Peatland carbon opportunities: a new worldwide inventory

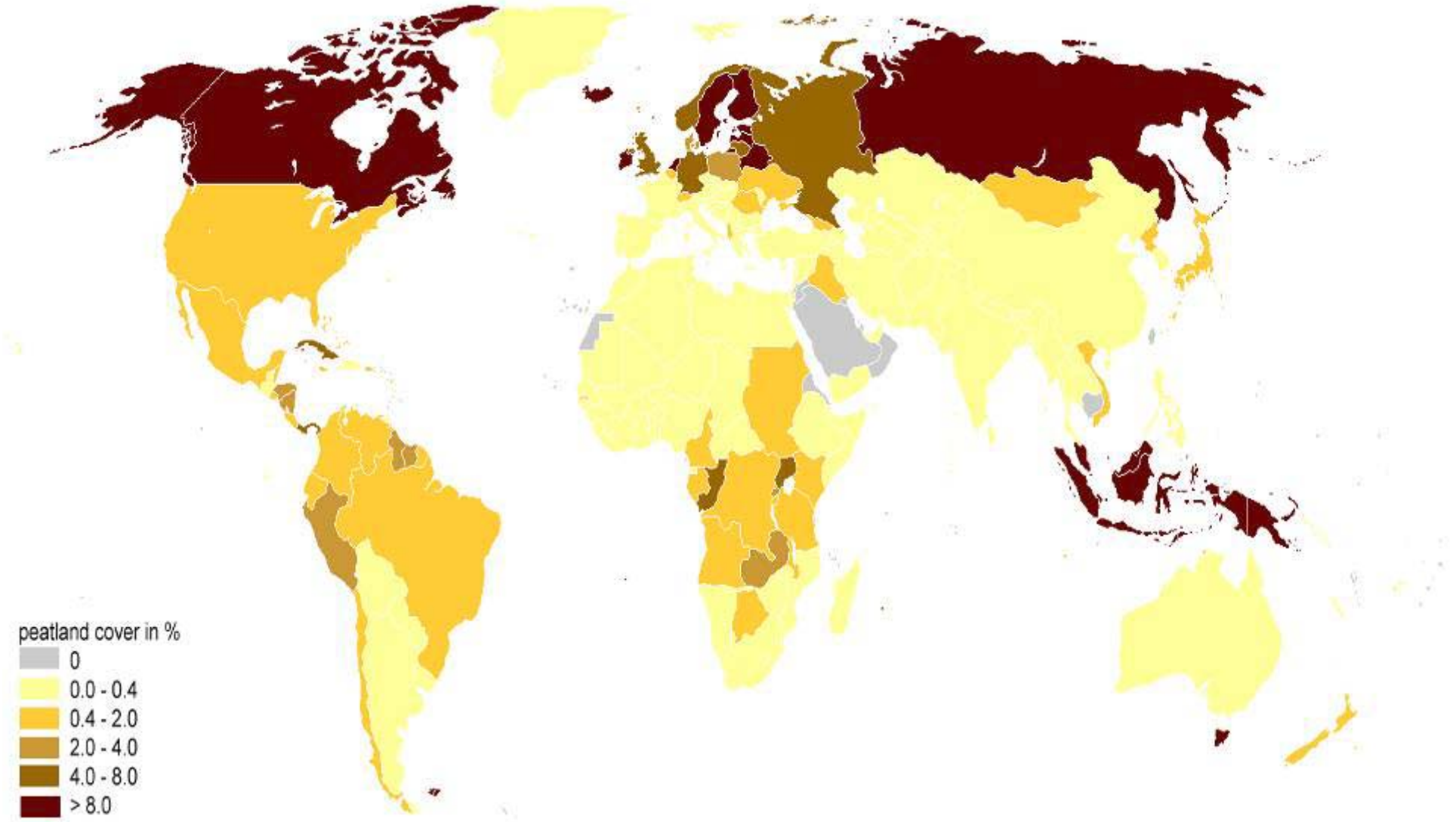
Hans Joosten

Telmatology & Palaeo-ecology Uni-Greifswald
International Mire Conservation Group
Belarus UNFCCC delegation

Peatland soils store concentrated carbon in thick layers

Lesotho

Peatlands are found in almost every country.
Worldwide: 4 million km^2



Peatlands are everywhere, but often not recognized…

Sichuan, China

… from the tundra …

Yakutia, RF

… to the tropics and …

Borneo

…to the uttermost part of the World…

Tierra del Fuego
Argentina

…from the mountains …

Kyrgystan

… to the sea …

Archangelsk, RF

… and even in the city of Ramsar (Iran) !…

Peatlands are the most space-effective carbon (C) stocks of all terrestrial ecosystems

Covering only 3% of the World's land, peatlands contain some 500 Gt of carbon in their peat

Ireland

This is equivalent to all terrestrial biomass or twice the carbon stock of the total forest biomass of the world

Finland

When drained, peatlands become vigorous sources of carbon dioxide (and nitrous oxide)

Kalimantan, Indonesia

Globally, degraded peatlands emit >2 Gtons CO_2 yr^{-1}

0.3 % of the land surface is responsible for some 6 % of the total global anthropogenic CO_2 emissions…

New peatland inventory

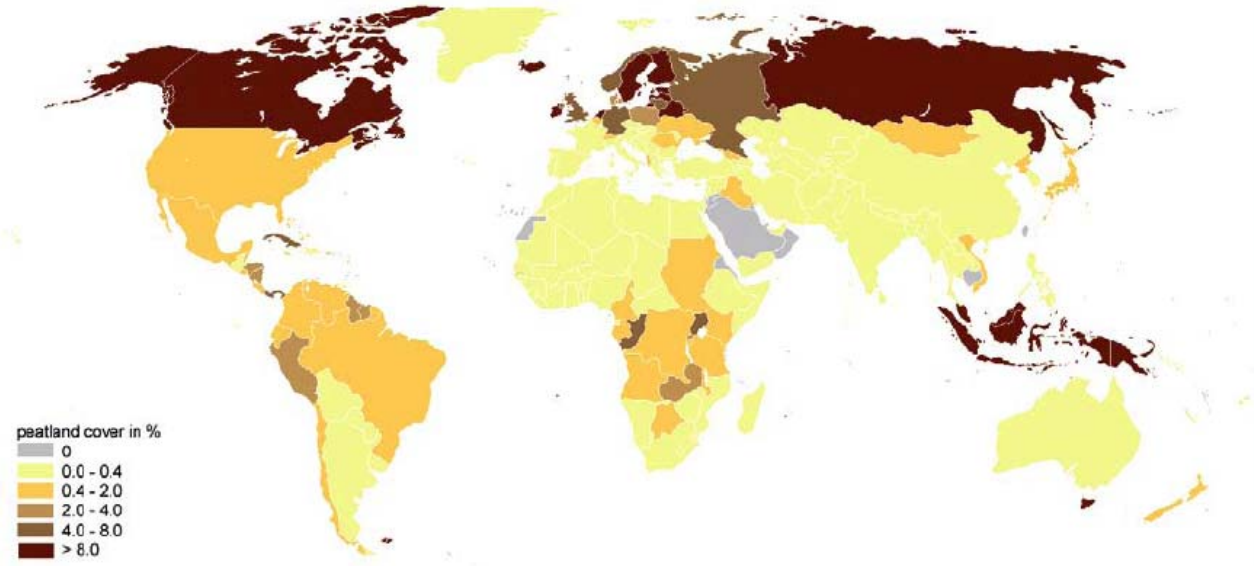
- All countries of the World (differentiated responsibility…)
- Areas, C-stocks, forested/deforested, CO_2 emissions from various land use, 1990 and 2008
- default values, algorithms
- Draft: invitation to correct/improve
- On KP website (submission Belarus)
- Hard copies available

New peatland inventory

The Global Peatland CO_2 Picture

Peatland status and emissions in all countries of the world

- draft -



WETLANDS INTERNATIONAL

New peatland inventory

Country list of CO_2 emissions from degraded peatlands AFRICA

	1990											
Country/area	Area of country /area	Peatland area 1990	Peat carbon stock 1990	Forested peatland area 1990	Emissions from 1990 peatland drained for agriculture before 1990	Emissions in 1990 from 1990 peatland drained for forestry before 1990	Emissions in 1990 from 1990 peatland drained for peat extraction before 1990	Emissions in 1990 from 1990 peatland drained for other purposes before 1990	Emissions in 1990 from peat from non-forested peatland	Total degrading peatland area in 1990	Emissions from peat extracted in 1990	**Total emissions in 1990 from degrading peat**
AFRICA (ctd)	km^2	km^2	Mton C	km^2	Mton CO_2/a	Mton CO_2/a	Mton CO_2/a	Mton CO_2/a	Mton CO_2/a	km^2	Mton CO_2/a	**Mton CO_2/a**
Madeiras (Portugal)	794	0	0	0	0	0	0	0	0	0	0	**0**
Malawi	118.484	700	70	100	1,2	0	0	0	1,2	300	0	**1,2**
Mali	1.240.192	400	40	50	0,2	0	0	0	0,2	50	0	**0,2**
Mauritania	1.031.000	60	6	20	0,12	0	0	0	0,12	30	0,0004	**0,12**
Mauritius	2.040	0,05	0,01	0,02	0,0001	0	0	0	0,0001	0,02	0	**0,0001**
Melilla	12	0	0	0	0	0	0	0	0	0	0	**0**
Morocco	453.730	10	1	0	0,02	0	0	0	0,02	5	0	**0,02**
Mozambique	799.380	2.000	200	1000	3	0	0	0	3	750	0	**3**
Namibia	824.269	100	10	0	0,04	0	0	0	0,04	10	0	**0,04**
Niger	1.267.000	76	2	0	0	0	0	0	0	0	0	**0**
Nigeria	923.768	1.100	110	900	0,8	0	0	0,04	0,84	210	0	**0,84**
Réunion	2.512	120	9	50	0,08	0	0	0	0,08	20	0	**0,08**
Rwanda	26.338	800	120	10	0,4	0	0,01	0	0,41	104	0,03	**0,44**
São Tomé and Príncipe	1.001	2	0	0	0,004	0	0	0	0,004	1	0	**0,004**
Senegal	196.722	55	14	45	0,02	0	0,0003	0	0,02	6,1	0,04	**0,06**
Sierra Leone	71.740	100	5	50	0,12	0	0,003	0	0,12	31	0,0004	**0,12**
Somalia	637.700	200	20	10	0,2	0	0	0	0,2	50	0	**0,2**
South Africa	1.219.090	300	60	100	0,2	0	0,003	0	0,20	51	0,02	**0,22**
St Helena (UK)	324	55	6	0	0	0	0	0	0	0	0	**0**
Sudan	2.505.800	30.000	2.000	0	4	0	0	0	4	1.000	0	**4**
Swaziland	17.363	50	5	0	0,12	0	0	0	0,12	30	0	**0,12**
Tanzania	945.100	4.500	250	500	0,32	0	0	0	0,32	80	0	**0,32**
The Gambia	11.295	50	1	30	0,08	0	0	0	0,08	20	0	**0,08**
Togo	56.785	30	3	5	0,04	0	0	0	0,04	10	0	**0,04**
Tunisia	164.418	2	0,2	0	0,004	0	0	0	0,004	1	0	**0,004**
Western Sahara	252.120	0	0	0				0	0	0	0	**0**
Uganda	241.138	14.000	1.400	1.500	16	0	0	0	16	4.000	0	**16**
Zambia	752.614	15.500	800	1.000	4	0	0	0	4	1.000	0	**4**
Zimbabwe	390.759	350	20	50	0,8	0	0	0	0,8	200	0	**0,8**
AFRICA TOTAL	**30.332.498**	**129.288**	**11.018**	**46.346**	**47**	**0**	**0,1**	**0**	**47**	**11.779**	**0**	**47,2**

Conclusions World

- The global CO_2 emissions from drained peatland amount to 1.3 Gton / yr (excl. extracted peat and 0.5 Gton from fires).
- These emissions have strongly increased since 1990.
- On paper from 1,036 Mton in 1990 to 1,283 Mton in 2008 (~ +25%), in reality more because of too large decrease in Annex 1.

Conclusions Annex 1

- The Annex 1 countries emit 0.5 Gton CO_2 from 250,000 km^2 of drained peatland (excl. extracted peat and fires).
- These emissions have decreased since 1990.
- On paper from 655 Mton in 1990 to 503 Mton in 2008 (~ - 25 %), in reality less because of not-reported ('lost') abandoned lands in esp. E-Europe.

Conclusions EU

- The EU (27) is with 173 Mton/yr after Indonesia (500 Mton) and before Russia (151 Mton) the World‘s 2nd largest emittor from drained peatland (excl. extracted peat and fires) .

- These emissions have since 1990 decreased from 191 to 173 Mton (~ -10%).

Top emittors 2008

- The top (excl. extraction and fires) includes

Indonesia	500	Poland	24
Russia Eur. part	139	Russia Asian part	22
China	68	Uganda	20
USA (lower 48)	66	Pap. New Guinea	20
Finland	50	Iceland	18
Malaysia	48	Sweden	15
Mongolia	45	Brazil	12
Belarus	41	United Kingdom	10
Germany	32	Estonia	10

The growers

- Since 1990 peatland emissions have increased in 50 countries
- These include > 40 developing countries

- > 50% growth: **Papua New Guinea**, Burundi, **Malaysia**, **Indonesia**, Kenya, Colombia, Gabon, Togo, Dominican Republic, Trinidad and Tobago, Rwanda, **China**, Brunei, Ethiopia, Guatemala.

Peatland rewetting

Emission reduction potential:

- Gross 2 Gtons on 500,000 km^2
- Nett: much less
- Half of the CO_2 reduction annihilated by CH_4 emissions after rewetting

- → realistic some 100s Mton CO_2-eq./yr

Peatland rewetting

- Reduction opportunity for Annex 1 without risk with base year 1990
- Also large opportunities for developing countries, but base year 1990 is clearly unfavourable. → for CDM base year 2008 ('after Bali'…)

Rewet drained peatlands!

Rouergai, China