IMCG Bulletin: March 2018

INTERNATIONAL MIRE CONSERVATION GROUP

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Word from the Secretary-General

Dear mire friends

An overfull March Bulletin, covering the important events in Congo Brazzaville (incl. an article about some peatlands around Brazzaville visited by GPI partners) and a wide range of news items from all over the world. We have received the first nominations for the IMCG Main Board, with a nice initial geographic diversity but still with a severe gender bias… But nominations are still welcome! With respect to the 2018 Field Symposium in the Netherlands: registration is closed, the trip is fully booked. So if you had not yet registered, you are too late (but contact the organizers in case of urgent wishes). And you can always attend the symposium and/or the general assembly separately.

For the people who cannot make it to the Netherlands, a nice alternative is the peatland restoration working event in Mongolia: a nice opportunity to get acquainted with this special, largely unknown but important peatland country (on which we also have a background paper).

Read about all that and much more in this Bulletin and keep sending news, photographs, papers and other contributions (including nominations, resolutions etc. for the IMCG General Assembly) for the next Bulletin by May 6, 2018 to Hans Joosten at joosten@uni-greifswald.de.

Contents of this Bulletin

IMCG issues

2018 IMCG Field Symposium/General Assembly

Arrival: Monday August 20, Amsterdam, departure: Saturday, September 1, Amsterdam.

IMCG Symposium 22 August: NIOZ, Island of Texel; IMCG General Assembly: 31 August in Utrecht

Field excursions: Tuesday 21 (Island of Texel) and August 23-31. Number of participants: 50 max. (registration closed. Keep an eye on the website: http://www.imcg.net/pages/events/imcg-2018.php

IMCG General Assembly 31 August 2018,

On the IMCG General Assembly 2018 in the Netherlands only a limited number of IMCG members will be present, and only limited time will be available. Therefore we will arrange the discussions and decisions largely by internet and email. The January Bulletin contained the preliminary agenda for this Assembly and in the beginning of July 20018 we will produce a Bulletin containing the documents for the Assembly and all information on how the voting per email or snailmail will be done. We will furthermore open a special place on the website where discussion papers can be made available. Therefore: provide the IMCG secretariat with additional agenda points and submit your background papers, concrete proposals, draft resolutions, contributions for discussion, nominations for the IMCG Main Board and for Honorary Life membership, etc. until 30 June 2018. Send the material in as soon as possible to joosten@uni-greifswald.de– the sooner the better – so that we can arrange the democratic procedures in a smooth way.

Main Board nominations

The following persons have already submitted their candidature for the new IMCG Main Board. Don't hesitate to run for MB member: we should again strive for a fair representation with respect to geography, expertise, gender, and age.

Zhao-Jun Bu (China, male, 46 years old)

PhD, Professor, Associate Dean at School of Geographical Sciences, Northeast Normal University, China. Peatland scientist and *Sphagnum* ecologist. Up to now, he has published nearly 70 peer-reviewed articles more than 40 of them (including those published in New Phytologist, Oecologia, Science of the Total Environment, Wetlands, Journal of Bryology, Acta Oecologica etc.) as first or corresponding author.

As a co-author he has published 5 monographs including as "Jilin Wetlands", "Wetlands and Wetland Research in China" and "Observing Methods of Wetland Ecosystems". He is an associate editor of the journals Mires & Peat and Chinese Journal of Humic Acid. He is member of the Sixth Reviewer Committee of National Nature Reserves of the Ministry of Environmental Protection, China, the Bryophyte Professional Council of Botanical Society of China, the International Mire Conservation Group (IMCG), the International Peat Society (IPS), the International Association of Bryologists (IAB) and the International Allelopathy Society (IAS). His vision of mire conservation: Mires and peatlands are cherished and efficiently conserved in the whole world.

http://js.nenu.edu.cn/teacher/index.php?zgh=1998900012 or http://geo.nenu.edu.cn/info/1334/2429.htm

ResearchGate: https://www.researchgate.net/profile/Zhao_Jun_Bu

Ab Grootjans (Netherlands, male, 67 years old)

Worked at the University of Groningen, Netherlands, as an associate professor (1976-2017)and also as a visiting professor at the Radboud University of Nijmegen (2007-2017). He was trained as a vegetation scientist, but later worked on ecohydrological approaches to restore wetlands on the landscape scale.

He participated for more than 20 years in the national OBN programme (= Survival Plan of Dutch Nature) aimed at restoring nature reserves that were acidified due to high atmospheric nitrogen deposition and drainage in surrounding agricultural areas. The last two decades he was involved in restoration projects in more or less natural mires in Polen, (Eastern) Germany, Slovakia, Tierra del Fuego (Argentinië), Russia, Latvia and South Africa. Ab has published over 140 articles in peer reviewed journals, ca 50 chapters in books and more than 100 professional publications. He supervised more than 120 master students and 15 PhD students. He is a member of the board of the IMCG since 2011 and is an associate editor of the journal Mires and Peat since 2016. (Photo Stephan Busse).

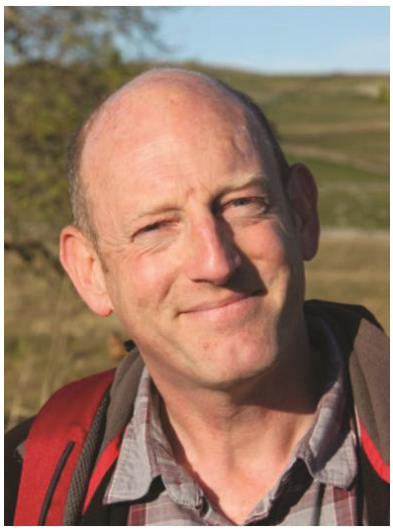
Piet-Louis Grundling (South-Africa, male, 52 years)

Was trained as a geologist at the University of Pretoria. Has a wide overview of peatlands and mires in Southern Africa. For six years he was actively involved in the South African programme 'Working for Wetlands' on the restoration of wetlands that had been affected by erosion.

In 2004 he led the team that organised the IMCG Assembly and Field Symposium in South Africa. In 2006 he started a PhD project at the University of Waterloo, Canada, where he successfully defended the thesis on the hydrology of Mfabeni, the oldest and largest fen in South Africa. He later joined the government programme Working for Wetlands again and supervised restoration works all over South Africa. He has published numerous reports and scientific publications on wetland restoration and hydrological functioning of wetlands and mires. He is affiliated with the Free State University and involved in training of students and employees of National Parks and workers in government programmes on restoration. He was president of the IMCG between 2010 and 2016.

Rob Stoneman (United Kingdom, male, 51 years)

BSc (Hons) in Geography (1988) from the University of Liverpool followed by PhD at University of Southampton (1993) studying the palaeoecology of lowland raised bogs, specifically to look at whether it was possible to pick out a Holocene climate signal through the study of macro-fossils. This was followed by a career in nature conservation with the Wildlife Trusts in the UK. I have worked at five Wildlife Trusts – as Project Manager for the Scottish Raised Conservation Project with Scottish Wildlife Trust (1993-97), as Chief Executives of the Sheffield (1997-2001), Hampshire (2002-2006) and Yorkshire (2006-present) Wildlife Trusts and a short time as Director of Conservation at the Royal Society of Wildlife Trusts (2001-2002). I have maintained a strong interest in peatland ecology and conservation throughout my career. Currently I am co-Chair of the IUCN-UK Peatland Programme and Chair of the Yorkshire Peatland Programme. Publications include the Bog Management Handbook (second edition imminent), Conserving Bogs (1997), IUCN-UK Peatland Programme Commission of Inquiry (2011) and Peatland Restoration and Ecosystem Services (2016).



My vision for peatlands is for the restoration of all the world's peatlands. My particular role is focussed primarily on the UK in setting up and running within my organisation – the Yorkshire Wildlife Trust – the Yorkshire Peat Partnership that to date has brought into conservation management about 30,000 ha of eroded blanket mire in the Pennines and North York Moors in the UK, primarily through revegetation of bare peat, hydrological restoration and gully re-profiling. At a UK level, my role is one of advocacy through the IUCN-UK Peatland programme helping decision-makers, especially Government, to recognise the value of peatlands to Society and engender funding for the complete restoration of Britain's peatlands within the next 30 years. The IUCN-UK Peatland Programme has an additional role in promoting global peatland conservation through the Global Peatland Initiative.

Mires and Peat

In March 2018 the following papers were published in our scientific journal Mires and Peat:

- Strategies for peatland conservation in France - a review of progress. [F. Muller] Volume 21: Article 06 http://mires-and-peat.net/media/map21/map_21_06.pdf
- Developing a national strategy for the conservation and sustainable use of peatlands in the Republic of Belarus. [A. Kozulin, N. Tanovitskaya & N. Minchenko] Volume 21: Article 05 http://mires-and-peat.net/media/map21/map_21_05.pdf

- Impact of drainage and soil properties on carbon dioxide emissions from intact cores of cultivated peat soils. [L. Norberg, Ö. Berglund & K. Berglund] Volume 21: Article 03 http://mires-and-peat.net/media/map21/map_21_03.pdf
- The climate warming effect of a fen peat meadow with fluctuating water table is reduced by young alder trees [V. Huth, M. Hoffmann, S. Bereswill, Y. Popova, D. Zak & J. Augustin] Volume 21: http://mires-and-peat.net/media/map21/map_21_04.pdf

Some impressions of the GPI partner meeting in Brazzaville, March 23, 2018. Photo: Hans Joosten.

Papers

Peat and peatlands close to Brazzaville (Republic of Congo)

Hans Joosten (joosten@uni-greifswald.de)

The Republic of Congo is located in the Congo River sedimentary basin, whereas in the southwest ancient granite rocks appear at the surface. The relief is rather flat with three essential units: plains, plateaus and hills, and low mountains. The plains are represented by the sandy coastal plain, the Niari valley, also in the Southwest, and the Cuvette Congolaise in the north of the country. In the latter area huge transboundary peatlands occur (Dargie et al. 2017, Miles et al. 2017). The area around Brazzaville consists of low plateaus embedded in a low hilly landscape (Fig. 1).

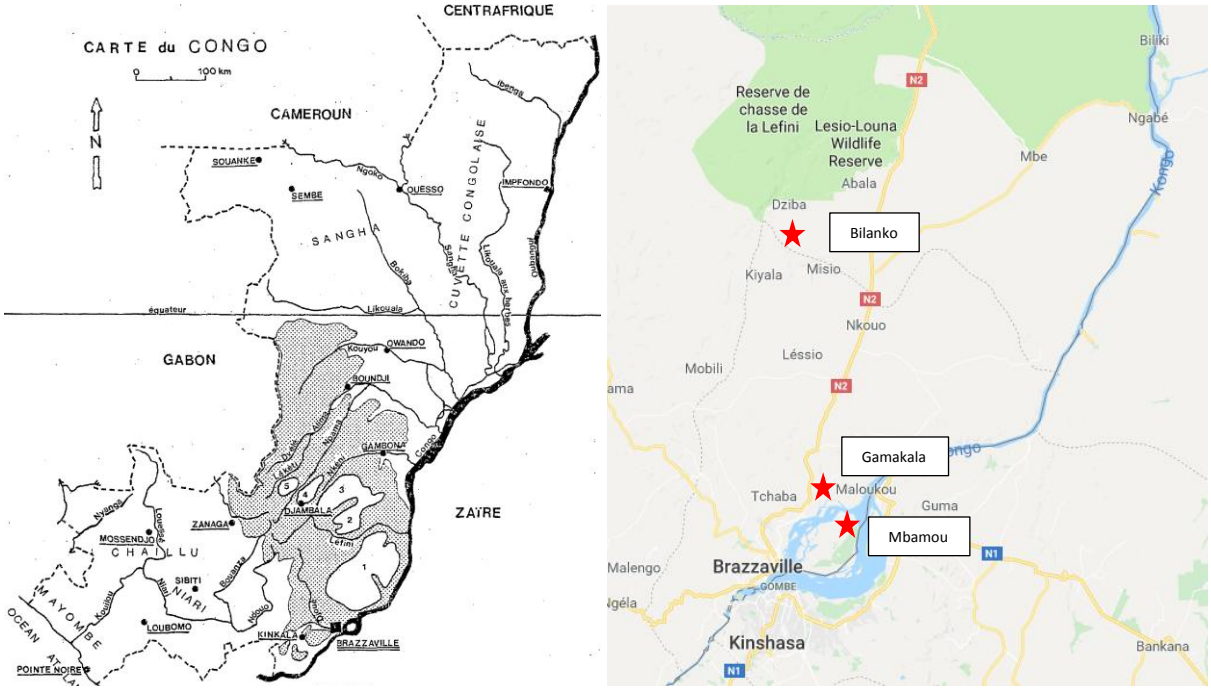


Fig. 1: The Republic of Congo with in grey the hills and enclosed plateaus of the Bateke area (from Schwartz 1985) (left); Location of the visited sites (right).

The Batéké area is a savanna region with plateaus and hills of Cretaceaous and Tertiary sands and sandstones (Moguedet et al. 1986, Smuts & Akiaoue 1999). The plateaus (1-4°S, 14-16°E) cover an area of 12,000 km^2 at an altitude between 600 and 886 m and are surrounded by a hilly area of 70,000 km^2, with an altitude between 350 and 800 m. Mean annual rainfall ranges between 1300 and 1900 mm with a dry season of 3-4 months. Mean annual temperature ranges is between 22 and 25°C with a mean thermal amplitude of 6°C (Elenga et al. 1994). The characteristic landscape unit is the lousséké, named after the local name of a small grass species, *Loudetia simplex*, which grows on extremely poor soils and is especially abundant on podzolized and hydromorphic soils (Vennetier 1966). Loussékés are mostly found in closed depressions with mineral but sometimes organic soils. Because of their location near permanent water points, loussékés have always constituted attractive sites for humans and wildlife (Schwartz 1985).

The first area with peat we visited was Ile M'Bamou, the main island (180 km²) in the Pool Malebo (formerly Stanley-Pool), just upstream of Brazzaville and Kinshasa, the capitals of the Republic of Congo (RoC) and the Democratic Republic of Congo (DRC), respectively (Fig. 2).

Fig. 2: The NE point of Ile M'Bamou with sand deposits and peaty valleys. Photo: Faizal Parish.

Ile M'Bamou had in the 1990s been prospected for the occurrence of peat to find a cheap and easily accessible alternative to wood and charcoal as a domestic fuel for Brazzaville (Smuts & Akiaoue 1999). The island is subject to sedimentation and erosion. Sand from the eroding hills washes down into the Congo River where it is deposited predominantly on the north-western banks of the islands in the Pool. On larger islands this leads to the formation of a wind-blown sand dune of up to 2 m high on the north-western edge of the island. An area of 50 to 600 m wide is thus covered by sand and peat formation occurs there only seasonally during the rainy season when higher water levels permit local vegetation growth leading to peat layers of 10-30 cm thick. Beyond this zone the thick reed/sedge vegetation of the permanently wet areas acts as an effective sand trap inhibiting further extension of sand into the wetlands (Fig. 3). Here peat accumulation can occur continuously as there is no dormancy in the growth cycle of the peat forming vegetation.

In the central part of the island, the most extensive peat deposits are found. The peats are mainly grass/sedge/fern peats with short fibres. The individual peatlands range in size from 15 ha to 622 ha with a total peatland area of 1297 ha and an average peat thickness of 1.23 m. The total peat resource of the island was calculated to be 15,953 million m^3 wet peat (Smuts & Akiaoue 1999).

Fig. 3: Strongly organic soils and reed vegetation on Ile M'Bamou. Photos: Faizal Parish.

The Ngamakala Pond (4˚03’ 59’’ S, 15˚ 22’ 57’ E, 410 m asl) on the Batéké plateau is a 950 m long and 150-200 m wide, swampy depression (Fig. 4), covered by a vegetation characterized by *Sphagnum cuspidatum* (Fig. 5, 6) and the arrow-leaved Araceae *Lasimorpha senegalensis* (Fig. 7). Forest patches in the mire are dominated by *Alstonia boonei* (Fig. 4, 6).

Elenga et al. (1994) found in Mgamakala 1-3 m deep deposits of fibrous peat with silty or clayey layers. The

Fig. 4: Ngamakala Pond in a depression in a podzol savanna dominated catchment area. Photos: Hans Joosten

upper part of the mire is extremely wet and fibrous, which prevented Elenga et al. (1994) to collect the uppermost 0-40 cm and 0-140 cm of their cores Gama 1 and 4 (Fig. 5). The same conditions forced us to wade waist-deep through the mire.

^{14}C dates (Elenga et al. 1994) show that the mire started growing around 28,000 years ago (cal BP, calibration HJ), that peat accumulation stopped 15,000 years ago. Peat growth restarted around 5,000 year ago to continue up to present. The mire has a nutrient poor acid character, which is illustrated by the presence of e.g. *Sphagnum* and *Drosera* (Fig. 8) and *Utricularia* sp. The water flowing out of the mire in a small rivulet and the very permeable upper layers of peat indicate that Ngamakala Pond could be an acid, nutrient poor percolation mire (Joosten et al. 2017), fed by water infiltrating in the poor podzolic catchment area .

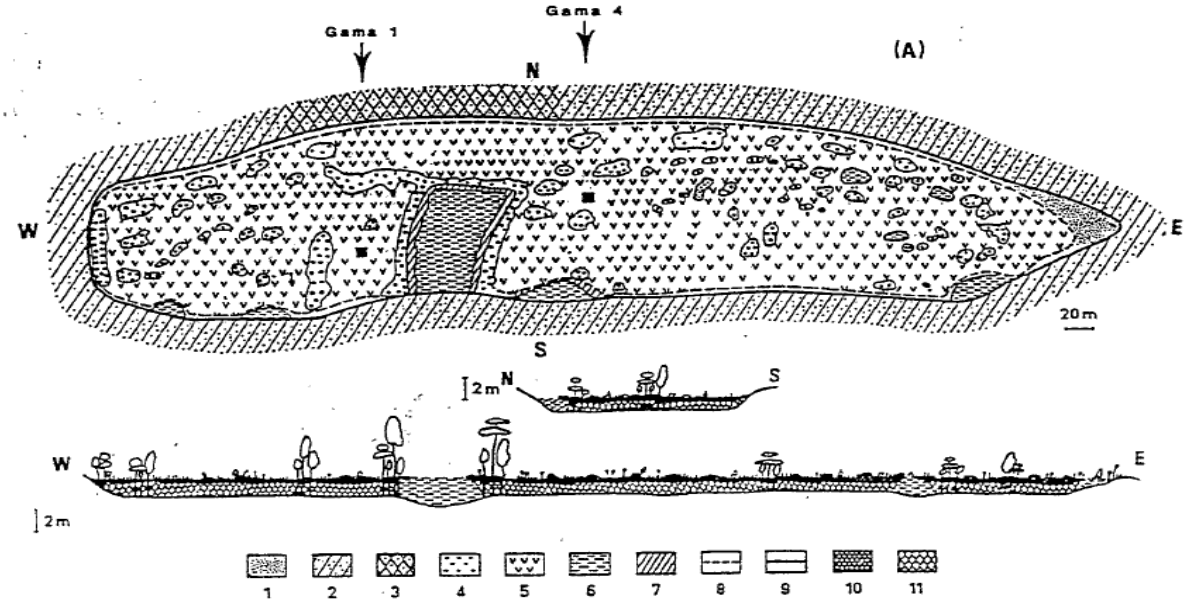


Fig. 5: The Ngamalaka Pond. 1= fluctuating limit of water level, 2= Loudetia demeusei *savanna, 3= new growth with Pentaclethra eetveldeana, 4= clumps of* Alstonia boonei*, 5=* Sphagnum *peatland, 6= pond, 7=* Stipularia africana *zone, 8= peatland extension, 9=pond extension, 10= floating upper part of peat, 11= lower part of the peat largely saturated with water. (Elenga et al. 1994). Mind: the N-S orientation is here incorrectly indicated.*

Fig. 6: Sphagnum cuspidatum *Ehrh. ex Hoffm. (det. Dierk Michaelis, Greifswald Mire Centre) in Ngamalaka Pond. Photo: Hans Joosten.*

Fig. 7: The orchid Eulophia caricifolia *(Rchb. f.) Summerh. (left) and the Araceae* Lasimorpha (Cyrtosperma) senegalensis *Schott (right) in Ngamalaka Pond. Photos: Hans Joosten.*

Fig. 8: Suspense Ifo admiring Drosera madagascariensis *DC and* Sphagnum cuspidatum *Ehrh. ex Hoffm. in Ngamalaka Pond. Photo: Hans Joosten.*

The last mire we visited was the lousséké (or bois) de Bilanko (3˚30'43'' S, 15˚21'40'' E, 730 m asl, 80 km NNE of Brazzaville), which covers – next to a grassy *Sphagnum* vegetation - also forest on organic soil (Schwarz 1988). Elenga et al. (1991) describe wet peat swamps from the Bilanko forest dominated by the Myrtaceae *Syzygium* with up to 4 m thick peat horizons in its central part. A piece of wood on a depth of 54 - 48 cm had an age of 10,850 14C years BP indicating a pre-Holocene age of most of the deposit. We ourselves cored 0.4 m of peat in the open lousséke´vegetation and 1.8 m in the forest.

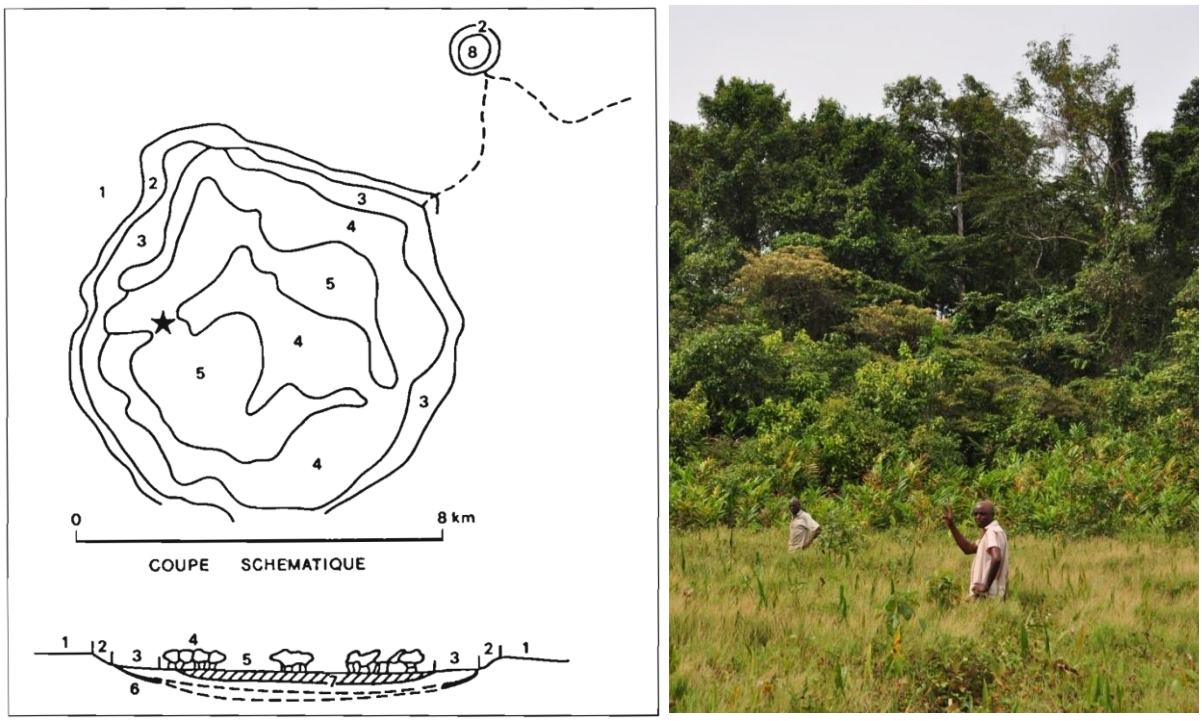


Fig. 9: The lousséké de Bilanko (after Schwarz 1988). 1=ferralitic plateau soils, 2= hydromorphic soils on the depression slope, 3= lousséké, 4= hydromorphic forest on peat, 5= grassy rafts on peat, 6= other organic soils (i.e. the "sol enterré noir sec/buried black dry soil" of Le Marechal 1966), 7= peat, 8= open water. The diameter of the lousséké is not 8 km, as indicated, but 2 km. Photo: Hans Joosten.

Fig. 10: In the lousséké de Bilango. From left: Local guide, Faizal Parish (Global Environment Centre), Yannick Enock Bocko (Université Marien Ngouabi), local guide, Maria Nuutinen (FAO), Suspense Ifo (Université Marien N'Gouabi), Niatis-Niaty Grace (Ministry of Tourism and Environment, RoC), Hans Joosten (Greifswald Mire Centre), Dianna Kopansky (UN Environment), Jonny Hughes (IUCN), Johannes Refisch (UN Environment). Photo: Rosa Román-Cuesta (CIFOR).

The trip was facilitated by Arlette Soudan-Nonault , Minister of Environment and Tourism of the Republic of Congo, who had made the four-wheel drives for our trip available and who wanted us to report on the trip 'fresh' from the mire (Fig. 11).

Fig. 11: Faizal Parish (left) and Maria Nuutinen (right) explaining the functioning of Sphagnum to minister Arlette Soudan-Nonault of the Republic of Congo. Photo: Hans Joosten.

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Peatlands in Mongolia: why we are losing them and could they be restored?

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(Photos: Burenbataar G., Ab Grootjans, Jill Heyde, Tatiana Minayeva & Jürgen Nauber)

Peatlands in Mongolia are integrated in the landscape and economy in a very specific way. They depend on a variety of water sources: permafrost, groundwater, surface water and precipitation. Peatlands are the most stable ecosystems in the world. As long as nothing is changed in their hydrology, peatlands maintain themselves over thousands of years. Peat has a huge water retention capacity, it works as a sponge. The water surplus causes highly productive vegetation, which helps to form new peat. More peat – more water (Fig. 1).

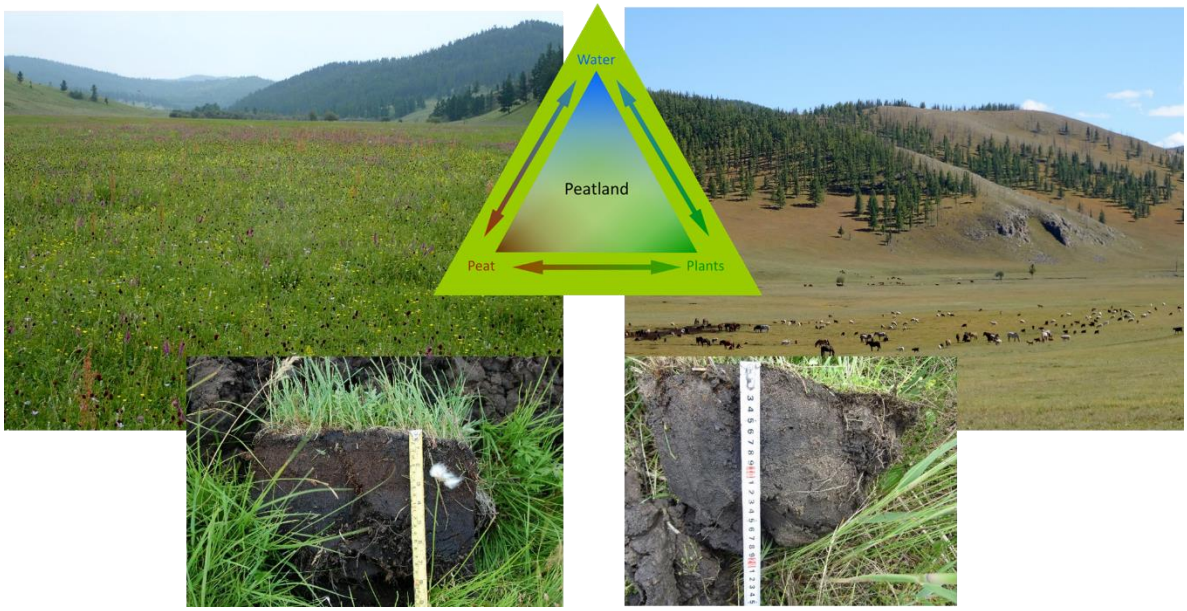


Fig.1: The interconnection of vegetation, peat, and water in a peatland.

That is why peatland is a self-maintaining ecosystem. Under wet conditions, the peat is saturated with water, stores carbon and provides productive habitats (Fig. 1, left photo). Under dry conditions, peatlands loose carbon and the peat turns to degraded meadow soil with low productivity (Fig. 1, right photo).

Why restore peatlands?

In their natural state peatlands in Mongolia provide unique ecosystem services: they protect the permafrost from thawing and hence guarantee stability of the country landscape and climate; they retain water and gradually give it out to the landscape; they capture dust and other pollutants and thus clean water; they accumulate carbon and are the largest long-term acting carbon sinks among all terrestrial ecosystems; they maintain a cooler and more humid local climate, mitigating droughts ('zud') and provide a productive grass yield, even during droughts. Their economic significance for pastoral land use is large but not recognised.

Peatlands are the last productive pastures. That is why during the last decades the nomads shifted to peatlands from other pastures that had degraded before. This leads to huge impact on peatlands, they start to dry out, erode and degrade, loose the peat and its retention capacity, loose productivity. Furthermore the mining industry is destroying peatlands upstream in the highlands and discharges too large amounts of groundwater. Due to degradation of peat and vegetation, permafrost is exposed to heat and thaws. Peatlands cannot be maintained without permafrost or/and groundwater.

The structure and natural functions of peatlands should be restored in order to bring back the capacity of peatlands to carry out their significant ecosystem services.

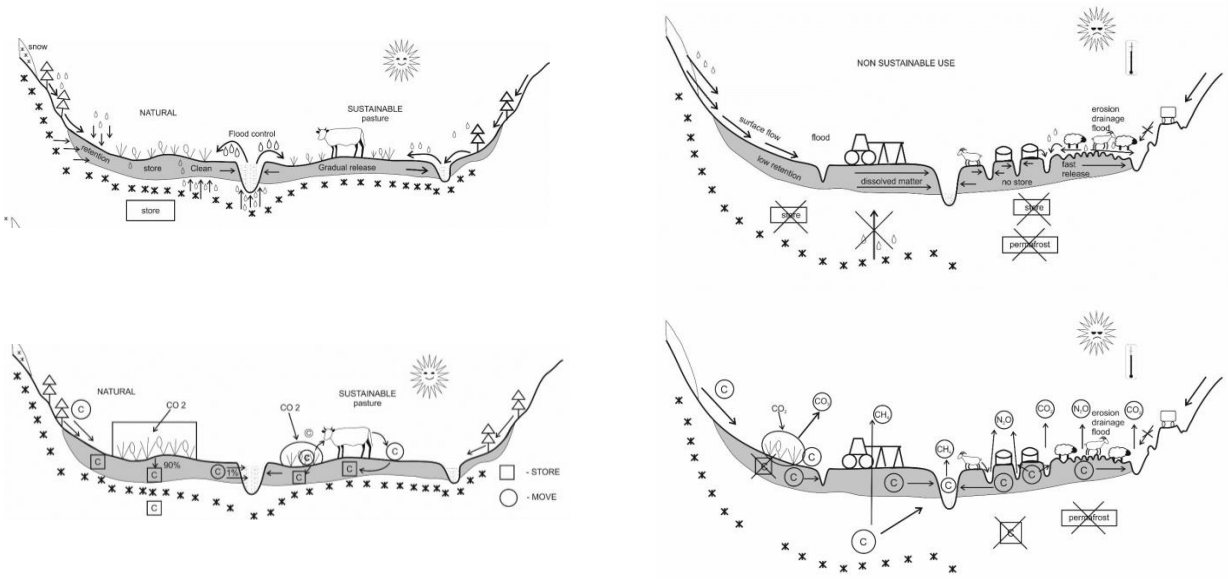


Fig. 2: Water (top) and carbon cycle (bottom) in natural (left) and degraded peatlands (right) in Mongolia. Design: Oxana Cherednichenko

How to restore peatlands

During the last years more and more herders have started to understand the role of peatlands in their livelihoods and especially in water supply. They have started to plan and implement some measures themselves. For example, they fence the springs in the mires to protect them from cattle (Fig. 3) and they construct dams to capture some water in one place for animals (Fig. 4).

To make these measures more effective and systematic, scientists and NGOs with support of the Asian Development Bank (ASB) and Wetlands International have implemented a pilot demonstration project on peatland restoration in Nomgon bag, Khashaat sum of Arkhangaj aimak in Central Mongolia (Fig. 5).

What have we done?

Peatland restoration in Mongolia is possible only through accurate hydrological planning and cooperation of all interested partners. Usually peatlands have originated because of the presence of permafrost and a large storage of groundwater. We had to answer the question: is it still possible to restore Nomgon peatland? Are

Fig. 3: Examples of spring fencing

Fig. 4: Example of dam construction

Fig. 5: Location of the Nomgon *project site*

permafrost or ground water still in place? To make measures consistent we carried out detailed baseline studies and developed a restoration concept. In summary the baseline study gave the following results:

- Geophysical studies showed that permafrost has totally degraded in the area, even though still a large groundwater stock and an aquifer are present (Fig. 6).
- The peatland is mainly fed by springs. As groundwater is available, the main obstacle for conservation of the peatland is regular overgrazing and damage of springs by cattle (Fig. 7).
- The small paths developed as a consequence of overgrazing turn to the numerous waterflows, which drain the peatland (Fig. 8).
- Hence the main activities proposed to the engineers responsible for the project design were: fencing of the springs and installation of obstacles for water flow such as small dams. The latter will also enhance saturation by water of the remaining dry peat (Fig. 3, 4, 9).

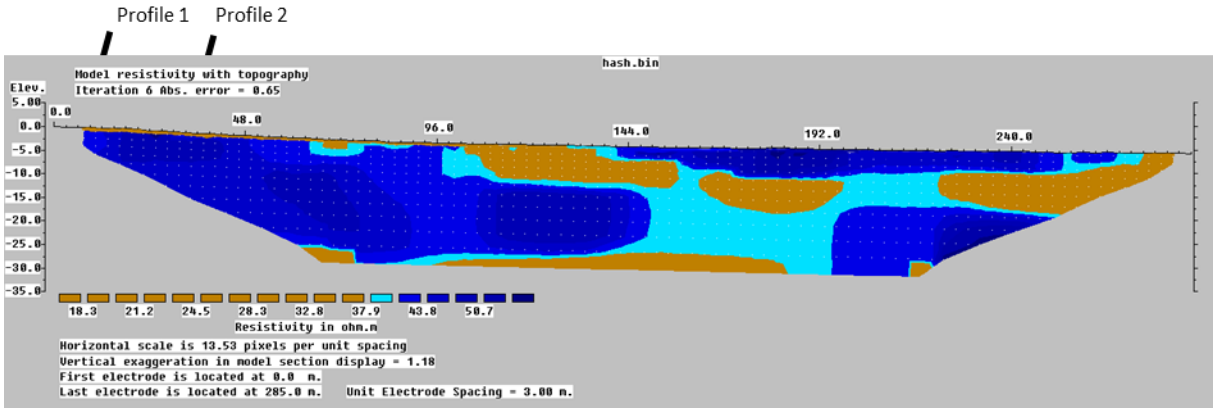


Fig.6: Results of the research on clay distribution (electric resistivity tomography) to a depth of c. 35 meter below the surface in a transect across the study area. Brown: clay with little gravel; light blue: idem with water-saturation; blue and dark blue: water-saturated gravel with sand. Underneath the clay layer at the left is a deep aquifer, which can transport water to the valley.

Fig.7: The trampled and partly destroyed springs in Nomgon peatland

Fig. 8: Peat erosion ending up in the formation of drainage channels.

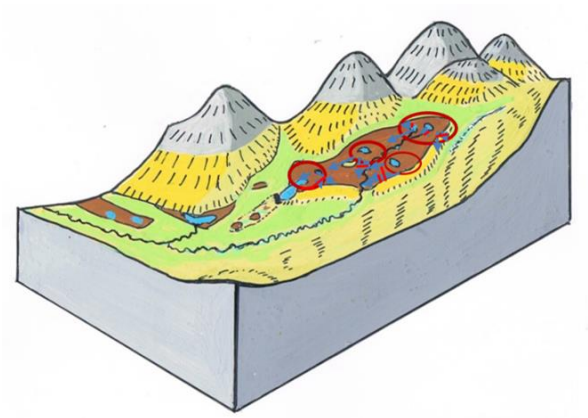


Fig. 9: The concept of the Nomgon peatland restoration: fencing the springs and constructing small dams. Design: Ab Grootjans.

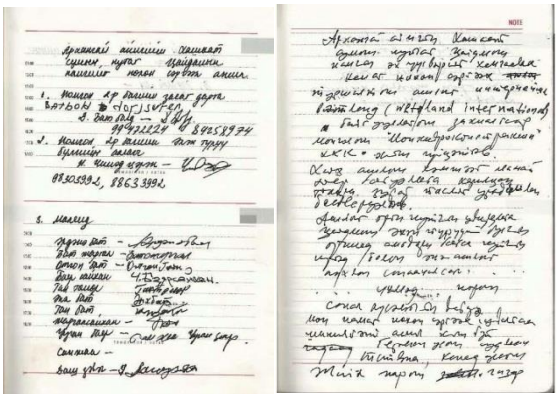


Fig. 10: Signatures of the herders under the agreement.

- Spring fencing could cause a conflict with the herders as it reduces access of cattle to water. As a compensation the project proposed to repair and fence a dam previously constructed by the herders (Fig. 11). The dam itself does not contribute to peatland restoration, it even contradicts its logic as far as it enhances water evaporation. Anyhow we had to suggest these measures to stay in line with the community.
- Not all local herders understand and support the proposed activities. To avoid conflicts the company appointed to develop a design consulted the local herders and explained them the design (Fig. 12). Signatures were gathered from most herders (Fig. 10), whereas posters explaining the reason of the constructions were placed on all fences.
- The baseline study revealed a wide spectrum of counterarguments and fears, which were later confirmed by attempts of the herders to break the fences. The fact that the work was recognised by the head of the administration of the 'sum' helped to convince the local herders (Fig. 13).

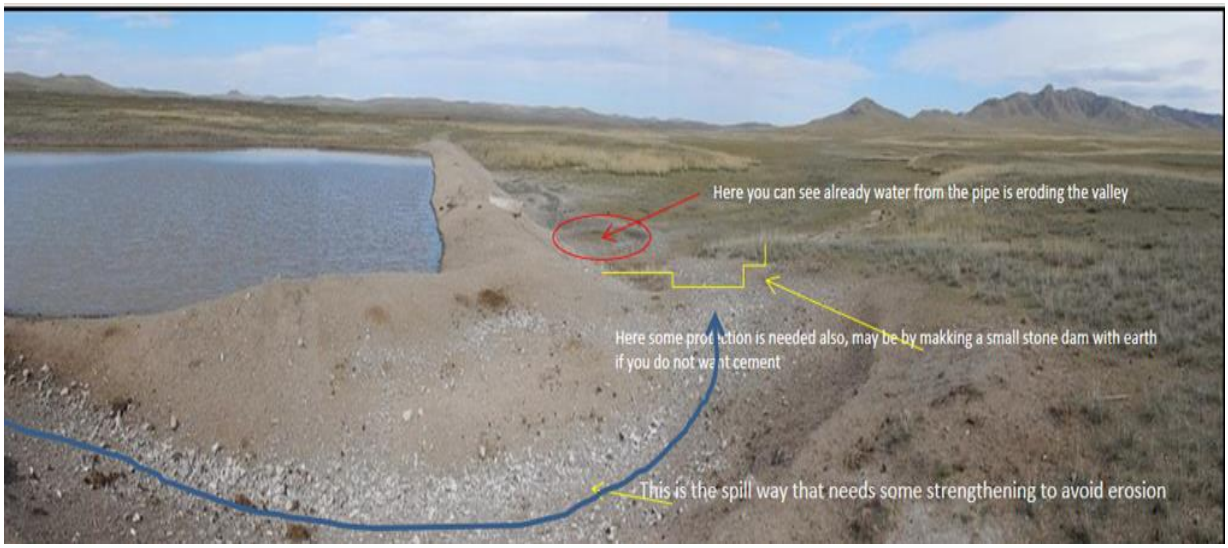


Fig. 11: Concept of dam restoration as compensation measure (by Ab Grootjans).

Fig. 12: Discussing the problems of peat degradation with local herders (May 2017)

Fig. 13: Presenting of the results of the works. From left: Academician Dugarjav; Mr. Gerelt-Od Badarch, head of Khashat sum administration; head of neighboring bag; local herder Mr. Chimed, initiator of the restoration works (Sept. 2017).

What is the story

The story is about a family that wants to change the concept of life. They dream to have their home safe and beautiful as we all want. At the same time, they want to maintain their traditional life style. They care for their home, which is their environment, the typical Mongolian landscape, and call on other herders to do the same. From their own experience they know about the features and functions of peatland landscape. Chimed (whose official name is Chimedregzen Nadmid) and his wife Naranthuya are not a usual couple. Apart from their traditional ger they have a small house and garden with vegetables, flowers and a (plastic) glasshouse (Fig. 14).

Fig. 14: Chimed and Naranthuya and their house and garden.

They have convinced the surrounding families to start treating their peatland better. They gathered funds from a number of local herders and started to fence the springs and constructed the dam to create the pond.
In July 2016 we brought experts and a wide range of stakeholders together in a workshop on peatland conservation and wise use in Kharkharin in the frame of the ADB project „Strategic planning for peatlands in Mongolia". After discussion it was agreed that the efforts of local community could be supported.

Fig. 15: Chimed as part of the planning team for monitoring works.

Chimed had been supporting and hosting the expert team in course of project, helping to communicate the key messages to herders and other stakeholders, also providing connection to local authorities (Fig. 15). He even gave his personal award to some team members. In 2017 a volunteer from Germany Jürgen Nauber took part in the restoration activities. This was highly appreciated (Fig. 17) and inspired Chimed to organise a "Peatland restoration volunteer camp". He asked Care for Ecosystems UG to help. And we are asking you to join. Let us change the balance to peat accumulation together. More technical information on page 35 of this Bulletin.

Fig. 17: Award from Nomgon sum administration to the team and personal award of Chimed to Jürgen Nauber.

Peatland news

Global

High level attention to the 3th Meeting of the Global Peatland Initiative. In the front from left to right: Jacques Elion, Mayor of Poto Poto (representing Brazzaville Mayor), Siti Nurbaya (Minister of Environment and Forestry, Indonesia), Arlette Soudan-Nonault (Minister of Tourism and Environment, Republic of Congo), Clément Mouamba (Prime Minister of the Republic of Congo), Amy Ambatobe Nyongolo (Minister of Environment and Sustainable Development, Democratic Republic of Congo), Erik Solheim (Executive Director, UN Environment, and UN Under-Secretary-General). Photo: Hans Joosten.

Historic agreement signed to protect the world's largest tropical peatland

In an unprecedented move to protect the Cuvette Centrale region in the Congo Basin, the world's largest tropical peatlands, from unregulated land use and prevent its drainage and degradation, the Democratic Republic of Congo (DRC), the Republic of Congo and Indonesia on March 23, 2018, jointly signed the Brazzaville declaration that promotes better management and conservation of this globally important carbon store. To preserve the future of these valuable natural peatlands – which are about the size of England, and were only mapped scientifically in their entirety for the first time last year – the DRC and the Republic of Congo established a transboundary collaboration agreement. The agreement noted the importance of good land use and infrastructure planning that takes the nature of peatlands into account.

"Conservation and development can go hand in hand," said Erik Solheim, Head of UN Environment. "We will manage to conserve the peatlands if we put people's needs first. We can help countries to better understand the unique nature of the peatlands, and plan very carefully for any potential use."

Minister Siti Nurbaya Bakar. Photo: Hans Joosten.

Both the Republic of the Congo and the DRC are in the process of planning economic concessions for agriculture, oil and gas mining, and logging. Unregulated exploitation of the peatlands could potentially be detrimental to the environment and to the climate, as it could release the carbon emissions that have been locked in for millennia. "Peatlands have grown over the course of 10.000 years, and they can be destroyed in a matter of days if the land use is not sensitive to the nature of the peatlands," said Tim Christophersen, Head of Freshwater, Land and Climate Branch at UN Environment.

The declaration was signed on the sidelines of the Third Partners Meeting of the Global Peatlands Initiative, taking place in Brazzaville, Republic of Congo, on 21-23 March 2018. The meeting was opened by Clément Mouamba, Prime Minister of the Republic of Congo, together with Erik Solheim.

The meeting also fostered a deep collaboration between Indonesia and the countries of the Congo Basin. Indonesia, the nation in the world with the most experience on peat management issues, stepped up as a valuable partner in South-South development cooperation. "Indonesia has extensive experience in managing tropical peatlands, both in positive and negative terms. We are keen to share our experience with the Congo Basin and other countries through South-South Cooperation" said Siti Nurbaya, Minister of Environment of Forests of the Republic of Indonesia. "The main peatland management principle is to keep the peatlands wet."

Minister Arlette Soudan-Nonault. Photo: Hans Joosten.

"Destroying the peatlands would be a grave assault on the Paris Agreement and the climate. We need to find sustainable alternatives, and traditional management practices are important," said Arlette Soudan-Nonault, Minister of Environment and Tourism of the Republic of the Congo. "We are taking action with the Brazzaville Declaration signed today".

- https://www.unenvironment.org/news-and-stories/press-release/historic-agreement-signed-protect-worlds-largest-tropical-peatland
- https://news.grida.no/from-brazzaville-southsouth-action-on-peatlands
- https://gridarendal-website-live.s3.amazonaws.com/production/documents/:s_document/389/original/Brazzaville_D%C3%A9claration_FR_and_EN.pdf?1521803496
- http://www.tourisme-environnement.gouv.cg/environnement/initiative-mondiale-sur-les-tourbieres/
- https://www.devdiscourse.com/Article/2075-historic-agreement-signed-to-protect-the-worlds-largest-tropical-peatland
- https://www.unredd.net/announcements-and-news/2880-guarding-the-planet-s-carbon-treasure-three-countries-sign-the-brazzaville-declaration.html
- https://www.iucn.org/news/climate-change/201803/ministers-commit-protecting-world%E2%80%99s-largest-tropical-peatland
- http://www.environewsnigeria.com/why-peatlands-should-be-protected-by-solheim/
- https://news.globallandscapesforum.org/26809/new-pact-conserve-congo-basin-peatlands-risk-unsustainable-exploitation/

THIRD MEETING OF THE PARTNERS OF THE GLOBAL PEATLANDS INITIATIVE (GPI)
BRAZZAVILLE DECLARATION

Under the High Patronage of their Excellencies the Presidents of the two Congos, Denis SASSOU NGUESSO and JOSEPH KABILA, the Republic of Congo and the Democratic Republic of the Congo co-organized the 3rd Conference of the Partners of the Global Peatlands Initiative with the support of UN Environment and the Global Peatlands Initiative partners,

We, Ministers in charge of the Environment Indonesia, the Democratic Republic of Congo and the Republic of Congo, covered by vast expanses of peatlands, gathered in Brazzaville on March 22, 2018 with UN Environment support, on the occasion of the Third Meeting of the Global Peatland Initiative Partners, to discuss challenges and solutions related to Conservation, Restoration and Sustainable Management of peatlands in the central basin.

Recalling the Marrakech meeting in 2016 on the sidelines of COP22, where the Global Peatlands Initiative was launched, during which the Ministers adopted the vision for 2050 and the strategic objectives 2020 and 2030.

Recalling the conclusions of the first meeting and the second meeting on the Global Peatland Initiative held in September 2016 in Rome at the head quarters of FAO and in May 2017 in Jakarta, Indonesia, respectively.

Recalling the role of the Congo Basin forests, the second largest tropical rainforest after the Amazon, in regulating the global climate, including its very high carbon sequestration capacity in its flooded areas namely peatlands.

Recalling that peatlands are natural treasures of great importance for the Republic of Congo and the Democratic Republic of the Congo, for the planet, by their valuable carbon stock which is an essential source for the climate, and by their unique and exceptional biodiversity and by the provision of ecosystem services that ensure livelihoods for local people, making them relevant to the achievement of the Sustainable Development Goals on health, water and land life, but also relevant to the achievement of Aichi Biodiversity Targets.

Recalling that the peatlands found in the central Congolese basin, in an almost intact state, are of great interest not only for its unique and exceptional biodiversity, for their contribution to mitigation and adaptation to climate change through carbon storage, biodiversity conservation, regulation of water regime and quality,

Recalling the Memorandum of Understanding and the Plan of Action on the Sustainable Management of the Binational of the Two Lakes, Lake Tele and Lake Tumba, signed between the Republic of Congo and the Democratic Republic of Congo, in July 2017 in Kinshasa.

Recalling also the potential of the Lac Tumba Lac Télé zone in economy of protected areas adopted by the Heads of State of the Economic Community of Central African States (ECCAS), on 25 May 2015 in NDjamena, including ecotourism and scientific tourism as well as other non-environment services intended to develop the economy of the riparian territories with a view to a real improvement in the living conditions of the neighboring populations.

We reaffirm our commitment to preserve the right of local communities to use natural resources in areas covered by peatlands, to maintain their traditional uses and to implement the principle of free, prior and informed consent in engaging in activities with local people, to help them use peatlands sustainably and to develop methods other than destructive practices.

We also reaffirm our commitment to continue to make the fight against climate change and the promotion of inclusive and sustainable development a high priority for compliance with the Ramsar Convention, the Paris Agreement, the Sustainable Development Goals (SDG), the 2030 Agenda of the United Nations and the 2063 Agenda of the African Union and the Marrakech Declaration of African Heads of State and Government of Action for Co-Emergence of the Continent.

We are committed to:

1. Implement coordination and cooperation between different government sectors to protect the benefits provided by peatland ecosystems. To this end, the countries are committed to set up multi sectoral and multidisciplinary national frameworks to manage peatlands in the Central Basin of the Congo Basin;
2. Establish and finalize land-use plans that promote the conservation and protection of peatlands and prevent their drainage and degradation. To this end, the two countries announce the establishment of a transboundary collaboration agreement to preserve the future of these valuable natural peatlands and their ecosystem services, with the participation of communities and local stakeholders.
3. Work for the development and promotion of a land use model that favors the sustainable management of peatlands and economic development of local communities in the Lac Télé/Lac Tumba landscape.
4. Work to transform the growth of the economies of Lac Télé/Tumba landscape to ensure inclusive and sustainable development in order to eradicate extreme poverty, and improve the well-being of the local populations by leveraging human, financial, technical, technological opportunities as well as opportunities provided by the green economy and the blue economy;
5. Take immediate action with the support of the African Development Bank to increase sustainable investments compatible with conservation and sustainable development in the Lac Télé/Lac Tumba zones in order to encourage and attract private sector partnerships;
6. Encourage investment plans Climate of the Republic of Congo and the Democratic Republic of Congo, projects and programs of all stakeholders to reconcile the fight against climate change and inclusive and sustainable economic development;
7. Take immediate action to develop ambitious diplomacy and marketing of Congo Basin peatlands with a view to publicizing the socio-economic and ecological challenges of these particular peatlands in Africa and beyond;
8. Work to accelerate the operationalization of the Blue Fund for the Congo Basin and the Green Economy Fund in Central Africa to finance socio-economic and ecological programs and projects in Lake Tele/Lake Tumba landscape with support from the Central African Development Bank (BAD) and the Central African Development Bank (BDEAC);
9. Promote best management practices in peatland areas covered by economic activities, so that they are managed in a sustainable and climate-smart way, that is, in such a way that are neither drained, nor degraded.
10. Act without delay to set up an Observatory for the collection, monitoring and dissemination of multi-purpose data by decision-makers, scientists, journalists and all other stakeholders interested in Congo Basin peatland issues challenges;
11. Work without delay on the creation of a Center of Excellence for Training, Research and Innovation as well as on training centers for technical experts with the aim of developing a pool of competent and quality human resources to steer and promote green growth in Lac Télé/Lac Tumba peatlands.

We call on the international community, including the UN Environment, through the Global Peatlands Initiative, to bring their support to both Congo's in the process of sustainable peatland management.

We call on the international community to fund research programs to better understand the state and extent of peatlands, to better understand the contribution of peatlands to greenhouse gas fluxes; to better appreciate the costs and benefits of restoring peatland ecosystem services as well as the opportunity costs of a wait and see or business as usual approach.

We solemnly call on donors to urgently provide adequate resources for the countries concerned for a solid climate action - for the benefit of the populations and the planet, as indicated by the general theme of the 3rd meeting of the partners of the Global Peatlands Initiative.

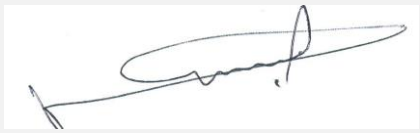
We also call upon the technical and financial partners to support the Republic of Congo and the Democratic Republic of Congo in the process of facilitating the emergence of an innovative market, where private investors, motivated by corporate social responsibility of their companies, are assured that their investments in peatland conservation and restoration will produce positive and verifiable climate benefits, verifiable by an independent validation and certification body.

We call on the international community to review existing international mechanisms, such as the National Determined Contributions, the REDD+ program and nationally appropriate mitigation measures adopted under the UNFCCC, for the integration of sustainable peatlands management into relevant policies.

Finally, we call on all major donors to support the Blue Basin Funds and the Green Economy Fund in Central Africa to finance national and sub-regional initiatives to address climate change challenges, economic development, private sector development, job creation and livelihood improvement.

Finally, we congratulate the Republic of Indonesia and the Republic of Peru for their offer to share knowledge, management tools and lessons learned in peatland management, and look forward to an intensification of South-South Cooperation.

Son Excellence, Mme Arlette SOUDAN-NONAULT, Ministre du Tourisme et Environnement de la République du Congo



Son Excellence, Dr. Amy AMBATOBE NYONGOLO, Ministre de l'Environnement et du Développement Durable de la République Démocratique du Congo

Son Excellence, Siti NURBAYA, Ministre de l'Environnement et des forets de la République d'Indonésie

Brazzaville, 22 March 2018

Amy Ambatobe Nyongolo, Siti Nurbaya Bakar, Arlette Soudan-Nonault and Erik Solheim after signing the Brazzaville Declaration. Photo: Hans Joosten.

Political declarations are worth as much (or as little) as the follow up that is invested into their implementation. In this context, the Declaration has to be viewed as an opening to (i) intensify the national cross-sectoral dialogues, and transboundary collaboration between the two countries, and to build decision-making structures that reflect the unique characteristics of peatlands; (ii) intensify South-South Cooperation between Indonesia and RoC/DRC; and (iii) use the Declaration to continue shining a spotlight on forests, peat and natural resources management in DRC and Republic of Congo, in particular at times of increasing pressure to exploit natural resources. All of the above should build on and support the ongoing processes, most notably under REDD+ and CAFI. For example, the draft REDD+ investment plan for RoC will hopefully be taking new scientific findings on peatlands into account.

The Brazzaville Declaration: Words and action on peatland protection in the Congo Basin

The signing of the Brazzaville Declaration has evoked mixed reactions. Whereas the United Nations Environment Programme, one of the organisers and funder of the meeting, in a press release announced that a "historic agreement" had been signed "to protect the world's largest tropical peatland" (see above), other voices questioned "whether it will actually protect anything".

Greenpeace Africa points out that "recent developments on the ground show that industrial activities are already taking place which pose an alarming threat to those peatland areas". Amy Ambatobe, the Minister of Environment for DRC, recently illegally allocated three logging concessions covering an area of 650,000 hectares to Chinese-owned logging companies Forestière pour le Développement du Congo (FODECO) and Société La Millénaire Forestière (SOMIFOR). Two of the concessions overlap with the Cuvette Centrale peatlands. Meanwhile, DRC's President Joseph Kabila signed three oil exploration blocks also mainly in the Cuvette Centrale. Irène Wabiwa Betoko, Greenpeace Africa Senior Forest Manager, comments: "Greenpeace Africa is alarmed by these developments. We call on both governments of DRC and RoC to protect these peatlands by cancelling any current and future industrial activities in these areas and keeping the moratorium on logging permits in place."

- http://www.redd-monitor.org/2018/03/27/the-brazzaville-declaration-words-not-action-on-peatland-protection-in-the-congo-basin-and-the-strange-case-of-the-congo-basin-blue-fund-and-the-brazzaville-foundation/

Global brands divided over transparency efforts to tackle deforestation for palm oil

Eight major household brands are refusing to say where their palm oil comes from, despite promising to stop buying from companies that destroy rainforests. Eight others, such as Nestlé and Unilever, have made their palm oil supply chains more transparent, according to a new report by Greenpeace International, *Moment of Truth*. "Brands have repeatedly promised to end deforestation for palm oil by 2020. With less than two years to go they are way off track. Some, such as Nestlé and Unilever, have at least come clean about that. Others, including PZ Cussons, Johnson & Johnson and Kraft Heinz, are still keeping customers in the dark," said Kiki Taufik, Global Head of the Indonesian forests campaign at Greenpeace Southeast Asia.

In 2010, consumer brands pledged to eliminate deforestation from palm oil and other key commodities by 2020. In January 2018, Greenpeace International challenged 16 leading brands to disclose their palm oil suppliers, along with the mills that produced the palm oil they used. This would show whether brands continue to source from forest destroyers. Eight brands have now disclosed this information. Eight refused to say where their palm oil comes from. "Despite corporate commitments to reform this dirty industry, palm oil remains a high-risk commodity. Brands need to come clean about where their palm oil comes from and cut off growers that refuse to change their destructive ways," said Kiki.

- https://www.greenpeace.org/international/press-release/15404/global-brands-divided-over-transparency-efforts-to-tackle-deforestation-for-palm-oil/
- http://www.onegreenplanet.org/news/greenpeace-calls-out-brands-for-failing-to-disclose-palm-oil-supply/
- http://www.ekklesia.co.uk/node/25453

Agri-giant Olam launches 'net positive' sustainability strategy

Olam, the world's third-largest agricultural business, has launched a new sustainability strategy that promises to deliver a 'net positive' impact across its supply chain. The strategy, dubbed 'Living Landscapes', was launched early April and promises to develop environmental targets for its own operations and its supply chain by 2020. It also promises to eliminate unsustainable practices across Olam's supply chain, including banning any conversion or degradation of peatland, high value wildlife habitats and natural habitats with high levels of

organic carbon, such as high carbon forests. Olam launches the strategy because the agricultural industry is at a "tipping point", facing multiple environmental risks including climate change, soil depletion, entrenched poverty, and wildlife destruction. Group CEO Sunny Verghese stressed the new policy was not just about reducing environmental harm, but was also vital for securing Olam's profits in the future. "Unless we address the multiple environmental and social issues affecting our supply chains, our future volumes are at risk," he warned. "We must now go beyond simply doing less harm, and instead aim for a 'net-positive' impact towards the creation and restoration of natural and social capital."

- https://www.businessgreen.com/bg/news/3029763/agri-giant-olam-launches-net-positive-sustainability-strategy

High Carbon Stock and High Conservation Value forest reserve with locally organic soils spared in new Olam oil palm plantation in Gabon. Photo: Hans Joosten

IPS 50th Anniversary Jubilee Symposium 2018 'Wise use of peatlands, past and future'

The International Peatland Society (IPS) celebrates its 50th anniversary from 11 to 13 September with a symposium and a spectacular gala evening. The Dutch National Committee of the IPS (Nederlands Veengenootschap) as a local host offers this symposium on the wise use of peatlands and peat, along with specific topics that will attract experts from all around the world. The symposium will for most part be held on the ss Rotterdam, a former flagship of the Holland-America Line but now a hotel and conference center, permanently moored in Rotterdam, the Netherlands.

50 YEARS

IPS

International Peatland Society

Special attention will be given to Dutch landscape history, responsible peat production and the use of peat by horticulture, subsidence of drained peatlands, related CO_2 emissions and strategies for dealing with soil subsidence like submerged drains and paludiculture.

During the symposium the results of the IPS project "Peat for Food and Quality for life" will be presented, which includes a forecast of the demand for peat from 2020 – 2050 and how this demand can responsibly be satisfied. More info: https://www.ipsjubileesymposium.nl/99768

Prior to the IPS Jubilee Symposium, on Monday 10 September, the IPS will hold a Global Summit for senior executives of companies that rely upon peatland and/or peat products for a significant part of their business. Click here for the Global Summit website.

The International Peatland Society has now 1437 members in 41 countries. This is the result of the annual membership check that was carried out by the IPS Secretariat in cooperation with the 16 National Committees. Altogether these are 1114 individual members, 230 corporations, 68 students as well as 14 research institutes and 11 governmental institutes. Source: IPS Peat Snippets March 29, 2018.

Draining peatlands gives global rise to greenhouse laughing-gas emissions

Drained fertile peatlands around the globe are hotspots for the atmospheric emission of laughing-gas -- a powerful greenhouse gas called nitrous oxide, which is partly responsible for global warming and destruction of the ozone layer, a new study shows. Research into natural peatlands such as fens, swamps and bogs, as well as drained peatlands, found that either draining wet soils or irrigating well drained soils boosts the emission of nitrous oxide significantly. Led by researchers at the University of Birmingham and the University of Tartu, Estonia, the study took in 58 peatland sites around the world. These included locations in the United States, Australia, Brazil, South America, Australia, New Zealand, East Africa, Southeast Asia, Siberia and Europe. The authors of the study -- published in Nature Communications -- are calling for increased conservation of fens and swamps to help reduce the impact of climate change and protect the ozone layer.

Prof Ülo Mander, Senior Lecturer in Biogeochemistry, at the University of Tartu, Estonia, who conceived this research with a global network of 36 scientists said: "Nitrous oxide is no laughing matter -- it is a significant contributor to global climate change and depletion of the ozone layer, which protects our planet from cosmic radiation.

"Organic soils, such as fens, swamps, bogs and drained peatlands, make up more than one-tenth of the world's soil nitrogen pool and are a significant global source of laughing gas. They are significant sources of nitrous oxide when drained for cultivation." Dr Sami Ullah, Senior Lecturer in Biogeochemistry at the University of Birmingham added that this potential problem was further exacerbated when drained cultivated organic soils are irrigated, particularly in warm/tropical regions, which significantly increases nitrous oxide emission.

Laughing gas measurer Ülo Mander at one of his research sites. Photo: Hans Joosten

The report's lead author Dr. Jaan Pärn is a joint exchange postdoctoral fellow at the University of Birmingham working under Dr. Ullah and Prof. Mander's supervision. "Our findings show that artificial drainage will be the primary driver of future changes in laughing gas emission from organic soils," he explained. "This effect will be more pronounced in tropical regions leading to more nitrous oxide emitted to the atmosphere. Therefore, conservation and restoration of tropical fens and swamp forests should be made a priority to avoid and reduce emissions of this grim laughing gas." The survey found that changes in nitrous oxide levels flux emission can be predicted by models incorporating soil nitrate concentration, water content and temperature. Nitrous oxide emissions increase with nitrate and follow a bell-shaped distribution peaking at intermediate soil moisture content around 50%. Both nitrate and soil moisture together explains 72% of laughing gas emission from the global organic soils. https://www.nature.com/articles/s41467-018-03540-1

Africa

Oil palm, rubber could trigger 'storm' of deforestation in the Congo Basin

Thousands of square kilometers of the Congo Basin sit on the verge of destruction, according to a new report released on March 12 by Earthsight, the London-based non-profit that investigates global environmental issues. Earthsight documented approximately 500 km^2 of deforestation to clear the way for new rubber and oil palm plantations in Central Africa's rainforest countries over the past five years. But the team also found that companies in Cameroon, Gabon, Central African Republic, the Republic of Congo and the Democratic Republic of Congo (DRC) hold licenses for industrial agriculture on another 8,400 km^2 of land. Their research shows that government authorities granted several of these concessions with little regard for transparency, and in some cases in violation of laws written to protect forests, often to devastating effect for local communities.

The low prices that palm oil and rubber fetch on global commodity markets has held conversion in check in DRC for now, said Sam Lawson, Earthsight's executive director, in an interview. The lack of roads and functioning infrastructure in large parts of the Congo Basin make the region a complicated and expensive place for agricultural companies to operate, so prices must be high enough to justify the substantial overhead. But, according to Lawson, the path to continued production of commodities like palm oil and rubber will undoubtedly pass through tropical Africa, as producers run out of land in Southeast Asia and other parts of the world. "The demand for the raw materials in China continues to grow, and the available land in the traditional production areas [continues] to diminish," Lawson said. The report reveals that several of the largest companies operating in the region are doing so illegally, including two related companies in the Republic of Congo.

In 2013, the government of the Republic of Congo authorized a company called Lexus Agric, without making any of the contracts public, to plant oil palm and rubber trees on a 500 km^2 section of forest in the southern part of the country. Lexus Agric's permit to operate in the area expired in June 2016, but satellite images show that the company continued to build logging roads and clear forest, even in areas of critical habitat called intact forest landscapes, into July of that year. As the illicit clearing was happening on the Lexus Agric concession in 2016, Jeremie Issamou, one of the company's directors, posted a picture of a truck hauling a massive log out of the forest on Facebook. The Republic of Congo's director general of agriculture, Simon Dieudonné Savou, commented on the post, warning that bragging about this "secondary activity" might lead to sanctions on the company.

Issamou is also a former director of a company called Atama Plantation, which the government of the Republic of Congo gifted with a 4,700-km^2 concession for oil palm in 2010. Large populations of chimpanzees and gorillas roam vast stretches of this concession, which also holds peatlands and intact forest landscapes.

While larger companies are more inclined to rid their palm oil and rubber supply chains of illegalities to protect their images, such concerns might not burden other players. "These are not companies that are likely to be susceptible to the usual influences," Lawson said. "It's one of the many drawbacks of putting too much focus on voluntary corporate pledges to deal with the deforestation associated with these forest-risk commodities." "You need a regulatory approach, and a regulatory approach [that] involves regulations on the demand side as well as supply side."

https://news.mongabay.com/2018/03/oil-palm-rubber-could-trigger-storm-of-deforestation-in-the-congo-basin/

South-Africa

National Wetlands Indaba 8 – 11 October 2018

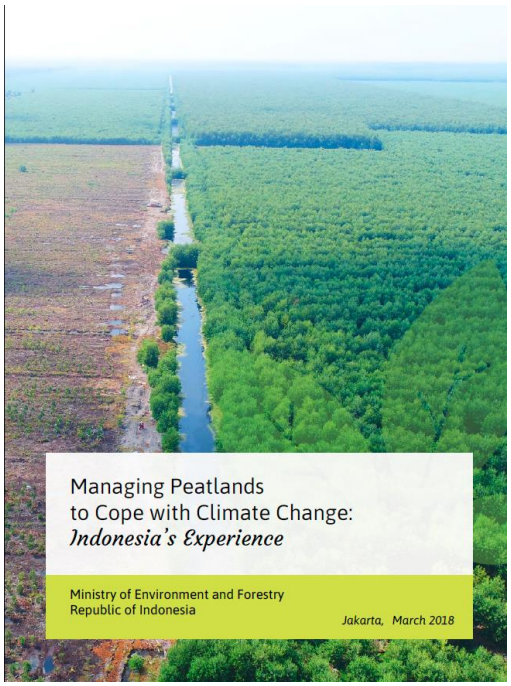
The National Wetlands Indaba 2018, 8 – 11 October 2018, Mittah Seperepere Convention Centre, Kimberley, Northern Cape, will this year run under the motto: "Drylands and Wetlands: connecting and managing heterogeneity across landscapes". Deadline for submission is 15 June 2018. Visit the website:
http://www.nationalwetlandsindaba2018.com

Asia

Indonesia

Indonesia success in managing peatlands becomes example for other countries

The management of peatlands in Indonesia is considered successful so that it becomes an example for other countries in the world. Environment and Forestry Minister Siti Nurbaya brought this peatland diplomacy to a global level, especially at the Global Peatland Initiative's Working Group Meeting in Brazzaville, the capital of the Republic of Congo. For the success of Indonesia, Siti Nurbaya was not only present as a regular participant, but also as a keynote speaker in ministerial dialogue at the international meeting. Siti Nurbaya proudly said that Indonesia, as the founder of the Asia-Africa movement, is ready to share experiences and help other countries to advance peat management through South-South and Triangular cooperation. Indonesia is ready to roll out its plan to establish the International Research Center of Tropical Peat in Indonesia. She believed in the next few years, the world will recognize Indonesia's peatlands as world archive. As a country with 15 million hectares of peatland, Indonesia certainly has the privilege of various peat ecosystems; ranging from coastal peat that is mostly found on the islands of Sumatra, Kalimantan and Papua; peatlands in the Mahakam delta of East Kalimantan, Kapuas in West Kalimantan; to peatland in the highlands as in Papua. Similarly, peat swamps in Kalimantan bear a resemblance to the peat in the Congo.



www.menlhk.go.id/downlot.php?file=Managing_Peatlands.pdf

Minister Siti succeeded in bringing Indonesia's diplomacy for peat management to global level. Minister Siti explained that the Indonesian Government learned very expensive lessons for the great peatland fires in 2015. The government responds through policies to control very tightly and thoroughly to minimize the recurrence of this incident. The result is fantastic, within two years from 2015 to 2017 Indonesia managed to reduce the fire spots as much as 93.6 percent. This result proves the seriousness of President Joko Widodo in making the prevention of forest and peatland fires as national priority. The President succeeded in making the policies he took into effective action on the ground. "Strong cooperation between various parties, especially the involvement of the private sector becomes the key," said Siti Nurbaya, in a press release on Wednesday March 21.

"Proper peatland management is a top priority for the Indonesian Government. Our tropical peatland resource is huge, over 15 million hectares. I should say that Indonesia has been a pioneer in tropical peatland management. We have learned a lot of what we have done well and what we should have done differently", said Minister Siti. She also said, President Joko Widodo has effectively set peatland as national priority and turns the policy into action. "He has directly lead meetings and field coordination concerning peatland fires and the measures to address them. Under his command, my ministry has won the excellent support from key agencies such as the Ministry of Home Affairs along with the Sub-national Governments, the Army, the Police, etc.", she continued. The Indonesia Delegation brought success story of peatland management to the global world. Indonesia has renewed and reinforced the Moratorium, as well as law enforcement. No less than 500 legal cases have already been brought to justice including an unprecedented USD 1.2 million fine imposed to a private corporation proven to have committed crimes against the environment. It builds public trust in environmental law enforcement in Indonesia.

The two Congos, the Republic of Congo and the Republic of Democratic Congo, are strongly keen to learn success story on institutional framework that has been set by the Indonesian Government. BRG supports the

grand strategy for peatland management developed by the Ministry of Environment and Forestry. Their ongoing peat restoration program covers 2.49 million ha, which includes 1.39 million ha by private companies. Minister Siti highlights the importance of maintaining Indonesias vigilance at all levels as well as nurturing the excellence support from all stakeholders, including civil societies and private sectors. Key concession holders are proactively initiating collaboration to update peat fires response technology as well as educating smallholders for a responsible yet sustainable peatland management.

- http://www.en.netralnews.com/news/currentnews/read/19519/indonesia.considered.successful.in.managing.peatlands..it.becomes.example.for.other.countries
- http://www.straitstimes.com/asia/se-asia/un-praises-indonesias-peatland-management-efforts
- http://www.en.netralnews.com/news/currentnews/read/19519/indonesia.considered.successful.in.managing.peatlands..it.becomes.example.for.other.countries
- http://www.menlhk.go.id/siaran-152-indonesia-championing-global-peatland-management.html

Despite government pledges, ravaging of Indonesia's forests continues

Seven years after Indonesian officials declared a moratorium on logging in undisturbed areas, logging and palm oil interests have not eased their assault on the world's third-largest expanse of tropical forest, with major impacts on biodiversity and greenhouse gas emissions. Global demand for forest commodities has devastated major portions of the world's third-largest tropical forest, with Indonesia losing more than 100,000 square miles of woodlands and peatlands — an area larger than the United Kingdom. The island of Sumatra alone lost 29,000 square miles — about one-third of its forests — from 1990 to 2010. Seven years ago, this relentless toll led Indonesia to declare a moratorium on logging new concessions in undisturbed tropical forests and peatlands. That it came shortly after a $1 billion dollar pledge from the government of Norway as part of the then-nascent Reducing Emissions from Deforestation and Forest Degradation (REDD+) program, led many to hope that this was an important step toward reversing decades of deforestation in Indonesia. Adding to the momentum were zero-deforestation pledges from companies like Asia Pulp & Paper and the Consumer Goods Forum, which includes major palm oil buyers such as Mars, PepsiCo, and Proctor & Gamble.

Nearly seven years after the declaration of the moratorium, however, the initiative has failed to stem the loss of forests and peatlands across the Indonesian archipelago. Satellite monitoring shows that palm oil and paper plantations continue to expand, with at least 10,000 square miles of primary forest and peatland — the equivalent of five islands the size of Bali — disappearing since the moratorium went into effect, according to one analysis. Following the moratorium, says Asep Komarudin, Forest Campaigner for Greenpeace Southeast Asia, "there were no significant improvements in Indonesia's natural resource governance, particularly in the forestry sector."

Indeed, several years ago, Indonesia became the world leader in deforestation, overtaking Brazil. Erik Meijaard, a conservation scientist who founded the Borneo Futures initiative, says he has seen little change in Indonesian Borneo, where palm oil plantations continue to expand. "In fact, there was a marked increase of deforestation after 2010… you get a very rapid expansion of the oil palm industry into forest areas, so if a moratorium was called in 2011, it didn't seem to have an impact on the oil palm sector at least," said Meijaard. Data from Global Forest Watch shows a similar pattern – little change in deforestation rates across the country since the moratorium went into effect.

The reasons for this are manifold. First, there is the weakness of the moratorium itself, which was only a so-called Presidential Instruction, not a legally binding statute, meaning it lacked strong enforcement mechanisms. Moreover, the moratorium only applied to new concessions, not existing concessions that had already been ceded to companies and smallholders, but had not yet been cut down or burned. Adding to the moratorium's ineffectiveness are ongoing problems with corruption, and the drive — particularly after the election of Joko "Jokowi" Widodo to the presidency in 2014 — to rapidly expand the economy. Moreover, government weakness and inefficiency also have meant that Norway's pledged funds have scarcely been used to protect forests. Moreover, the zero-deforestation pledges made by corporations have not yet had a major impact. A study published earlier this year in *Nature Climate Change* analyzed pledges from 450 companies and found that the majority were insufficient in their scope to meaningfully reduce deforestation on their own. The report's authors argued that companies also need to push governments at all levels to crack down on deforestation globally.

Some experts say that while Indonesia's progress is disappointing, fixing decades of forestry mismanagement in a few years was always an impossible task. They also note that deforestation rates have come down from their peak in the 1990s and early 2000s. "The very important steps in the right direction that Indonesia has taken are

unfairly characterized as failures because the whole big ship has not turned around yet," said Jonah Busch, an environmental economist and a visiting fellow at the Center for Global Development. "If there hadn't been a moratorium, deforestation might have been even higher."

The problem, conservationists say, is that the necessary changes are not happening fast enough to protect Indonesia's landscapes and biodiversity. The country has 350,000 square miles of tropical forests, the third-largest area in the world after Brazil and the Democratic Republic of the Congo. According to ProFauna, an Indonesian wildlife protection nonprofit, Indonesia is first in the world in endemic birds and mammals. A country with just 1.3 percent of the world's land has 17 percent of its wildlife species.

"There are a lot of potential emissions reductions from conserving forests in Indonesia," said Busch, "and there are a lot of reasons to think that those are relatively cheap ways to reduce emissions relative to industrial reductions. The world has good reasons to take advantage of this low-cost climate solution… but it has not been happening to the extent it should be."

Such imperatives drove Norway's pledge to Indonesia. According to the Norwegian Ministry of Environment and Climate, only 12 percent of the $1 billion that Norway pledged has been disbursed so far, and that portion has been designated specifically for helping the Indonesian government properly monitor, evaluate, and disseminate payments for reducing deforestation. Some of the money already disbursed has been used to improve firefighting and resolve social conflicts between communities and companies in forest areas, Ola Elvestuen, Minister of Climate and Environment for Norway, told *Yale Environment 360*.

One of the core problems is a lack of incentives for developing countries to protect forests, especially when faced with the need to expand their economies. While Norway's $1 billion pledge sounds like a lot of money, it pales compared to the size of the industries responsible for deforestation. In 2015, Indonesia's pulp exports were $1.8 billion and palm oil $15 billion; coal exports in 2016 were $12.9 billion.

Norway's pledge was meant to be just the start, with other countries following suit. But additional climate financing has not been forthcoming. While developed countries agreed to put $100 billion into the Green Climate Fund as part of the Paris Agreement to fight climate change, only about $10 billion has been committed. Factor in lower revenues from carbon credit money linked to cap-and-trade programs in places like Europe and Canada, and you have a major funding gap in investments in programs like REDD+.

"The amount of money that's on the table for conserving forests is not nearly enough to compete with the amount of money that is changing hands every day for clearing forests for palm oil and paper pulp," said Busch.

Still, there are some signs of hope. The Norwegian government is optimistic that direct payments for emissions reductions can begin soon, meaning that Indonesia can tap into more than $800 million to protect and restore forests. Yet as is often the case in Indonesia, defining progress is not easy. Earlier this year, the Ministry of Forestry released what seemed to be good news for the country's remaining forests. According to their data, deforestation had decreased in the past two years. However, dig deeper into the data and a different reality emerges: Pulpwood plantations were counted as "forests." Only by defining deforestation as forests could Indonesia show it was making progress.

- https://e360.yale.edu/features/despite-government-pledges-ravaging-of-indonesias-forests-continues

Forest loss (areas in pink) in Indonesia from 2001 to 2016. Source: Global Forest Watch *http://www.globalforestwatch.org/map/6/0.45/110.30/IDN/grayscale/loss?tab=analysis-tab&begin=2001-01-01&end=2017-01-01&threshold=30*

Degraded peat swamp forest in Central Kalimantan. Photo: Hans Joosten.

Debates heat up as Indonesian palm oil moratorium is about to be signed

Two years after he announced a freeze on new oil palm plantation permits, President Joko Widodo of Indonesia finally appears to be on the verge of putting it into effect, ahead of regional elections set to take place this June. But a coalition of environmental NGOs argue that the moratorium should remain in place for much longer than the three years proposed.

President Jokowi, as he is popularly known, declared the moratorium in the wake of the 2015 fire and haze crisis. The underlying cause of the disaster was the large-scale drainage of Indonesia's vast peat swamp zones, mainly by huge conglomerates planting cash crops like oil palm and acacia to feed global markets.

Since shortly after the 1998 fall of the dictator Suharto, control over licensing for plantations has rested largely in the hands of district chiefs, known as *bupati*. Many of the permits they have issued are known to be linked to corruption, often for the purpose of financing an election campaign. Spurred on by the nation's anti-corruption commission, known as the KPK, Indonesia's law enforcement agencies are already bracing themselves for an expected uptick in corruption ahead of the upcoming regional elections.

The lack of any formal legalization of Jokowi's permit moratorium was brought into sharp relief last month, when the website ForestHints, a media platform through which forestry ministry officials often release information to the public, quoted one of the ministry's directors-general as saying that four new permits had been issued to palm oil companies in Indonesia's easternmost Papua region.

At present, the nation's palm oil sector is rife with illegality. In Riau, the main palm oil-producing province on the island of Sumatra, there are 18,000 km^2 of illegal oil palm plantations with no proper permits. In Central Kalimantan, only 85 out of 300 oil palm companies comply with basic laws regarding environmental impact assessments, payment of taxes and royalties, and proper registration of concession boundaries and corporate information, according to the NGO Forest Watch Indonesia (FWI).

And there is also a problem of oil palm permits overlapping with permits for other industries, such as mining and timber. FWI estimates there are at least 46,900 km^2 of concessions with overlapping permits in Indonesia.

When Jokowi announced the moratorium on oil palm permits back in 2016, he also mentioned that he would impose a moratorium on coal mining permits. However, the current draft of the moratorium doesn't address coal permits, and it's not clear when or if such a freeze will be implemented.

"What's clear is that there should be no more new permits for three years," Environment and Forestry Minister Siti Nurbaya Bakar told reporters recently in Jakarta. She said she believed three years was sufficient time for the government to review all permits and take necessary actions. The coalition of NGOs, though, say the

moratorium period should not be limited to three years, but instead should remain in effect until it achieves its goals. “The implementation of this moratorium should be based on criteria and indicator of a certain achievement, not based on a period of time,” the NGOs said in their list of recommendations. “So it’s important for the government to design and announce a mechanism to verify its achievements, priority areas and to ensure the results are open for public.” The NGOs also say the draft moratorium is weak in its law-enforcement aspect, with the bulk of that role relegated to the Ministry of Environment and Forestry, and no mention of roles for other law enforcers such as the police or the Attorney General’s Office.

Responding to the recommendations, the presidential chief of staff, Moeldoko, said in a press statement published on the office’s website: “The Presidential Staff Office will study the 11 recommendations and will ensure to push the direction of oil palm development on increasing productivity sustainably, not through new land clearing.”

- https://news.mongabay.com/2018/03/debates-heat-up-as-indonesian-palm-oil-moratorium-is-about-to-be-signed/

Study: Indonesia’s ambitious peat restoration initiative severely underfunded

High costs and a lack of funding stand in the way of Indonesia achieving its target for the restoration of degraded peatland across the country, a new study says. The government in 2016 embarked on a program to restore 20,000 km^2 of degraded peat forest by 2020. The cost for this undertaking, according to a recent study by researchers at the University of Queensland, Australia, will likely exceed $4.6 billion. To date, however, the Indonesian government has budgeted just $200 million for the initiative, according to the study, and the results are telling: only 2,000 km^2 of peatland, or 10 % of the total, had been rewetted by the end of 2017.

That funding includes 34 million Norwegian krone ($4.4 million) from the Norwegian government and $134.6 million from the U.S., U.K., Japan, Germany and the Netherlands. For its part, the Indonesian government initially allocated the equivalent of $60.5 million from its 2017 spending budget. The $200 million figure cited in the study, though, used the lowest cost projections available and did not account for the subsequent slashing of Indonesia’s contribution by half, as part of wider cost-cutting measures by the Ministry of Finance.

The study found that peat areas with low-intensity fires were more easily restored than those that had experienced high-intensity fires, with the former showing greater signs of unassisted recovery compared to the latter. But the biggest determinant of the total cost of restoration, the researchers found, is the width of the canals dug to drain the peat soil in preparation for planting. The wider the canals, typically associated with oil palm plantations, the more difficult, and more expensive, it is to restore the peat areas. Cost associated with restoring wide canals can reach up to $23,500 per hectare. Restoring or rewetting small-scale agricultural landscapes is relatively inexpensive, starting at around $400 per hectare. These areas typically have much smaller canals that can be dammed much more cheaply.

Peat areas that have been drained and burned for commercial use make up the bulk of BRG’s working area, driving the potential cost of the entire endeavor to $4.6 billion, the study estimated. Because of the stark difference between the actual funding allocated and the money required, Indonesia will have to choose between using best-practice methods in smaller areas or using cheaper and potentially ineffective restoration methods to reinstate larger areas. Attracting global funding will be essential for Indonesia in realizing its target and developing a cost estimate may help in highlighting the need for international support.

- https://news.mongabay.com/2018/03/study-indonesias-ambitious-peat-restoration-initiative-severely-underfunded/

Turning down the heat in Indonesia’s oil palm industry

A new study led by Center for International Forestry Research (CIFOR) scientist Herry Purnomo looks at the extent to which good governance principles are applied to Indonesia’s palm oil value chain and analyzes options to reduce the use of forest and land fires in the industry. The research focuses on Indonesia’s Riau Province, which has the largest area of oil palm plantations in the country and the highest frequency of fires too. “We know that 20% of fire incidences happen in oil palm plantation areas, so we tried to find out what caused the fires and how to reduce them.”

In theory, the central government has power to influence the oil palm supply chain through law and policies; district-level governments have the most jurisdiction for law enforcement and information-spreading; and village governments are closest to plantation developers, thus having the responsibility of dealing directly with them. However, good governance for the industry is not as simple as a top-down approach. From consumers to mills, refineries and developers, players in palm oil influence governance processes in different, sometimes unexpected ways. “With the governance analysis, we looked at how existing powers contest,” says Purnomo.

“Along the value chain, power is not at the landscape level but at the consumer level, or at the mills and refineries. The central government can only function through the district government, but mills can influence local government using incentives and coercion.

Furthermore, the study found that illegal oil palm developers can hold a lot of influence at local levels and force village governments to support them, often through deceptive use of a Certificate of Land (SKT). This imbalance between governance and supply chain capacity can drive actors at the landscape level to meet the mill demands in ways detrimental to landscapes. “Now there are mills everywhere, even in national park areas. People respond by developing plantations everywhere. The fastest and cheapest way is by burning.”

Oil palm plantation on peat in Riau. Photo: Hans Joosten.

When demand is high and burning has long been practiced, what reason do farmers and developers have to change their habits to more arduous land-clearing methods? “We calculated whether existing incentives in the market are enough to change the situation on the ground,” says Purnomo. “The analysis looks at benefits distributed from oil palm plantation development using fire, who benefits, and what alternatives can be adopted to compensate.”

The first step is for the market to support certified producers, incentivizing them not to burn as well as to employ value-added farmers. This, however, raises production costs, as well as the cost of fresh fruit bunches (FFB) of oil palm fruits. As this price margin grows, the next step is to make sure that the financial benefits go back into the hands of the farmers, to incentivize their good practices as well.

Another key step to fire reduction is agrarian reform. While many farmers possess an SKT, the land is still legally part of a state-owned forest area. The unclarity of land status dissuades farmers from investing resrources in land. “Why should they spend money, when the government can take their land away at any time? The farmers should be guaranteed land legality at least for 25 years, so they can invest safely.”

Recently, the European Union approved draft measures to ban the use of palm oil in motor fuels by 2020. Purnomo believes that this boycott will change little. Instead, he says the EU market should give incentives for sustainable production, and Indonesia should create an environment in which that can be done. “Incentives can change the situation. The government of Indonesia should be more transparent with environmental problems faced by the palm oil industry, show real progress in improving the industry’s sustainability, draw a clear roadmap to meet international standards in three to five years and invite the EU to participate in palm oil in more constructive ways.” For more information, contact Herry Purnomo at h.purnomo@cgiar.org.

- https://forestsnews.cifor.org/55405/turning-down-the-heat-in-indonesias-oil-palm-industry?fnl=en

Indonesian billionaire using 'shadow companies' to clear peat swamp forest for palm oil

The owner of Indonesia's largest conglomerate has been accused of participating in the illegal deforestation of Borneo's Ketungau peat swamp to make way for oil palm plantations. The Salim Group, owned by tycoon Anthoni Salim, Indonesia's fourth-richest man according to Forbes, is reportedly linked either by ownership or association with the two companies that cleared nearly 10,000 hectares of the protected rainforest. The Salim Group notably includes Indofood, a joint-venture partner with major brands such as PepsiCo and Nestle, as well as First Pacific, the joint owner of Goodman Fielder, a leading food producer in the Asia-Pacific region.

In a new report released on 11 April 2018, Aidenvironment, a sustainability consultancy, said that the Salim Group's continuing reliance on "shadow companies" to sidestep legal oversight also raised questions over the complicity of major banks, such as Citibank, Mizuho, Standard Chartered, BNP Paribas and Rabobank, that finance the Salim Group. "This report provides clear evidence of shady business dealings and inaction at the highest levels of business, all while tropical rainforests continue to fall for Conflict Palm Oil," said Gemma Tillack, forest policy director of Rainforest Action Network (RAN), which commissioned the research along with Rainforest Foundation Norway (RFN) and SumOfUs.

Recently deforested land at Salim related companies. 0°14'54.77" N, 111°30'46.80" E. Photo: Aidenvironment 18-01-2018.

The report, titled "Palm oil sustainability assessment of Salim-related companies in Borneo peat forests", also alleged that The Salim Group was made aware of the deforestation carried out by PT Duta Rendra Mulya, majority owned by Anthoni Salim, and PT Sawit Khatulistiwa Lestari, linked with the tycoon through business associates, in early 2016, but failed to act despite repeated attempts at government intervention. It found that one of the companies, PT Sawit Khatulistiwa Lestari, had successfully applied for a change to the government's peatland moratorium map to allow development, despite almost all of the concession being categorized as 'peatlands prioritized for protection.' "The Salim Group's financiers and business partners—like PepsiCo—are complicit in the illegal deforestation, as they continue to do business with Salim without issue. PepsiCo, Nestle and Wilmar must bring their business partner into compliance with Indonesian law and sustainability norms of deforestation-free development or exit their business relationships," Tillack said in a statement.

"This isn't the first time that companies in the Salim Group have been exposed for destructive practices," Kiki Taufik, head of Greenpeace's Indonesian forests campaign, said in the statement. "The Salim Group is one of the worst offenders and has gone out of its way to keep its destructive operations separate from the public face of the Indofood empire. That's why companies need to take responsibility for ensuring that they only use palm oil from responsible producers that protect rainforests and respect human rights."

In response to the findings in the Aidenvironment report, Citigroup said it was cancelling all lending agreements with IndoAgri, the Salim Group's agribusiness arm, effective immediately and conducting an investigation into its exposure to tainted palm oil through other lines of credit offered to Indofood. Standard Chartered, HSBC, Rabobank and DBS said they remained committed to sustainable palm oil policies and would review lending arrangements where necessary. BNP Paribas and SMFG denied responsibility because PT Duta Rendra Mulya and PT Sawit Khatulistiwa Lestari are not their clients.

Selwyn Moran of awas MIFEE said it was a challenge for the environmental movement to campaign against the financing of companies such as the Salim Group, which operate obscure supply chains. "It is not just the Salim Group; most of the main palm oil groups have these 'dark sides' that continue to deforest," he told Mongabay. "If trader and consumer companies genuinely want to commit to no-deforestation policies then they need to apply the principle of group-level responsibility to these groups where the ownership structure is obscure and

there is a good reason to believe that there is a beneficial owner who is not on the shareholding list." "It should really be up to the trading companies to place the burden of proof on their suppliers to disprove the link with companies that deforest, especially if they are registered at the same address, as in the case of some of the Salim concessions."

- https://news.mongabay.com/2018/04/indonesian-billionaire-using-shadow-companies-to-clear-forest-for-palm-oil-report-alleges

Indonesia peatland swap plan questioned over deforestation risk

Indonesia's plan to curb the commercial use of peatlands by swapping nearly 1 million hectares of concessions on peat risks displacing environmental destruction to other parts of the archipelago, green groups say. On 5 April 2018 an alliance of 10 environmental organizations said in a joint statement that the government was not being open about what land would be exchanged. "We fear that vast areas of natural forest, especially in Kalimantan, Sumatra (island), and Papua will be designated for land swaps and converted into pulpwood plantations in the name of peatland restoration." To estimate where potential land concessions would be given away, the alliance compared satellite imagery of forested area with known government allocations of land suitable for plantations and inactive land. "With this analysis, we found that 971,900 hectares of potential land swap locations are on natural forest area," said Syarul Fitra of Auriga, one of the NGOs in the alliance.

The government has not made public the locations of the new concessions that will be given as part of the land swap program. A PowerPoint presentation made by the ministry in December 2017 and seen by Mongabay shows the ministry has already identified 99 companies whose concessions include peat areas. The total peat overlap area amounts to 25,923 km^2 in 11 provinces, of which 14,311 km^2 are designated as protected peatlands. The PowerPoint also shows the environment ministry has identified at least 18 companies that will get substitute lands under the program. But the document is not publicly available, and civil society groups have been left to rely on information that may already be outdated to monitor the land swap program.

- http://pasopatiproject.id/wp-content/uploads/2018/04/HTI-land-swap-policy-indicates-nearly-1-million-hectares-deforestation-risk.pdf
- https://www.reuters.com/article/us-indonesia-environment-forests/indonesia-peatland-swap-plan-questioned-over-deforestation-risk-idUSKCN1HD1D3
- https://news.mongabay.com/2018/04/indonesia-land-swap-meant-to-protect-peatlands-risks-wider-deforestation-ngos-say

Smallholders loading palm oil bunches in Riau. Photo: Hans Joosten.

Firms to be tested on fire readiness

Indonesia's government will apply strict environmental and fire readiness testing to pulp and paper firms before they will be granted new concessions under a land swop scheme that aims to get the companies off carbon-rich deep peatlands, a senior official said on April 5. Last year, Jakarta passed a regulation under which pulp and paper company concessions on deep peatland must be allocated non-peatlands as compensation. Under the scheme, the firms, such as Singapore-based Asia Pulp and Paper and Asia Pacific Resources International Holdings Limited, must halt replanting on deep peatland concessions once the current rotation is harvested. These are swopped for non-peatland elsewhere.

Mr Hilman Nugroho, a director-general at the Ministry of Environment and Forestry, said any swops will have conditions attached. "Let's see how this year. Is there fire on their land? If there is still fire, we will hold," he told reporters, saying companies must be equipped with adequate fire-fighting personnel and equipment and possess good environmental management. Field teams were checking if such equipment had been deployed by the firms, he said. "If they have all that, it means they are in good faith. And we will see this year whether they 'play' (are involved in slash-and-burn) or not... whether the water level (in the peatland) rose, canals are blocked properly." He was responding to a statement by a coalition of Indonesian civil society groups, which urged the government to reveal more details about the land swop scheme.

Mr Hilman dismissed the worries, saying non-productive forest concessions will be reallocated to qualified pulpwood firms. He also said officials will prepare and make public maps of land swop locations. The coalition also appealed to the government to hold public auctions for firms to select concessions. Mr Hilman said: "We will find the (land) allocations first. The amount of land swop will follow the amount of those restored and remedied." The ministry last year said about 920,000 ha of non-productive forestry areas and areas requested by plantation firms but not yet given permits might be suitable. Pulp and paper companies have expressed concerns over the land swop scheme, saying there is little clarity on where the land is, that it is likely to be far from their mills, and that they will have to protect the deep peatland concessions from encroachment, fires and illegal logging for the life of the concessions. Some concession areas have leases of 60 and even 99 years.

- http://www.straitstimes.com/asia/se-asia/firms-to-be-tested-on-fire-readiness

Malaysia

Sarawak makes 80% forest preservation commitment, but some have doubts

The Malaysian state of Sarawak is committing to preserve 80 percent of its land area as primary and secondary forest, according to an announcement by Sarawak Chief Minister Datuk Patinggi Abang Johari Tun Openg made February 26 in the city of Kuching. But some in the conservation community are expressing doubt that these promises will come to fruition.

Occupying the northern coast of Borneo, Sarawak's rainforests are home to unique, disappearing species like endangered proboscis monkeys (*Nasalis larvatus*) and critically endangered Bornean orangutans (*Pongo pygmaeus*). But plantation agriculture, timber harvesting and other development pressures have supplanted many areas of Sarawak forest, with data from the Food and Agriculture Organization of the UN (FAO) finding natural forest covered just under 65 percent of the state in 2010. Other research indicates the amount of 2010 forest coverage may be closer to 57 percent – much of that heavily degraded by logging, according a 2013 assessment. But in a speech presented to attendees of a business networking event called The Sarawak Dialogue, Chief Minister Abang Johari indicated the state will be working to preserve and restore the state's rainforests. "Sarawak is a small state but it has its obligation in its role to preserve the environment," Abang Johari said, as reported by regional media outlets. "We make sure that 80 percent of our land mass must be covered by primary and secondary forests." According to news reports of the event, Abang Johari went on to say that Sarawak's forests provide important environmental services for the world, like generating oxygen.

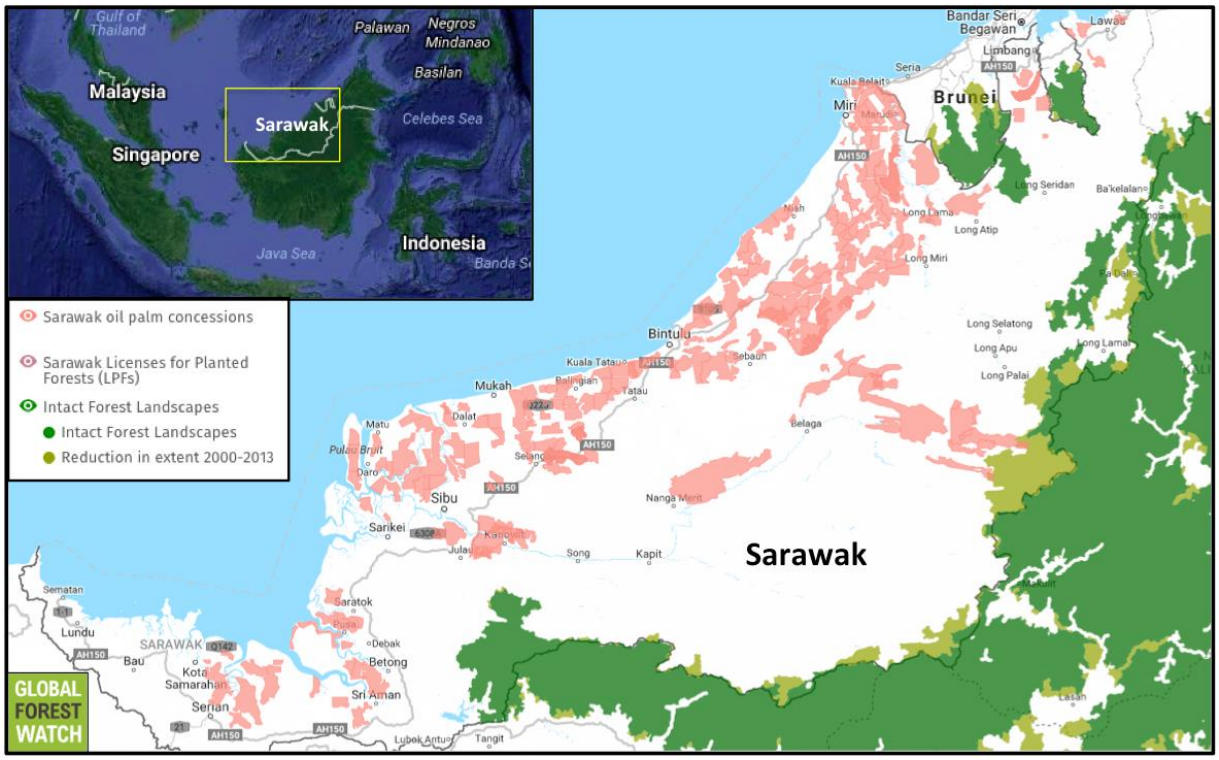
"We do not even claim the credit for this," Abang Johari reportedly said. "The rest of the world is enjoying when we are providing free of charge."

But some aren't buying it. Sam Lawson, director of the UK-based environmental and human rights watchdog organization Earthsight, told Mongabay that he is "really suspicious" of Sarawak's new commitment, and that he has "no reason to believe anything." "I welcome any serious commitment by the Sarawak government to protect what forest remains," Lawson said, "but given that the administration has a long history of broken promises and disinformation in this regard, I would treat any such promises with a great deal of skepticism."

Lawson says the state needs to increase transparency and crack down on illegal logging if its conservation commitments are to be believed. “If Sarawak wants its promises to be taken seriously, the first thing it needs to do is release information about all of the areas of forest licensed for conversion to palm oil and timber plantations,” he said. “It also needs to immediately halt the destructive and commonly illegal commercial logging still taking place in some of the last vestiges of intact forest in the state.”

According to data from Earthsight and other organization analyzed by Global Forest Watch, concession boundaries for oil palm and other kinds of tree plantations covered 32.7 % of Sarawak’s land area as of 2010/11. Lawson said he doesn’t believe those boundaries have changed significantly since then, suggesting that if Sarawak is to fulfill its commitment to preserve 80 % of its land as primary and secondary forest, then it may need to cancel some of these concessions.

- https://news.mongabay.com/2018/03/sarawak-makes-80-forest-preservation-commitment-but-some-have-doubts/



According to Global Forest Watch, plantation concessions cover nearly 33 % of Sarawak’s land area. Data sources: SADIA, Aidenvironment, Global Witness and Earthsight Investigations.

Mongolia

Request for help in peatland restoration

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We are seeking for help of volunteers. We need your help in restoring Mongolian mires. Our objective is to help the local arats returning water to the wetlands of the valley. We will be working close to the ancient capital of Mongolia: Kharkhorin. Our camp is located in the Khashat sum (sum is an administrative unit in Mongolia), four hundred kilometers west of Ulaanbaatar. Without our help, the valley will not only become uninhabitable for cattle, but it will keep losing water until it is a dry desert. We will be building fences around springs to prevent cattle stomping them out, planting willows, and helping the local scientists to document the changes and effects of the work done the previous year. Apart of work, you will have opportunity to listen to interesting lectures about nature and society, international and national programs for the sustainable development.

Some days will be devoted to excursions. Working language is English. Organisers also speak German, Russian, Polish and Mongolian. The conditions are simple, but not extreme. One can stay in a ger or tent, there is a simple toilet and shower, there will be doctor on the site, and even a chef to cook.

The schedule of the camp is as follows: **22 July**: Arrival in Ulaanbaatar and travel to the campsite; **23 July**: Introduction to the mission, rules of the camp and the surrounding area; getting acquainted with each other. In

the afternoon: trip to the work site, allocation of tasks, beginning of the work; **24-25 July**: Work on the springs and monitoring efforts; **26 July**: Visit to Kharkhorin, monastery and museum; **27-31 July**: Work on the springs and monitoring efforts; **1 August**: Visit to Karakorum and to the centre of the Ramsar site of Ögii Lake. The farewell dinner; **2 August**: Early departure from the camp to Ulaanbaatar, sightseeing in the city; **3 August**: Return flight.

The official last day of the camp is the 3rd of August. Those who wish to stay longer may do so under their own responsibility. We can also recommend some inexpensive and safe hotels for them. The costs for participation is 1000 EUR p.p., all in, but excluding your personal travel to and from Ulaanbaatar and possible visa costs.

To learn more about the camp, living conditions and its schedule, please contact us at info@care-for-ecosystems.net. To learn more about the people of Mongolia who want to restore their peatlands, about their life and participation in the restoration project: read the story on page 10 of this Bulletin.


In Erdene Zuu monastery near Kharkhorin, Mongolia. Photos: Hans Joosten

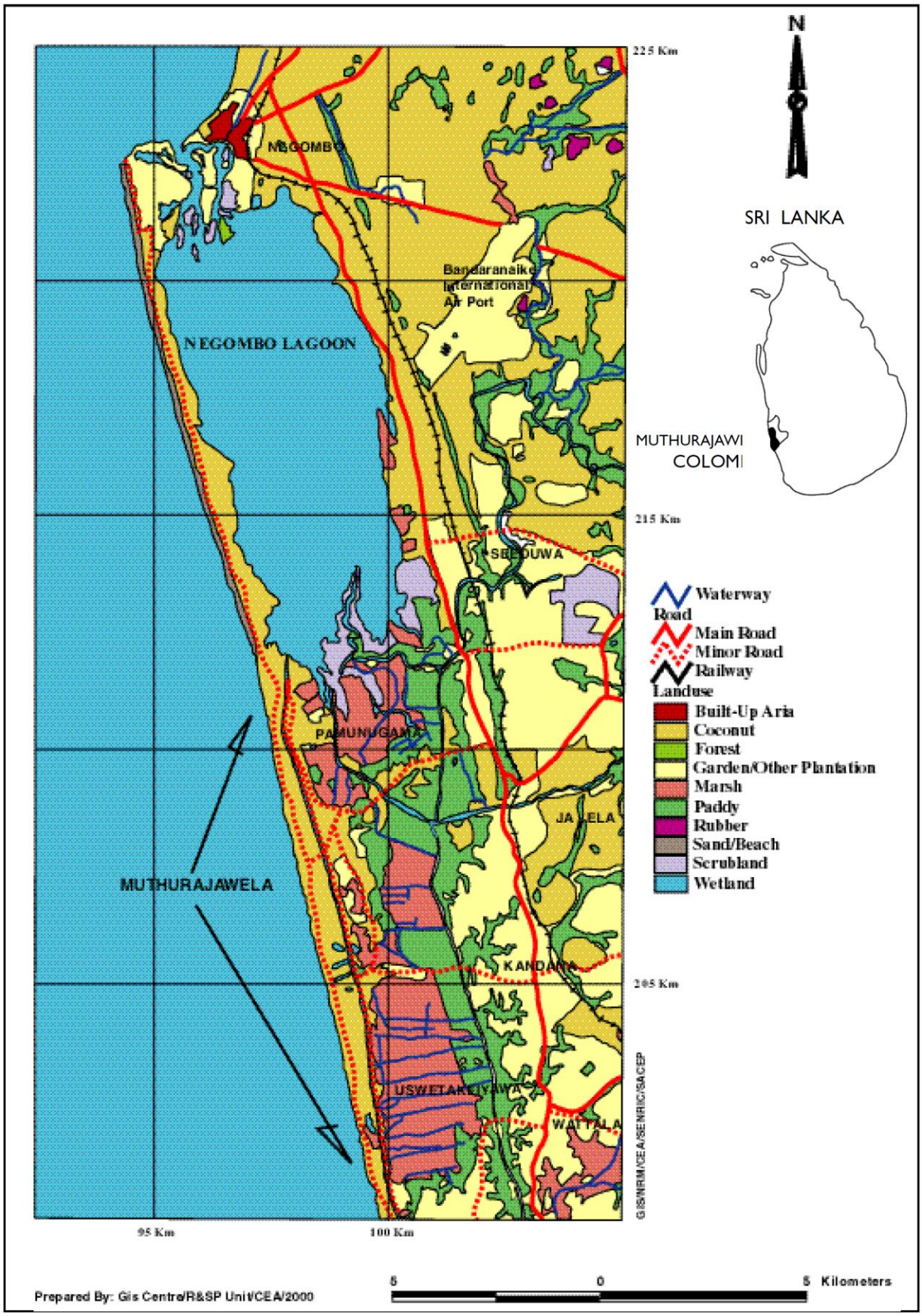
Sri Lanka

President orders to halt degradation of Muthrajawala peatland

A news item in the Daily Mirror of March 15, 2018, titled 'Private Co. grabs Muturajawela land for housing scheme', has caused alarm to environmentalists who feel that the rich biodiversity of this wetland would suffer irreparable and extensive damage. In view of these reports, President Maithripala Sirisena undertook an observational visit to the place on March 22 and, after the visit, held a special meeting with the ministers, government officers, as well as the Chiefs of security forces. He directed the officers to obtain legal advice to gazette these lands as wildlife and environmental conservation regions and instructed to cease all the activities of construction and fillings of land paving way for environmental pollution. Furthermore he has ordered to revoke all permits that have already been given by any government organization to fill any lands around the area and has instructed relevant authorities to take disciplinary actions against the government officers who have sponsored such acts.

The peatland is situated north of Colombo and is part of a 2,900 hectares large open wetland. The peat layers consist of sedge peat with an age of 7300 ± 95 years BP. In 1947 a Soviet firm made an attempt to exploit the peat deposit. In 1961, investigators suggested the use of 460 hectares of the Muthurajawela peatland for industrial and agriculture purposes. A study into the socio-economic impact of peat extraction revealed that the area suitable for peat extraction was not more than 250 hectares and located away from roads where houses are mainly located. The Finland Foreign Affairs Ministry awarded a contract to the Finnish Ekono company to conduct a detailed study on the feasibility of the potential use of peat. According to field studies of Ekono carried out in 1985, the total quantity of peat available in Muturajawela is 258,000 tonnes. The sulphur content of the peat is very high, whereas the mean bitumen content of the ash-free peat of 1.26 percent made it uninteresting for exploitation. As these reserves could support 2-3 MW electricity generation for about 20 years only, it was concluded that a peat-fired power plant would not be economically viable.

- http://digathanews.com/private-co-grabs-muturajawela-land-for-housing-scheme/
- https://www.news.lk/news/politics/item/19892-president-visits-muturajawela
- http://www.dailynews.lk/2017/04/27/features/114269/fate-muturajawela



Location of Muturajawela, Sri Lanka. From: https://portals.iucn.org/library/sites/library/files/documents/2003-005.pdf

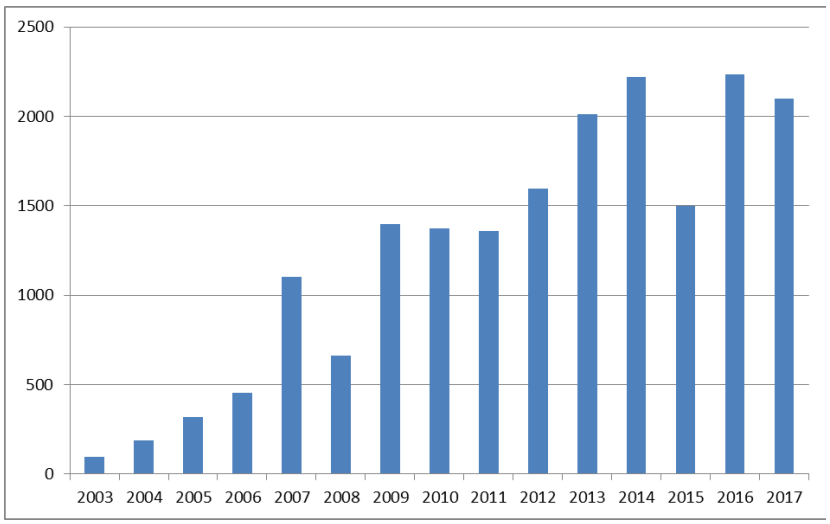
Australasia

New Zealand

New Zealand's cows increasingly eat Indonesian peat

The diary industry in New Zealand loves to promote itself with image of cows grazing on pristine landscapes, but farmers show no sign of shaking of their 500 million-a-year addiction to palm kernel expeller (PKE). PKE, a cheap supplementary feed generated from palm oil in Indonesia, is heavily used by New Zealand's dairy industry, which is in this way linked to deforestation, peatland drainage, and global warming. Moreover, some PKE had been linked to human rights abuses in the plantations. Therefore NOGs plea for fading out the use of PKE.

- https://www.stuff.co.nz/business/industries/102536599/fonterra-concerned-by-brutality-claim-made-against-indonesian-police-hosted-by-its-pke-supplier



Import of PKE in New Zealand in 1000 T yr^{-1}. Data: https://www.indexmundi.com/agriculture/?country=nz&commodity=palm-kernel-meal&graph=imports

Kernel within an oil palm fruit. Photo: Hans Joosten

Europe

Belarus

The 3th International Scientific Seminar "Vegetation of Bogs: Modern Problems of Classification, Mapping, Use and Protection" will be held September 26-28, 2018 in Minsk and Grodno and will cover the themes 1) Classification and mapping of vegetation in bogs and 2) Biological diversity, resources, use and protection of wetlands. Working languages: Russian, Belarusian, English. For more information and registration: http://botany.by/

Ireland

EPA report suggests rewetting of cutover bogs

The EPA has published a new research report on the rewetting and restoration of peatlands for climate and biodiversity benefits. The NEROS (Network Monitoring Rewetted and Restored Peatlands/Organic Soils for Climate and Biodiversity Benefits) project report describes a field-based study that quantified biodiversity and climate mitigation benefits across a rewetted peatland land use category network. The report finds that the

rewetting of degraded peatlands is a major challenge and can be a balancing act between benefiting biodiversity and/or climate. The findings from this research suggest that rewetting of drained-only bogs, domestic cutover bogs and industrial cutaway peatlands should be prioritised to maximise biodiversity provision and climate change mitigation.

The land use categories (LUCs) monitored were forestry (on nutrient- poor soils), grassland and peat extraction (domestic cutover and industrial cutaway on nutrient-poor and nutrient-rich soils). Drained sites were also monitored for comparison purposes. The findings demonstrated that the environmental and management variables present prior to rewetting can influence species composition and, therefore, the regeneration of species typical of natural sites. This in turn will affect the climate benefits from rewetting degraded peatlands in terms of potential for GHG emissions reduction and in some cases, the return of the carbon sequestration function characteristic of natural peatlands.

The study found that rewetting can bring back peat forming (i.e. carbon sequestering) vegetation within a short timeframe (<10 years) and this period is shortened in less damaged sites, such as drained- only raised bogs. Such synergy between GHG emissions saving and biodiversity may not be achieved at other sites and therefore the best outcomes should be prioritised. For example, high carbon dioxide (CO_2) emissions can be avoided from rewetting industrial cutaway where typical raised bog biodiversity may not return. Meanwhile, rewetting previously afforested bogs remains a major challenge from both biodiversity and climate perspectives.

The report is opportune as it informs on the delivery of sustainable management of one of the last natural resources in Ireland, as envisioned in the 2015 National Peatlands Strategy. Providing high biodiversity and avoiding CO2 emissions, drained-only sites, which includes most domestic cutover bogs should be targeted for rewetting so Ireland can deliver on both biodiversity and climate targets and facilitate its legal requirements under EU Directives and International conventions. In addition, the findings from this research suggest that since drained peatlands managed for peat extraction are significant CO_2 emission hotspots and have a positive feedback on climate change, they should be also targeted for rewetting as a climate mitigation strategy.

For the full report: http://www.epa.ie/researchandeducation/research/researchpublications/researchreports/research236.html

Abundant growth of Eriophorum angustifolium *in rewetted cut-over peatland site in Turaun Boora, Ireland. Photo: Hans Joosten.*

Netherlands

Peat extraction as a restoration measure: looking for innovation

Authorities and conservation organisations are looking into possibilities to rejuvenate terrestrialisation in the Dutch peatland national park Weerribben-Wieden. Plans are to dredge 540 hectares of new peat pits, with a rate of 30 - 40 hectare per year, to set back succession and to prevent the entire area being overgrown by peat swamp forest. Province, State Forestry Service and the private conservation organisation Natuurmonumenten have started an innovation traject to explore – together with market parties –the best, most cost-effective way to dig pits in the vulnerable conservation area, to transport the extracted materials, and to sell the organic material. Extraction itself is a challenge but there are more hurdles. The area has hardly any roads, the soil has no carrying capacity, the ditches are narrow and nature is very vulnerable. The usability of the material is furthermore determined by how it will be extracted and transported. But the large quantity (more than 200.000 m^3 per year) and stable supply provide chances for innovative solutions. More information under: www.overijssel.nl/innovatie-petgaten

Topsoil removal as a reedbed rejuvenation technique in National Park Weerribben-Wieden, the Netherlands. Photo: Hans Joosten.

United Kingdom

Pioneering £2.1m natural flood management scheme to be piloted in Weardale

The Weardale Natural Flood Management pilot project, a £2.1m scheme to reduce flood risk and improve wildlife habitats, will see pioneering natural techniques used across a 100km² area to reduce the risk of flooding to 141 properties. Over April a series of sessions informed residents what the project means for them and how they can get involved. Potential measures include integrating small temporary storage areas into the landscape, restoring peatland and creating woodland and grazing marshes. As well as reducing flood risk, the scheme will create a haven for wildlife.

- http://www.thenorthernecho.co.uk/news/local/southdurham/weardale/16122285.Pioneering___2_1m_natural_flood_management_scheme_to_be_piloted_in_region/

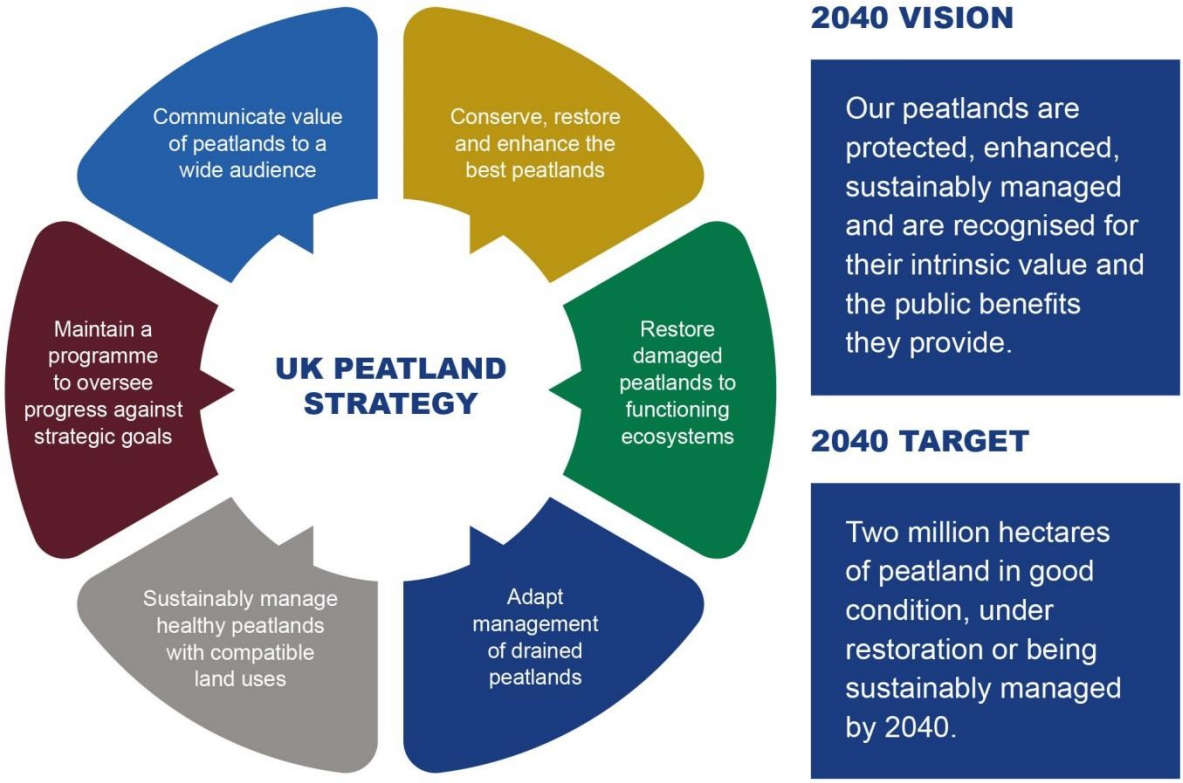
First UK Peatland Strategy launched

The UK's first collaborative Peatland Strategy was launched in April, setting out a shared vision for a brighter future for the damaged, but vital peatlands found in England, Scotland, Wales and Northern Ireland. In developing the strategy, the IUCN UK Peatland Programme worked with stakeholders from across UK Government, NGOs, scientific and land managing communities. The collaborative nature of the strategy was seen as essential if it is to be used to drive the landscape-scale change required to achieve a target of two million hectares of peatland in healthy condition by 2040.

Estimated to cover around 10% of the UK, the large majority of peatlands in the UK are considered as damaged (at least 80%), so large-scale conservation and restoration is seen as necessary to ensure the societal benefits they provide such as clean water, climate change mitigation and a buffer to environmental disasters such as flooding. The UK Peatland Strategy encompasses all peatlands in the United Kingdom, setting the context for action led by the devolved administrations. It recommends six goals to achieve change:

- Conserve, restore and enhance the best peatlands
- Restore damaged peatlands to functioning ecosystems
- Adapt management of drained peatlands
- Sustainably manage healthy peatlands with compatible land uses
- Maintain a programme to oversee progress against strategic goals
- Communicate value of peatlands to a wide audience.

http://www.iucn-uk-peatlandprogramme.org/resources/uk-peatland-strategy-2018-2040



North-America

USA

Working group looks into peat extraction on Kenai Peninsula (Alaska)

Much of the western Kenai Peninsula (Alaska) is covered in peatlands, and some people want to extract and sell it. The Kenai Peninsula Borough's Material Site Working Group is in the midst of a comprehensive look at the codes governing extraction operations around the peninsula and dug into peat extraction. Peat extraction operations are currently regulated under the same rules as gravel pits. The workgroup agreed that peat

extraction is different than gravel and should be permitted differently, in part because mining peat almost always requires working in groundwater. Many applicants intend to extract peat to create ponds with a grant from the National Resource Conservation Service, a federal agency that provides grants for the restoration of wildlife habitat. The Planning Department, however, requires a year's worth of groundwater monitoring before a permit will be granted, a requirement, which doesn't line up with the grant length, said borough planner Bruce Wall during a meeting on March 14. Peat extraction should also take into consideration nearby anadromous streams, as it would be affecting the water and possibly the fish in those streams.
The working group is addressing the entirety of borough code regulating material extraction sites, but mostly focused on gravel pits, as they regularly receive the most complaints because of noise, dust, traffic and groundwater concerns. The group is planning two public listening sessions in the first week of April.

- http://peninsulaclarion.com/news/local/2018-03-19/borough-working-group-looks-peat

Canada

Peatlands for People Revisited

The Burns Bog Conservation Society organized the first Peatlands for People conference in 1996. And 22 years later we find ourselves revisiting our important peatlands. The Society in association with Kwantlen Polytechnic University (KPU) will be hosting the Peatlands for People Revisited Conference from October 11-13, 2018, at the KPU Surrey Campus in British Columbia, Canada. The conference coincides with the 30th anniversary of the Society. Burns Bog Conservation Society was founded in 1988 to give a voice for the largest raised peat bog on the west coast of North America.

The Society is a champion for the protection of Burns Bog and other peatlands. It runs educational programs for children and adults. These include day tours, summer camps, and community events. Burns Bog houses many red and blue-listed species. Dubbed The Lungs of the Lower Mainland by our Honorary Chair, David Bellamy, industrial development is the biggest threat facing the bog today.
Does your research focus on wetlands, specifically peatlands? Then you are invited to submit your work for presentation at Peatlands for People Revisited. This conference will highlight the current research addressing wetland and peatland conservation and The Species At Risk Act (S.A.R.A.). Email an electronic abstract (word or PDF) of your paper or project of no more than 750 words using plain-language. Include your name, home institution, email, and contact number in the submission. Please email all submissions to Nathalie@burnsbog.org by May 15 2018. Successful applicants will be notified by June 1 2018.

Peatland conservation relevant papers March 2018

Collected by Hans Joosten: joosten@uni-greifswald.de

1. De la fumée sur l'eau – lutter. Contre les menaces mondiales liées à la destruction et à la dégradation des tourbières: https://gridarendal-website-live.s3.amazonaws.com/production/documents/:s_document/388/original/RRA_peatlands_FRENCH_02032018_WEB_lowquality.pdf
2. Brief review on climate change and tropical peatlands: https://www.sciencedirect.com/science/article/pii/S1674987118300343
3. Nature mistaken: economics, emotions and the drainage of peatlands in the Russian Empire and the Soviet Union: http://www.whpress.co.uk/EH/papers/1536.pdf
4. The impact of a black spruce (*Picea mariana*) plantation on carbon exchange in a cutover peatland in Western Canada: http://www.nrcresearchpress.com/doi/abs/10.1139/cjfr-2017-0378#.WtoLKn8uDiw
5. Recovery of methane turnover and the associated microbial communities in restored cutover peatlands is strongly linked with increasing *Sphagnum* abundance: https://www.sciencedirect.com/science/article/pii/S0038071717305965

6. *Juncus effusus* mono-stands in restored cutover peat bogs – Analysis of litter quality, controls of anaerobic decomposition, and the risk of secondary carbon loss: https://www.sciencedirect.com/science/article/pii/S0038071717306673
7. Response of peat biogeochemistry and soil organic matter quality to rewetting in bogs and spruce swamp forests: https://www.sciencedirect.com/science/article/pii/S1164556317300948
8. Nurse species and indirect facilitation through grazing drive plant community functional traits in tropical alpine peatlands: https://onlinelibrary.wiley.com/doi/abs/10.1002/ece3.3537
9. Sustainability impact assessment of peatland-use scenarios: Confronting land use supply with demand: https://www.sciencedirect.com/science/article/pii/S2212041617300761
10. Accumulation of polycyclic aromatic hydrocarbons in hummocky tundra peatlands under climate change at high latitudes: https://link.springer.com/article/10.1134%2FS0016702917060039
11. Short and long-term controls on active layer and permafrost carbon turnover across the Arctic: http://onlinelibrary.wiley.com/doi/10.1002/2017JG004069/abstract
12. Vertical stratification of peat pore water Dissolved Organic Matter composition in a peat bog in Northern Minnesota: http://onlinelibrary.wiley.com/doi/10.1002/2017JG004007/abstract
13. Forecasting responses of a northern peatland carbon cycle to elevated CO_2 and a gradient of experimental warming: http://onlinelibrary.wiley.com/doi/10.1002/2017JG004040/abstract
14. Complete annual CO_2, CH_4, and N_2O balance of a temperate riparian wetland 12 years after rewetting: https://www.sciencedirect.com/science/article/pii/S0925857417306523
15. Impact of organic amendments (biochar, compost and peat) on Cd and Zn mobility and solubility in contaminated soil of the Campine region after three years: https://www.sciencedirect.com/science/article/pii/S0048969718300639
16. The respective characteristics of millennial-scale changes of the India summer monsoon in the Holocene and the Last Glacial: https://www.sciencedirect.com/science/article/pii/S0031018217310325
17. Holocene relative sea-level changes inferred from multiple proxies on the west coast of South Korea: https://www.sciencedirect.com/science/article/pii/S0031018217310106
18. The underappreciated potential of peatlands in global climate change mitigation strategies: https://www.nature.com/articles/s41467-018-03406-6.pdf
19. Competition for light as a bottleneck for endangered fen species: An introduction experiment: https://www.sciencedirect.com/science/article/pii/S0006320717314301
20. Relative sea level rise, site distributions, and Neolithic settlement in the early to middle Holocene, Jiangsu Province, China: http://journals.sagepub.com/doi/abs/10.1177/0959683617729442
21. Holocene pool formation in oligotrophic fens from boreal Québec in northeastern Canada: http://journals.sagepub.com/doi/abs/10.1177/0959683617729439
22. The $\delta^{13}C$ of cellulose from modern plants and its responses to the atmosphere – From the peatland records of Dajiuhu, China: http://journals.sagepub.com/doi/abs/10.1177/0959683617729444
23. Human-induced changes in fire regime and subsequent alteration of the sandstone landscape of Northern Bohemia (Czech Republic): http://journals.sagepub.com/doi/pdf/10.1177/0959683617729443
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25. Late glacial and post-glacial deposits of the Navamuño peatbog (Iberian Central System): Chronology and paleoenvironmental implications: https://www.sciencedirect.com/science/article/pii/S104061821730277X
26. Indications of geomorphological activity in peat bog deposits in the Pirin Mountains, SW Bulgaria: https://www.sciencedirect.com/science/article/pii/S1040618217305748
27. A 5000-yr record of Afromontane vegetation dynamics from the Drakensberg Escarpment, South Africa: https://www.sciencedirect.com/science/article/pii/S1040618216313714
28. The effect of volcanism on submontane rainforest vegetation composition: Paleoecological evidence from Danau Njalau, Sumatra (Indonesia): http://journals.sagepub.com/doi/abs/10.1177/0959683617721329
29. The dialectic between deciduous and coniferous forests in central Iberia: A palaeoenvironmental perspective during the late Holocene in the Gredos range: https://ac.els-cdn.com/S1040618216314835/1-s2.0-S1040618216314835-main.pdf
30. Ericoid plant species and *Pinus sylvestris* shape fungal communities in their roots and surrounding soil: https://nph.onlinelibrary.wiley.com/doi/abs/10.1111/nph.15040
31. Water losses from the Sudd: https://www.tandfonline.com/doi/full/10.1080/02626667.2018.1438612

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33. In situ tropical peatland fire emission factors and their variability, as determined by field measurements in Peninsula Malaysia: https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2017GB005709
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35. The marine isotope stage 1–5 cryptotephra record of Tenaghi Philippon, Greece: Towards a detailed tephrostratigraphic framework for the Eastern Mediterranean region: https://www.sciencedirect.com/science/article/pii/S0277379117309411
36. Nitrogen-rich organic soils under warm well-drained conditions are global nitrous oxide emission hotspots: https://www.nature.com/articles/s41467-018-03540-1
37. A submerged pine forest from the early Holocene in the Mecklenburg Lake District, northern Germany: https://onlinelibrary.wiley.com/doi/abs/10.1111/bor.12314
38. Indicator value of oribatid mites in determining past permafrost dynamics in northern European sub-Arctic peatlands: https://onlinelibrary.wiley.com/doi/abs/10.1111/bor.12312
39. The history of seabird colonies and the North Water ecosystem: Contributions from palaeoecological and archaeological evidence: https://link.springer.com/article/10.1007/s13280-018-1031-1
40. Carbon accumulation in Dahu Swamp in the eastern Nanling Mountains (south China) and its implications for hydroclimatic variability over the past 47 000 years: https://onlinelibrary.wiley.com/doi/abs/10.1111/bor.12279
41. Perspective of landscape change following early settlement (landnám) in Svalbarðstunga, northeastern Iceland: https://onlinelibrary.wiley.com/doi/abs/10.1111/bor.12287
42. Managing peatlands to cope with climate change: Indonesia's experience: www.menlhk.go.id/downlot.php?file=Managing_Peatlands.pdf
43. Potential for negative emissions of greenhouse gases (CO_2, CH_4 and N_2O) through coastal peatland re-establishment: Novel insights from high frequency flux data at meter and kilometer scales: http://iopscience.iop.org/article/10.1088/1748-9326/aaae74/meta
44. High-resolution digital mapping of soil organic carbon in permafrost terrain using machine learning: a case study in a sub-Arctic peatland environment: https://www.biogeosciences.net/15/1663/2018/bg-15-1663-2018-discussion.html
45. Soil properties and sediment accretion modulate methane fluxes from restored wetlands: https://onlinelibrary.wiley.com/doi/abs/10.1111/gcb.14124
46. Testate amoeba records indicate regional 20th-century lowering of water tables in ombrotrophic peatlands in central-northern Alberta, Canada: https://onlinelibrary.wiley.com/doi/abs/10.1111/gcb.14143
47. Vascular plant-mediated controls on atmospheric carbon assimilation and peat carbon decomposition under climate change: https://onlinelibrary.wiley.com/doi/abs/10.1111/gcb.14140
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52. Drivers and trajectories of land cover change in East Africa: Human and environmental interactions from 6000 years ago to present: https://www.sciencedirect.com/science/article/pii/S0012825217303331
53. Mid- to late Holocene geomorphological and hydrological changes in the south Taihu area of the Yangtze delta plain, China: https://www.sciencedirect.com/science/article/pii/S0031018217312014
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57. Greenhouse gas fluxes over managed grasslands in Central Europe: https://onlinelibrary.wiley.com/doi/abs/10.1111/gcb.14079

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60. Impact of the 2015 wildfires on Malaysian air quality and exposure: a comparative study of observed and modeled data: http://iopscience.iop.org/article/10.1088/1748-9326/aab325/meta
61. Minor contribution of small thaw ponds to the pools of carbon and methane in the inland waters of the permafrost-affected part of the Western Siberian Lowland: http://iopscience.iop.org/article/10.1088/1748-9326/aab046
62. Consequences of grazer-induced vegetation transitions on ecosystem carbon storage in the tundra: https://besjournals.onlinelibrary.wiley.com/doi/abs/10.1111/1365-2435.13029
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67. Temperature response of ex-situ greenhouse gas emissions from tropical peatlands: Interactions between forest type and peat moisture conditions: https://www.sciencedirect.com/science/article/pii/S0016706117319985
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Bog in National Reserve 'Bor' in the Tatra mountins, Slovakia, visited during the 2010 IMCG Field Symposium. Photo: Hans Joosten.