in a sustainable manner. Chief Minister Tan Sri Adenan Satem said the government set up its Tropical Peat Research Laboratory (TPRL) in 2008 with the objective of developing scientific and technical knowledge on the sustainability of oil palm cultivation in tropical heat. "The challenge that we face today is that tropical peat land compared to other soil type is still quite an understudied soil. "As a result, there have been numerous political and public slurs and slander made by NGOs against the state, creating confusion on understanding and appreciation of tropical peat land," he said on November 7, 2016, at the official opening of the TPRL complex renamed as Tropical Peat Research Institute. Adenan's speech was read out by Second Resource Planning and Environment Minister Datuk Amar Awang Tengah Ali Hasan. Adenan added that many of the allegations were based on studies equating tropical peat with temperate peat, which was less complex than tropical peat. He said researches conducted in the institute has enabled the state to credibly defend its action to develop peat land with empirical evidence to prove that carbon dioxide emanating from peat with oil palm plantations is lower than what it is as an unused wasteland. Such 'wasteland', he added, was therefore better off developed with systematic and profitable agriculture for their benefit. The decision to use peat land has allowed development of oil palm plantations, which has become one of the fastest growing industries and major contributor to the state's export value.

Institute director Dr Lulie Melling is optimistic that the complex will become more productive in contributing towards the sustainable utilisation of peat land for oil palm, pineapple and other cash crops for greater economic benefits to the state and people. "In today's global criticism against palm oil trade, scientific data is very important and crucial to clarify and debunk any misunderstanding or distorted information. "The R&D output of the institute strives to provide the fundamental science to develop standard operating procedures

and code of practice for the management and sustainable exploitation of tropical peat land for planting of oil palm and other cash crops,” she said.

Approximately 1.6 million ha or 13% of the total land area in Sarawak consists of coastal peatlands. The Tropical Peat Research Institute complex, completed in October last year, can accommodate 50 scientists and 150 supporting staff.

<http://www.thestar.com.my/metro/community/2016/11/08/focus-on-sustainable-projects-on-peat-soil-cm-the-need-to-understand-soil-secrets-is-important/>

<http://www.theborneopost.com/2016/11/08/adenan-unlock-the-secrets-of-tropical-peat/>

<http://www.newsarawaktribune.com/news/60565/PEATLAND-LAST-FRONTIER-OF-ARABLE-LAND/>

<http://www.lifespaceconnect.com/peatland-is-states-last-frontier-of-arable-land-awg-tengah/>

See also the rebuttal of the false sustainability claims of oil palm and other crops on drained peatland:

<http://onlinelibrary.wiley.com/doi/10.1111/gcb.13516/epdf>

*“Peatland is the last frontier of arable land, not only in Sarawak, but in the country”.*

Chief Minister of Sarawak Tan Sri Adenan Satem, Nov. 7, 2016



*Pineapple cultivation on drained peatland in Sumatra (Indonesia). Photo: Hans Joosten*

### **Pressing need to increase pineapple output**

Malaysia can only meet the rising demand for pineapple in overseas markets if it shifts the cultivation of the fruit from peatlands to hilly areas, according to the Malaysian Pineapple Industry Board (MPIB). Its director-general Sahdan Salim said while pineapple was traditionally grown on peat soil, it has been found that hilly areas were far more suitable for the commercial cultivation of the fruit, whose export market was projected to grow at five per cent per annum. Sahdan added that there was a pressing need to increase Malaysia's pineapple output in view of the rising demand worldwide, especially in China. "Pineapple plantations in hilly areas not only yield higher quality fruits but are easier to maintain too. On the other hand, peatlands are more difficult to take care of as weeds tend to flourish there and they are easily hit by floods as well.

Johor has 9,675 hectares (ha) of pineapple plantations, followed by Sarawak with 1,805 ha, Sabah (763 ha), Kedah (513 ha), Pahang (492 ha) and Selangor (446 ha). Sahdan said there was a need to increase the acreage

for the MD2 variety to meet the demand from overseas markets, especially China which has taken a liking for this particular pineapple. [http://www.bernama.com.my/bernama/state\\_news/news.php?cat=st&id=1303195](http://www.bernama.com.my/bernama/state_news/news.php?cat=st&id=1303195)

## Russia / Siberia

### **INTERNATIONAL CONFERENCE “Carbon Balance of Western Siberian Mires in the Context of Climate Change”**

Yugra State University, Khanty-Mansiysk, Russia is happy to host the 5th International field symposium “West Siberian Peatlands and Carbon Cycle: Past and Present” and the International conference “Carbon Balance of Western Siberian Mires in the Context of Climate Change” on 19-29 June, 2017.

Key topics:

- Biogeochemical cycles of natural and disturbed peatland ecosystems, their role in the global cycle of carbon and greenhouse gases
- Role of mires in biological biodiversity
- Palaeoecology and history of development of peatland ecosystems
- Remote sensing of peatland ecosystems and processes
- Protection of mires, reclamation and restoration
- Environmental monitoring of peatland ecosystems and processes
- Modeling of climate change at different spatial scales.

The program of the Symposium and Conference will include a trip to the natural park Kondinskiye Lakes, 450 km to the west from Khanty-Mansiysk, sessions and meetings, an excursion to the international field station Mukhrino and a trip to peat bogs of the northern taiga near Noyabrsk (Yamal-Nenets Autonomous Okrug).

Working languages are Russian and English. More information: <https://mukhrinostation.com/projects/wspcc-2017/>



## Europe

### European Union

#### **European Commission confirms EU nature protection laws will be saved**

European Commission President Jean-Claude Juncker and his Commission have confirmed, that the EU's flagship nature laws – the Birds and Habitats Directives – will be saved and not rewritten and weakened, ending two years of uncertainty over the laws' future. They have also called for a plan to better implement these laws.

The Directives are vital for Europe's nature conservation policy, safeguarding more than 1,400 threatened species and one million square kilometres of natural habitats in Europe that fall under their protection and as such, their implementation needs to be improved. This was one of the findings of the extensive evaluation the

Commission has been carrying out since late 2014 in which it has been consulting citizens and stakeholders across all EU Member States. A record-breaking 520,325 (!!!) citizens took part in the European Commission's consultation on the Directives in 2015, calling for the Directives to be saved and better implemented, contributing to the largest response to any Commission consultation to date. On December 7, First Vice-President Timmermans, Vice-President Katainen and Commissioner Vella presented the key findings of this evaluation. The challenges and problems identified primarily relate to the insufficient management and lack of adequate investment in the Natura 2000 network of protected sites, as well as to local deficiencies such as delays, unnecessary burdens for project permits and lack of adequate different assessments in regulating individual species. The evaluation identified the need to improve the implementation of the Directives and their coherence with broader socio-economic objectives, including other EU policy areas such as energy, agriculture and fisheries. On the basis of today's Orientation Debate, the Commission will develop an Action Plan to correct the deficiencies encountered in the implementation of the Birds and Habitats Directives. Environmental NGOs have welcomed the decision and also emphasise that the tough work still lies ahead to turn this decision into a real victory for nature – by coming forward with strong proposals to implement and enforce these laws and tackle the drivers of nature loss, notably industrial agriculture.

<http://www.foeeurope.org/nature-dodges-bullet-huge-campaign-saves-nature-laws-071216>

[http://europa.eu/rapid/press-release\\_MEX-16-4308\\_en.htm](http://europa.eu/rapid/press-release_MEX-16-4308_en.htm)

[https://www.theguardian.com/environment/2016/dec/07/eu-nature-directives-birds-habitats-directives?CMP=share\\_btn\\_tw](https://www.theguardian.com/environment/2016/dec/07/eu-nature-directives-birds-habitats-directives?CMP=share_btn_tw)

## Germany

### **Germany adopts long-term low greenhouse gas emissions development strategy including peatland**

Germany is the first country to present a detailed long-term low greenhouse gas emissions development strategy outlining how it intends to decarbonise its economy. The plan includes interim targets for 2030, broken down by individual sectors: power, industry, transport, buildings and agriculture. This gives citizens, companies and investors the clarity they need. Germany also recognises its international responsibility, placing the plan (which includes an explicit reference to international climate finance and support for developing countries to implement their NDCs) in the context of the Sustainable Development Goals.

This has to be a short hug, though: Germany has to get back to work. Fossil lobbyists were successful in stripping many good elements from the draft plan. There are quite a few gaps in the document that need to be strengthened, especially the headline targets—a range between 80 and 95% reduction by 2050—that are still not enough to deliver Germany's share of the global effort urgently needed to limit warming to 1.5°C. And coal... The plan's targets can only be achieved if Germany phases out coal. But the government lacked the courage to explicitly say so. This only creates uncertainty and makes a just transition more difficult to organise.

A laudable element is the mentioned conservation of peatlands, a promising sign that the federal government acknowledges the problem of peatland drainage. An analysis of the peat component in the plan by the Greifswald Mire Centre shows, however, that in spite of first positive steps towards peatland conservation as an effective contribution to climate change mitigation in the land sector, concrete targets for land use and forestry are lacking and therewith also for emissions from organic soils. Relevant peatland conservation actions have to be developed and substantiated in dialogue with all stakeholders. Only in that way the ultimate aim of carbon neutrality by 2050 can be reached. See for an analysis of the peatland component in the plan:

[http://greifswaldmoor.de/files/images/pdfs/Moore%20im%20Klimaschutzplan%202050\\_Greifswald%20Moor%20Centrum.pdf](http://greifswaldmoor.de/files/images/pdfs/Moore%20im%20Klimaschutzplan%202050_Greifswald%20Moor%20Centrum.pdf)

### **RRR2017: Paludiculture Conference week in Greifswald**

In the light of the great potential of peatland rewetting for climate change mitigation, innovative land use concepts for wet peatlands are crucial. The first RRR conference on the utilisation of wetland plants ([www.paludiculture.com](http://www.paludiculture.com)) was held in 2013 in Greifswald. The partners in the Greifswald Mire Centre warmly invite you to join this dialogue and to use the RRR conference week as a platform for exchange. The week includes a national conference "Paludiculture in Germany", excursions, an international conference on paludiculture, and an international workshop on Sphagnum farming. More information on [www.rrr2017.com](http://www.rrr2017.com).

The international conference “Renewable resources from wet and rewetted peatlands” takes place from September 26th to 28th 2017. This conference brings together the various actors from research, governance and practice that deal with the utilisation of wetland plants from all over the world. The focus is on paludiculture, i.e. agriculture and forestry on wet or rewetted peatlands. The main objectives of the conference are building and fostering networks, exchanging experience and information as well as identifying research demands. Therefore, this conference addresses scientists, land owners, land users and environmentalists alike.

The key topics are:

- Greenhouse gas emissions and other climate effects
- Biodiversity
- Nutrient cycling, retention and removal
- Water retention and flood control
- Species: productivity, genetics, physiology
- Biomass to product
- Economics & life cycle assessment
- Legal and policy framework: incentives & constraints
- Case studies

Submissions of abstracts for oral or poster presentations are welcome before 28th February 2017. Register for the national and/or international conference and for excursions at [www.rrr2017.com](http://www.rrr2017.com).

*Paludiculture machinery exhibition at the market place of Greifswald at RRR2013. Photo: lensescape.org*



**GREIFSWALD  
MIRE  
CENTRE**



## Ireland

### **IPCC launch new education pack- bringing peatlands to primary schools**

The Irish Peatland Conservation Council (IPCC) has launched the ‘Discovering the Wild Bogs of Ireland Primary Schools Education Pack’. The pack was written by the education team at the IPCC who have over 30 years experience in the delivery of educational resources to schools. The pack contains cross-curricular worksheets for primary school students. These worksheets are age appropriate and take a spiral approach to teaching students about peatlands with 4 worksheet booklets available as follows: Junior/Senior Infants, 1st/2nd class, 3rd/4th class and 5th/6th class. This will ensure that children expand on their knowledge and understanding of peatlands as they progress through school. Each booklet contains 12-23 pages with original artwork and exercises appropriate to the cognitive stage of the students.

The worksheets focus on Geography and Science exploring bogs but also include activities that will develop student’s skills in literacy and numeracy – key priorities in all primary schools. The senior worksheets also offer students practical investigations that can be undertaken in the classroom using the new teaching approach of practice in enquiry-based science education. These worksheets are now available to download at [www.ipcc.ie/discover-and-learn/resources/](http://www.ipcc.ie/discover-and-learn/resources/) For further information about the ‘Discovering the Wild Bogs of Ireland Education Pack for Primary Schools’ please contact [bogs@ipcc.ie](mailto:bogs@ipcc.ie) or call 045 860133 <http://www.ipcc.ie/ipcc-launch-new-education-pack-bringing-peatlands-to-primary-schools/>

## Netherlands

### Subsiding peat soils will cost billions of euros until 2050

The Dutch peat soils are subsiding, especially in the urban area. As a result, the cost of repair of damage to buildings, roads, sewage systems and quays will demand more than 20 billion euro, according to researcher Gert Jan van den Born of the Netherlands Environmental Assessment Agency PBL. Extra repair costs to infrastructure as a result of subsidence will until 2050 amount to 5.2 billion euro, to foundations of houses and company buildings at least 16 billion euro. Next to these urban damages, costs of 1 billion are foreseen to occur in the rural area.

An extensive report with the title 'Dalende bodems, stijgende kosten' (Subsiding soils, rising costs) presents these estimates and discusses options to mitigate the damage (<http://www.pbl.nl/sites/default/files/cms/publicaties/pbl-2016-dalende-bodems-stijgende-kosten-1064.pdf>). Whereas many assumptions in the report are too conservative and the mitigation actions (esp. submerged drainage) are presented too positively, the report clearly illustrates the enormous societal costs of the use of drained peatlands.

<http://nos.nl/artikel/2144782-daling-veenbodem-gaat-tot-2050-miljarden-euro-s-herstel-kosten.html>

## Russia

Finally the film made for the PeatRus project is on YouTube to watch.

English: [https://www.youtube.com/watch?v=QZ5qu\\_nPHYM](https://www.youtube.com/watch?v=QZ5qu_nPHYM)

Russian: <https://www.youtube.com/watch?v=YdcYn-OfKOM>

## Scotland

### Climate Change Secretary Cunningham reveals £400,000 fund to restore Scottish peatlands

Climate Change Secretary Roseanna Cunningham has announced £400,000 is being invested to help restore peatlands in Scotland. The funding will build on Scottish Natural Heritage's (SNH) recent Peatland Action work as well as helping to reduce carbon emissions in line with Scotland's climate change targets. Overall, SNH has improved the biodiversity, water quality and natural flood management of 10,000 hectares of peatlands since 2013. Announcing the funding, Ms Cunningham said: "Almost a fifth of Scotland's land is covered with peatland. It's not only a key habitat for wildlife, but plays an important role in carbon capture and storage and helps reduce our greenhouse gas emissions. This type of action is crucial if we are to continue to build on our world leading low carbon ambitions, which saw us exceed our 2020 emissions reductions targets six years early. "Our investment in peatland restoration has already transformed more than 10,000 hectares since 2013 and I expect this will play a significant role in our proposed domestic climate change plan, which we will set out to Parliament in January."

<http://www.buildscotland.co.uk/construction-news/221866/cunningham-reveals-400-000-fund-to-restore-scottish-peatlands>

## United Kingdom

### Cumbria BogLIFE: Restoring peatlands - The development of best practice techniques

One requirement for LIFE nature projects is to share experience and knowledge. Cumbria BogLIFE held a mid-project conference during the first week of October and based it around 'Restoring Peatlands – The Development of Best Practice Techniques'. The main aim of the conference was to demonstrate the practical peatland restoration techniques that had been developed over the last 30 years both in Cumbria and throughout the UK and Europe. It proved that there was a clear appetite for such a 'catch-up' within the peatland world as the conference booked up fully within weeks.

Over three days, around 120 delegates were offered a stimulating mix of formal presentations, interactive workshops, and site visits. Rob Stoneman (Yorkshire Wildlife Trust), Richard Lindsay (University of East London)

and Chris Dean (Moors for the Future) opened each day with their views of how far we have come with peatland restoration within the UK, the challenges that still face us not just on a UK scale but on a global scale and Moors for the Future celebrated just what successes we can all strive to achieve.

The conference started off with speakers showcasing restoration work from some of the most innovative projects in the UK. Cumbria BogLIFE presented the challenges associated with establishing peat forming vegetation on former milled bog at Bolton Fell Moss and how landscape scale rhododendron and tree cover has been removed successfully at Roudsea Mosses. Cumbria Wildlife Trust and Natural England presented landscape scale restoration peatland projects on Foulshaw Moss and Fenns and Whixall Mosses respectively, and the Humberhead Peatland LIFE Project showed how many years of work have achieved real differences on the most extensive body of damaged peatland in England. Natural Resource Wales described the uniqueness of their raised bogs sites and alluded to the real issues facing many peatland managers in the future – funding. From Scotland, Forest Research (Scotland) presented work they have been carrying out on afforested sites to assess the suitability and success of cell-bunding and Scottish Natural Heritage gave an overview of their recent works within the Peatland ACTION Fund.

It is not often that UK peatland professionals get the opportunity to experience projects outside the UK so it was with great pleasure to present a platform for speakers heading up large-scale restoration projects within the Baltic regions, Sweden and on the largest raised bog in western European lowlands located in Denmark. The conference clearly identified that there is significant uncertainty towards securing future funding for our peatlands. Many discussions evolved around the emphasis on gathering robust monitoring data that can really help towards demonstrate our successes and underpinning the case for future funding. Bringing people with us, supporting and appreciating peatlands and our work was also seen as paramount and we all can play a part in public engagement. There was particularly great interest from delegates with new attitudes to gaining funding, including the IUCN Peatland Code and the Natural Capital and ecosystem services approaches.

<http://www.iucn-uk-peatlandprogramme.org/news-and-events/news/cumbria-boglife-restoring-peatlands-development-best-practice-techniques>



*Eroding peat in the Black Hills (Pennines, UK). Photo: Hans Joosten*

### **IPS Annual Meetings 2017 in Aberdeen**

The organizing committee of the 2017 Annual Convention of the IPS has launched an own website for their event: [www.peatlands2017.net](http://www.peatlands2017.net). The event will embrace the most recent scientific research, technical developments and practical activities on agriculture and forestry on peatland, responsible peat production and peatland restoration. This will be completed by interesting excursions, social events in the evening and an attractive accompanying person's programme, plus business meetings of the IPS. The organizers are also still welcoming sponsors and other cooperation partners. For more information: [jack.rieley@btinternet.com](mailto:jack.rieley@btinternet.com)

### **UK Peatland Strategy consultation open**

IUCN UK is inviting comments to its work on a UK peatland strategy "Secure Peatland Future: A vision and strategy for the protection, restoration and sustainable management of UK peatlands". Aim is to have the document agreed by a wide range of partners within the Peatland Programme, including statutory bodies, environmental and land managing NGOs, peatland landscape partnerships and private land managers. IUCN UK PP partners consider that in the current political climate it is crucial to have the peatland story clearly set out to support developing strategy and policy, and to provide ongoing momentum, synergy and cooperation across the four UK countries as Britain prepares to leave the EU. Please read and comment at [www.iucn-uk-peatlandprogramme.org/uk-peatland-strategy](http://www.iucn-uk-peatlandprogramme.org/uk-peatland-strategy) by 20 January 2017.

### **IUCN UK peatland programme conference in Shrewsbury, 29.11.-1.12.2016**

*Anke Nordt (nordta@uni-greifswald.de)*

The (bi?)annual conference took place in Shropshire, with one day of field trips to regional sites of restoration and conservation interest. More than 150 scientists, peatland and restoration managers and representatives of various authorities discussed and exchanged experiences around five workshop themes: Peatland benefits, monitoring, sustainable management, restoration, and communication. Big issues were recurring throughout the key notes, workshops and discussions: funding, monitoring and communication, underlain by the overall question: what will happen to land use and restoration of UK peatlands after the Brexit.

*Funding:* Different obstacles were discussed, spanning from difficult global funding mechanisms which should be brought down to national or regional level (M. Silvius) across the time scale, where signing grant contracts can take years (J. Hughes) towards the need of new (market based) funding mechanisms for ecosystem services delivered by peatlands. The Peatland code, peatland investment case which needs to be linked to funding mechanisms and an individual 10-year payment to land owner for economically valued ecosystem services delivered after restoration measures in Wales were given as examples for new funding mechanisms.

*Monitoring:* Various new monitoring approaches using UAVs were presented, showing a wide range of assessments being possible at landscape scale with high resolution data. Using UAVs for monitoring degradation as well as restoration makes it possible to combine landscape- with timescale. Roxanne Anderson made a point in questioning objectives and goals which need to be set to measure whether and how restoration goals are reached. She also called for long term monitoring for which methods need to be improved and funding is necessary. A third thought was given on how to merge data and knowledge from existing restoration projects to feed into tools for better monitoring, as restoration today needs to make ecosystems resilient to CC. This might include the establishment of new ecosystems instead of restoring former situations.

*Communication:* '(Key) Champions' are i.e. landowners taking on restoration measures who show and tell other farmer, sponsors and authorities about it. This peer-to-peer communication and best practice examples are needed beside broad information of what peatlands do for people and the site specific knowledge transfer by i.e. restoration managers and scientists. For upland farmers 'who have sheep in their genes' (D. Chapman) it is not so easy to change land use practices carried out for generations. But land managers are the ones who have to do the change and an important step to do so is to raise awareness and provide tools like techniques to improve peat conditions, financial and advisory support and knowledge exchange (S. Thorp). Further land use like tourism needs also to be taken into (communication) account.

*What do I take home?* It is a unique situation in the UK where lots of volunteers carry out restoration measures on the ground, not only improving specific fens, bogs and mosses, but also spreading the word about peatlands and their ecosystem services for society. Paludiculture is mentioned repeatedly as a solution to improve peatlands globally. Approaches of wet land use on fens and lowland bogs are tested and carried out in different countries in the temperate climate zone, with experiences which could be applied to UK peatlands. Further thoughts need to go into sustainable wet land use options on upland blanket bogs used for grazing livestock, as Olivia Bragg pointed out: 'let's think about paludi-husbandry'.

I met lots of dedicated peat people and I think most delegates will remember the 2016 IUCN peatland conference for one situation: where two people fell into a (very chilly) canal, with an air temperature of about 2°C. (No names will be given!).



*Fenn's, Whixall and Bettisfield Mosses National Nature Reserve. Photo: Anke Nordt*

## **North America**

### **USA**

#### **Rewetting pocosin peatlands to mitigate climate change**

With the US National Wildlife Refuge System being responsible for the management of more than 850 million acres of land and water, the Service's management can substantially contribute to climate change adaptation and mitigation. Peatlands, such as those at Pocosin Lakes National Wildlife Refuge in North Carolina, are one such ecosystem, and the Service is collaborating with partners to increase resiliency to climate change by restoring the hydrology of these carbon-rich wetlands.

Pocosins are unique peat-based wetlands, also known as south-eastern shrub bogs, which occur from southern Virginia to northern Florida along the southeastern Coastal Plain. The typically thick (up to 14 feet) layer of peat

soil underlying pocosins has acted as a chemical sponge over geologic time, locking up metals, carbon and nitrogen in vegetation and the deepening soil layer. North Carolina's Albemarle-Pamlico peninsula has the greatest pocosin acreage in the United States, but, like peatlands all over the country, 70 percent of this habitat in Albemarle has been drained and converted to agriculture and forestry since the 1960s.

Drained pocosin peatlands present several problems: They are a source of carbon emissions and are particularly vulnerable to catastrophic wildfires that emit large amounts of carbon and negatively impact wildlife habitat and air quality.

Peatland forests are gaining global recognition for their tremendous carbon sequestration potential. Restoring the wetland hydrology in peatlands stops the loss of carbon via peat oxidation while allowing carbon sequestration via soil and biomass accumulation to resume (halting surface elevation loss and enhancing resiliency in low lying pocosins vulnerable to sea-level rise). Partnerships with TNC, North Carolina and others have already restored 20,000 acres of pocosins at Pocosin Lakes Refuge, which the Service estimates should ultimately sequester more than 21 million tons of carbon dioxide equivalents.

Given the magnitude of the carbon-mitigation benefit and the geographic scope of restoration needed (nearly a half million acres of degraded pocosin wetlands in North Carolina alone), the Service has partnered with TNC, TerraCarbon, East Carolina University and the U.S. Geological Survey to implement a 1,300-acre peatland restoration demonstration project at the refuge to test a first-of-its-kind accounting methodology to quantify the carbon-sequestration benefits gained.

The accounting methodology is undergoing review for adoption as an eligible method to verify carbon offsets. Approval could provide entities a new way to offset their carbon impact that, because of the amount of carbon retained in restored peatlands, could offer a high return on investment. Additionally, these entities might not otherwise have broad interests in restoration efforts. But the value of peatland restoration could entice nontraditional partners to help meet restoration, land conservation and monitoring goals in peatland habitats nationwide while meaningfully contributing to achieving GHG emission reduction targets.

<https://www.fws.gov/news/blog/index.cfm/2016/11/18/Rewetting-Pocosin-Peatlands-to-Mitigate-Climate-Change>

## South-America

### Ecuador

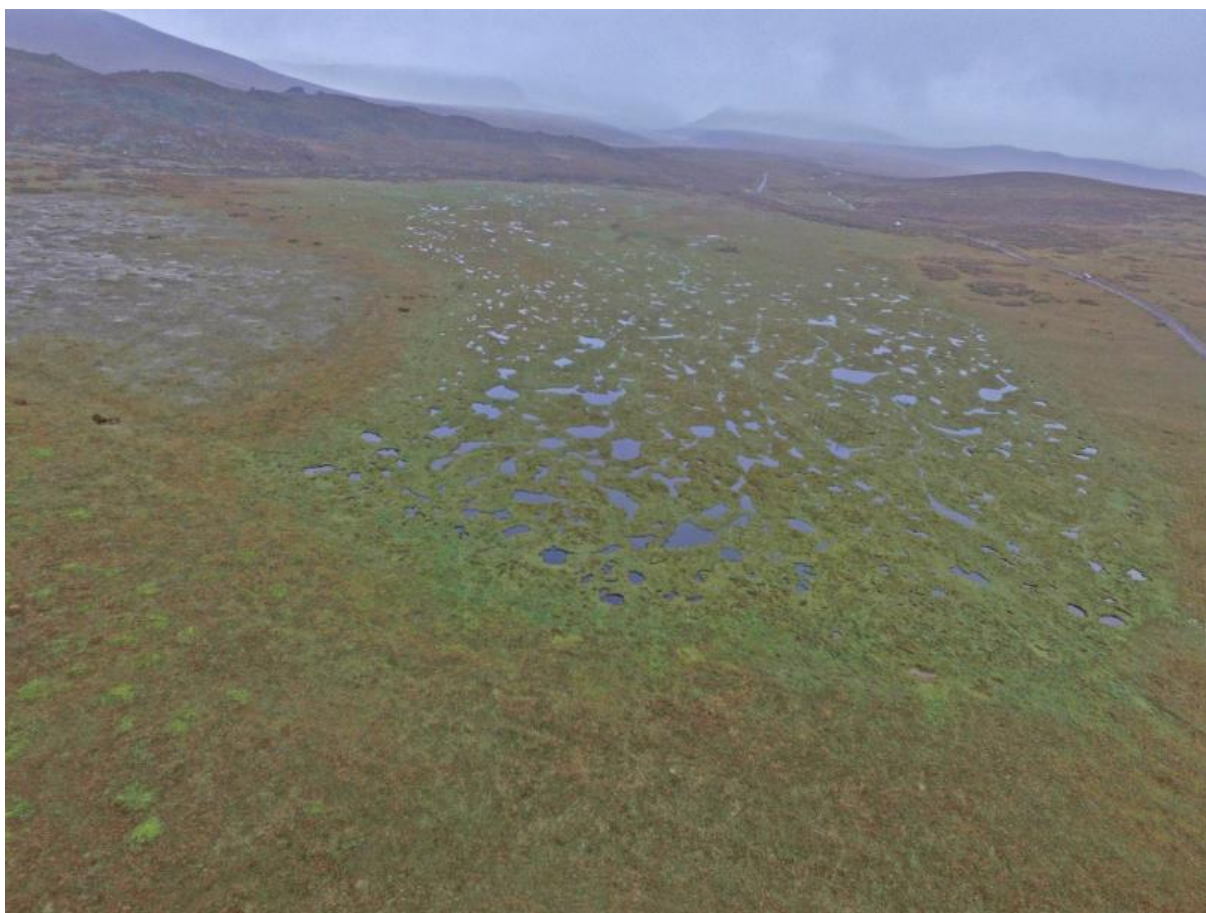
#### New perspectives on high Andean peatland and wetland restoration

*Bert De Bièvre, Technical Secretary, Quito Water Fund, Ecuador ([bert.debievre@fonag.org.ec](mailto:bert.debievre@fonag.org.ec))*

In September 2012, IMCG visited the high Andean wetlands around Quito and Bogotá. During several days, we studied wetlands above 3500 m altitude in the Papallacta area and around the Cotopaxi volcano, all areas that are part of the catchments in the eastern Andean Cordillera that supply water to Quito.

Since one year, I am heading Quito's Water Fund FONAG. FONAG ([www.fonag.org.ec](http://www.fonag.org.ec)) is in charge of conservation and restoration of all areas that provide water to the city of Quito. The financial mechanism is a trust fund, fed mainly by a percentage of the water utility's income.

In an effort of improving the cost effectiveness and the hydrological performance of FONAG's field interventions, I am very happy to confirm that the rewetting of paramo wetlands/peatlands will be an important part of FONAG's portfolio of interventions in Quito's watersheds in the coming years. As preparatory work, we have been identifying artificial drainage channels that have been excavated historically, which is largely unknown by the general public, and even by the paramo expert community. Our restoration efforts will focus at first on drainage blocking in a wetland that you can observe in this video, especially between 04:00 and 06:30: <https://www.youtube.com/watch?v=9A0jL0McxUE> We welcome any scientific accompanying efforts. The pilot rewetting project is located near the Antisana volcano, in land owned by the water utility. Though at 4000 m altitude, it is easily accessible from Quito, and at half an hour walking from housing that is very comfortable (for 4000 m altitude standards) and the logistical base of FONAG's park rangers. Students or other researchers will be very welcome! If interested, please contact at [bert.debievre@fonag.org.ec](mailto:bert.debievre@fonag.org.ec)



*Puglluma wetland near Antisana, after heavy rain. Photo: taken with drone by FONAG.*

## Peatland conservation relevant papers November 2016

Collected by Hans Joosten: [joosten@uni-greifswald.de](mailto:joosten@uni-greifswald.de)

1. Reintroduction of fen plant communities on a degraded minerotrophic peatland: <http://www.nrcresearchpress.com/doi/abs/10.1139/cjb-2016-0023#.WCT5BMnX5P8>
2. Update on climate geoengineering in relation to the Convention on Biological Diversity: Potential impacts and regulatory framework: <https://www.cbd.int/doc/publications/cbd-ts-84-en.pdf>
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4. Restauration des tourbières minérotrophes : État des connaissances 2015: [http://www.gret-perg.ulaval.ca/fileadmin/fichiers/fichiersGRET/pdf/Doc\\_generale/Restaur\\_tourb\\_minerEtat\\_connaissances\\_2015.pdf](http://www.gret-perg.ulaval.ca/fileadmin/fichiers/fichiersGRET/pdf/Doc_generale/Restaur_tourb_minerEtat_connaissances_2015.pdf)
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6. The effects of check dams and other erosion control structures on the restoration of Andean bofedal ecosystems: <http://onlinelibrary.wiley.com/doi/10.1111/rec.12402/abstract?campaign=woletoc>
7. Where the fish swim above the birds: configurations and challenges of wetland restoration in the Po Delta, Italy: <http://onlinelibrary.wiley.com/doi/10.1111/rec.12369/abstract?campaign=woletoc>
8. Флора и растительность верховых болот Беларуси/ Flora and vegetation of the raised bogs of Belarus: <https://cloud.mail.ru/public/8nAg/XsExB37kX> (29Mb)
9. Formalized classification of European fen vegetation at the alliance level: <http://onlinelibrary.wiley.com/doi/10.1111/avsc.12271/full>
10. A developmental study of pollen dyads and notes on floral development in *Scheuchzeria* (Alismatales: Scheuchzeriaceae): <http://onlinelibrary.wiley.com/doi/10.1111/boj.12482/abstract?campaign=woletoc>
11. A new soil mechanics approach to quantify and predict land subsidence by peat compression: <http://onlinelibrary.wiley.com/doi/10.1002/2016GL071116/abstract?campaign=woletoc>

12. Doubling of annual ammonia emissions from the peat fires in Indonesia during the 2015 El Niño: <http://onlinelibrary.wiley.com/doi/10.1002/2016GL070620/abstract?campaign=woletoc>
13. Subfossil peatland trees as proxies for Holocene palaeohydrology and palaeoclimate: <http://www.sciencedirect.com/science/article/pii/S0012825216303609>
14. Linear growth and production of *Sphagnum* mosses in the middle taiga zone of West Siberia: [https://www.researchgate.net/publication/309292255\\_LINEAR\\_GROWTH\\_AND\\_PRODUCTION\\_OF\\_SPHAGNUM\\_MOSSES\\_IN\\_THE\\_MIDDLE\\_TAIGA\\_ZONE\\_OF\\_WEST\\_SIBERIA](https://www.researchgate.net/publication/309292255_LINEAR_GROWTH_AND_PRODUCTION_OF_SPHAGNUM_MOSSES_IN_THE_MIDDLE_TAIGA_ZONE_OF_WEST_SIBERIA)
15. Late-Holocene vegetation and climate change in Jeju Island, Korea and its implications for ENSO influences: [http://www.sciencedirect.com/science/article/pii/S0277379116304620?dgcid=raven\\_sd\\_via\\_email](http://www.sciencedirect.com/science/article/pii/S0277379116304620?dgcid=raven_sd_via_email)
16. Management effects on greenhouse gas dynamics in fen ditches: <http://www.sciencedirect.com/science/article/pii/S0048969716324366>
17. Fabric and properties of mineral soils underlying a shallow peat mantle in Estonia: [http://www.sciencedirect.com/science/article/pii/S1040618215008174?dgcid=raven\\_sd\\_via\\_email](http://www.sciencedirect.com/science/article/pii/S1040618215008174?dgcid=raven_sd_via_email)
18. Respiration and emissions of methane and nitrous oxide from a boreal peatland complex comprising different land-use types: <http://www.borenv.net/BER/pdfs/ber21/ber21-405.pdf>
19. Effects of soil frost on snowmelt runoff generation and surface water quality in drained peatlands: <http://www.borenv.net/BER/pdfs/ber21/ber21-556.pdf>
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23. Mapping peat in Scotland with remote sensing and site characteristics: <http://onlinelibrary.wiley.com/doi/10.1111/ejss.12393/abstract?campaign=wolearlyview>
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25. Do moose redistribute nutrients in low-productive fen systems?: [http://www.sciencedirect.com/science/article/pii/S0167880916302365?dgcid=raven\\_sd\\_via\\_email](http://www.sciencedirect.com/science/article/pii/S0167880916302365?dgcid=raven_sd_via_email)
26. Reprint of "Biodiversity in low-intensity pastures, straw meadows, and fallows of a fen area—A multitrophic comparison": [http://www.sciencedirect.com/science/article/pii/S0167880916305163?dgcid=raven\\_sd\\_via\\_email](http://www.sciencedirect.com/science/article/pii/S0167880916305163?dgcid=raven_sd_via_email)
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29. Rising floodwaters: mapping impacts and perceptions of flooding in Indonesian Borneo: <http://iopscience.iop.org/article/10.1088/1748-9326/11/6/064016/meta>
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31. Relationships between vegetation succession, pore water chemistry and CH<sub>4</sub> and CO<sub>2</sub> production in a transitional mire of Western Siberia (Tyumen Oblast): <http://link.springer.com/article/10.1007/s13157-016-0798-8>
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34. Species composition and diversity of the True Bugs (Hemiptera, Heteroptera) of a raised bog in Belarus: <http://link.springer.com/article/10.1007/s13157-016-0816-x>
35. Wetland evapotranspiration: Eddy covariance measurement in the Biebrza valley, Poland: <http://link.springer.com/article/10.1007/s13157-016-0821-0>
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37. A thermodynamic analysis of soil ecosystem development in northern wetlands: <http://link.springer.com/article/10.1007/s13157-016-0833-9>
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44. First pollen record in South America. Commentary: Die Zeichenschrift der Pollenstatistik:  
[http://journal.frontiersin.org/article/10.3389/feart.2016.00100/full?utm\\_source=newsletter&utm\\_medium=email&utm\\_campaign=Earth\\_Science-w49-2016](http://journal.frontiersin.org/article/10.3389/feart.2016.00100/full?utm_source=newsletter&utm_medium=email&utm_campaign=Earth_Science-w49-2016)
45. Is peat accumulation in mangrove swamps influenced by the “enzymic latch” mechanism?:  
<http://link.springer.com/article/10.1007/s11273-016-9493-z>
46. Can we effectively stop the expansion of trees on wetlands? Results of a birch removal experiment:  
<http://link.springer.com/article/10.1007/s11273-016-9522-y>
47. Evaluating a sampling protocol for assessing plant diversity in prairie fens:  
<http://link.springer.com/article/10.1007/s11273-016-9491-1>
48. Land use increases the recalcitrance of tropical peat: <http://link.springer.com/article/10.1007/s11273-016-9498-7>
49. Short-term response of CO<sub>2</sub> emissions to various leaf litters: a case study from freshwater marshes of Northeast China: <http://link.springer.com/article/10.1007/s11273-016-9506-y>
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51. Management of the margins in cutover bogs: ecological conditions and effects of afforestation:  
<http://link.springer.com/article/10.1007/s11273-016-9508-9>
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54. Identification of the criteria for decision making of cut-away peatland reuse:  
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## Peat for speed in land sector mitigation and adaptation

- Peat (organic) soils cover only 3% of the land but hold more carbon than all global forest biomass
- 15% of these soils (= 0.4% of the land) has been drained, mainly for cropland, grazing land, and forestry. As a result they emit 5% of the total global anthropogenic greenhouse gases (GHG)
- Most (>95%) peat emissions are caused by only 25 UNFCCC parties (incl. EU) (Fig. 1, Fig. 2)
- A substantial emission reduction can be achieved by rewetting drained peat soils
- Rewetting also stops soil degradation, subsidence, salt intrusion, and consequent loss of productive land, and improves water purification, meso-climate, flood control, and biodiversity. Rewetting is thus consistent with a wide variety of global and regional policy agreements
- Many countries can kick-start **national emission reductions** by focussing on drained peat soils. In 25 countries (18 developing and 7 European Annex-I countries), emissions from drained peat exceed 50% of the total emissions from fossil fuels and cement. In an additional 25 countries, emissions exceed 10% of those from fossil fuels and cement (Fig. 3)

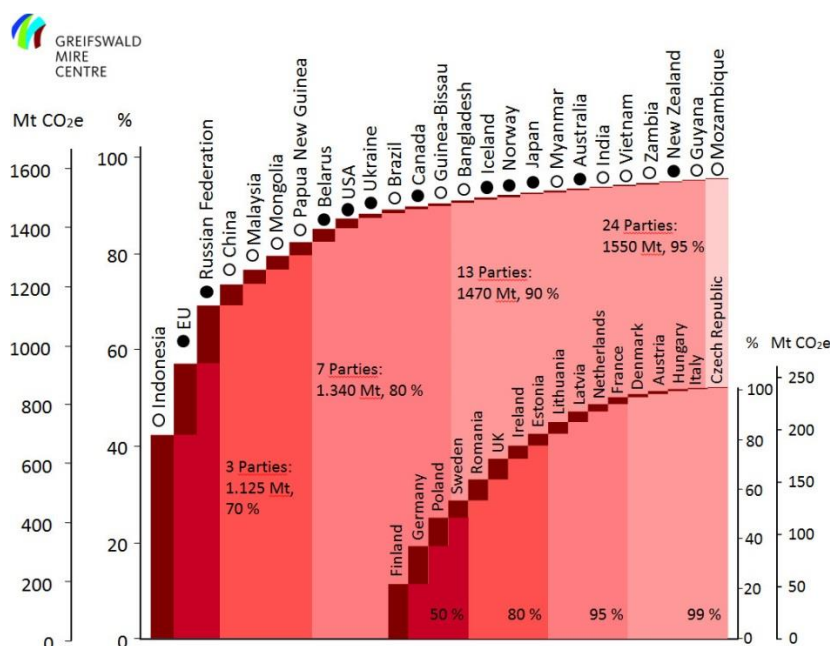


Fig. 1: Emissions from drained organic soils for the 25 UNFCCC Parties responsible for 95 % of the emissions in descending order. White dots denote non-Annex 1 Parties, black dots Annex 1 Parties. Red shades indicate where the 70, 80, 90 and 95 percent marks are crossed. The inset depicts the contributions of the 16 EU countries that are together responsible for 99 % of EU and 17 % of global emissions from organic soils. Presented emissions values concern microbial oxidation only; fires raise the importance of particularly Indonesia and Russian Federation. All data from the Global Peatland Database/Greifswald Mire Centre: <http://tiny.cc/globalpeat>

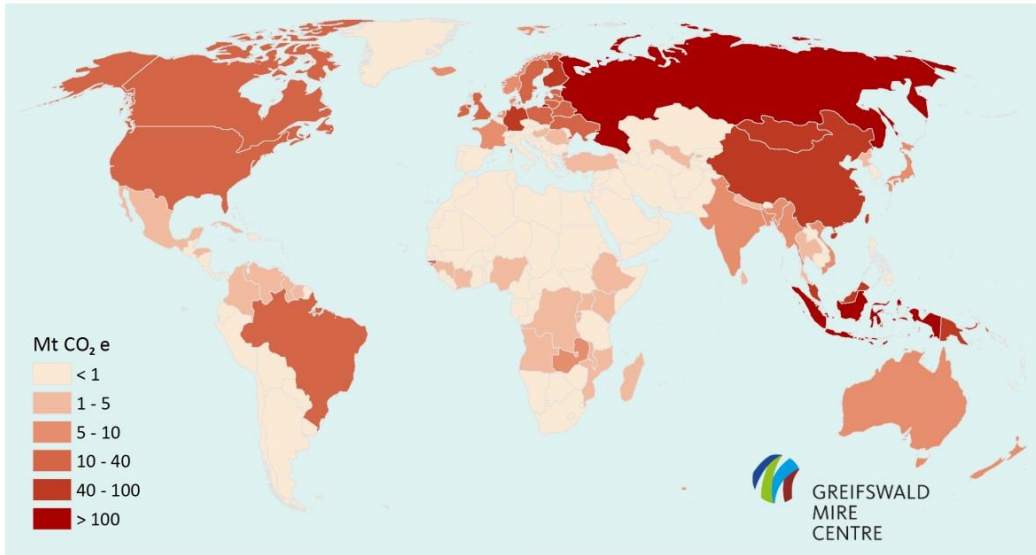


Fig. 2: Annual emissions from drained peatlands per country in Mt CO<sub>2</sub>e/yr.

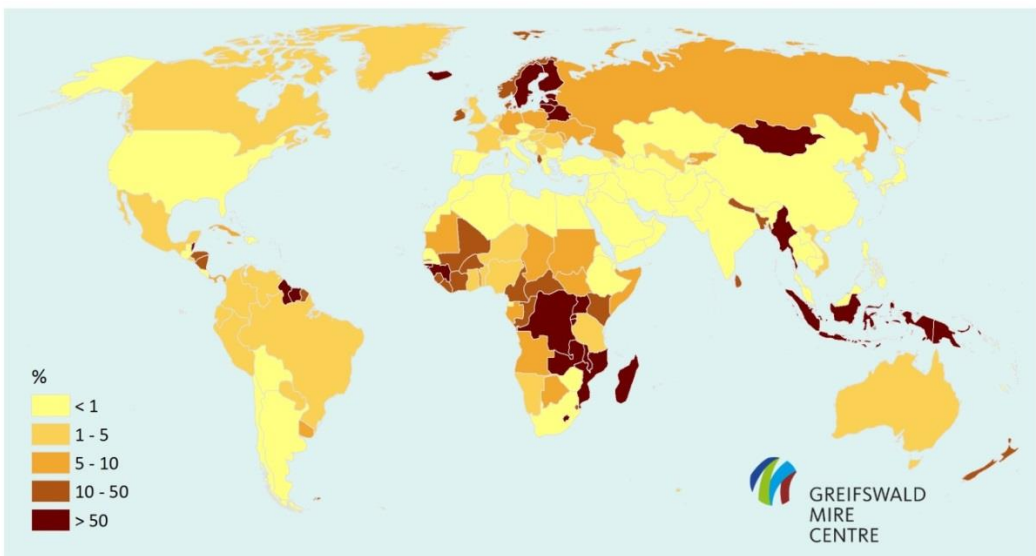


Fig. 3: Emissions from drained peatlands per country as a % of the emissions from fuel and cement from that country.

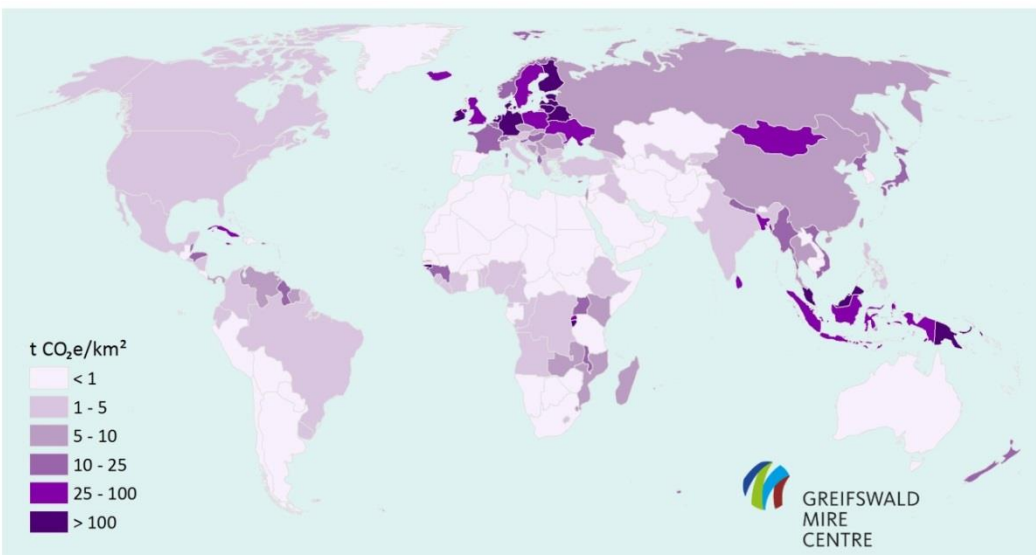


Fig. 4: Emissions from drained peatlands per country expressed per unit land area per country (in t CO<sub>2</sub>e/km<sup>2</sup>/yr).

- In many countries, land use on peat is a substantial source of emissions from the land (Fig. 4). In Germany, for example, organic soils used for agriculture comprise 7.3% of the agricultural land, but emit more than one third of all emissions from agriculture, including those from enteric fermentation and fertilization (Fig. 5). Generally these soil emissions remain concealed in overall LULUCF reporting. Ongoing drained peatland emissions will in several countries with decreasing forest sinks frustrate compliance with a 'no debit rule' of no net emissions from LULUCF as proposed by the EU
- Rewetting organic soils concerns a minor part of total agricultural land only (Fig. 5). Reaching similar emission reductions in fertilization and animal husbandry will much stronger affect agricultural productivity
- Furthermore, rewetting does not imply discontinuation of agricultural use. Paludiculture, the productive use of wet peatlands, provides ample opportunities to continue production while avoiding the environmental burden of drainage based agriculture

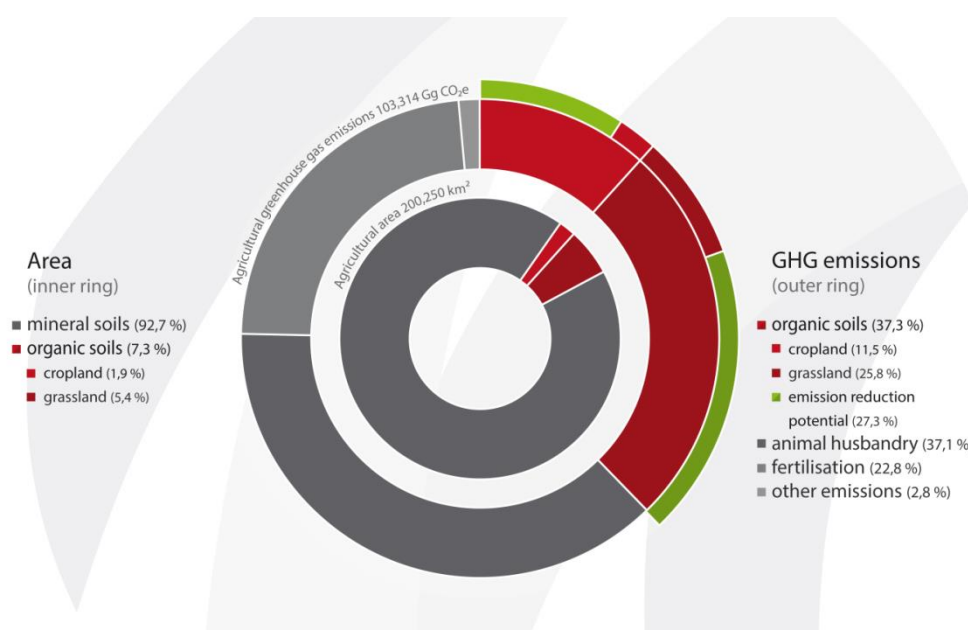


Fig. 5: GHG emissions from German agriculture (sectors Agriculture + LULUCF Cropland and Grazing Land Management). Graph based on data of the National Inventory Report, Germany 2016.

#### What is needed:

- The will to start: sufficient information is already available on peatland location and status, as well as on rewetting techniques and monitoring methodologies
- Communication of the societal benefits (ecosystem services) provided by wet peatlands and the costs arising from drained peatlands
- Local technical capacity for rewetting and paludiculture provided by sharing international expertise and innovation
- Research into regio-specific paludiculture opportunities
- Elimination of subsidies and regulations that drive peatland drainage and destruction
- Pilot and demonstration projects
- Financial support and direct funding via funding agencies, private sector and civil society

#### If you think about land use, think about peat!

1. Protect undrained peatlands
2. Rewet drained peatlands, while maintaining their production function (paludiculture)
3. Phase out drained peat land use



Wetlands International is the only global not-for-profit organisation dedicated to the conservation and wise use of wetlands. Our vision is of a world where wetlands are treasured and nurtured for their beauty, the life they support and the resources they provide.

Wetlands International is a leading science-based conservation organisation and is addressing peatland degradation related development issues world-wide through the promotion of conservation and sustainable alternative development.

We provide expertise regarding the rewetting and conservation of peatlands. We raise awareness on the impacts of peatland degradation caused by direct and indirect land-use (change), and the related emissions and other impacts such as soil subsidence, flooding and loss of biodiversity.

**For more information**

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The Greifswald Mire Centre (GMC) is the science-policy interface for all peatland related questions – locally and globally.

We are 50 peatland experts of various disciplines concentrated in one place. We offer science-based solutions for social challenges such as

- Climate protection: Reduction of greenhouse gas emissions from peatlands and ecosystem-based adaptation
- Biodiversity: Conservation and restoration of peatlands worldwide
- Sustainable use: Paludiculture and innovative financing such as carbon credits

We coordinate the 'Global Peatland Database', the largest database of distribution and status of peatlands worldwide. The extensive 'Peatland and Nature Conservation International Library' (PeNCIL) is part of the GMC.

**For more information**

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