5 July 2022

Peatlands International

issue 2.2022

International Peatland Society

Finally! Estonia Face to Face

IHC 2022
31ST INTERNATIONAL HORTICULTURAL CONGRESS

14–20 AUGUST 2022
CONGRESS CENTRE ANGERS–FRANCE
HYBRID

The International Horticultural Congress (IHC) is the most important scientific event organised every four years since 1959 in the fields related to Horticulture* under the auspices of ISHS **(International Society for Horticultural Science)**. ISHS is a truly global network comprising over 7,000 members. Its aim is to promote and foster research and education in horticultural science and to facilitate cooperation and knowledge transfer on a global scale through events and publications. In a different continent every 4 years (...2010 Lisbonne - 2014 Brisbane - 2018 Istanbul...), IHC regroups many divisions and commissions-symposia.

ISHS

150 countries | Over **3000** delegates | Every **4 years**

* **Horticultural crops**, raw or processed : fruit, vegetables, aromatic and medicinal plants, seeds and roots, ornamental plants, landscaping, vineyard.

Spirit of 31st edition

REACH A HIGH SCIENTIFIC LEVEL
With a unique opportunity to gather, meet and debate on the global topics:
- Competitiveness and skills for the Horticultural sectors
- Food, health & well-being,
- Sustainability of production systems,
- Adaptation to climate change and mitigation solutions

CONNECT AND MAKE VALUE FROM THE TRIPTYCH RESEARCH – EDUCATION – INDUSTRY
The IHC2022 will be an opportunity to boost links between **Research, Education and Industry** in order to **facilitate** the transfer and application of research for industry. It is also the place to **motivate** and encourage young minds in Horticulture for the future.

DEVELOP INTERNATIONAL COLLABORATION, IN PARTICULAR BETWEEN SOUTH AND NORTH
Promote experience-sharing by bringing together different types of Horticulture.

Program
During one week, participants will discover and interact in plenary sessions, Symposia, networking exhibition, user-friendly social program and technical tours.

14 - 18 AUGUST IN ANGERS CONGRESS CENTRE	&	19 - 20 AUGUST
Plenary sessions 25 Symposia Workshops Meetings Exhibition		Technical and touristic post tours
Social program Side events		

Participants
IHC2022 will gather around **3,000 participants**, **ISHS'members and non-members** from all over the world:

- Scientists,
- Technicians,
- Students,
- Consultants,
- Engineers,
- Growers,
- Professionals from industries,
- Representatives of trade and consumer organisations,
- Medias
- Policymakers
- And other professionals.

Editorial


Erki Niitlaan (right) at Viru Bog. Photo: SW

A few days ago, just as my 12-year stint on the IPS Executive Board was coming to an end, I received Bo Scheeringa's photo album "Peat", in which she has documented her thoughts and included photographic memories of her days spent in Ireland in 2019, capturing the local bogs and people and how they have traditionally co-existed. It is a nostalgic recollection of how old customs and habits of cutting turf for households are in danger of fading away. However, this is not the fate of peat as such, definitely not yet!

Forgive me for writing in a European-centric way, but listening to the European Union's Green Deal rhetoric, it is easy to get the impression that peatlands only have value in their natural state. It is not a question that the majority of them should be in good condition. Still, in many countries, people have managed peatlands for centuries in a reasonable manner without them becoming extinct. Peatlands have delivered numerous ecosystem services, as well as economic benefits, in particular, the use of peat as a raw material, and the need for it is not declining.

The protection of pristine mires and bogs and the restoration of drained ones are essential. However, this does not mean that we should not manage peatlands at all or we should not use peat at all. It is a pity that we are only reminded of this by the energy crisis or Russia's shock invasion of Ukraine. Alongside environmental protection, there is a renewed focus on the importance of local resources, including peat. Not that environmental protection is less important, but other aspects are important too!

The environmental protection and reduction of greenhouse gas (GHG) emissions associated with peatland management, which certainly needs to be addressed, should not necessarily be at the expense of the economy but through innovative solutions.

The emissions resulting from peat usage are globally negligible compared to all the anthropogenic emissions (less than 0.02%), however, this does not mean that we should not try to reduce them. Even so, it is time to abandon the outdated principle that this must come at

Peatlands International is the global magazine of the International Peatland Society (IPS). It provides the more than 1,500 individual, institute and corporate members of the Society with up-to-date information on peat and peatland matters, reports and photos of conferences and workshops, background reports and publication reviews. To serve all of our members, we provide always a good balance between economic, social and environmental points of view. Opinions are those of the authors. To receive Peatlands International in your email every three months, visit www.peatlands.org/join-us and sign up as a member - or easily subscribe for € 59/year via our online shop.

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Cover: Break during the walk of the Executive Board and guests through Viru Bog, Estonia, in May. Photo by Susann Warnecke
www.peatlands.org/publications

the cost of reducing volumes. Perhaps we should ensure that the peat that is no longer used does not become an atmospheric emission in the first place. In doing so, we could continue to reap the peat benefits while avoiding most GHG emissions.

I represent the peat industry, but that does not mean that I do not care about the environment. I care a lot! Substantive cooperation is also the aim of the members of the Estonian Peat Association. We have launched an ambitious programme of restoring cutover peatlands.

We have also started R&D cooperation with Estonian universities to find ways in which we can significantly reduce the climate impact of horticultural peat usage, without limiting the volumes. We aim to find constructive solutions that genuinely consider the needs of environmental protection but also the peat industry.

I firmly believe that coexistence is possible, and IPS' international arena will contribute to this.

Erki Niitlaan

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The IPS has a new Executive Board!

The Annual Assembly of National Representatives of the IPS has elected a new Executive Board (EB) during its MS Teams meeting on 8 June.
The Board now consists of:

2022-2024
Marko Pomerants, President
Guus van Berckel, Netherlands, 1st Vice President
Jack Rieley, United Kingdom, 2nd Vice President

Donal Clarke, Ireland
Asha Hingorani, Canada
Giedrius Kavaliauskas, Lithuania
Tuija Vähäkuopus, Finland

2022-2026
Bernd Hofer, Germany
Sabine Jordan, Sweden
Anna-Helena Purre, Estonia
Meng Wang, China

EB members are elected for a four-year term, in a manner that half of the ordinary members change every second year, and presidents every four years. We express our warmest congratulations to all new EB members and thank those who have moved on to new challenges: Lulie Melling, Erki Niitlaan, Paul Short and Frank Tamminga.

Marko Pomerants stated after the meeting, "What were my expectations as President before the Assembly? Firstly, the elected members should be active members of EB, since this position does not mean belonging but contributing. The following factors are important to our organization:
1. Financial stability and, if possible, growth. We need to fulfil our plans and increase our scientific capacity by hiring a scientific officer. Among other things, this means that today's "producer countries" are represented in the EB of the IPS.
2. We need the participation of producers at EB level and in its committees.
3. We need to rejuvenate the organization to

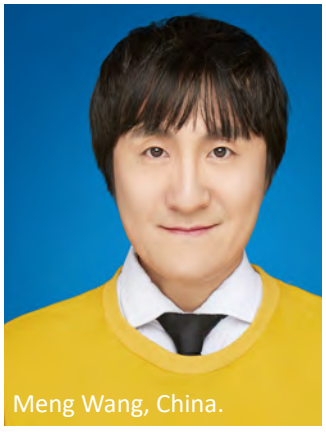

Asha Hingorani, Canada.


Bernd Hofer, Germany.


Sabine Jordan, Sweden.


Anna-Helena Purre, Estonia.


Giedrius Kavaliauskas, Lith.


Meng Wang, China.

ensure our sustainability.
4. We need more active researchers from the younger generation.
Today I can say that we succeeded. I can observe initiative already and hope that it will remain."

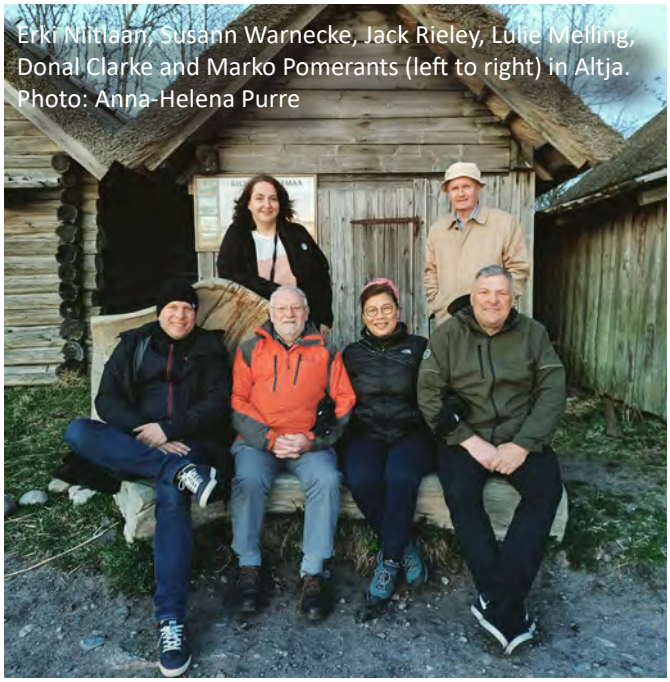
In addition, the Assembly approved the Annual Report and finances for 2021, as well as the budget and membership fees for 2022. The financial and personnel impacts of the Position Paper: Embracing Change, were also accepted. This means that the IPS will be able to hire a Science Officer to support the scientific work of the IPS, as soon as the fees are paid, which we anticipate will be in August. It was also decided to hold the 2023 Annual Assembly in conjunction with the RE3 Conference in Québec, Canada, next June. You are welcome to participate!

The Assembly meeting was attended by official representatives from 13 countries, 15 observers, EB candidates as well as the President and Acting Secretary General. The "new" EB held its first meeting virtually afterwards. Although online meetings have certain advantages and are timesaving, we have noticed one more time, especially during the voting, that face-to-face meetings are the crème de la crème of association networking. We hope to see you all in person latest next year!

Face-to-face in Palmse

One month before the elections, the "old" EB met for its last session in Palmse, Lahemaa, Estonia between 9 and 11 May. It was a pleasure to finally welcome Donal Clarke, Lulie Melling, Erki Niitlaan, Marko Pomerants, Jack Rieley and Susann Warnecke face-to-face in the same room (after two years!), along with Sabine Jordan, Paul Short and Tuija Vähäkuopus participating via MS Teams.

Outdoors we were accompanied by Giedrius Kavaliauskas, Martin Küttim and Anna-Helena Purre, and during dinner, researchers Edgar Karofeld and Elve Lode. This meant that we finally had the opportunity to express our heartful thanks for organising IPC2021! Especially enjoyable was the very well organised field trip to beautiful Viru Bog, which has become a popular leisure destination for Tallinn inhabitants, especially during the pandemic. We visited the Baltic Sea


Erki Niitlaan, Susann Warnecke, Jack Rieley, Lulie Melling, Donal Clarke and Marko Pomerants (left to right) in Altja. Photo: Anna-Helena Purre


During the EB meeting in Palmse. Photo: Susann Warnecke

coast at Altja and watched a wonderful sunset, and travelled to the Nõmmeveski and Joaveski waterfalls, as well as the very wet Lauksoo restoration site. The wildlife was impressive and we were fortunate enough to see numerous species of birds and mammals. The meeting ended with a presentation given by Mr Pomerants and Ms Warnecke (from the President's Tallinn office) to the IVG, the German Garden Industry Association.

The time spent together resulted in numerous fruitful discussions, ideas for future activities and spontaneous small problem solving, which would never have been discussed online and in an organised manner. We hope to repeat this experience in Ireland in October.

Susann Warnecke

Acting Secretary General
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CSPMA Celebrates World Peatlands Day - Championing Peatland Research and Innovation for over 30 years

World Peatlands Day (WPD) is celebrated on 2 June every year to raise awareness of the important role peatlands and peat play in delivering social and economic benefits to communities' world worldwide.

WPD provides an opportunity for the Canadian Sphagnum Peat Moss Association (CSPMA) to highlight the industry's strong 30-year commitment to science and investments in peatland research and innovation to ensure the wise use of peatlands and their responsible management.

Recognizing that the responsible management of peatlands was critical to moving forward as an industry, since 1992 the CSPMA and its members have partnered with science expertise including multiple Canadian universities, and governments, both federally and provincially, to focus on ecological restoration, primarily research in biodiversity, hydrology and greenhouse gas balance.

This and next pages: a few of the ten campaign teasers of IPS for counting down to WPD on social media.
Artwork Susann Warnecke via Canva

"For over 30 years, the industry has been relying on science to ensure horticultural peat harvesting is done in a responsible manner, to reduce its environmental footprint and making the responsible management of peatlands an integrated component of daily operations," said CSPMA President, Asha Hingorani.

Since industry inception, Canadian horticultural peat producers have operated on a

total of 35k hectares out of the 114M hectares of peatlands that can be found in Canada or 0.03%. Peat extracted in Canada is only used for horticultural purposes. Peat-based growing media is used by professional growers, and gardeners across North America. Food security and well-being are key characteristics of the products it produces and sells.

However, the industry recognizes that in parallel to the critical role peat plays in food security and well-being, peatlands play an essential role in our environment.

"The long-term research collaboration between scientists and CSPMA has made an important contribution to advancing peatland science in Canada and internationally. Through this partnership, Canada is one of the leaders in peatland restoration following peat extraction and we are now able to apply what we have learned to reduce impact and restore peatlands affected by other types of disturbances such as roads, oil well pads and mines," said Dr. Maria Strack, University of Waterloo Professor and Canada Research Chair.

"In the 90's, the industry initiated the first research program on peatland restoration, conducted by the Peatland Ecology Research Group (PERG) head at Université Laval. The researchers from various expertise looked at all the functions of the ecosystem, including biodiversity, hydrology and greenhouse gas (GHG). This led to the development of Canada's expertise in peatland restoration research. Now, the research is taking a closer look to the full story around GHG, especially at the extraction and use phases." said CSPMA's Science Coordinator, Stéphanie Boudreau.

"Ten years ago, the industry ensured it was walking the talk by implementing Responsibly Managed Peatlands - A Veriflora® Standard for Responsible Horticultural Peat Moss Production, an ever more stringent certification program. Also, 5 years ago, the industry adopted the National Peatland Restoration Initiative. Under this initiative, producers committed to restore 100% of its "legacy" bogs over the next 15 years. It is currently on track to reach its goal", added Boudreau.

World Peatlands Day was launched by the International Peatland Society (IPS) in autumn 2019. IPS is an organization of individual, corporate and institutional members dedicated to the responsible management and Wise Use of peatlands and peat.

About the CSPMA

The CSPMA is the Canadian national association of horticultural peat moss producers. The association is devoted to promoting responsible management of Canadian peatlands. CSPMA provides support to and advocacy for its members and leadership in environmental and social stewardship, as well as economic well-being and food security related to Canadian peatland resources use.

Asha Hingorani

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Ducks Unlimited Canada and the Canadian Sphagnum Peat Moss Association announce partnership

Ducks Unlimited Canada (DUC) and the Canadian Sphagnum Peat Moss Association (CSPMA) signed a five-year memorandum of understanding (MOU) on 2 June 2022, World Peatlands Day, which will see the two organizations continue their work to develop innovative, sustainable, and ethical peatland and wetland management practices.

Peatlands are geological areas with high amounts of partially decayed organic matter in wet conditions. In Canada they cover around 13% of the country's surface area, offering many environmental benefits from hosting high levels of biodiversity including many species of waterfowl, to filtering pollutants, and functioning as an extremely efficient natural carbon sink.

Peat harvested in Canada is used in horticulture, primarily as an important ingredient in growing media that contributes to food security and well-being.

Although the footprint of the horticultural peat industry is small (less than 0.03% of Canadian peatlands), DUC and the CSPMA acknowledge the importance of establishing best practices for peat harvesting and peatland restoration to ensure that this sensitive and valuable resource is managed with long-term sustainability in mind.

Kevin Smith and Asha Hingorani after signing the Memorandum of Understanding in Miramichi, New Brunswick. Photo: Doris Reeve

Asha Hingorani, President of the CSPMA explains, "Ensuring the ecological restoration of peatlands that have been used for horticultural peat harvesting are a key value to the CSPMA and its members, specifically through our National Peatland Restoration Initiative. This renewed partnership with DUC provides cooperation and collaboration on research projects, knowledge mobilization and sharing. DUC is a trusted partner to help move our goals and objectives towards environmental stewardship forward."

The newly signed MOU addresses many goals, with DUC and the CSPMA working together primarily on conservation initiatives that will guide policy recommendations for government and industry on topics like management and restoration, climate change mitigation, wildlife habitat planning, and sustainability. Knowledge sharing is another key focus of the MOU, with both organizations realizing the value of collaboration.

"We are committed to our relationship with the CSPMA to support the continued understanding of Canada's boreal wetland systems, promoting and supporting the use of strong science in sustainable development and wetland stewardship, and providing organizational science-based expertise," says Kevin Smith, National Manager of DUC's National Boreal Program.

The National Boreal Program of Ducks Unlimited Canada has over 20 years of experience working with governments, Indigenous Peoples, and industry to develop comprehensive, science-based solutions for conserving boreal wetlands. DUC is a registered charity and the leader in wetland conservation.

This MOU is the second between the two partners, whose work is ongoing with many like-minded organizations for the betterment of Canadian wetlands and ecosystems.

Ducks Unlimited Canada (DUC) is the leader in wetland conservation. A registered charity, DUC partners with government, industry, non-profit organizations, Indigenous Peoples and landowners

to conserve wetlands that are critical to waterfowl, wildlife and the environment. To learn more about DUC's innovative environmental solutions and services, visit www.ducks.ca.

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Neova Group is Creating Green Growth

Sustainability is at the heart of Neova Group's strategy and purpose

Our sustainability aim is to create green growth through net positive products and services. Being net positive means that we contribute more to the world than we take from it.

"Today, sustainability is an essential part of any successful business. The key is to understand the continuously evolving stakeholder expectations on sustainability topics, anticipate the changes in your business environment from a sustainability perspective and make sustainability a competitive advantage for your business.

In Neova Group, we have consistently developed our sustainability strategy with clear and ambitious target setting and have ensured that our sustainability activities are integrated into our business strategies, business development plans and functional plans. Sustainability management is about taking concrete actions that have an impact", says Petri Järvinen, Chief Supply Chain and Sustainability Officer at Neova Group.

The renewed sustainability strategy

During 2021 we conducted a major review of our sustainability strategy and renewed sustainability aim, themes, mid-term and long-term goals for Neova Group. The renewed sustainability strategy ensures that sustainability is at the core of Neova Group's strategy and purpose - Creating Green Growth. Our sustainability aim is to create green growth through net positive products and services, by considering the impact on the environment, health, society and knowledge.

Our mid-term and long-term goals have been defined for the three areas of sustainability (environmental, social and financial sustainability) with selected themes:

- We do our business in balance with nature.
  Themes: Greenhouse gas emissions, Biodiversity, Circularity and Water.
- We support the growth of our people and partners.
  Themes: Safety first!, Great workplace, Responsible partners.
- We ensure profitability in a sustainable way.

UN Sustainable Development Goals are used as our key external sustainability framework to align our activities on the most impactful areas. At Neova Group, we are committed to making the UN Global Compact and its principles on human rights, labour, environment and anti-corruption part of the strategy, culture and day-to-day operations of our company. In this article, we will focus on the

concrete measures we are taking to reduce CO_2 emissions and safeguard biodiversity through our case studies.

We are committed to minimizing the harmful environmental impacts of our operations
We have set ambitious targets to reduce the environmental impact of our own operations. In our previous sustainability strategy (formulated in 2019), we committed to reducing CO_2 eq. emissions in our own operations by 50% by the end of 2025 from 2018 levels (scope 1 and 2 without compensation actions). In this latest strategy review, we decided to extend our scope to the full value chain and thus set an additional target to reduce carbon intensity in our value chain (scope 1, 2 and 3) by 50% by the end of 2030 from 2020 levels.

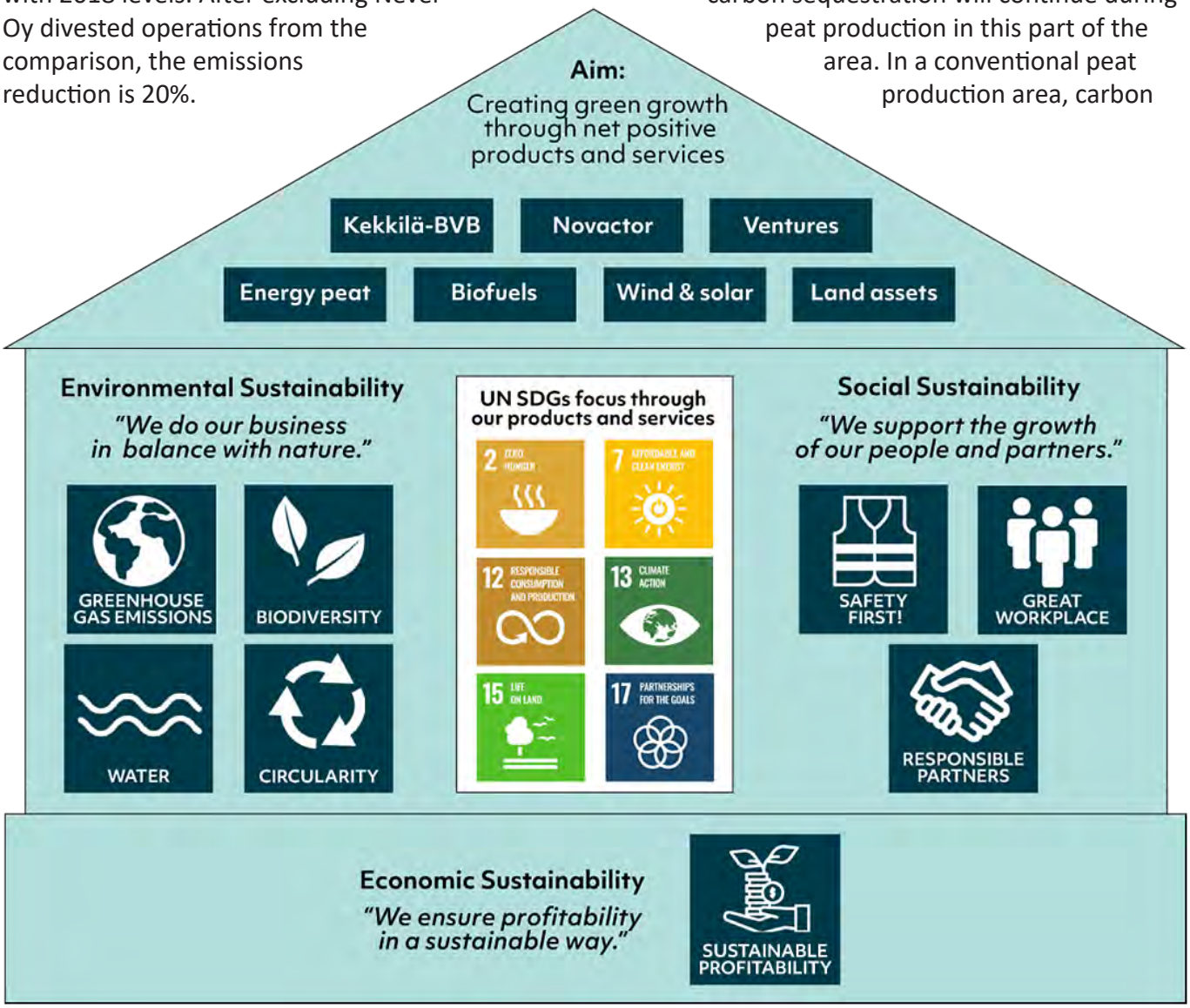
To date, we have achieved a reduction of 44% of our own operations' emissions by comparison with 2018 levels. After excluding Nevel Oy divested operations from the comparison, the emissions reduction is 20%.

The majority of the reduction comes from soil emissions from our peat production areas, which have already been reduced by 18%.

We will evaluate options to increase carbon sinks, utilising our land assets as well as pilot alternative horticultural peat harvesting techniques, such as using the peat mass transfer method to reduce CO_2 emissions.

Case: Sustainable horticultural peat harvesting technique was studied in Hietasalonneva.

During the 2021 peat production season in the Hietasalonneva production area in Virrat, Finland, we studied ways in which horticultural peat can be produced sustainably with fewer carbon emissions. In the autumn of 2020, a so-called "mass transfer of peat" was carried out in an area of around four hectares, to preserve the surface vegetation in the peat fields. In this way, carbon sequestration will continue during peat production in this part of the area. In a conventional peat production area, carbon



During 2021 Neova Group reviewed its sustainability strategy, including aim, themes, and goals.

Every third field is covered with original plants, which allows carbon sequestration to continue. The layer suitable for horticultural peat has been transferred from under the vegetation to the adjacent field, on the left-hand side. Photo: Neova

sequestration from the air is reduced, due to the removal of vegetation. In addition, as a result of the drainage, the water level lowers, the peat layer oxidizes and begins to release stored carbon as carbon dioxide.

As part of the research project, in the intermediate fields that remain plant-covered, the plant cover was moved aside briefly with an excavator, the peat layer suitable for horticultural peat was transferred to the adjacent fields and the plant cover was returned to the same location. In this way, every third field was left with the original bog vegetation on the surface, so that carbon dioxide sequestration could continue. Natural bog vegetation does not pose a weed risk to peat production.

In the summer of 2021, the drying process and amount of peat produced by the mass transfer area was compared to that produced by conventional fields. The seasonal yield per hectare in the mass transfer area (total vegetation and drying plots) was the same as in the area of conventional production, although the drying area was one third less. The 10-centimetre surface layer of the mass transfer drying field was clearly drier than that of the conventionally prepared reference field. This was also reflected in the faster drying speed. The moisture content of the dried peat ridges in the mass transfer area was, on average, 6.6 weight % drier than in the control field. The production work steps were performed simultaneously in both fields and despite the dry and hot summer, the bog vegetation survived. Monitoring will continue next summer.

Thanks to the positive results, the next test area in Finland is planned for the Vehkaojansuo peat area in Kouvola, where the transfer of thicker layers of peat, suitable for horticultural peat can be studied. In this case, the surface of the vegetation fields can be lowered closer to the level of the bog water, which in turn slows down the decomposition of peat and reduces carbon dioxide emissions.

Moreover, similar pilot areas have been planned in our Grimsåsmossen and Göklundsmossen peat areas in Sweden and potentially in the Kasesoo peat area in Estonia.

Since 2010, the scientists have monitored the area's overgrowth from open water and bare peat areas to new, peat-forming vegetation. The first Sphagnum patches occurred in 2012 and have grown exponentially over the years with a small

decline in 2019 and 2020, due to the very dry summer in 2018. A stable water supply is thus a very important factor for a successful Sphagnum establishment with farming as a goal.

Our biodiversity programme aims to increase biodiversity

We have established a Neova Group biodiversity programme aiming to increase biodiversity by restoring (re-wetting or afforestation) 2,000 hectares between 2021 and 2025 in collaboration with local stakeholders.

In 2021, restoration planning was started for example in the Lavassaare area in Estonia with the EU WaterLANDS project, in the Norrbomuren area in Sweden with the Swedish University of Agricultural Sciences (SLU), as well as in the Komppasuo area in Finland with the EU's Merlin Project. This focuses on specific peat production areas, where we wish to showcase the way in which to increase biodiversity in habitats by wetland creation, as well as by mosaic-like variation. Regarding closed peat production areas, the topography, hydrology and rocks/stones influence the best next land use option to be taken. Moreover, during peat production, a diverse wetland species is formed in water treatment structures, and biodiversity can further be increased by creating small wetlands and building nesting or shelter areas.

Case: Neova Group restores 1,000 hectares of old peat production area in Estonia

Neova Group is participating in the WaterLANDS project in Estonia, together with the University of Tartu, Estonian Fund of Nature (ELF) and State Forest Management Centre (RMK). WaterLANDS is a new European Green Deal project, aimed at the large-scale restoration of Europe's wetlands.

Neova Group's part of the project will cover approximately 1,000 hectares of our peat production area in Lavassaare over the next 10 years. The main goal of the project is to increase the area's biodiversity. During the project, wetlands for birds and insects will be created and

Petri Järvinen is Chief Supply Chain and Sustainability Officer at Neova Group. Photo: Neova

rehabilitated, and higher areas will be reforested. The goal is that within the next five years, around half of the area will be restored.

The biodiversity pilot in Lavassaare is part of Neova Group's biodiversity programme to increase biodiversity in our own industrial areas through concrete actions. In Estonia, we have approximately 3,700 hectares of active horticultural peat production. The Lavassaare area is our largest peat production area in Estonia. Overall, in Estonia, 358,923 hectares are defined as active peat resources (i.e., not under protection or unsuitable for production in other reasons) and only 6% of active peat resources are used for peat harvesting.

Europe has already lost up to 90% of its original wetlands, resulting in massive biodiversity loss, water and food shortages, devastating floods and fires, coastal subsidence and erosion. Wetlands are home to 40% of the world's species. They also store and capture carbon, remove environmental pollutants and protect communities from flooding. Wetlands are particularly vulnerable to damage from human activities.

The five-year WaterLANDS project is led by University College Dublin (UCD), Ireland and brings

During the biodiversity pilot in Lavassaare, wetlands for birds and insects will be created and rehabilitated, and higher areas will be reforested. Photo: Neova

together 31 other organisations from research, industry, government and non-profit sectors in 14 European countries. Funding for the project is part of the European Commission's Green Agreement goal of making Europe the first climate-neutral continent by 2050. The WaterLANDS project was officially launched in December 2021. See also pages 22 ff. in this magazine.

Case: Neova Sweden works closely with peatland researchers from the Swedish University of Agricultural Sciences (SLU) in relation to Sphagnum growing projects

In Sweden, Neova Group has two ongoing projects, where the revegetation of terminated extracted peatlands through Sphagnum (peat moss) growing started in Ekebymossen (next to the Kekkilä-BVB growing media factory in Mosås) in 2018 and in Norrbomuren (outside Gävle) in 2021. The plan is that the projects will run to the end of 2023.

Researchers from SLU are conducting field preparation, Sphagnum establishment, monitoring of vegetation growth and GHG measurements.

Besides climate-smart peatland restoration, industrial Sphagnum farming for the long-term to meet the demand for growing media is the main objective of the projects. The projects are part of Neova Group´s biodiversity programme and two student theses have been compiled regarding this subject to date.

The sprinkled peat mosses in 2018 are growing very nicely sheltered by pioneer plants, such as *Carex* and *Eriophorum*. At the beginning, the Sphagnum stand was not a pure stand. This will change when the peat mosses have outcompeted other plants and taken over the ecosystem by lowering the pH value of the ecosystem. In spring 2021, 10 m^3 of Sphagnum for cultivation at Ekebymossen was brought out. During future projects, we will monitor how fast the densely packed Sphagnum site will cover the water surface. This will also give us a comparison if compacted Sphagnum mats are growing faster than "loosely" spread Sphagnum.

In addition to the Sphagnum farming projects, we work together with SLU in Toftmossen, a peat

extraction area located in Surahammar, Västerås, which was terminated in 2007. The after-use plan aimed for an area mixed with open water, wetlands and forest. SLU became interested in the area in 2009.

Case: The next land use for Neova´s Komppasuo has been planned in the EU's Merlin Project

After peat production, next land use forms are planned and implemented in the Komppasuo peat production area in the municipality of Ii in Northern Finland within the EU's Merlin Project. The Komppasuo project area covers 120 hectares of the former Neova-owned peat production area, where peat extraction ended in 2021. The project aims at the versatile implementation of different forms of land use. In the Komppasuo area, this will be carried out with the aim of quickly restoring the nature of the mire, various wetlands and afforestation. Other forms of land use that emerge as design progresses are also possible.

Local stakeholders are involved as much as possible in land use planning. The first stakeholder event was organized by the Merlin Project as a Teams event in late March. The environmental impact of the implemented measures will be monitored by the research infrastructure to be built in the area. The project will last until the autumn of 2025.

The researchers of the Finnish Environment Institute (SYKE) and Tapio Oy are the implementers of the research project at Komppasuo. Tapio Oy plans and implements the next land use of the Komppasuo peat production area and is building a research infrastructure for the site. SYKE is responsible for site measurements, environmental impact assessments, scalability reviews and economic and social impact reviews.

As the holder of the environmental permit, Neova will usually be responsible for the measures, monitoring and costs related to the aftercare of the area until the end of 2023. When planning the next land use, co-operation will be established between the implementers of the Merlin Project and Neova.

MERLIN

Horticulture peat helps the EU reach its reforestation targets

Already by the summer of 2021, the majority of the peat extracted by Neova was being used as growing media, bedding peat and raw material for activated carbon.

Currently, peat is by far the most used material in various growing media products in Europe. Peat accounts for around 75% of the European growing medium market of around 30 million m^3. Only 10% of the growing media used in professional growing do not contain peat at all.

About Neova

Neova is a Finnish company operating in international markets. Our business operations promote professional growing and home gardening, the construction of attractive and pleasant living environments and the well-being of animals.

We provide corporate and consumer customers with local fuels and develop products for air and water purification. The Neova Group produces peat responsibly in around 200 production areas in Finland, as well as in Sweden and Estonia. The Finnish State owns 50.1% of Neova and Suomen Energiavarat Oy own 49.9%. Group turnover is approximately €500 million and there are approximately 1,000 group employees.

Neova's subsidiaries are Kekkilä-BVB Oy, Kekkilä Oy, BVB Substrates B.V., G&C Materials Oy, Hasselfors Garden AB, Kekkilä-BVB Iberia S.L., Kekkilä-BVB Eesti Oü, Kekkilä-Brill Substrate GmbH&Co KG, G&C Materials Germany GmbH, Kekkilä-BVB Germany GmbH, Brill France S.A., Neova AB, AS Tootsi Turvas and Vapo Oy. Neova operates in China, Estonia, Finland, France, Germany, Italy, the Netherlands, Spain, Sweden and the USA.

In Finland alone, around 150 million tree plants are nurtured annually in horticulture peat. Photo: Neova

The explanation is simple. Peat has innumerable superior properties as a growing medium. It saves water, reduces the need for fertilisation, is free from weeds, toxins and pathogens, and above all, it creates ideal growing conditions for plants. After use, it is fully recyclable.

In Finland alone, around 150 million tree plants are nurtured annually in horticulture peat. These tree seedlings are planted annually to either reforest or create additional forest. Horticulture peat decomposes and releases carbon dioxide into the air, but as a gift to nature, it can sequester huge amounts of carbon into regenerated forests.

In one m^3 of horticulture peat, it is possible to grow around 8,000 tree seedlings to be planted. The cultivation of 150 million tree seedlings, therefore, requires less than 20,000 m^3 of horticulture peat. When that peat decomposes in a few years, it will release less than 4,000 tonnes of CO_2 (calculated by the emission factor 0.193 tonnes CO_2/m^3, black peat) into the atmosphere. The production of that amount of horticulture peat requires an extraction area of around 50 hectares, with annual soil emissions of around 550 tonnes of carbon dioxide (11.4 tonnes CO_2/hectare).

150 million tree seedlings will be able to plant 75,000 hectares of new forest. Forest growing in Finland sequesters around three tonnes of carbon per hectare per year.

In other words, up to 200 tonnes of carbon are sequestered in the new forest per hectare during its life cycle. Thus, emissions of horticulture peat from seedling cultivation are already compensated for in forest areas of less than 20 hectares.

The remainder are left to increase the carbon sink. This is the net positivity of horticulture peat - and this is exactly what Neova Group wishes to make clear in the EU's debate concerning the expansion of sustainable financing taxonomy, which assesses whether or not the use of horticulture peat is sustainable.

"We are proud of the progress we are making and the sustainability journey we are on. Our sustainability efforts are closely integrated into our business strategies as well as our business development plans and action plans. Our work is meaningful, and this is reflected in our employees' commitment to our sustainability efforts", summarises Petri Järvinen.

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A new call from the Ramsar Convention to transform agriculture to sustain people and wetlands

Figure 2. Actions to transform agriculture to sustain people and ensure the wise use of wetlands. Adapted from FAO (2014), FAO (2018), van Dam et al. (2021)

Estimates based on available data show that approximately 35% of the world's wetlands have been converted to other land uses since 1970, with agriculture being one of the main drivers of change.

Recently, in a policy brief the Ramsar Convention identified priority actions to increase the sustainability of agriculture. It is recognized that policymakers need to have better guidance on what is needed to transform agriculture and ensure the wise use of wetlands.

In its policy brief, the Ramsar Convention identified several transformative actions for sustainable agriculture and wetland wise use (see figure on the left).

In many peatland regions, drainage and fertilization has facilitated the use of agriculture for food supply. Today's challenge is to couple efforts to re-wet peatlands and capture carbon

with sustainable farming practices, such as extensive agriculture or paludiculture.
IPS, with its expertise in peatland management, has the potential to contribute to developing such guidance for agriculture relating to organic soils.

The IPS Expert Group on Agriculture on Peatlands invites IPS members to participate in their activities to facilitate exchange of knowledge, promote awareness raising and organise dialogue between stakeholders.

With an intensified effort, the IPS community would be well equipped to 'make a difference' and contribute substantially to the transformation of agriculture on peatlands, in line with the Ramsar Convention.

If interested, please contact the IPS Secretariat or author.

Jos Schouwenaars

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New Members of the IPS

New members (or new contact persons for corporate, NGO and institute members, and industry partners) are mainly approved by our National Committees. For all other countries, the approval is made by the Executive Board of the IPS. Each National Committee is asked to compare their membership list to that of the IPS at least once a year (status below as of 29 June 2022). In some countries, IPS has both a National Committee and an industry association as a member.

In countries without a National Committee (including Latvia and Poland), member applications can be sent directly to the IPS Secretariat or via **www.peatlands.org/join-us**. Members are currently not accepted from Belarus and Russia. Membership fees 2022 were invoiced in mid June.

Individual members:
Finland (Suoseura): Terttu Hermansson, Liisa Maanavilja, Miina Rautiainen
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You can ask for, change or delete your membership information any time by contacting susann.warnecke@peatlands.org. **More info and membership form: www.peatlands.org/join-us**

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Scaling up peatland restoration: an introduction to the WaterLANDS project

Dublin, May 2022. The energy was palpable as partners of the WaterLANDS project from 14 countries gathered for the first time. After over six months of meeting virtually due to Covid-19, the researchers were keen for in-person collaboration at long last.

WaterLANDS (water-based solutions for carbon storage, people, and wilderness), is an ambitious Horizon 2020-funded project[1] that will undertake hands-on restoration of wetlands across Europe. Led by University College Dublin, the project aims to restore wetland sites which have been damaged by human activity, thus laying the foundations for upscaling protection across a much wider area.

The key focus of the project is the restoration of wetland ecosystems, including peatlands. These habitats retain and purify water, remove pollutants and excess nutrients, store atmospheric carbon,

All 75 attendees of the WaterLANDS first in-person Consortium Meeting, 6-8 May, in a surprisingly sunny Dublin. Photo: Rebecca Doyle, ERINN Innovation

Cuilcagh-Anierin uplands Special Area of Conservation.
Photo: John Derwin, LIFE IP Wild Atlantic Nature

moderate flooding and coastal storms, support an immense variety of wildlife, and offer recreational, well-being and economic benefits to surrounding communities. When mismanaged, these essential services for landscapes and society are lost. Scaling up the restoration of isolated peatlands can work towards re-establishing former wetland landscapes and realising new opportunities for local communities.

WaterLANDS is one of only four projects funded under the EU Green Deal Call 7.1 - Restoring Biodiversity and Ecosystem Services, with combined funding of €80 million. Together, the projects provide a landscape-scale view of ecosystem restoration in Europe. Much of WaterLANDS' efforts and €23 million budget will be dedicated to on-the-ground restoration, with the consortium consisting of representatives from community organisations, government organisations and commercial entities, as well as academia.

Adopting a holistic approach to restoration is central to the project's success. Project Coordinator Dr. Craig Bullock said: "Previous attempts at wetland restoration have often been too localised or fragmented to make a significant difference to the re-establishment of ecosystems and species. We aim to co-create more effective restoration which captures ecological, social, governance and financial aspects, to connect habitats and communities across Europe, ensuring both thrive for many generations to come."

WaterLANDS will initially focus its restoration work at six Action Sites across Europe, including three peatland sites: Cuilcagh-Anieran (Ireland), Yorkshire iCASP (England), and the Pärnu catchment (Estonia). The Cuilcagh-Anierin Uplands Special Area of Conservation (SAC) is a blanket bog site covering 9,735 hectares, comprising 11 habitats and 7 species protected under the Habitats and Birds Directives. Actions here will involve the establishment of functioning results-based payments schemes for uplands farmers, encouraging positive behaviour change and the uptake of additional measures such as drain blocking and fence construction.

The Yorkshire iCASP Action Site covers a range of blanket peatland across Northern England including parts of three National Parks: Peak District, Yorkshire Dales and North York Moors. This site will link up with existing efforts as part of the Great North Bog, the England Peatland Programme and the IUCN-UK Peatland Programme, particularly focussing on the vast ecosystem services provided by the Yorkshire peatlands in terms of water, amenity and carbon storage.

A beautiful day at the Great North Bog.
Photo: Joseph Holden, University of Leeds

The Pärnu catchment of western Estonia has various Baltic bog areas identified for restoration including exhausted peat extraction fields, conifer plantations on peat soil and former mires and wet forest. This combined approach engages with local NGOs, and two important commercial entities who will restore former peat extraction sites and forestry plantations.

The remaining Action Sites include the Dragoman Marsh (karst marsh habitat in Bulgaria), Venice Lagoon (coastal lagoon in Italy) and the Ems-Dollard Estuary (intertidal marshes in the Netherlands). The work at these sites will contribute to the creation of best practice models applicable to other sites. By engaging with local communities, policymakers and other stakeholders, the project will ensure that wetland restoration results not only in environmental gains, but also in social and economic benefits for the communities involved. Identifying viable investible propositions for wetlands will also help establish long-term financial support for scalability.

The project will draw on 15 'Knowledge Sites' across Europe, identified as examples of successful restoration, be this in terms of public engagement, supportive governance mechanisms, fruitful financial incentivisation or physical restoration of habitats and ecosystem services.
The project's workflow has been designed to achieve holistic restoration and prioritises connecting with local communities and stakeholders. For example, the project's community engagement will include artistic outreach where artists-in-residence at each Action Site will provide a "new way of seeing", enabling a deeper understanding of restoration, and develop innovative ways of reaching local communities and stakeholders.

Identifying continued funding beyond project lifespans has remained a critical limitation of similar initiatives. Thus, WaterLANDS will develop propositions for a selection of restoration sites which attract continuing blended finance and which offer tangible scalability within the WaterLANDS network and beyond.

To strengthen investor confidence, this will adopt a landscape finance approach, embedded in national policy and standards and supported

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101036484 (WaterLANDS). This output reflects the views of the authors and the European Commission is not responsible for any use that may be made of the information contained therein.

by sound science. As Dr Shane Mc Guinness, deputy Coordinator notes; “a key principle of WaterLANDS is not to ‘re-invent the wheel’ of restoration, but to dovetail with existing projects, research and knowledge to co-create a new paradigm for wetland restoration.”

Lavassaare peat area, Pärnu catchment. Photo: Evelin Krekker

The project is still in the early days of its 5-year duration, but it was clear from the positive, collaborative atmosphere at the Consortium Meeting this month that there is plenty that can be achieved in the coming months and years.

To keep up with the project’s progress and learn more about the Knowledge and Action Sites, please visit waterlands.eu, follow the project on Twitter and LinkedIn, or subscribe to our mailing list.

Footnote:

[1] Horizon 2020 was the EU's research and innovation funding programme from 2014-2020 with a budget of nearly €80 billion.

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Carbon Sequestration Potential of Sphagnum Planting for Peatland Restoration

When compared to other terrestrial systems, peatlands possess a disproportionately high carbon stock and the influence of damaging these areas on greenhouse gas emissions is now being regarded globally to the same degree as issues such as deforestation. This is evidenced through recent enhancement to funding schemes for peatland restoration and acknowledgement from government bodies such as DEFRA and the European Union Green Deal, as well as the emergence of regional initiatives such as the Manchester Zero Carbon Target to improve the state of these vital systems.

Figure 1: Re-established Sphagnum-dominated vegetation on an upland peatland site in the Peak District, UK, achieved through targeted planting of micropropagated Sphagnum. Photo Sadie Manning

This more intensive focus has facilitated the advancement of large-scale restoration practices which have produced tangible results for emissions avoidance on damaged peatlands. These valuable efforts within the field have also encouraged private financing of restoration through organisations offsetting emissions via purchase of carbon stock, necessitating the development of certification methods for carbon accreditation.

In the UK, the Peatland Code sets out standard practice for restoration within defined condition categories, making a vital contribution to encouraging and funding practices which can immediately result in the reduction of carbon emissions. But will reducing emissions suffice in the long-term?

Rewetting is vital in the primary stages of restoring drained peatlands in order to re-establish hydrological conditions associated with natural ecosystem functioning. However, rewetting is capable of reducing emissions but cannot alone convert damaged peatlands to carbon sinks. A recent report from the Centre for Ecology and Hydrology (CEH) detailing the emissions

from peatlands at various stages of degradation revealed that though the emissions at drained sites were significantly higher, rewetted sites still emitted 2 tonnes of carbon dioxide equivalent per hectare per year (Evans et al., 2019).

Current evidence suggests that the only method of restoration which can provide the capability to return damaged peatlands to carbon sinks is the reestablishment of native vegetation due to the carbon sequestration associated with growth, and the prevention of peat surface erosion. Healthy undisturbed temperate peatlands are characteristically Sphagnum dominated. Restoration of Sphagnum is estimated to be the most effective in terms of degree of long-term carbon sequestration when compared to restoration of alternative vascular moorland plant species such as *Eriophorum* (Bortoluzzi et al., 2006; Kivimäki et al., 2008).

Observations of greenhouse gas flux were carried out at Little Woolden Moss restoration site in Greater Manchester following revegetation with a number of Sphagnum species and *E. angustifolium*. Results demonstrated a transition from active carbon emission from targeted areas to net carbon sequestration within one year of vegetation establishment (Keightley, 2020). Further research carried out to assess how Sphagnum presence equates to the status of site as a carbon sink demonstrated that net carbon uptake is relative to increase in percentage cover of Sphagnum. The data presented in Figure 2 indicates that the site investigated became a net carbon sink once Sphagnum cover exceeded approximately 50% (Keightley, 2021).

It is reported that natural undisturbed peatland systems produce a baseline sequestration rate of approximately 1 tonne of carbon dioxide equivalent per hectare per year, carbon which is locked into the system by established vegetation and converted into peat over time (Worrall et al., 2011).

Further research from the CEH indicates that adequate restoration of native peatland vegetation has the potential to provide even more significant initial levels of carbon capture. Sequestration levels were modelled for both healthy undisturbed peatlands and peatland with newly restored vegetation. Results indicated that the maturation of the restored vegetation and acrotelm induced a significant increase in sequestration beyond the baseline levels of the healthy peatland, with potential for this elevated transitional sequestration between system states to persist for an extended period beyond establishment (Evans, 2021).

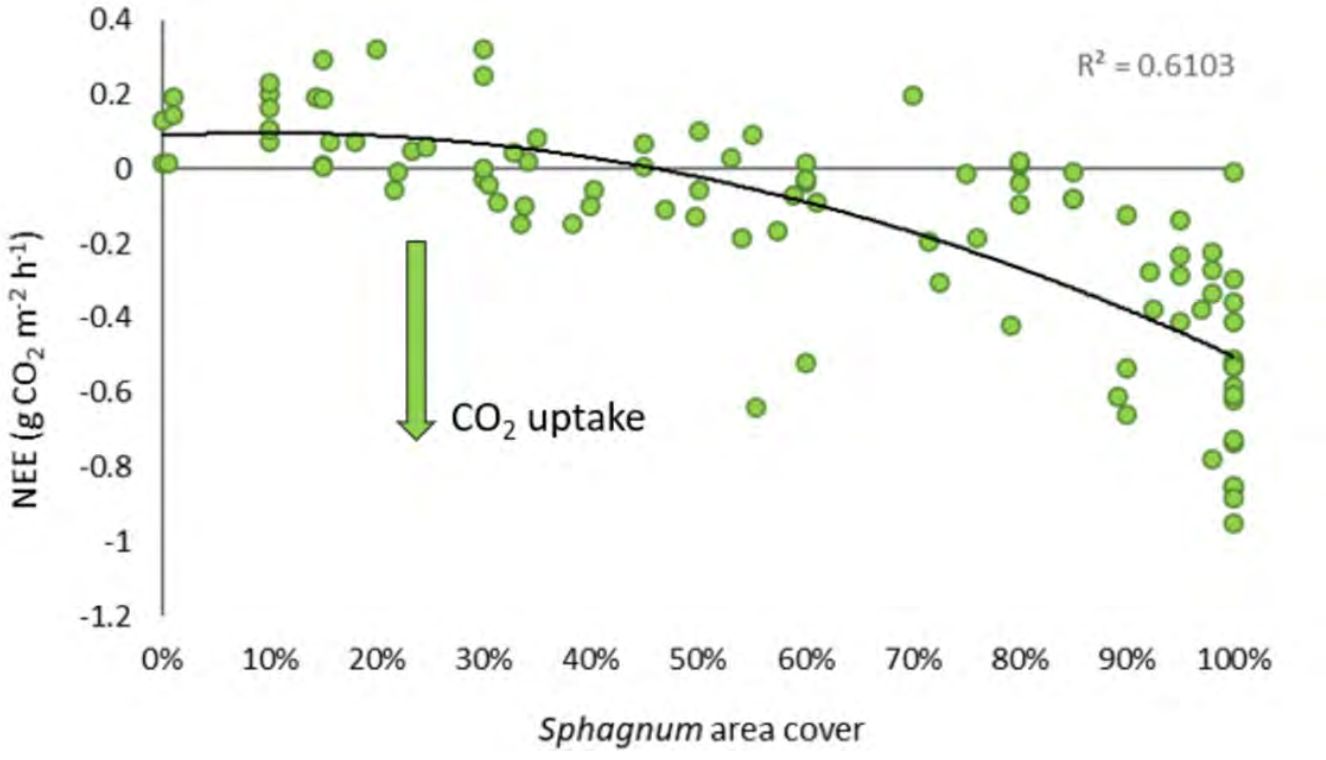

Figure 2: Relationship between net carbon uptake (NEE) measurements from a cutover peatland and the percentage cover of pure Sphagnum observed over a period of establishment (Data derived from Keightley, 2021).

Companion planting trials for the Care-Peat project in which *Sphagnum spp*. and *Eriophorum spp*. were introduced on a bare peat site produced sequestration levels of 33.25 tonnes of carbon dioxide equivalent per hectare per year during the period of maturation (Keightley, 2022). Revegetating with any native moorland species has the capacity to produce high levels of sequestration, however the presence of Sphagnum enables fixing this carbon permanently by peat formation.

There is initial evidence from Little Woolden Moss that surface water retention by established Sphagnum artificially raises and maintains a high table water, thus preventing drying and associated carbon emissions, indicating that restored and intact peatlands are also further resistant to variability in hydrological conditions in the short-term. This also potentially translates to higher resilience in the case of variable hydrological conditions associated with future climate projections. As well as providing the means for avoidance of emissions, Sphagnum is also peat-forming which provides permanence to the associated carbon capture.

Historically, a significant portions of peat soils were drained for agricultural production. In many cases the restoration of these areas to functioning peatland systems is not economically viable. However, planting of Sphagnum on agricultural soils through practices such as carbon farming and paludiculture provides the means for profitable emissions avoidance and potential for net sequestration of atmospheric carbon. This is evidenced by the pioneering work carried out at the Interreg Winmarleigh Carbon Farm, where in the first year of establishment the emissions at the site were reduced by 21 tonnes of carbon dioxide equivalent per hectare per year when compared to adjacent grazed pasture. The site is projected to become a carbon sink once sufficient Sphagnum cover is achieved (Johnson, 2022).

There are also numerous additional benefits of re-establishing native peatland vegetation which are not achievable through methods of hydrological restoration alone. Native moorland plant species, including Sphagnum compose the basis of these crucial habitats which are selectively occupied seasonally by a number of important and protected bird and insect species, therefore efforts to re-establish vegetation have a direct influence on biodiversity at restoration sites (Osborne et al., 2021). Healthy Sphagnum-dominated peatlands also provide a number of valuable ecosystem services such as increased resistance to catchment flooding and wildfires, and water purification due to the high-water retention capacity of Sphagnum species.

Much of the existing evidence of carbon sequestration associated with Sphagnum is theoretical, which restricts the ability to directly quantify the benefits of restoring peatland vegetation. It is likely that the current estimates of emissions reductions/sequestration utilised by certification schemes such as the UK Peatland Code and European GEST System are highly conservative, as quantification of carbon benefits can only be based on substantial evidence. Though revegetation is greatly encouraged within the best practice guidelines, under the current method of assigning a condition category to a peatland project, carbon credits allocated to projects which perform both rewetting and revegetation can be the same as those which only rewet. Therefore, in many cases this does not provide any financial incentive for revegetation of damaged peatlands as no additional funding can be obtained.

Going forward, it is imperative that we strive to produce robust evidence of the sequestration potential of Sphagnum in order to assign adequate value to this fundamental component of the peatland restoration process. If you are working in this field, we encourage you to reach out. We are open to collaboration and able to produce materials for trials if required.

Incorporation of sequestration into accreditation schemes would have the potential to increase funding for vital revegetation work which will have extensive and long-lasting effects for mitigating climate change and returning our peatlands to carbon sinks.

References

Bortoluzzi et al. (2006) Carbon balance of a European mountain bog at contrasting stages of regeneration. New Phytologist 172(4): 708-718.

Evans et al. (2019) Implementation of an Emissions Inventory for UK Peatlands, A report to the

Department for Business, Energy & Industrial Strategy 2019.
Evans (2021) Peatland restoration: Economics, financing mechanisms and carbon. IUCN Peatland Programme Conference 2021.
Johnson (2022) Best practices in peatland restoration - A carbon farm in the United Kingdom. Care-Peat Scientific Conference on Peatland Management and Restoration, Galway 2022.
Keightley (2020) Micro-propagated Sphagnum introduction to a degraded lowland bog: photosynthesis, growth and gaseous carbon fluxes. PhD thesis Manchester Metropolitan University.
Keightley (2021) Greenhouse gas benefits of Sphagnum farming using micropropagated material in the UK. Renewable Resources from Wet and Rewetted Peatlands - RRR2021 Conference.
Keightley (2022) *Eriophorum spp*. introduction initiates rapid ground cover and high GHG uptake on bare peat sites. Care-Peat Scientific Conference on Peatland Management and Restoration, Galway 2022.
Kivimäki et al. (2008) Carbon sink function of sedge and Sphagnum patches in a restored cut-away peatland: increased functional diversity leads to higher production. Journal of Applied Ecology 45: 921-929.
Osborne et al. (2021) From bare peat desert to nature reserve within ten years: a review of restoration practice on Little Woolden Moss, Manchester, UK. North West Geography, 21(1).
Worrall et al. (2011) A review of current evidence on carbon fluxes and greenhouse gas emissions from UK peatland. JNCC Report, No. 442.

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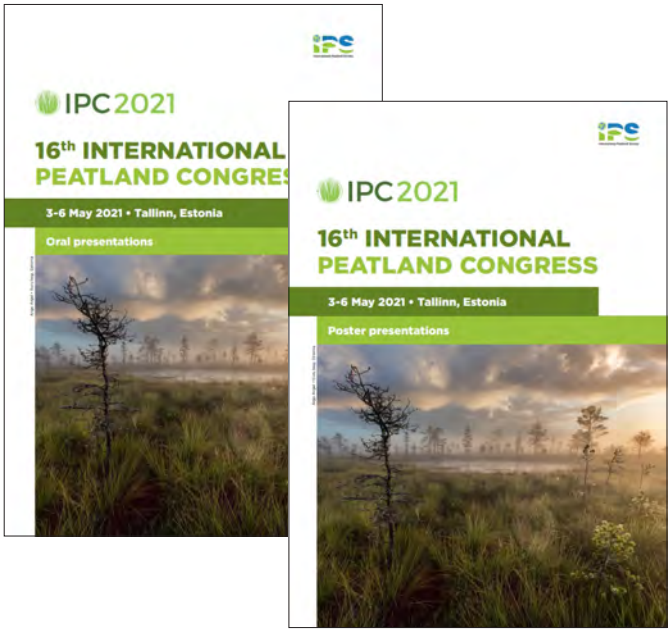

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Exploring the Cuvette Centrale:

How do People, Plants and Birds Function and Interact in the Democratic Republic of Congo's Peatland Forests?

The Congo Basin houses Earth's largest complex of tropical peatlands, covering over 14.6 million hectares (the size of England) and extending across the Democratic Republic of Congo (DRC) and its neighbour, the Republic of Congo. First discovered in 2017 by Greta Dargie, Simon Lewis and others, the Cuvette Centrale peatlands store 30.6 petagrams of carbon, equivalent to three years of anthropogenic emissions (Dargie et al., 2017). Protecting this ecosystem is vital, therefore, in offsetting global carbon emissions and mitigating climate change.

While the ecological and land-use aspects of these peatlands remain understudied, the ecosystem is threatened by plantations, logging concessions and climate change, potentially exerting

Peatlands in the Congo Basin. Photo: Professor Simon Lewis, UCL and University of Leeds

detrimental impacts on their carbon storage potential, biodiversity and local livelihoods (Dargie et al., 2018).

A joint research project by MSc students, Cassie Dummett and Joe Langley (both UCL), and PhD candidate, Joseph Kanyama (University of Kisangani), seeks to explore the social, ecological and botanical aspects of the Cuvette Centrale peatlands. The project is supervised by Professor Simon Lewis and Professor Corneille Ewango. Three research topics of interest will be examined, namely the community use of peatland resources, the composition of plants growing in the peatland and the diversity of bird species found in the peatland forest. Together, this research will contribute to existing knowledge of the social and natural dynamics of the peatland rainforest in the Mbandaka region of the DRC.

Communities living near the peatland forest use it for hunting and collecting forest products (Dargie et al., 2018). The peatland forest provides important sources of food, including fruit and palm wine from *Raphia sese* and edible roots from *Lasimorpha senegalensis*. The leaves of palm species such as *Raphia laurentii* are used for roofing and the forest provides firewood, timber for construction and medicinal plants with antimalarial, antibiotic and antiviral properties (Ewango, 2021). These practises cause minor impact on the forest ecosystem and are understood to be relatively sustainable (Dargie et al., 2018).

A plant species inventory along a 3km sampling transect in the peatland forest will contribute to understandings of peatland vegetation and will enable the quantification of above-ground biomass carbon stored in the forest, and below-ground carbon in the peat. A characterisation of plants growing on the *terra firme* will facilitate a comparison of peatland and non-peatland landscapes.

This research will contribute to existing botanical knowledge of the Cuvette Centrale and will follow the same methodology as the team who originally discovered the peatlands in 2017. They collected data from hundreds of locations and matched the presence of peat with specific vegetation types. They sampled peat every 250 m for 30 km and found peat under waterlogged swamp forest of hardwood trees and palm-dominated swamp forest. Whereas the former is characterised by *Uapaca paludosa*, *Carapa procera* and *Xylopia rubescens*, the latter is generally dominated by a single species of palm, *Raphia laurentii* (Dargie et al., 2017).

This project will also use qualitative research methods to understand whether sustainable resource management practices exist amongst the local community. Participatory methods will be used to develop an understanding of harvesting practices and community agreements permitting and limiting the collection of plants and forest products in the peatland forest.

Customary ownership of forest is based on clans within a community and management decisions are taken by the *ayant-droits*, or right holders, who are descended from the clan's founding ancestor (Rainforest Foundation UK, 2019). Interviews with *ayant-droits*, participant observation of individuals collecting forest produce and community mapping of activities will develop understanding of how trees and plants are harvested and used in a community.

The peatland forest has cultural and spiritual value, as well as economic. Tropical forests are believed to be home to the spirits of the ancestors who ensure its fertility and abundance (Rainforest Foundation UK, 2019; Maclean, 2022). The *ayant-droits* not only manage access to forest resources, but also mediate with the spiritual world.

Fear of retribution by the ancestors for damaging the forest deters destructive behaviour (Rainforest Foundation UK, 2019). Yet, the economic and cultural value of the peatlands is curiously understudied and further research is undoubtedly required (Biddulph et al., 2021). Studies of peatland forests around the world show the importance of understanding the cultural value of forest as a factor in management practices (Schulz et al., 2019, Cole et al., 2021).

A central aim of this project, therefore, is to improve understandings of local resource management and community governance in the peatland forest to ensure that the management of the peatlands simultaneously delivers benefits to the local communities.

Although the composition of bird species in the Democratic Republic of Congo - and, more specifically, the Congo Basin - is well documented, birds in the locality of the Cuvette Centrale are far less understood. This project will inventory bird populations in the peatland forest using avian point counts at dawn and dusk. The counts will be undertaken, if possible, in the hardwood swamp forest, palm-dominated swamp forest and *terra firme* to determine whether specific species favour different peatland habitats. While previous studies have investigated bird populations in other tropical peat swamps, notably in Indonesia (Warren-Thomas et al., 2022), this project would be the first such study of birds in the Cuvette Centrale. 585 species of birds have been recorded in the Equateur province of the DRC (Lepage, 2022), but it is unknown as to how many of these reside in the peatland forest.

While wetlands are considered to be key habitats for birds, wetland-dependent species are in a worrying decline, primarily due to the deterioration of these ecosystems induced by land-use change and other anthropogenic activities (Ramsar, 2018). The fragmentation and degradation of peatlands specifically is considered to exert significant pressures on birds, especially if the deterioration of the ecosystem is accompanied by an increasing abundance of open patches of vegetation (Wijedasa et al., 2020). This is concerning because birds provide a number of important ecosystem services, so their decline would likely lead to the diminution of these services too. Intact peatlands support frugivorous birds, for instance, which are useful seed dispersers (Warren-Thomas et al., 2022) - a key process for tropical forest health and diversity. This study will, therefore, provide insight into the species found in the Cuvette Centrale and also reveal the diversity of birds across three broad habitats.

Our multidisciplinary research will contribute to the CongoPeat network's efforts, bringing initial findings of ecology-land use interactions in peatlands to their broader research programme. A summary of our findings and a blog will be published on CongoPeat.net and a briefing paper in French will set out the implications for policy makers. The University of Kisangani and UCL will supervise this research in coordination with the Ministry of the Environment and Sustainable Development in DRC, PhD candidate, Shona Jenkins, and other relevant stakeholders. Community members, local civil society organisations and forest governance stakeholders will be briefed following the fieldwork in July 2022.

We are grateful to the Royal Geographical Society and the Jeremy Willson Charitable Trust for their Overseas Fieldwork Grant and we are looking for further sponsorship to make our project viable. You can find out more about our research and support us on our crowdfunding page: https://experiment.com/drcpeatlands.

Feel free to follow progress on Twitter (@joe_langley9 and @CassieDummett) and reach out with any questions.

References

Biddulph, G.E., Bocko, Y.E., Bola, P., Crezee, B., Dargie, G.C., Emba, O., Georgiou, S., Girkin, N., Hawthorne, D., Jovani-Sancho, A.J., Kanyama, T.J., Mampouya, W. E., Mbemba, M., Sciumbata, M. & Tyrrell, G. (2021). Current knowledge on the Cuvette Centrale peatland complex and future research directions. Bois et Forêts des Tropiques, 350, 3-14.

Cole L. E. S., Willis K. J. & Bhagwat S. A. (2021). The future of Southeast Asia's tropical peatlands: Local and global perspectives. Anthropocene, 34, 100292.

Dargie, G.C., Lawson, I.T., Rayden, T.J., Miles, L., Mitchard, E.T.A., Page, S.E., Bocko, Y.E., Ifo, S.A. & Lewis, S.L. (2018). Congo Basin peatlands: threats and conservation priorities. Mitigation and Adaptation Strategies for Global Change, 24(4), 669-686.

Dargie, G.C., Lewis, S.L., Lawson, I.T., Mitchard, E.T.A., Bocko, Y.E. & Ifo, S.A. (2017). Age, extent and carbon storage of the central Congo Basin peatland complex. Nature, 542(7639), 86-90.

Ewango, C. (2021, December 17). Cop 26 | Protecting the Congo peatlands for climate mitigation & adaptation [Video]. YouTube. https://www.youtube.com/watch?v=xWM37eVjKMM.

Lepage, D. (2022). Checklist of the birds of Équateur. Avibase, the world bird database. https://avibase.bsc-eoc.org/checklist.jsp?lang=EN&region=cdeq&list=clements&ref=l_afr_zr.

Maclean, R. (2022, February 2021). What Do the

Protectors of Congo's Forests Get in Return? The New York Times. https://www.nytimes.com/interactive/2022/02/21/headway/peatlands-congo-climate-change.html.
Moïse, R.E. (2019). Making Community Forestry Successful in DRC. Rainforest Foundation UK. https://www.fr.rainforestfoundationuk.org/media.ashx/drc-moise-study-english.pdf#:~:text=In%20order%20to%20overcome%20this,CFCL%20management%20and%20decision%20making.
Ramsar Convention (2018) Convention on Wetlands - Global Wetland Outlook: State of the World's Wetlands and their Services to People, Gland, Switzerland: Ramsar Convention Secretariat.
Schulz, C., Martín Brañas, M., Nuñez Pérez, C., Del Aguila Villacorta, M., Laurie, N., Lawson, I.T. et al. (2019). Uses, cultural significance, and management of peatlands in the Peruvian Amazon: Implications for conservation. Biological Conservation, 235: 189-198.
Warren-Thomas, E., Agus, F., Akbar, P.G., Crowson, M., Hamer, K., Hariyadi, B., Hodgson, J.A., Kartika, W.D., Lopes, M., Lucey, J.M., Mustaqim, D., Pettorelli, N., Saad, A., Sari, W., Sukma, G., Stringer, L.C., Ward, C. and Hill, J.K. (2022) No evidence for trade-offs between bird diversity, yield and water table depth on oil palm smallholdings: Implications for tropical peatland landscape restoration, Journal of Applied Ecology, 59, 1231-1247.
Wijedasa, L.S., Vernimmen, R., Page, S.E., Mulyadi, D., Bahri, S., Randi, A., Evans, T.A., Lasmito, Priatna, D., Jensen, R.M. and Hooijer, A. (2020) Distance to forest, mammal and bird dispersal drive natural regeneration on degraded tropical peatland, Forest Ecology and Management, 461, 117868.

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New Articles in Mires and Peat

Volume 28 (2022)

- Is the residual ash method applicable to tropical peatlands? A case study from Brunei Darussalam. by A.A.M. Addly, A.R. Cobb, R.S. Sukri, S.M. Jaafar, S. Isnin, S.K. Thamilselvam, S.H. Gödeke
- Scots pine bog woodlands in the Eastern Carpathians versus their northern, lowland counterparts: floristic dissimilarities and underlying ecological gradients. by A.I. Stoica, D. Gafta, G. Coldea
- Contrasting patterns of woody seedlings diversity, abundance and community composition in Bornean heath and peat swamp forests. by N.S. Nafiah, R.S. Sukri, M.Y.S.M. Ya'akub, S.M. Jaafar, F. Metali
- Effects of lime and fertiliser applications on the physical properties of tropical peat soils in Peninsular Malaysia. by A.A. Reeza, A. Hussin
- Water retention and pore size distribution in organic soils from tropical mountain peatlands under forest and grassland. by D. Tassinari, P.G.S. Soares, C.R. Costa, U.M. Barral, I. Horák-Terra, A.C. Silva, W.J. Carmo
- Mapping peat soil moisture under oil palm plantation and tropical forest in Sarawak. by L.D. Ngau, S.S. Fong, K.L. Khoon, E. Rumpang, H. Vasander, J. Jauhiainen, K. Yrjälä, H. Silvennoinen
- Stabilisation of peat with colloidal nano and micro silica. by S. Ghadr, A. Assadi-Langroudi
- Leaf litter production and soil carbon storage in forested freshwater wetlands and mangrove swamps in Veracruz, Gulf of Mexico. by E. Cejudo, M.E. Hernández, A. Campos, D. Infante-Mata, P. Moreno-Casasola
- An insect derived peat? The curious case of sediments at Bogong moth aestivation sites. by B. Keaney, A. Wade
- Does the restoration of shallow marginal peatlands alter the distribution or abundance of bog asphodel (Narthecium ossifragum)? by A.M.S. Hand, J.E. Cresswell, M. Angus, R.E. Brazier

www.mires-and-peat.net

Mapping and managing tropical peatlands in lowland Peruvian Amazonia

Understanding the spatial extent and thickness of tropical peatlands and identifying strategies to increase the value of these ecosystems to local communities, are crucial steps towards preventing degradation and deforestation of these ecosystems.

Two new publications (Hastie et al., 2022; Hidalgo Pizango et al., 2022), focusing on the peatlands of lowland Peruvian Amazonia, address these issues by mapping peat thickness and area, estimating emissions from land-use change, and quantifying the potential economic value of sustainable palm fruit harvesting in this region.

Mapping the extent of tropical peatlands based on remote sensing products requires an extensive set of ground reference points, requiring fieldwork in locations that are often difficult to access. A key advance of Hastie et al. was to collect 445 new data points on the presence and thickness of peat across lowland Peruvian Amazonia, including from previously unsampled peatlands in the Napo, Tigre and Putumayo river basins.

Combined with existing field measurements they established a database of >1,000 ground reference points. Hastie et al. used these data to estimate that there are >62,000 km^2 of peatlands in Amazonian Peru.

Fig. 1: The fan-shaped leaves of *Mauritia flexuosa* palms form an almost continuous canopy in the palm swamps of Peruvian Amazonia. Photo: Ximena Tagle

Peat thickness is crucial for determining current carbon stocks in addition to peatland area, but it is difficult to map, not only because is it underground but also because peat thickness depends on the length of time that a certain location has experienced the environmental conditions that favour the accumulation of peat. Remote sensing products can only measure the legacy of such historical processes indirectly. However, Hastie et al. were able to explain the

majority of variation in peat thickness in Peruvian Amazonia by using a variety of optical and radar imagery, combined with derived indices and metrics including normalized difference water index (NDWI) and distance to peatland edge. Using the resulting maps of peatland area and peat depth, Hastie et al. calculated a total peat stock of 5.4 (2.6-10.6) PgC - almost as much as the entire above-ground carbon stock of Peru but contained within just 5% of the land area.


Fig 2. The aguaje fruit is key to increasing the value of intact palm swamps in the Peruvian Amazon. Photo: Dael Sassoon

Scientific findings such as these will only support conservation action if they are articulated in a way that meets the needs of policymakers. Of particular relevance for tropical peatlands is the need for governments to have national-level information on carbon emissions to design and implement Nationally Determined Contributions to the Paris Agreement to reduce the rate of climate change. To respond to this need, Hastie et al. combined their peatland map with national land-cover change data and IPCC tier-1 emission factors of peat decomposition to reveal small but growing areas of deforestation and associated CO_2 emissions from peat decomposition between 2000 and 2016.

Successful conservation, however, requires us to identify and implement strategies that increase the value of these ecosystems. These strategies need to be appropriate to each location. For peatlands, this means that we should not uncritically transfer techniques from the temperate zone to the tropics, or promote development pathways used in one region of the tropics to another.

For example, western Amazonian peatlands have an important and unique feature: the most common species, *Mauritia flexuosa*, locally known as 'aguaje', bears edible, nutritious and tasty fruits that are an economically important food source in the region. This species is not found in tropical peatlands of the Congo basin or Southeast Asia, nor does it grow on any temperate peat bog.

Careful exploitation of wild aguaje fruit could become an important pathway for conserving peatland ecosystems in Amazonia - and boost local incomes at the same time - but requires research to understand the potential value of the resource and how populations of this species are affected by harvesting.

Addressing this challenge, Hidalgo et al. show that *M. flexuosa* forests that appear superficially to be undisturbed have often in fact been severely affected by selective felling of the adult female, fruit-bearing palms for fruit harvesting. By using the proportion of female trees in a stand as an indicator of the cumulative impact of felling trees to harvest fruits, Hidalgo et al show that potential fruit productivity has been halved across the region, with the greatest impacts in stands closest to the city of Iquitos.

However, the study also had good news. In some communities, there has been a shift towards harvesting aguaje fruits sustainably by climbing, rather than felling the female palms, supported by government institutions or NGOs, and in some cases, initiated by community members themselves. Hidalgo et al. found that more female palm trees are found in these sites. They estimate that, if climbing was used across the region, the potential income from aguaje fruit could increase by 50% from US$41 to 62 million per year. Moreover, Hidalgo et al demonstrate that this economic potential rivals the value of logging in this region and the income to the regional government from oil extraction.

Together, we hope these findings provide a strong basis for justifying investment in sustainable

management of the peatlands of the Peruvian Amazon in coming decades.

The Tropical Wetlands Consortium

Find out more about our work at https://tropicalwetlands.wp.st-andrews.ac.uk/en/about or watch our short videos that introduce the peatlands of lowland Peruvian Amazonia and present our work estimating the potential value of sustainable palm fruit harvesting in this region.

References

Hastie, A., Honorio Coronado, E.N., Reyna, J., Mitchard, E.T., Åkesson, C.M., Baker, T.R., Cole, L.E., Oroche, C., Córdova, J., Dargie, G., Dávila, N., De Grandi, E.C., Del Águila, J., Del Castillo Torres, D., De La Cruz Paiva, R., Draper, F.C., Flores, G., Grández, J., Hergoual'ch, K., Householder, J.E., Janovec, J.P., Lähteenoja, O., Reyna, D., Rodríguez-Veiga, P., Roucoux, K.H., Tobler, M., Wheeler, C.E., Williams, M. & Lawson, I.T. (2022) Risks to carbon storage from land-use change revealed by peat thickness maps of Peru. Nature Geoscience, 15, 369-374. doi.org/10.1038/s41561-022-00923-4

Hidalgo Pizango, C.G., Honorio Coronado, E.N., del Águila-Pasquel, J., Flores Llampazo, G., de Jong, J., Córdova Oroche, C.J., Reyna Huaymacari, J.M., Carver, S.J., del Castillo Torres, D., Draper, F.C., Phillips, O.L., Roucoux, K.H., de Bruin, S., Peña-Claros, M., van der Zon, M., Mitchell, G., Lovett, J., García Mendoza, G., Gatica Saboya, L., Irarica Pacaya, J., Martín Brañas, M., Ramírez Paredes, E. & Baker, T.R. (2022) Sustainable palm fruit harvesting as a pathway to conserve Amazon peatland forests. Nature Sustainability, doi.org/10.1038/s41893-022-00858-z

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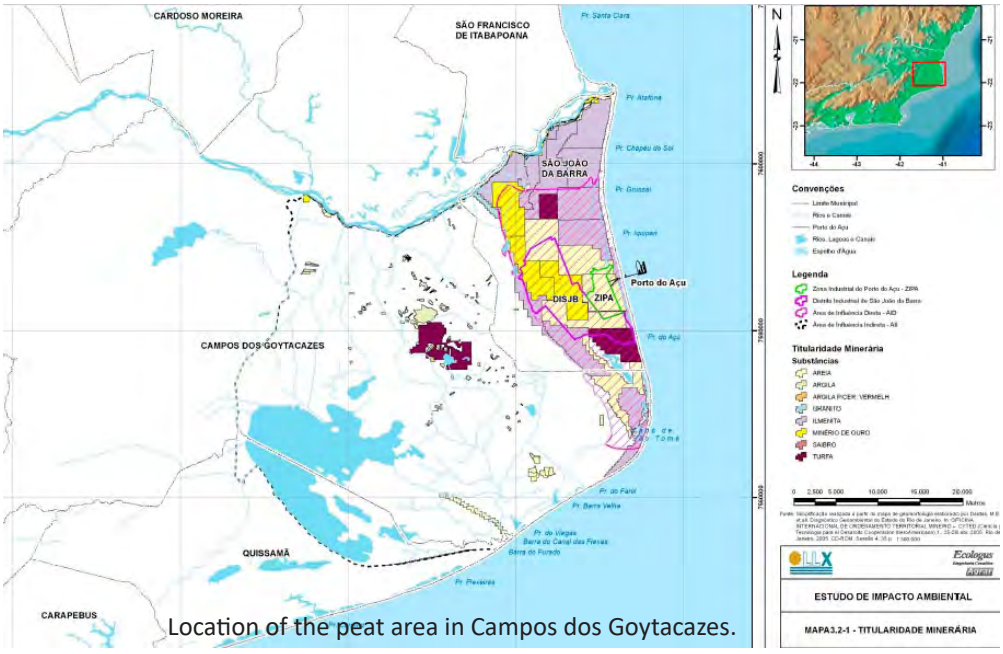
Why small environmental recovery and peat preservation projects are so important to the ecosystem

In Brazil, heavy rains caused the death of hundreds of people last summer. We know that climate change has a direct impact on this phenomenon, so what can we do to combat these changes? What are developed countries doing so that countries like mine can fight these changes?

This is not a problem directed at the ESG department of large companies (environmental, social, and corporate governance), this is a problem that affects John, Maria and Raymundo, the people who lost practically everything in the last flood; they are the biggest losers in this game. While influential people are not concerned about their population, people like us suffer, therefore, the concern needs to be global and not selective.

We need to respect and better understand how each community can help, how each citizen can do their part to protect “Nossa Casa”. All projects matter, the small sustainable project and the Amazon Forest, Pelag all carry the same weight and the same relevance! The preservation of our species needs to be a subject debated in all places, in all classes, with both current and future generations, as our planet depends on them.



Location of the peat area in Campos dos Goytacazes.

Our project is located in south-eastern Brazil in a city called Campos dos Goytacazes, formed by an extensive Quaternary fluvial-marine plain, located on the right bank of the lower Paraíba do Sul River (North Fluminense Region).

It originated from a vast surface of swamps and lakes that underwent a progressive process of drainage from the start of Portuguese colonization.

This process intensified at the turn of the 19th to the 20th century, when there was the conversion of sugar cane mills into alcohol plants and, consequently, the demand for arable land increased. Thus, large-scale drainage became a state policy, aimed at creating conditions conducive to the broad development of sugarcane monoculture, as it met the needs of the sugar and alcohol agroindustry.

In our Biome you will find birds like: Carcará (*Caracara Plancus*), Jaçanã (*Jacana Jacana*) Quero-Quero (*Vanellus chilensis*), Banhado Saracura (*Pardirallus sanguinolentus*) and the Dirty Buraqueira Owl (*Athene cunicularia*) In summer, when the rainy season begins, we can see the harmonious coexistence of these birds.

In the northern region of Rio de Janeiro, the extractive industry has great expression, currently being responsible for 84% of the national oil production. In 2008 around 120 million pieces of ceramic per month were produced, making this region the largest brick producing area in the country. The ceramic industry, despite having great importance for the region, is one of the industries that most negatively impacts the environment.

Currently, around 7,000 m^3 of clay is extracted daily (Ramos 2000) and it is estimated that in the north of Rio de Janeiro, there is a total deposit of 1,591,460,000 m^3 of clay, with a total exploitable area of 620 km^2, which is, therefore, the area to be to be directly impacted by this activity. Taking into account the clearings, open fields, borders and firebreaks, this is a very expressive degraded area.


Quero Quero. Photo by Kalki Pinheiro


Carcara. Photo by Kalki Pinheiro


Mineiros - peatlands. Photo: Reynaldo M Rosa Neto

The lack of supervision and scarce "prad" recovery processes facilitate illegal extraction, making it difficult to revitalize and recover these sites. As a result of their location in lowland areas, most of these clearings are covered

Tia Telinda. Photo: Reynaldo M Rosa Neto

by water, due to their proximity to the surface or free water table, and most of them cannot benefit from a total recharge, which leads to acidification and increases the leaching of water-heavy metals. To solve this problem, the drainage channels need to be de-sanded so that the water can complete its natural cycle.

The Tia Telinda Environment Preservation Centre is an environmental project that seeks to rehabilitate areas degraded by clay extraction through fish farming, contributing to the growth and local socioeconomic development of families in the North Fluminense region.

The concept could have financial benefits and positive impacts when implemented, generating new forms of income and employment, stimulating local commerce and developing the circular economy. Fish farming can be used as an alternative for the reuse of excavated ponds, as it is an important method of producing food that is extremely rich in protein at a low production cost, being an efficient instrument of environmental recovery with a rapid response from the ecosystem.

Through pisciculture, we were also able to protect our area's peat bogs. Totalling an area of approximately 1 km² in the municipality of Campos dos Goytacazes and 20 thousand m² in our centre, we can say that an important part of our project is the preservation of this much explored and poorly preserved ecosystem; the peatlands store and sequester more carbon than any other type of terrestrial ecosystem, surpassing even the global aboveground carbon stock of forest ecosystems.

It is still possible to recover, preserve and conserve degraded areas, create employment and income in an unproductive area, generating financial returns for the community, bringing more security to the region and, together with other activities, reducing the environmental impacts caused by degradation resulting from this type of mining activity.

The area will also be used for educational projects, meetings, workshops, virtual or physical school tours and will be open to the community, in addition to a 24-hour monitored recovery of biodiversity. Get to know a little more about our project on our Instagram page: @pisciculturatiatelinda

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TISOLS

Tenth International Symposium on Land Subsidence

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Hydrological Programme

ANNOUNCEMENT

TISOLS 2023

AND CALL FOR ABSTRACTS

We have a new date for TISOLS:
17 – 21 April 2023
in the Netherlands!

The Tenth International Symposium on Land Subsidence (TISOLS) was planned for April 2020. As a result of the COVID-19 pandemic, we were unfortunately forced to postpone the symposium.

We are planning for an on-site symposium, with options for online participations. The symposium is organised under the auspices of the Unesco IHP Land Subsidence International Initiative. This group has endeavored to improve and disseminate knowledge on Land Subsidence since the 1970s, through International Symposia on Land Subsidence, collaborative projects and publications.

The symposium will include three scientific days, one day with excursions, and one day focused on science-policy interaction.

We are now inviting submissions on the conference topics outlined and other topics which fall within the general objectives of the symposium. There are three options:

1. present your work as published in the TISOLS2020 proceedings
2. submit and present a maximum 2-page paper update on your publication in the TISOLS2020 proceedings
3. submit a new, 4-page extended abstract

Papers published in the TISOLS2020 proceedings for which the authors do not react will of course remain accessible. They will, however, not be part of the TISOLS2023 programme.

We have formulated the following five themes in the context of Land Subsidence:

- Measuring and Monitoring
- Mechanisms and Understanding
- Modelling and Matching
- Impacts and Hazards
- Measures and Coping Strategies

We are hoping to host many participants in the Netherlands in 2023 and we look forward to real-life fruitful scientific discussions!

On behalf of the scientific and organizing committee of TISOLS 2023

Peter Fokker
Chairman of the
Scientific Committee

Gilles Erkens
Chairman of the
Organising Committee

Call for abstracts

Authors are invited to indicate their interest in presenting their previous paper (option 1) or submit either an update or a new extended abstract (options 2 and 3) by **1 September 2022**

Letters of acceptance will be sent before 1 December 2022

For further guidelines, please visit
www.tisols.org

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Conserving tropical peatland through water management for carbon-neutral agriculture

Marrying a business (such as agriculture) and relatively finite resources (like peat) to meet global demand is extremely difficult. Is it even possible?

We trace back to the early 1900s, to the east coast of Sumatra Island in Indonesia, where there is a region called Indragiri Hilir that utilised peatland for coconut agriculture. This region lies on Sungai Kampar - Sungai Gaung Peatland Hydrological Unit, a 711,000-ha peatland ecosystem. For decades, people have been aware of the importance of water management on peatland to ensure its agricultural longevity. Following the global demand for coconut products, the area began to transform into a large-scale coconut agroindustry in 1986, complemented by the extensive plantation under the Nucleus estate and smallholder (NES) and its processing plants. Indragiri Hilir has thrived until now as one of the largest coconut producers in Indonesia.

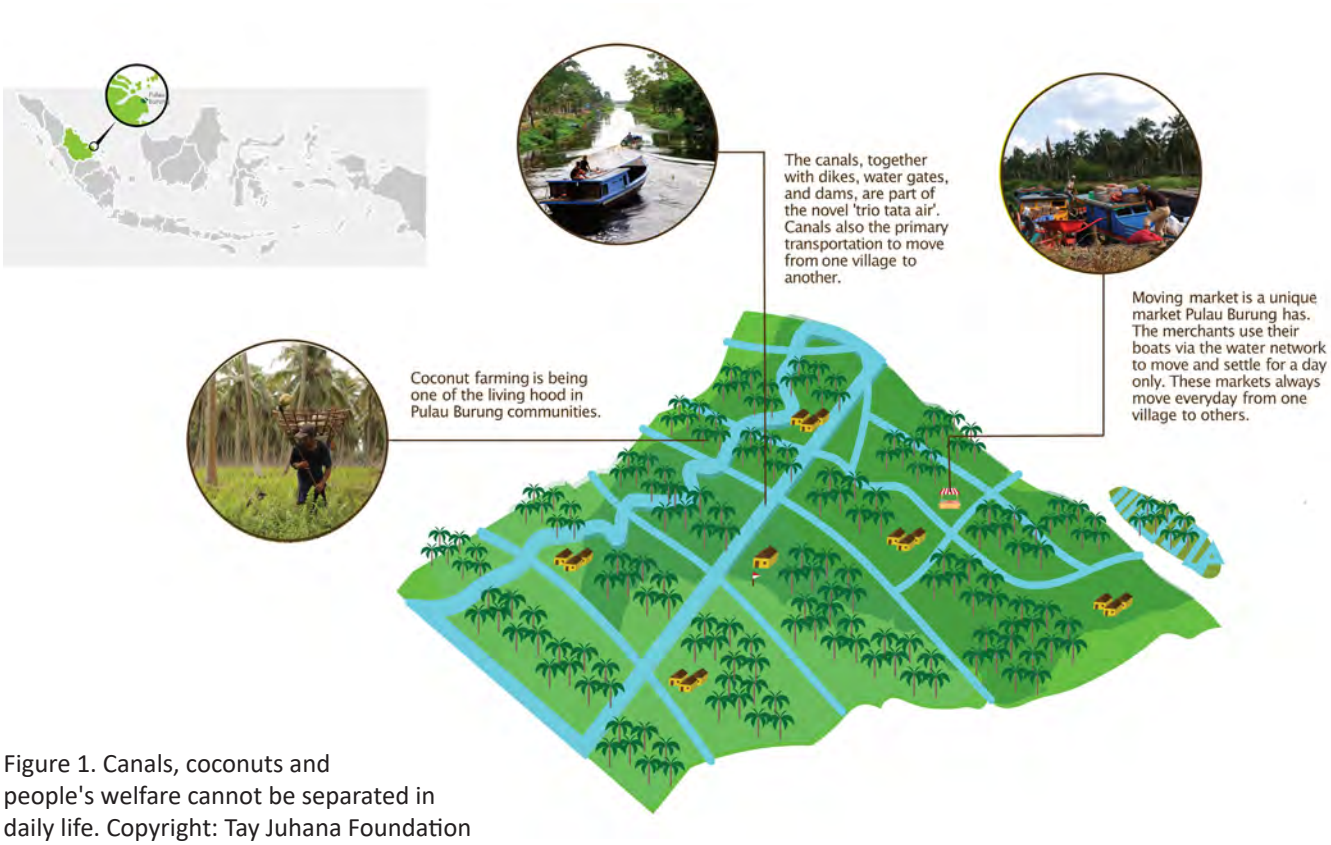


Figure 1. Canals, coconuts and people's welfare cannot be separated in daily life. Copyright: Tay Juhana Foundation

In early 2020, before the COVID-19 lockdown, I arrived at one of the coconut plantations in Pulau Burung, a district under Indragiri Hilir. I observed and noted, “How nice! This might be the closest we can get to the sustainable use of peatland agriculture”. I saw water everywhere, people on boats transporting coconuts and other goods, no tilted trees, no subsidence, no fire, no flood and most importantly I saw the smile on local people’s faces. This situation contradicts articles in the news, as well as scientific articles that show the devastating condition of tropical peatland agriculture.

Why water management becomes vital

I work as a researcher at Tay Juhana Foundation, a research-based organisation that initiates sustainable agriculture on suboptimal land (peatland included) to maintain food security. In Pulau Burung, I conducted data collection and analysis, an ideal practice, implemented using Water Management Trinity (WMT). WMT is a closed system of integrated water management to maintain a desirable water table depth for agronomic purposes. WMT also regulates the water to prevent floods and preserve water during dry periods. The word “trinity” refers to the system that is formed from canals, dikes and dams with water gates.

On paper, we believe that water management is crucial for peatland agriculture, but has it been practised in reality? Undeniably, tropical peatland faces the disadvantage of industrial development that can harm humans, due to carbon loss and smoke from fires. Water management is a common agricultural practice for peatland use by drainage, which removes excess water as crops cannot grow in wet and inundated peat. This practice led to over-drainage and made the peat vulnerable to fire, especially during the dry season. The drainage process combined with the practice of burning exacerbates the loss of carbon to the atmosphere.

The WMT has successfully maintained the water table depth between 25-71 cm, without draining the peat since 1986[1]. The rule “keep peatland wet” is maintained all year long in this plantation. Besides WMT's core function to regulate the water resource, its canals also serve as waterways transportation for the local community. While the aforementioned knowledge is derived from years of observation, we still have no idea how to prove WMT's role in minimising carbon emissions. As a result, I began my research into this issue.

How does water management affect peatland emissions?

In nature, soil does respire and produce carbon dioxide (CO_2), this includes the peat soil. The CO_2 flux from peat soil comes from the biological activity of soil organisms and root respiration from plants. Anthropogenic activities accelerate peatland loss and produce emissions, especially from unsustainable practices (i.e., burning, overdraining). Fire in Indonesia, especially on peatland, produces a large amount of smoke that contributes to climate change.

My preliminary study reveals the existence of the WMT successfully prevents fire occurrence since it maintains high soil moisture[2]. The low fire risk supports people's awareness regarding the negative impact of burning practices on peatland, which has become the main strength in alleviating fire risk in the region.

To answer the main question, we need to ‘quantify’ the success of WMT. Hence, as proposed to IPS, I measured CO_2 flux from the peat soil using a closed chamber method on this coconut plantation for a period of six months. The research was designed to differentiate CO_2 flux from peat soil and from the biological activities (root respiration) from coconut trees. Two-chamber bases were put beside coconut trees and in between two coconut trees (the plantation has 8-9 metres of space for planting). In total, we replicated it in 10 locations with different peat depth and coconut cover (i.e., age, productivity).

The grant from IPS covered the cost of making the chambers from iron alloy and maintaining them in the field. For 10 locations, 20 pieces of chamber bases were needed. We collaborated with Bogor Agricultural University to provide the

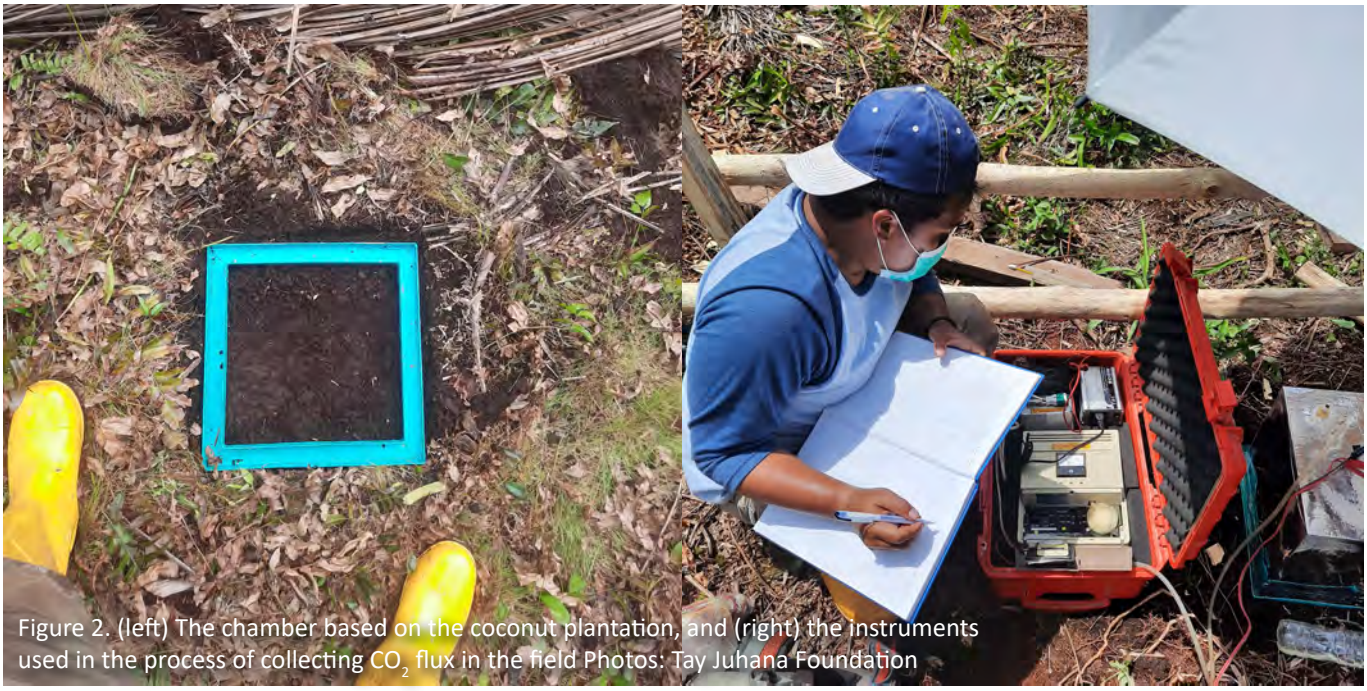


Figure 2. (left) The chamber based on the coconut plantation, and (right) the instruments used in the process of collecting CO_2 flux in the field Photos: Tay Juhana Foundation

main instrument, an Infrared Gas Analyser, and to collaborate with technical experts for cross analysis.

Apparently, the result shows no relationship between water table depth and CO_2 flux. The explanation is that the controlled water table maintains peat soil moisture from the creation of the coconut plantation in 1986. The average CO_2 flux measured near the coconut tree and in between coconut trees was 21.2 t C-CO_2/year/ha and 8.7 t C-CO_2/year/ha, respectively. These numbers show that the emission factor in peatland agriculture is the crop itself (root respiration), which produces double CO_2 flux when it has higher productivity (biomass).

Nutrient cycle system for carbon neutral practice

From an agricultural perspective, crops need nutrients for optimal growth. Peat soil is suboptimal land due to its poor nutrients, even the soil itself is formed from the decomposition of organic materials. Applying fertiliser is not optimal because peat soil chelates Cu, Zn, Fe and Mn elements, so they are unavailable for crops.

To cope with this problem, along with the WMT, the coconut plantation is managed using the nutrient cycle method. Currently, the plantation's management only uses a minimum amount of pesticide/herbicide to kill unwanted pests/diseases and to avoid burning methods to remove agronomic weeds or obtain ameliorant. People are aware that while the practice of burning is a cheaper method of providing crops with nutrients, it could also degrade the peat soil. As a solution, the nutrient cycle was employed with manual weeding of the understory plant, leaving it to decompose. The decomposed material provides essential nutrients to coconut plants ensuring their optimal growth and productivity.

The benefit shows that the plantations with a nutrient cycle under the water management coverage are more productive (1.3 t/ha) compared to the traditional practice outside the area (coconut productivity in Indonesia is 0.84 t/ha)[1]. The decomposed material has also formed an additional organic layer above the matured peat soil (Figure 3).

As I previously conducted a study on carbon balance calculation in this coconut plantation, including above and below ground biomass measurement, this nutrient cycle practice results in 'carbon positive' status. It further supports the fact that proper management and good control of water levels are key to productive peatland agriculture without carbon emissions.

I thank the IPS for the grant. It means a lot to my team and I, as it can accommodate our wider

Figure 3. (left) Manual weeding to remove unwanted plants under coconut trees, and (right) organic layer formed above the peat soil, due to the nutrient cycle method. Photos: Tay Juhana Foundation

research on developing sustainable management on peatland. Moreover, I hope this research will provide a new pathway for reducing carbon emissions from peatland agriculture.

References

[1] N I Fawzi et al 2021 Mires and Peat 27(30) doi: 10.19189/MaP.2021.OMB.StA.2204

[2] N I Fawzi et al 2021 IOP Conf. Ser.: Earth Environ. Sci. 914(012037) doi: 10.1088/1755-1315/914/1/012037

Nurul Ihsan Fawzi

Tay Juhana Foundation, Indonesia
ihsan@tayjuhanafoundation.org

Irish Peatland Society
Meetings and excursion
Tulach Mhór, Co Offaly
11 - 13 October 2022
More info coming soon.

Join the IPS Expert Groups!

IPS's work is mainly carried out via Commissions and Expert Groups, and National Committees. They organise symposia, workshops, webinars and excursions in their region and area of expertise. Active people are always an asset and very welcome. Do not hesitate to contact the coordinators and join them!

- Peatlands for Agriculture: josschouwenaars@kpnmail.nl
- Peatlands for Forestry: sakari.sarkkola@luke.fi
- Peat for Growing Media: *vacant*
- Peatlands and Climate Change: gerald.jurasinski@uni-rostock.de
- Peatlands and Biodiversity: lydcole@googlemail.com
- Peatland Restoration: whittingtonp@brandonu.ca
- Tropical Peatland Round Table: jack.rieley@btinternet.com
- Peatlands and Culture, Education, Communication and Publicity: ilze.ozola@epicentrs.lv
- Peatland Conventions and International Affairs: jack.rieley@btinternet.com
- Peatlands and people, health and local livelihoods: *vacant*

Restoring nature through art: The case of the Ondiri swamp in Kenya

Artsy murals is an ongoing project series founded in January 2021 by Eva Ntara, an artsy environmentalist. The aim of the project is to beautify public spaces with inspiring mural art, with the main underlying theme of environmental conservation. On completion of every project, we celebrate by planting trees and/or collecting garbage with the people on site.

The idea came about when Eva was doing her MSc. in Global Change Ecology in Germany, where she learnt about the importance of involving human beings in solving the climate change crisis. In addition, whenever she travelled through Europe, she was particularly fascinated by the mural art scenes of Berlin, Malaga, Paris, Barcelona, Bucharest and Bayreuth. When she came back to her homeland, she decided to merge her passion for environmental sustainability and mural art by launching a project that would cut across both subjects.

Ondiri Swamp Tunnel before the mural was painted. Photo: Eva Ntara

The first project, supported by the Allan Robertson Grant was conducted in February 2021 and named “The Kikuyu Arts Festival”. This event was held at the Ondiri Swamp in Kikuyu, Kenya. The Ondiri Swamp is the largest quacking bog in Kenya and has great potential for climate change mitigation, as the peat itself, which is the layer of vegetation growing on top of it, stores a great deal of carbon. However, when the swamp is drained, the peat decomposes, releasing carbon into the atmosphere.

Throughout the project, Eva wished to convey the message of environmental conservation to the local communities who often visit the swamp. Together with the Friends of Ondiri Wetland Community Based Organization (FOWK) in Kikuyu, Eva successfully pitched the idea of creating a mural in a rather neglected tunnel at the Ondiri swamp. Through the partnership and support of other local partners, such as the Rhodes Tour Company, Barbecue Ventures, friends and family, we were able to:

- Plant 150 indigenous trees around the swamp.
- Scout for five talented local mural artists,

The local artists painted the tunnel with a white undercoat the morning of the event. Left to right: Kevin, Mwas, Aluoch, Stickker, Katruck, Victor and Morris. Photo: Eva Ntara

obtain painting resources and organize the artists to produce the sketches that would be drawn on the Ondiri swamp tunnel.

- Enjoy a nature walk and breathe in the fresh air, as we learnt more about the Ondiri peatland ecosystem.

The event was a great success with approximately 350 people in attendance. Later, following many sensitization campaigns by the FOWK, as well as media coverage, the swamp was selected to be the location for the national celebrations of the Wetlands Day 2022. This work is certainly not over, and demonstrates how the support of such environmental grants, such as the Allan Robertson Grant, can push the agenda of peatland conservation in the country.

"You cannot protect the environment unless you empower people, you inform them and you help them understand that these resources are their own, that they must protect them"- Wangari Maathai.

Further references

Background article:
www.e-mc2.gr/el/news/peats-sake
Article on mural art by independent journalist:
https://bit.ly/3xTJAzp
Event photos:
https://bit.ly/3HuNrHt
Event page:
https://web.facebook.com/artsymurals

Eva Ntara

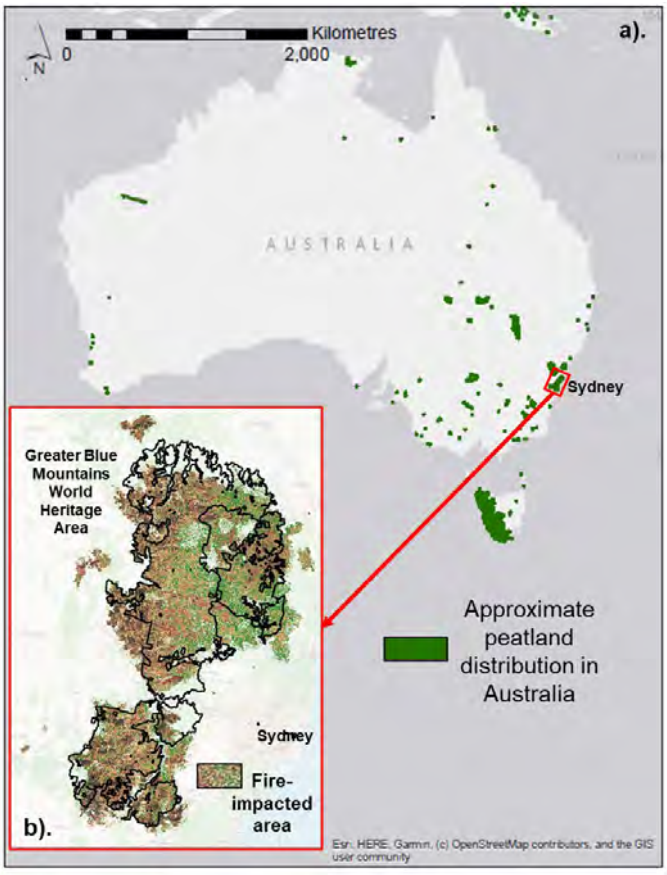
Consultant at FAO
Fire Management & Wetlands
eva.ntara@fao.org

The Ondiri Swamp Mural after the event. Photo: Eva Ntara

Australian Peatlands in a Changing World

Australia is a fire-prone, typically arid landscape; and peatland distribution is restricted due to limited and variable peat forming environmental conditions compared to that of the Northern Hemisphere (Whinam & Hope 2005).

Of the estimated total global peatland area of approximately 4.23 million km^2 (3% of the Earth's land surface), 1.6% of global peatlands are found within the Oceania region (Xu et al. 2018). Within Australia, total peatland area (defined as greater than 30 cm peat with over 30% organic material) was previously estimated at just 1,350 km^2 (Joosten & Clarke 2002). Predominantly found across south-eastern Australia (Figure 1a), these peat-rich environments are recognised to have high conservation significance and are listed in Australia as an 'endangered ecological community' under the Federal Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth).



The Greater Blue Mountains region, located in Australia's most populous state New South Wales is a UNESCO listed World Heritage Area that covers approximately 1.03 million hectares and has high cultural, ecological, biodiversity and economic value. Peatland ecosystems within the National Park boundaries reside predominantly in areas between 500-1000 m in elevation on moderately sloped sandstone (Figure 1b) and are believed to have formed during the early transition to the Holocene with charcoal dating of deeper sediments from approximately 10,000 years ago.

The undulating sandstone landscapes acted to protect depositional basins in the higher Blue Mountains areas. However, recent climatic events have had a significant impact on peatlands in south-eastern Australia. Prolonged drought, with dry conditions particularly from 2017-2019, led to the desiccation of many peatlands. In the summer of 2019/2020, severe bushfires occurred that covered approximately 12.6 million hectares across Australia (Fryirs et al. 2021), predominantly

Figure 1: a). Approximate distribution of peatlands found in Australia (shown in green), with the majority of peatlands located in south-eastern Australia. Peatlands are classified here as being >30 cm in depth or a recognised endangered ecological community with peat-forming potential. Dataset sources: State Government of NSW & DPIE [Dataset] (2018); Xu et al. (2018); Commonwealth of Australia & Macquarie University [Dataset] (2019). b). Fire extent across the Greater Blue Mountains World Heritage Area (boundary of this region indicated in black) from the 2019-2020 bushfires. Data sourced from State Government of NSW & DPIE (2020)

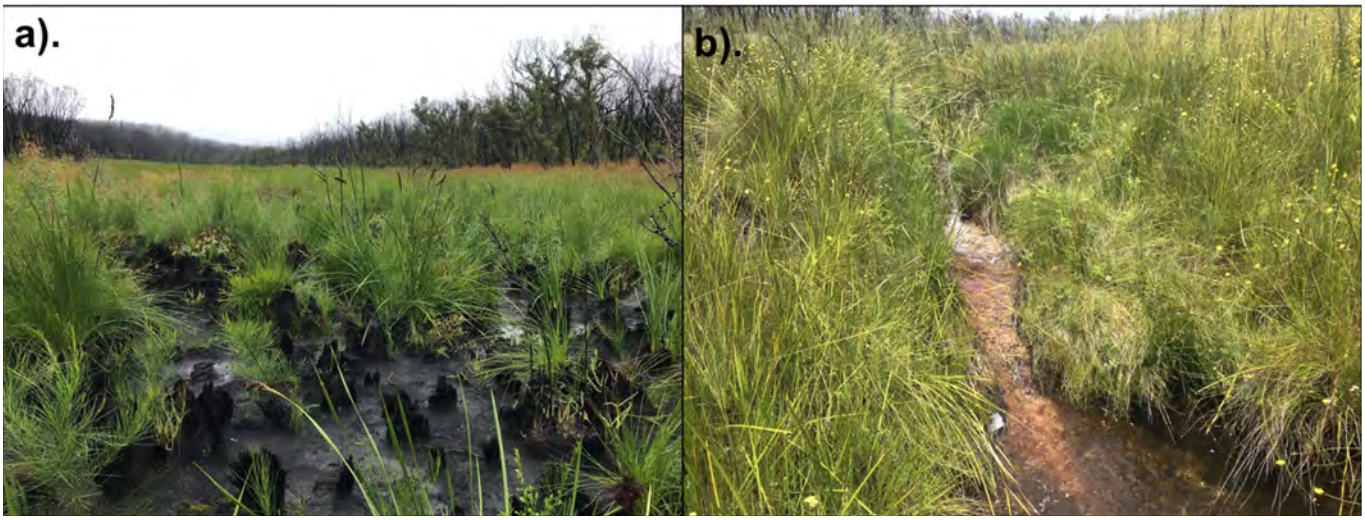


Figure 2: Fire-erosion impacts at Blue Mountains peatlands, New South Wales after a significant bushfire and erosion event in 2020 which resulted in the loss of surface vegetation and organic material. a). Post-fire recovery just over one year after the fire occurred (note: missing peat layer estimated to be 30cm), and b). incision of the main drainage channel to bedrock after above average rainfall occurred post-fire. Photos: Rani Carroll

across south-eastern Australia, which resulted in a significant loss of natural environments, flora, and fauna.

Within the Greater Blue Mountains World Heritage Area in New South Wales, up to 81% of this treasured landscape was impacted by fire over an intense four-month period (October 2019-February 2020) (Figure 1b). During this time, many peat systems experienced a range of impacts from low intensity fires that resulted in a loss of the existing vegetation communities to more severe fires where the desiccated peat layer was burnt (Figure 2). To compound these effects further, immediately following the fires in 2020, an above average rainfall event occurred which resulted in significant erosion of burnt areas.

This contributed to a loss of organic material, nutrients, and carbon from peatland environments (Figure 2).

The focus of this PhD project is to explore the post-fire and erosion impacts on peatlands within a listed World Heritage Area of south-eastern Australia, and it seeks to understand more about the functioning of these vulnerable systems and their recovery after disturbance.

As part of this research, we have been exploring the impacts of drought, fire and erosion events on

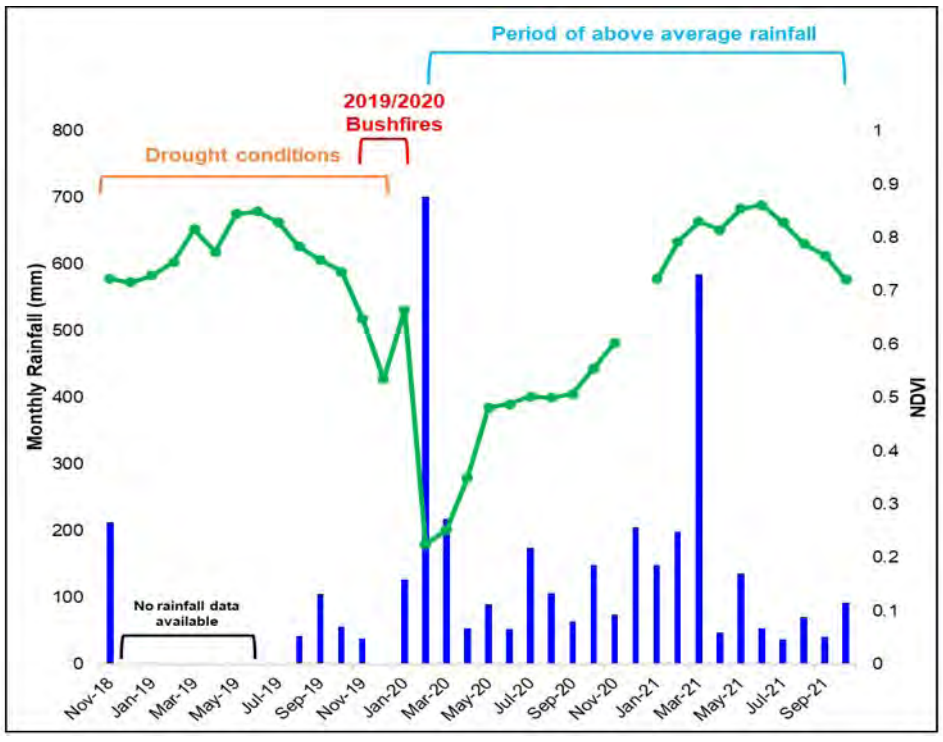


Figure 3: Blue Mountains normalised difference vegetation index shown in green (NDVI Copernicus Sentinel 2) highlighting vegetation survival during declared drought conditions (2018-2019), near complete loss in 2020 and recovery into 2021. Monthly rainfall is shown in blue (from the Australian Government Bureau of Meteorology 2022)

peatlands in the Greater Blue Mountains World Heritage Area. Analysis of satellite imagery over time highlights the loss of surface vegetation (green cover) that has occurred as a result of these events for peatlands in the Blue Mountains.

For example, this is shown in Figure 3 by the drop in the normalised difference vegetation index (NDVI) in January 2020 which corresponds with the fire ignition and a marked drop in green vegetation cover in February 2020 which is in line with the erosion event. Figure 3 provides an example of a peatland in the World Heritage Area where the surface peat layer was lost due to the fire, and large areas of exposed soil remained for an extended time post-fire and erosion event.

Ongoing work is also investigating surface water quality, soil characteristics, and estimates of nutrient exports from a sample of fire and erosion impacted peatlands in the Greater Blue Mountains region. Based on preliminary assessments, we estimate that there has been a significant loss of organic material, nutrients and carbon from these systems, and these trends will be further explored throughout this PhD project.

I would like to thank the International Peatland Society for the support of the Allan Robertson Grant, which has greatly assisted with sampling equipment costs. The cumulative impacts of fire and erosion events are of concern as peatlands are accretionary systems that form over extended timeframes, and we risk losing valuable environments if they are unable to recover from increased fire frequency and intensity, erosion and changes to hydrology that alter peatland functioning.

This research seeks to contribute to better understanding how these recognised endangered ecosystems are being impacted by fire and erosion events, the role these events may have on nutrient cycling, and the recovery of unique and fragile peatlands in south-eastern Australia.

References

Australian Government Bureau of Meteorology (2022). Climate data online.

Commonwealth of Australia and Macquarie University (2019). Temperate Highland Peat Swamps on Sandstone (THPSS) spatial distribution maps - VIS_IDs 4480 to 4485, [Dataset].

Fryirs KA, et al. (2021). Extent and effect of the 2019-20 Australian bushfires on upland peat swamps in the Blue Mountains, NSW. Int J Wildland Fire.

Joosten H and Clarke D (2002). Wise use of mires and peatlands - background and principles including a framework for decision-making. International Mire Conservation Group and International Peat Society. https://bit.ly/3BS07Ea

Whinam J and Hope G (2005). The peatlands of the Australasian region. Mires - from Siberia to Tierra del Fuego 35, 397-434.

State Government of NSW and Department of Planning, Industry and Environment (2018). Alpine Sphagnum Bogs and Associated Fens Endangered Ecological Community, Kosciuszko Resorts VIS_ID 4836, [Dataset].

State Government of NSW and Department of Planning, Industry and Environment (2020). Fire Extent and Severity Mapping (FESM) 2019/20, [Dataset].

Xu J, et al. (2018). PEATMAP: refining estimates of global peatland distribution based on a meta-analysis. Catena 160, 134-140.

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Photos welcome! If you would like to contribute peatland and peat photographs to our publications and website - as well as social media, email us via ips@peatlands.org :)

In Memoriam

Yrjö Pessi 1926- 2021

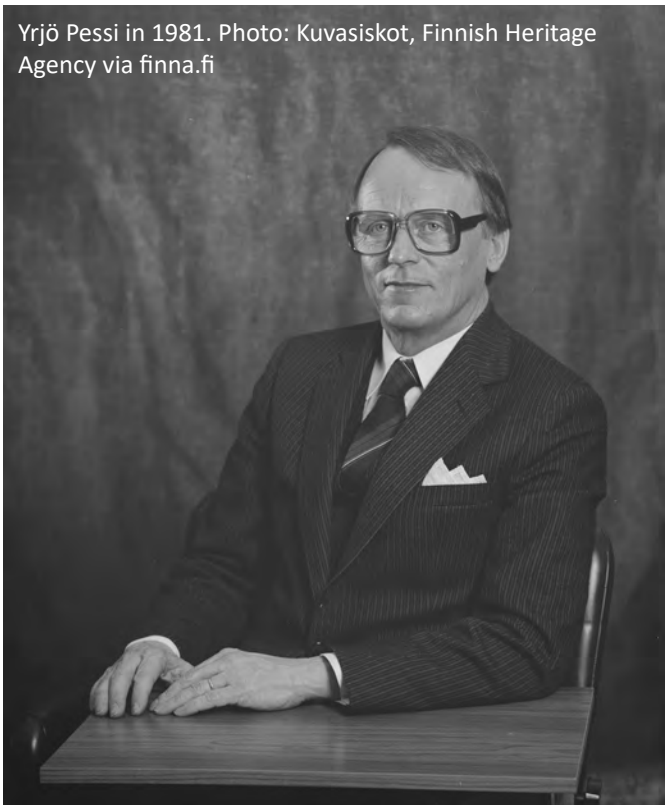
Dr Yrjö Pessi was born on 30 August 1926 in Kaukola, a municipality on the western shore of Lake Ladoga in former Finnish Karelia. He was the son of a farmer, inheriting his father's interest in agriculture already during childhood. He died in Espoo at the age of 95 years on 2 December 2021.

Yrjö Pessi became well known in Finland as Director General of Kemira Oy, a big industrial concern, producing among other things, fertilizers. In addition to his career as a nationally recognized industrial leader, he was - mostly unknown to the public - interested in international peatlands and had links with mire experts. Dr Yrjö Pessi was also actively interested in organisational work and left his mark on the Finnish Peatland Society, as well as the International Peatland Society and the Finnish Society for Peatland Cultivation.

During the initial stages of his career as a researcher, Dr Pessi published the results of studies on peatland cultivation in SUO-Mires and Peat, which were carried out at the frost experiment station of Pelso, located on a large peat deposit in Northern Ostrobothnia. The main goal of his studies was to improve the growth of cereals on drained peatlands.

As stated above, Yrjö Pessi had close connections with the Finnish Peatland Society. Lectures and excursions organised by the Society were among his favourite professional events, which he willingly attended. Between 1971 and 1973 he was chairperson of the Board of the Society. In 1989 he was appointed as Honorary Member of the Society.

Thanks to the Finnish Peatland Society, which represents the International Peatland Society as its National Committee, Dr Pessi soon found his way to the IPS administration. In 1980, he was elected as a Council member of the IPS and



Yrjö Pessi in 1981. Photo: Kuvasiskot, Finnish Heritage Agency via finna.fi

in 1982, as Vice President. Dr Pessi´s extensive social connections, executive leadership and professional knowledge in peat science were soon noticed within the IPS and in 1985, he was elected President of the Society. His seven-year long period as President coincided with a significant phase of development in the administrative structure of the IPS.

During the 8th International Peat Congress, held in St. Petersburg (formerly Leningrad) in 1988, at a time when signs of significant change in international policy were becoming evident, Dr Pessi realized that the time was right to make changes in the IPS administration. Following lengthy negotiations, the IPS Council decided to change the order of election of the President and the Secretary General of the Society.

Since the foundation of the Society in Canada in 1968, the President represented Finland and the Secretary General the former Soviet Union. Through the initiative of Dr Pessi, the President was elected every four years and the permanent

Secretary General was chosen from Finland. This change proved to be quite successful, as the system has been in use since 1991.

The career of Dr Pessi in the IPS administration finished in June 1992 during the 9th International Peat Congress, at which time he handed over the presidency to Mr Reidar Pettersson from Sweden. In a Council meeting, held during the Congress, Yrjö Pessi was invited to become an Honorary Member of the IPS.

Due to his spiritual capacity and ability to control daily schedules, Dr Pessi found time to participate in the events of many different organisations during his daily life as General Director of an industrial enterprise. On the other hand, he had the power to use the capacity and premises of his company for IPS events. Mr Allan Robertson, former Honorary President of the IPS, reminisced about enjoyable meetings hosted by Dr Pessi in the log cabin of Kemira Oy in Lapland.

One of the organisations to which Dr Pessi devoted considerable effort was the Finnish Association for Peatland Cultivation, established as early as 1894. He was Executive Manager of the association for 10 years and was also a manager of the Leteensuo experimental station, owned by the organisation. In 1975 he was elected as Chair, an obligation which lasted 38 years without interruption. The Finnish Association for Peatland Cultivation, which is still functioning, may have been one of the most recent organisations in which Dr Pessi actively participated before his retirement.

Yrjö Pessi was a many-sided and talented person and wrote many books relating to different topics. Experiences of leadership, events regarding family life, inside stories of Kemira Oy, etc. have been published in the form of small booklets. A favourite subject of his essays was Karelia, the loss of which as a result of war with the Soviet Union during the Second World War caused him lifelong grief.

Raimo Sopo

Executive Manager of the Finnish
Association for Peatland Cultivation
Secretary General of the International Peatland Society 1991-2004

Leila Urvas 1933 - 2021

Ms. Leila Urvas, an agronomist and an active member of the Finnish Peatland Society, died on 7 June 2021 in Jyväskylä, Finland at the age of 87 years. She was born on 12 December 1933 in Uurainen, Central Finland, and she was the firstborn in the family. Her father was a merchant, and her mother was a farmer´s daughter.


Photo: Maire Urvas

Leila enrolled as a student in 1952 and was the first student in her home village. She graduated as an agronomist from the University of Helsinki in 1960 with a major in Plant Science, but her work took her to soil research. She worked as a researcher at the Soil Science Department of the Agricultural Research Centre (MTTK) in Tikkurila and Jokioinen in 1959-1997. She studied the chemical properties of peat soils, in particular, in addition to which her work in mapping Finnish soils was significant.

Since 1966, she has compiled agricultural soil maps published by the MTTK and has written a total of nine soil map reports. In the 1970s - when the base map of Finland was being completed and the topographic workforce was becoming available - organizations in need of a soil map pooled their expertise and launched a basic survey of Finnish soils under the auspices of the Geological Survey of Finland and the National Land Survey of Finland. This was a pioneering collaboration between different ministries. Leila Urvas was a member of the co-operation group from 1976 to 1981 and took care of the agricultural needs in the survey. She trained topographers in recognizing soil types and stressed the importance of the accurate mapping of agricultural soils.

Leila was a lively and active person. She was the Secretary of a regional agronomic club from 1967 to 1968, the Secretary of the Finnish National Committee of the International Society of Soil Science (ISSS) from 1971 to 1994, a Board Member of the Finnish Peatland Society from 1982 to 1984 and a member of the Editorial Board of Suo -

Mires and Peat from 1985 to 1994. She regularly attended congresses of the ISSS and the IPS. In her spare time, she led a local unit of a Finnish home economics organization (The Martha Organization) from 1987 to 1994.

After retiring, Leila moved from Jokioinen to Jyväskylä, closer to her homeland and her relatives. Even when retired, she frequently participated in the events and excursions of the Finnish Peatland Society. She worked as a computer tutor at the University of Senior People in Jyväskylä. She enjoyed outdoor activities, theatre performances, concerts and attended church.

She also enjoyed living in a residential home for seniors, which offered a wide range of activities during the last phase of her life. Last months, she lived with her sister after a fire had destroyed the residence. Her sister recently moved back to the house, but sadly, Leila did not have that opportunity.

Merja Myllys

Tapio Lindholm. Photo by Hannu Nousiainen

Tapio Lindholm 1953-2021

A peatland specialist and international peatland conservation activist has passed away

Docent Raimo Tapio (Tapi) Lindholm passed away suddenly in Helsinki on 23 November 2021, due to complications caused by chemical treatments he was receiving for melanoma. He was born on 5 January 1953 in Tampere and was 68 years when he died. Tapio matriculated from Lapua high school in 1972. His schoolmates have told us that he was the only one who already knew at the age of 19 that he would become a biologist and nature conservation activist as an adult.

Tapi began studying in 1972 in the University of Helsinki. His major was botany including plant ecology. His minors were geography, zoology, genetics and statistics. He started his university career as an assistant in botany. In 1990, he completed his PhD: “Environmental control of the growth of *Sphagnum fuscum* and dwarf shrubs on raised bog Laaviosuo, southern Finland”. Professor Kimmo Tolonen was his opponent. The following year, he received a docentship in botany.

Even prior to his PhD, he worked at the Finnish Association of Nature Conservation as Editor in Chief of *Suomen Luonto* (1985-1989). He improved the layout and marketing of this popular journal, leading to a huge increase in the readership of the journal.

Tapi was very interested in editing and popularizing of science. As an example of the latter activity, he wrote around 200 nature columns between 1982-1995 together with Matti Nummelin in *Helsingin Sanomat*, which is the most popular newspaper in Finland. Moreover, he edited several books relating to peatlands. The most well-known of these are probably those connected to the excursion and seminar of the International Mire Conservation Group (IMCG) to Finland in 2006: “Mires from pole to pole”, “Mires of Finland: Daughters of the Baltic Sea” and “Finland: land of mires”, written together with Raimo Heikkilä and Teemu Tahvanainen. As a docent he gave lectures and field courses and served as the pre-reviewer and opponent of many MSc and PhD theses.

Tapio Lindholm made his career as a leading specialist in the Finnish Environment Institute (SYKE). His main responsibilities were the conservation of Finnish forests and mires, as well as Finnish-Russian cooperation in nature conservation.

This work required many excursions, talks and negotiations with authorities, NGOs and the general public. Tapi was able to handle all these situations with their various combinations, due to the fact that he had considerable general knowledge as well as knowledge of different cultures, clear and sensitive social opinions, a certain stubbornness and was athletic. He worked 24/7 and refused to use any kind of work time control system, as he considered that the results of his work should be measured in other ways rather than controlling his working time.

Tapio Lindholm was the Chair of the Finnish section of the Finnish-Russian working group on nature conservation between 2002 and 2021. He was a member of the nature and water working group of the Barents Council, as well as the working group of the European green zone; he also served on the Board of the International Mire Conservation Group (IMCG).

He had a large group of friends and colleagues all over the world but especially in Finland, other Nordic countries, Russia and Central and Southern Europe. He was highly valued in international cooperation. During meetings, he was usually sitting quietly making notes. He would subsequently summarize the questions and propose a solution. This was usually supported and accepted.

Tapio Lindholm was the Editor of the periodical *SUO-Mires and Peat*, published by the Finnish Peatland Society (Suoseura), in 1983-1984. He created the new layout, which is even used today. He was a member of the editorial board of *SUO* between 1985 and 2021.

He was also Chair of Suoseura in 2017-2018 as well as Vice Chair in 2016 and between 2019 and 2021, thus leading the Finnish National Committee of the IPS. He was also active in several other scientific societies.

As a person, Tapi was always ready to listen, discuss and support. He always helped newly appointed young people in administration, scientific societies and NGOs, and stressed that the show must go on in the future, too!

To balance hard work, Tapi enjoyed spending time with his family. Together with his wife Kirsi Arino, they had three children and three grandchildren. Thanks to technology, Tapi was able to watch the christening ceremony of his latest grandchild Runo (Poem) prior to his passing.

Summer vacations were spent on an island in the Baltic Sea near Helsinki, where the family owned a small summer house. Last summer, they built another small house there for their grandparents. Tapi and Kirsi spent three weeks in September in the brand-new house. In October, Tapi walked to the hospital but never came back.

His last wish was to make the world a better place for future generations. He also wished that instead of flowers, donations be given to the Finnish Foundation for Nature Conservation to support young researchers' theses in forest and mire studies: https://luonnonsuojelunsaatio.fi/lahjoita

On 12 May 2022, the first four Tapio Lindholm memory scholarships were granted for these purposes.

Harri Vasander, Raimo Heikkilä, and Rauno Ruuhijärvi

The authors are his friends and colleagues, as well as academic teachers.

Sadly, Rauno Ruuhijärvi, who is one of the fathers of Finnish mire conservation and Urho Kekkonen National Park, followed Tapio and passed away on 18 June 2022 at the age of 91.

May they rest in peace and stay in our hearts and memories.

Peat and Peatland Events

Cancellations or changes of dates due to Covid-19 possible. Check the event websites for updates!

129th Executive Board Meeting
MS Teams
18 August 2022

31st International Horticultural Congress
Angers, France
14 - 20 August 2022
www.ihc2022.org

H2020 Merlin All-Partner Meeting
Fulda region, Germany
12 - 16 September 2022
https://project-merlin.eu

Baltic Peat Producers Forum
Riga, Latvia
14 - 15 September 2022
www.peat.lv

AsiaFlux Conference
The Nexus of Land Use Change, Ecosystem & Climate: A Path Towards SDGs
Kuching, Sarawak, Malaysia
20 - 22 September 2022
www.asiaflux2022.com

IVG German Peat and Humus Day
Bad Zwischenahn, Germany
29 September 2022
www.ivg.org

IPS Executive Board Meeting
Tullamore, Ireland
10 October 2022

Irish Peatland Society
Seminar and Excursion
11 - 13 October 2022
www.facebook.com/Irish-Peatland-Society-190659956823

UNFCCC COP27
Sharm el-Sheikh, South Sinai, Egypt
7 - 18 November 2022
https://unfccc.int

Cultural heritage and conservation of peatlands
Osnabrück, Germany (part II, in German)
8 - 9 November 2022
www.dgmtev.de

TISOLS
10th International Symposium on Land Subsidence
Delft-Gouda, the Netherlands
17 - 21 April 2023
www.tisols.org

RE3 & IPS Annual Convention
Québec City, Canada
11 - 15 June 2023
https://re3-quebec.org/en

4th World Peatlands Day
2 June 2023
#worldpeatlandsday

IUFRO World Congress
Stockholm, Sweden
23 - 29 June 2024

17th International Peatland Congress
Changchun, China
5 - 11 August 2024

More at: www.peatlands.org/events

Next issue...

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Submission deadline: PI 3.2022: 30 August

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