Peatlands International





Editorial: Peatlands & COVID-19 by Marko Pomerants German growing media industry commits itself to reducing peat COVID-19 in our member countries: impacts on companies, NGOs and research Online workshop: Exploring criteria and indicators for tropical peatland restoration Signing of the implementation agreement of the Peat and Substrate Cluster Rehabilitating the Southeast Pahang peatland landscape with the Jakuns Peat Moss complete processing line: ASB Greenworld Case Study Allan Robertson Grant reports No 5-8/2019

16th International Peatland Congress

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ACCADEML

Editorial

Peatlands & COVID-19

ello peat people! This is my first editorial as the new IPS President. I dare say I have settled in, but that does not mean I know everything. There is much that I do not yet know about peatlands and peat, but I hope I have a sense of the nature of the IPS.

I have looked at some previous editorials for inspiration, and I have focused on one by Donal Clarke (written in 2018), about *New Forces*. He was referring to the appointment of Gilbert Ludwig as IPS Secretary General, and since I am the "new boy", I hope I can also be a "force" to help drive the IPS forward.

The COVID-19 pandemic has been challenging for IPS people. We were supposed to meet at the IPS Congress in Tallinn in June of this year, to discuss the many important issues affecting peatlands and peat; to explore the bogs of Estonia and renew friendships. Now, however, we must delay until



May of next year. I cannot wait to make many new friends.

COVID spurred Estonians to venture into the swamps when our health officials told us not to sit at home but go out into the fresh air. As a result, many North Estonians met on a wonderful nature trail in Viru bog, a place I know well. As COVID progressed, many open spaces became known to us, and people had more opportunities

Peatlands International is the global magazine of the International Peatland Society (IPS). It provides the more than 1,700 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. To receive Peatlands International in your email every three months, visit www.peatlands.org/ join-us and sign up as a member or subscribe for € 59/year.

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Cover: Girl with mask. Photo: Pille-Riin Priske

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to be socially distanced, making many Estonians better naturalists and more knowledgeable about peatlands.

COVID has given us another skill - the ability to use the fancy teleworking developed by IT people. We can join teams here and zoom there, reaching across the world in an instant, with the press of a key, to talk to colleagues and friends. Life will never be the same again. This is how the IPS Executive and Scientific Advisory Boards are meeting now, without face-to-face contact.

Being new to the IPS, I am on a steep learning curve. At the beginning of August, I visited northern Germany and the Netherlands to have discussions with peatland and peat experts, and to become better informed about current developments in the use of peat in growing media.



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I met with Jos Schouwenaars and Michiel Gerding, board members of the Dutch National Committee, and I visited the Zegveld (Wageningen University), where Jan van den Akker showed me how the Dutch are looking for solutions for the "post-cow" period and using grassland on peat wisely in order to deal with greenhouse gas emissions.

In Germany, I visited the Klasmann-Deilmann GmbH headquarters in Geeste, to meet Moritz Böcking (CEO) and Bert von Seggern, and to learn about their attempts to expand opportunities in the field of new growing-media substrates. My host, Guus van Berckel, First Vice President of the IPS, showed me peat extraction and after-use (rewetting) being carried out by his company, Griendtsveen AG. Finally, I inspected Sphagnum farming on Hankhauser Moor with Silke Kumar from Moorkultur Ramsloh, and Andreas Bauerochse and Joachim Blankenburg of DGMT, which is also the IPS German National Committee. I learned much during this short visit, which lasted only a couple of days, and I am grateful to all those who spared me their time.

The IPS will face many challenges in this coming quinquennium, and these will be discussed at the 16th International Peatland Congress in Tallinn in May 2021. Come and join us. It is a meeting that you must not miss. Registration is open, so please sign up.

Fortunately, COVID allows you to write and read (except when you are in intensive care). That is why I am pleased that another *Peatlands International* awaits you.

Happy reading!

Marko Pomerants

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COVID-19 in our member countries

How are companies, NGOs and researchers affected by the pandemic?

Canada, CSPMA

Spring 2020 has been a season the entire world will remember. The COVID-19 pandemic did undoubtedly distress every country, every individual, and every industry including ours. Members of the Canadian Sphagnum Peat Moss Association (CSPMA) have been extremely proactive with their response to this new context.

Managing such a crisis has been a real challenge. The CSPMA has been following closely decisions from the different levels of government in order to help its members to react and respond quickly to the latest directives. Our members put everything in place to ensure that all hygiene and social distancing, health and wellness protocols were followed to support the needs of their people. While the battle against coronavirus has still not been won, the Canadian sphagnum peat moss Producers keep working to ensure that their harvesting, processing and manufacturing processes are in total accordance with public health regulations.



The safety of our members' employees is at stake. In fact, the health and safety of their workers have always been a priority. As the latest results of our social and environmental assessment demonstrate, the whole peat industry is showing proactive even committed behaviours regarding occupational health and safety (OHS).

These new rules and procedures were necessary as our industry has been recognized as an essential service by many agencies both in Canada and the US. Indeed, Canadian sphagnum peat moss production is an essential part of the supply chain supporting food production, particularly in commercial greenhouses and mushroom operations. Maintaining food supplies during this national and international pandemic was, and still is, critical. The CSPMA is proud to take part in this major sector and to contribute in its own way to feeding the North American population.

As we have entered a progressive deconfinement phase, the Canadian sphagnum peat moss Producers would like to offer special thanks. First, we would like to thank governments for recognizing our industry as an essential service so our members can keep producing an essential good for fruits, veggies, herbs and mushroom production. We also want to thank North American growers, the industry suppliers and partners who are also part of this supply chain. Finally, the CSPMA wants to thank its own members and their workers for their successful response and adaptation during this crisis.

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China's Research & Peat Market

The Corona virus posed adverse impact on peatland research and business in China in the early spring, but the situation is substantially mitigated since early May. Overall, the scientific activities have been resumed now. In the early spring, especially over the period of Chines New



Source: United Nations COVID-19 Response

Year, the outbreak of the unknown virus impeded most of the scientific activities and people were quarantined without the access to the laboratory facilities. Therefore, some of the on-going experiments in the laboratory were retarded without routine maintenance. The access to field facilities were less affected in the late spring as the severe situation was alleviated. During the quarantine, virtual conferences and video meetings were very effective ways to keep people connected.

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COVID-19 has had a dual impact on China's peat market, including soaring freight rates and rising exchange rates. Due to the price increase of shipping companies and the shortage of containers, the overall price of peat transportation from Europe to China has increased by 50-60%. The exchange rate of the euro against the RMB has also risen from 7.73 to 8.14, and at its peak, it rose to 8.24, which also significantly increased the price of imported peat. Although many peatimporting companies had more stock in 2019 to compensate for rising costs, the increase in freight and exchange rates is transmitted to end customers, therefore, the increase in peat prices is also greater. Thanks to several years of market cultivation and user experience, imported peat and coir have become irreplaceable means of production for customers. Although individual users adjusted the planting structure to reduce peat consumption, no significant reduction in national sales was recorded in 2019 or 2020. In general, the Chinese market has the ability to absorb the impact of the pandemic, and the introduction and promotion of peat next year will continue to maintain the momentum of significant growth.

The COVID-19 crisis will not pass in five to six months like SARS, it is likely to last for three to five years. This means that the world economy will continue to experience a downturn for the next three to five years. Due to the long-term, low interest rates, low inflation and minimal growth in both European and American countries, the occurrence and continuation of the epidemic will inevitably further delay economic growth in these countries, resulting in sluggish production and consumption. European horticultural peat demand has been growing slowly, coupled with a cliff-like decline in energy peat demand, which has seriously threatened the survival and development of the peat industry in certain countries. The only means of restructuring the industrial chain is to find new alternative markets for horticultural peat and energy peat.

China is located in a temperate and warmtemperate zone. This is not only a zone of weak peat accumulation in the world, but also a poor



area for coir. If China wishes to provide its people with abundant food, improve the quality of life and restore the degraded environment, it must import peat and coir resources from abroad. China has a huge land mass and a large population, and is experiencing rapid economic development. The demand for peat and coir is huge. China can fully supplement the insufficient quantity of peat from European and American horticulture and stabilize the capacity of reduced energy peat production.

The Chinese peat market has huge potential and has expanded at a rate of 45% in recent years. However, due to the low starting point and small base of the Chinese peat market, the total imports of peat and coir at the end of 2019 amounted to just four million cubic metres, which is considerably less than the international peat and coir production capacity. There are problems such as oversupply and fierce price competition in the market. The main reason for the lack of a larger market demand is that the introduction, promotion and application of peat has not been affirmed and supported by the relevant government agency. In a country where government decisions determine the future of industrial development, the goal of the largest peat market in China with regard to the international peat industry, is difficult to achieve without government affirmation and support.

We look forward to the 2024 International Peatland Congress to actively cooperate in the fields of technology, information and expertise.

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Estonian Peat Producers

How has 2020 been for Estonian peat producers so far?

Sales of peat products to the horticultural market were high this spring. We had a small setback in February, but this was probably mainly due to emotions, not the virus itself. However, some differences between sectors can be observed. For example, fewer products have been sold for ornamental plant growing, and more have been sold for vegetable growing. Some members of the Association have stated that sales to the hobby market have been the best in a decade, and this was probably due to the crisis and the travel restrictions.

Sales have been high in both the Baltics and Central Europe. By the way, the season in Central Europe has not yet ended. This might influence sales for upcoming years, and some customers will probably have amassed reserves for the next few years. Some have also noticed that the geography of the market is changing, and the quantities of products sold outside Europe are increasing. This market share is still marginal though. The growing-medium market is interesting because the international market is influenced by factors that we cannot observe here in Estonia, for example, the weather in Canada or a deficiency of coconut coir in India; not to mention the global COVID-19 crisis.

What is new in the sector? Are there any new markets or new products?

As I have already mentioned, the geography of the market is changing. Changes do not occur overnight; rather, they take many years or even decades. However, it can already be observed that Southeast Asian markets are increasing, for example, China, South Korea and Japan etc. Agriculture is intensifying. Using substrates allows for faster and higher harvest volumes per unit area. On the one hand, overall prosperity changes the food that people put on their plates (with growing preferences for fresh fruit and vegetables etc.). On the other hand, more ornamental plants and cut flowers are being bought. Hence, specialists estimate that demand for growing medium will increase in the forthcoming decades.

How has the weather influenced production and volumes this year (a warm winter, long and relatively dry spring and recent heatwave, followed by rainy weather)?

As is so often the case, the weather is different every year. Spring and the first part of the summer have been generally good for production. It may be assumed that most growers have fulfilled 50% of their production plan. However, it should be mentioned that heatwaves are not good for production because they exhaust men and machinery, and they also increase the risk of fire. The current rainy weather, on the other hand, will halt production for several weeks at least. Many production sites look as wet as they did in spring after the snow had melted. We are therefore hoping that the weather in the second part of the summer will be beautiful again.

How has the virus crisis affected peat producers? Have some businesses been closed? Have there been layoffs or a reduction in production volumes?

The COVID crisis has mainly resulted in problems with transportation - increased prices and problems with availability (e.g., a lack of containers). Sales have also been affected, with reduced sales in March and April, which were followed by exponential sales growth in May and June. We have tried to prevent layoffs because it is hard to find valuable employees in our sector. Production volumes have not been reduced. Even if we do end up with a bigger stock in autumn, we still need to be ready for the new year. If we do not produce this year, then we will not have any products in the autumn and next spring.

Is peat production a relatively stable sector and thus not significantly influenced by crises?

The peat sector is generally stable, but some influence can be observed. People want to eat





and have warm homes despite the crisis. During this crisis, people have spent more time at home, resulting in increased sales in the hobby market. However, the exchange of goods has generally slowed down, and it is hard to organize transportation.

What are currently the main problems and sources of joy for peat producers?

We are pleased that the sector is still here and working. We can provide stable jobs and a competitive income. We are proud that Estonian peat products are among the best quality products in the world. At the same time, we are challenged by the climate policy and climate-neutrality goals. We are worried that society and political turbulence and upheaval will result in emotional decisions. Luckily, we have acknowledged the problem and are trying to reduce our ecological footprint. But we are not sure if there is enough time because plans and objectives are changed way too often.

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Finnish Peatland Society

The pandemic has affected the Finnish Peatland Society in many ways. The restrictions and ban of gatherings resulted in the cancellation of the spring seminar and the annual excursion, which are important activities of the Finnish Peatland Society. Furthermore, the important international meetings for Finns, such as IPC2020 in Tallinn and the mire symposium in Petrozavodsk, Russia were cancelled, which significantly affected the planned collaborative activities.

The Annual Assembly could be held remotely, but only mandatory issues were discussed and the number of participants was low. The Journal of SUO was published as usual, however

the pandemic also indirectly affected its timetable. In fact, due to the situation regarding COVID-19, the Society has not been able to organize any other significant activity this spring and this will also be the case in the autumn.

Research has also been affected. The transition to remote working halted physical meetings and appointments, and research visits abroad had to be cancelled. Interacting with people remotely has caused inconvenience. There have been restrictions on domestic travelling and only mandatory field work has been permitted. Laboratories have been partially open or completely closed, which has prolonged analysis times and changed the schedules of study projects - in some cases significantly.

New projects have also been postponed and those projects that have required travel abroad have faced major challenges and have been impossible to implement. The restrictions also drove many to take annual leave or to go on other holiday. Reconciling remote working and family commitments has not been easy either. Fortunately, many funders appreciated the difficulties of the situation and extended the period of funding for projects. All courses at university are taught remotely and field courses have either been postponed or cancelled.

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Bioenergy Association of Finland and Growing Media Finland

"The worst fears of March and April did not come true", said a producer of horticultural peat in Southwestern Finland at the start of September. There were many assumptions and uncertainties in the peat industry, when the COVID-19 restrictions were enforced on 16th March; national security of supply became important, as a result of disinfectants and face masks being in short supply. One could also assume that domestic peat products were valued more in these circumstances, but that assumption was wrong and vice versa. The Finnish peat sector has perhaps faced the greatest challenges ever during these months of the pandemic, and not because of the virus, but because of politics.

Finland was saved from the first wave of COVID-19 and has managed the crisis quite well so far. Social distancing guidelines and advice to stay at home were taken seriously, which encouraged home gardening and increased the sales of growing media. Peat deliveries inland for the purposes of animal bedding, especially to chicken farms, were not affected at all, but the shipping of peat growing media abroad slowed to some extent. Thanks to the versatile properties of peat and diverse, flexible markets, all products could be utilized and the slight reduction in exports was compensated by increased domestic demand.

Peat extraction also remained unaffected by COVID-19. There are far more severe factors than the virus which are negatively impacting the entire peat sector. The energy peat market is collapsing, however, the demand for peat for other purposes, remains steady. New developments and products made from peat are beginning to enter the market.

However, the rapidly shrinking share of milled energy peat will also affect horticultural and environmental peat products in the near future.

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Germany, Gardening Industry Association, IVG

In Germany, the lockdown started in mid-March. The Green associations quickly established a hygiene concept and presented it to the German government. Due to this concept, in 12 of the 16 states in Germany, DIY stores and most garden centres remained open during the lockdown. Because of this and the fact that people had plenty of time, most people started renovating their gardens. Therefore, sales of growing media for leisure purposes were only slightly affected.

Companies immediately implemented internal hygiene measures to ensure continuous production of growing media, also for the professional market. German companies were able to provide necessary growing media for the European horticultural market and to ensure continued production of local fruit and vegetables.

In the beginning of the pandemic, companies had some problems with the availability of peat from the Baltic countries due to checks and long waiting periods at the borders (coming from the Baltic countries or heading that way). But due to rapidly implemented regulations provided by the European commission, transportation and deliveries could take place as usual.

Peat harvesting was not negatively affected by the COVID-19 pandemic. The spring months in Germany were quite good ones, with dry, warm



weather. We are therefore expecting a normal peat harvest this year.

The German growing-media industry has used recent months to commit itself to reducing peat in growing media for professional use as well as for the hobby market (see page 15).

This self-commitment is supported by the downstream industry, e.g., the horticultural sector and the trade sector. This commitment was presented to the Federal Ministry of Food and Agriculture in June and is oriented towards the German government's 2030 climate protection plan.

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Lithuanian Peat Producers

In Lithuania, representatives of the peat industry are facing a new challenge which is forcing them to adopt a new approach to usual tasks such as production, extraction, sales, logistics and relations with colleagues and customers: re-planning and reviewing processes; digitizing work as far as possible; performing work remotely or planning tasks carefully to avoid infection transmission through use of shared equipment or premises. Therefore, maintaining social distancing, using disinfectants and protecting airways have become the key tools in every task.

The announcement of the COVID-19 pandemic and the introduction of quarantine measures initially caused chaos and impeded some work. Companies exporting their products to Italy, China and other East Asian countries such as South Korea or Japan have faced particular difficulties. They have had to reconsider and address financial problems caused by delayed exports and payments. Customer payments from China have stopped. Late payments have caused insurance companies and banks considerable problems.

Interest has also been charged. Previously loaded containers, held in Chinese ports, created tension among container lines, leading to downtime and boosting container shipping prices. Logistics have become more complex and road transportation more expensive. Countries closed their borders, and some carriers refused to carry goods to certain destinations entirely. This strained relations with regular customers, many of whom cancelled orders. The resulting insolvency factor also led to customer losses and a further reduction in sales.

It has become difficult to work with state institutions, and project coordination or decisionmaking deadlines have become longer due to remote working and the lack of control of employees. Some companies avoided stopping work and managed to organize relevant processes successfully. Production increased, and product demand and turnover grew as exports were shipped to less affected European countries. However, finding sufficient numbers of seasonal workers was difficult at the beginning of the peat extraction season, as additional state benefits discouraged them from returning to the labour market. COVID-19 has brought great changes, meaning that certain processes have had to be modified, and meetings and training have had to be held in virtual space. However, this has not stopped our plans and targets.

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United Kingdom: the fieldwork foe... but some opportunities, too

UK researchers, Lydia Cole, Sue Page and Mark Harrison, reflect on being bogged down as COVID-19 restricts travel to study sites in tropical peatlands at present: The ongoing COVID-19 pandemic has touched all of our lives, from changing our diurnal patterns to altering our social networks, and much more. Peatland science has not escaped the disruption, with offices shut, lab work on pause and many field sites off-limits, especially to non-local researchers. The latter is being felt acutely by many peatland scientists, for whom fieldwork is the highlight of their year, as evidenced by this creative ode to bogs.

In addition to fieldwork being one of the most enjoyable (and challenging!) parts of the work peatland scientists do, it is also the essence of their practice, from which everything else evolves. As peatland scientists, we collect data to understand more about peatland ecosystems, help us to teach about peatlands, and to spend time in the field/bog in order to engage in the conservation of these waterlogged wonderlands. As of late, and for an indefinite amount of time into the future, we are unable to travel to the swamps and bogs in which we are accustomed to spend months of our year.

Aside from international travel being either entirely restricted or prohibitively unpredictable at present, there are other reasons why visiting field sites in tropical peatlands is currently a risky prospect. In Peruvian peatlands, for example, there is a justifiable concern that foreign researchers, or even those based locally, may bring the virus to the relatively isolated indigenous communities living in and around these ecosystems, for whom medical treatment is inaccessible, or in some cases an unfamiliar and unwanted intrusion into their culture.

For peatlands in Indonesia, the pervasive smoke haze resulting from burning peatlands in the dry season (and increasingly throughout the year) may risk exacerbating the health impacts of a COVID-19 infection,



should a field researcher contract the virus. In addition to the risks to the health of local communities and researchers from continuing field research at present, there are risks associated with stopping the collection of data and monitoring for the indefinite duration of the pandemic.

If the routine collection of information on, for example, the incidence of fires, water-table levels and wildlife populations is interrupted, we cannot reliably measure how peatlands and their ecosystem components are changing, in response to climatic changes and local anthropogenic impacts, or to restoration efforts. This includes changes in the use of peatland ecosystems and their resources, or in peatland management brought about by COVID-19 responses.

With predicted future pandemics on the horizon, we must consider how to adapt to this situation of enforced distance from our familiar field sites. There are silver linings to be sought in this adaptation process. Building local capacity to continue and in some cases, to start new monitoring programmes in tropical peatlands, through training local researchers and ensuring continued funding for their work, is timely. This shift may enable local researchers and communities to develop stronger links with these ecosystems, to develop more locally-relevant monitoring and management programmes, and to empower them to work towards their conservation in areas where this is not already happening.

The reciprocal impacts between COVID-19 and tropical peatlands will be described in more detail in an upcoming publication that members of the UK Tropical Peatlands Working Group and other collaborators, led by Dr Mark Harrison, have put together. We consider why conserving tropical peatlands is particularly important in reducing the chances of future pandemics, as well as for mitigating the impact of the current one on the communities living in these environments, and on the biodiversity and carbon they contain.

Keep an eye out for a summary in the next issue of Peatlands International!

Lydia Cole, Sue Page and Mark Harrison lesc1@st-andrews.ac.uk

IPS Secretariat

The IPS as an umbrella organization has been significantly affected by COVID-19 as the 16th International Peatland Congress, involving 700 delegates, had to be postponed until May 2021. This resulted in a great deal of organizational changes but will also bring financial challenges. On the other hand, the IPS took a giant leap forward in terms of organizing virtual meetings, such as numerous Board meetings and the National Committee Round Table, as well as many smaller get-togethers by video conference. In practice, travel stopped following the Expert meeting in Prague in March, and home offices have been in use since then. As a result, savings have been made in relation to travel costs (and flight emissions), which will be used to compensate for income reductions in other areas. We genuinely hope that all IPS members stay safe and remain on board during these challenging times.

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www.bolpeat.nl

German growing media industry commits itself to reducing peat

üsseldorf, July 2020. The German soil industry is committed to reducing the amount of peat contained in growing media for the hobby market and in professional growing media.

Gütegemeinschaft Substrate für Pflanzen (GGS) and Industrieverband Garten (IVG) e.V. have developed a common position paper, which can be downloaded from the IVG website (www.ivg.org). This declaration states the most relevant measures to be taken in order to achieve these goals (see translation next page).

The growing media industry is fully aware of its social responsibility and, as stated in the position paper, aims to meet the goals in order to reduce CO_2 emissions in line with European Union guidelines over the next few years.

Considering the present conditions and demand for quality, the industry will increase the quantity of constituents other than peat in growing media: up to 50% for the hobby market, and up to 20% in professional growing media, until 2025. In a second step, the quantity of other constituents is intended to be increased to 70% in growing media for end consumers, and to 30% for professional growing media, by 2030.

"From the point of view of the industry, the quotas are the maximum achievable with respect to quality and availability of the raw material, according to present knowledge," says Anna Hackstein, IVG General Manager.

The quota may further increase from 2030. If the essential preconditions of self-commitment

are politically implemented, the availability of alternative constituents will increase, and the modified growing media for the hobby market and professional growing media are more likely to be accepted by users. "This goal can only be achieved together; therefore, a close dialogue between the growing media industry and the ministry in charge is essential," Hackstein states. An important aspect is the legal framework, as well as the availability of high-quality constituents. "Discussions have already been held on this and other topics in a very constructive manner and will hopefully continue."

However, apart from all these voluntary and scheduled measures, it should also be borne in mind that the potting soil trade is international. In order to avoid competitive distortion at the expense of the German specialist trade and horticultural production, a European approach is needed.

Green associations appreciate this selfcommitment

All parties involved, from production to specialist trade, continually support attempts to reduce the amount of peat in potting soil and growing media (as far as is possible, bearing in mind technical and economic considerations).

The associations Bund deutscher Baumschulen (BdB) e.V., Handelsverband Heimwerken, Bauen und Garten e.V. (BHB), Verband Deutscher GartenCenter e.V. (VDG) and Zentralverband Gartenbau e.V. (ZVG) therefore explicitly appreciate the selfcommitment of the growing-media industry to reducing the amount of peat in soil for the hobby market and professional growing media.

Growing media industry's selfcommitment to peat reduction (translation)

1. Aims of the growing-media industry

The German government's Climate Protection Plan 2050 contains steps to reduce the use of peat in growing media for the hobby and professional markets. By making this self-commitment, the Industrieverband Garten (IVG) e.V. (together with the Gütegemeinschaft Substrate für Pflanzen e.V.) is supporting the objectives of the German government. The industry has undertaken to increase the percentage of growing-media constituents other than peat to 50% in growing media for the hobby market, and 20% in media for the professional market, by 2025.

In a second step, the percentages of other growing-media constituents are to be raised to

About IVG

IVG is the association for manufacturers of "Green Sector" products for the leisure and professional market - plant breeders, forestry producers, lawn- and garden-care machinery, manufacturers of garden lifestyle products and products for plant protection and nutrition, producers of growing media and growing media constituents, and commercial horticulture producers.

More than 150 companies are currently members of IVG. IVG's core competencies are in the field of information, networking, public relations and lobbying.

For further information, see www.ivg.org.

70% in growing media for the amateur market, and 30% in media for the professional market, by 2030. From the industry's point of view, these quotas are the maximum levels currently considered to be achievable, taking into consideration the quality and availability of the constituents. These ideas only affect products that are intended for the German market.

Successful implementation of these steps will be a big challenge for the industry, and it can only be achieved if certain political and administrative framework conditions are provided.

Raising the quota further from 2030 onwards is conceivable if major requirements from this self-commitment have been met by politics; if the availability of other constituents has been enhanced; and if users are ready to accept the changed growing media for the hobby and professional markets. Since this goal can only be achieved by working together, we need a close dialogue between the soil industry and the ministry in charge.

2. Political steps necessary to achieve the growing media industry's aims

- Market access and competitive situation German products must remain competitive. Peat reduction should not put German producers at a disadvantage.
- Importing other constituents
 There should be no discrimination against imports (in favour of domestic constituents).
- German Fertilizer Regulation Tolerances for nutrients and pH value need to be raised to take account of the higher levels of microbial activation that can occur.
- EU regulation of fertilizing products All common constituents should be incorporated (as a minimum) into substrate industry products.
 Hygiene parameters should be adapted to the desired microbial activation of the substrates.
- Alleviate the competitive situation caused by the EEG (German Renewable Energy Sources Act)

Preference should be given to material use over thermal use.

• Easier use of compost Green waste should be provided where possible for the production of substrate compost, and it should be made easier for substrate producers to build their own composting plants.

- Agricultural aid Paludiculture crops should be included in agricultural aid in order to minimize farmers' risks.
- Improved access to coniferous timber Preferential access should be given to coniferous timber from state forests.
- Securing the economic future Substrate manufacturers' existing production facilities should be protected, including those in outdoor areas (as defined by construction law).
- Governmental funding of pilot and demonstration projects
 Findings from research and product development must be transferred into practice.
- Innovation aid Subsidies should be provided for the development of new constituents and support facilities that produce regional constituents.

- A comprehensive database Political decisions should be based exclusively on ecological and economic studies.
- Accelerated licensing procedures Approval procedures relating to extraction sites should be expedited.
- Provision of subsidies
 Financial support should be provided and
 land allocated for the remediation of peat bog
 peripheries, utilizing low proportions of raw
 material.

For further information, please contact:

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We all have peat on the plate...

In only 1 m³ peat substrate it is possible to produce up to 350,000 vegetable seedlings. Without peat efficient commercial horticulture is not conceivable. And our plates were nearly empty.



Signing of the implementation Gréneau d'excellence Tourbe et substrats agreement of the Peat and Substrate Cluster

R iviere-du-Loup, 8 July 2020: The Québec Peat Moss Producers' Association (APTHQ), in collaboration with the Ministère de l'Économie et de l'Innovation (MEI), is proud to announce the signing of the implementation agreement of the Bas-St-Laurent Peat and Substrate Cluster for the 2019-2024 period.

As a result of the ACCORD approach (governmental programme for concerted action for regional development), the Peat and Substrate Cluster aims to bring together the driving forces of the horticultural peat sector in the region and the province so that they can work together to address their common challenges. The cluster members are peat moss and substrate producers,

About the APTHQ

The mission of the hosting organization for the Peat and Substrate Cluster - the Québec Peat Moss Producers' Association (APTHQ) - is to promote the horticultural peat industry, to represent and defend the interests of its members, to raise awareness about responsible peatland management, and to let the public know about this essential agricultural and horticultural resource, which is a component of several frequently used products.

About the ACCORD approach

The ACCORD approach is a governmental initiative which aims to develop the economy in regions of Quebec. This approach is based on regional strengths, mobilization and the dynamism of business people in these regions, as well as the quest for excellence in Quebec's key sectors. equipment manufacturers, research centres and regional development agencies.

For this new five-year action plan, the Peat and Substrate Cluster has established its action plan around five strategic development axes, the most important of which are innovation, talent attraction and retention, and social acceptability. "I am really happy with the renewal of this fiveyear agreement for the Peat and Substrate Cluster. This third action plan is an ambitious one. Many projects are in front of us, notably in terms of scientific research and social responsibility," says Mrs. Stephanie Boudreau, Director of the cluster.

For the cluster's President, Mrs. Melissa Berger, this renewal is great news for the future of the industry. "We are proud of the renewal of the Peat and Substrate Cluster. The cluster is an important vector that allows a significant outreach of the industry while drawing on everyone's expertise acquired over the years. We are convinced that this great collaboration will allow the industry to innovate on global trends, develop a strong communication strategy while encouraging responsible business practices," explains Mrs. Berger. For more information contact:

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Weathering Below Blanket Bogs and Potential Impacts on **Carbon Dynamics**

eveloping appropriate conservation and restoration plans for blanket bogs necessitates an understanding of the hydrogeological conditions influencing solute transport in these systems, and how they interact with the wider hydrological cycle.

Recent research indicates that water quality in blanket bog streams can reflect weathering of materials underlying peat. This is significant, as particular weathering reactions can result in long term removal of atmospheric carbon (sequestration). While sequestration of carbon by peatlands is well documented, processes operating below bogs have received little attention to date. However, knowledge of bog water chemistry and the use of chemical first principles suggest this may prove significant. High organic matter content, low levels of mineralisation and acidic pH values of 3.5-4.2, suggest that water percolating through the base of a bog may react readily with underlying inorganic deposits.

A three year project being carried out at Queen's University Belfast is investigating this issue and looking at the significance of substrate weathering

Sarron Cuilcagh

below blanket bogs, to estimate possible CO₂ uptake.

The study investigates six blanket bog catchments at three locations across the island of Ireland.

Sites were located at the Garron Plateau, Co. Antrim, Letterunshin, in the Ox Mountains, Co.



Sligo and the Cuilcagh-Anierin Uplands, Co. Cavan (Figure 1).

Each location is underlain by a different bedrock type: basalt, limestone and sandstone respectively. The rock was locally overlain by glacial till, derived from local materials at Cuilcagh and Garron, while till is dominated by crystalline igneous and metamorphic material at Letterunshin. At each location, two catchments have been instrumented for study: one which contains blanket bog in relatively good condition, displaying little alteration by human activity, and another which consists of more degraded bog, impacted by drainage, peat cutting and/or forestry.

Drawing on support from the Irish Environmental Protection Agency's QUBBES research programme, all catchments have been instrumented to collect high frequency hydrological data over a twelve month period (Figure 2).

Continuous monitoring included in situ measurement of specific electrical conductivity (SEC), water level, barometric air pressure and water temperature. In addition, automatic water samplers, located at each catchment outlet, allowed collection of stream water samples every seven hours for a week on a monthly basis, while piezometers installed in various locations across each of the catchments, allowed

IPS' Allan Robertson Grants (€500) are awarded to:

a) young peatland and peat researchers carrying out research or practical work orb) young professionals in early stages of their career in managing peatlands or peat industry.

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groundwater samples to be collected from within the peat. Automatic and manual rain gauges allowed measurement of intensity/duration of rainfall, and collection of rainfall samples for chemical analysis. Weather stations at Garron and Letterunshin permitted determination of potential evapotranspiration rates. All water samples collected for laboratory analyses were analysed for colour and SEC, while select samples were sent for analysis of major ions, TOC, DOC and ammonium.

While geological maps of the region give an indication of what the substrate beneath the blanket bog in the catchments is likely to consist of, it was necessary to take samples of this underlying material to confirm its content.

Funding from the Allan Robertson Grant has been used to supplement the project resources





to allow geochemical analyses of soil samples from all catchments, and rock samples from both Garron and Cuilcagh. X-Ray Diffraction and X-Ray Fluorescence were carried out to determine the mineralogical and elemental composition of the material. Trace concentrations of calcite were found in the basalt dominated region, despite high levels of calcium and magnesium detected in stream water. By contrast significant levels of calcite content in shale samples at Cuilcagh had a relatively minor influence on stream chemistry. The findings point to water rock interactions that can give rise to additional carbon sequestration capacity. In other words, the composition of the substrate is key in determining the potential for CO₂ drawdown, as only weathering of particular minerals results in a long term CO₂ sink.

Results to date indicate that the stream water chemistry can be significantly influenced by weathering of the underlying substrate during lower flow periods. Moreover, stream water chemistries vary between the sites and reflect the material present in the substrate at each location. Results suggest that relatively high quantities of weathering derived ions are being output annually from these catchments. The next stages of this project will model the results of water quality analyses arising from bog waters coming into contact with underlying material, to estimate the quantities of atmospheric carbon drawdown that can be attributed to these weathering processes. More generally, this study will allow comparison of weathering processes between peatlands which are more degraded and those which are in a good condition (Figure 3). This, in turn, will be used to investigate whether the conditions on intact peatlands are more conducive to higher weathering rates, and therefore more effective at promoting inorganic weathering that sequesters CO₂.

This issue is a neglected area of peatland research and the findings are contributing to knowledge of blanket bog hydrology and the potential influence that weathering in these environments may have on stream water chemistry, atmospheric carbon levels and climate change mitigation.

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Out of the dark, into the light: Greenhouse gas fluxes from boreal permafrost peatlands fueled by warming, wildfire and thermokarst

Permafrost than increases nitrous oxide uptake, whereas wildfire reduces nitrous oxide uptake.

y research project is led by Dr. David Olefeldt at the University of Alberta's Department of Renewable Resources. His Catchment and Wetland Science Chair focuses on biogeochemistry in peatland regions within the Boreal Subarctic.

In September 2018, I started my Ph.D. studies on the greenhouse gas balance of boreal peatlands in the Taiga Plains Ecozone.

My aim is to determine the main effects of wildfire and permafrost thaw at the landscape level. In



my first year of fieldwork I measured nitrous oxide emissions using the static dark chamber technique from variously disturbed peatland stages around Lutose and Smith Creek.

With the focus on the latter site, my future research will analyze eddy covariance measurements. In a final investigation, upscaling our lab's greenhouse

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gas flux data by GIS techniques will help me predict future changes in the net radiative forcing on an ecozone scale.

Abstract

Increasing temperatures in the Taiga Plains in Northwestern Canada are causing more frequent and more intense disturbances in boreal permafrost peatlands. This threatens the stability of these globally significant stores of carbon and nitrogen. Resultant increased rates of permafrost thaw affect the greenhouse gas balance of these peatlands through a higher frequency and increased severity of wildfires and the development of thermokarst features where the ice-rich permafrost ground collapses into watersaturated bogs or lakes.

The developing landforms are characterized by differences in soil temperature and moisture conditions, thaw depth, pore water chemistry, and vegetation composition. While the consequences of these transformations for both carbon-based greenhouse gases (carbon dioxide and methane) have been investigated intensively, the effects of wildfire and thermokarst on nitrous oxide fluxes from permafrost peatlands are poorly understood.



We expect higher nitrous oxide emissions in burned areas compared to thermokarst-affected areas, due to the more substantial disruption in vegetation growth post-fire vs. post-thaw. The anaerobic conditions following permafrost thaw and consequently the lack of nitrate, may further inhibit nitrous oxide emissions. The results of this study will help us understand which of the two disturbance types intensified by warmer temperatures has a more significant impact on the nitrous oxide fluxes of northern permafrost peatlands.

Methods

We carried out flux measurements using static chambers on soil collars at the peatland sites and using floating chambers on the ponds. We were looking for differences in greenhouse gas exchange from selected post-fire and thermokarst stages compared to intact permafrost peat plateaus and pond edges. To reveal the interaction between surface fluxes and belowground nutrient cycling, each flux campaign was accompanied by pore water sampling using Rhizons[®] (Rhizosphere Research, Netherlands) on a stage level.

Nutrient supply rates on a collar level were sampled by PRS[®] probes (Western Ag Innovations, Canada) inserted in mid-July for 40 days. To look more closely at the biogeochemical processes in the peat during peak season, we sampled for soil gases at both thermokarst transects, covering four depths (2, 5, 10, and 20 cm) at each of five replicates per peatland stage. This study was accompanied by a peat coring campaign, which will later be analyzed for macrofossils to get insight into the peatland development history.

Preliminary Results

Permafrost thaw and wildfire alter hydrological and soil temperature conditions which control the peatlands' nitrous oxide balance. We observed that permafrost thaw increases nitrous oxide uptake, whereas wildfire reduces nitrous oxide uptake.

An important driver of this increased nitrous oxide uptake is soil temperature at 5 cm depth, similar to soil respiration flux. Like the carbon-

Disturbance	Stage	Site	Water table depth (cm)	WFPS (%)	Thaw max (cm)	Tsoil, 5cm (°C)	Tsoil, 20cm (°C)	Tsoil, 40cm (°C)
Wildfire	Burn 2019	Steen River	38	15	62	17.6	7.4	2.7
Wildine	Burn 2007	near Lutose	43	20	81	14.4	7.7	4.4
Intact	Peat	Lutose	frost table	17	59	14.2	6.4	2.1
maci	Plateau	Smith Creek	38	16	36	9.7	3.1	0.2
	Plateau	Lutose	28	26		13.8	8.6	6.5
	Edge	Smith Creek	8	48		8.6	4.1	1.5
Thormokorot	Young	Lutose	12	87	thawed out	14.6	13.1	11.7
memokaist	Bog	Smith Creek	0	100		12.0	9.3	6.8
	Mature Lutose 34	34	19		13.8	9.8	7.9	
	Bog	Smith Creek	3	77		14.1	11.7	10.4

Table 1: Summary of soil parameters in the peak season from July - August 2020. Source: Schulze (unpublished data)

based greenhouse gases, the measured nitrous oxide fluxes present a seasonal pattern, peaking around June, July, and August. Investigating soil gas production at depth, revealed that the concentrations of nitrous oxide and methane follow the opposite pattern to the surface fluxes: nitrous oxide uptake driven by below ambient conditions, corresponds to higher methane concentrations governed by water table depth.

Acknowledgment

I want to thank the International Peatland Society for awarding my work the Allan Robertson Grant 2019, which helped me finance the fieldwork expenses in the remote peatlands of the Taiga Plains in Northwestern Canada. Furthermore, my colleagues Liam, Kenzie, Lauren, Becca, Julia, as well as our undergraduate assistants Theresa, Esly and Erik are always very supportive in any situation, be it in the lab or in the field. Last, but not least, I am grateful for the help from both of my supervisors, David Olefeldt and Oliver Sonnentag.

Please find more information on this study under astm6-agu.ipostersessions.com/Default. aspx?s=79-EE-E4-5A-20-34-E0-E7-C1-21-9F-15-19-75-E5-20

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New Members of the IPS

New members (or new contact persons for corporate 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 1 August 2020).

Individual members: Ireland: Howard Cross

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Mercury export from thawing permafrost peatlands

he summer of 2019 marked a long, tough, yet enjoyable first field season of my graduate thesis on mercury release from thawing permafrost peatlands.

Looking back on it, I am very grateful that I was able to spend so much time in the field collecting data which has cushioned the blow of fieldwork disruption due to the COVID-19 pandemic. My primary research sites are permafrost peatland catchments in sub-arctic western Canada, on the land of Dene and Métis people from the Dehcho. These peatlands are undergoing rapid permafrost thaw that displaces treed permafrost plateaus in favour of expanding fens, bogs, and lakes (Photo 1). With permafrost thaw, carbon and mercury that has been locked into permafrost for millennia suddenly become mobilized into





the aquatic environment. I am interested in the release of mercury and the possibility for transformation by microbes into neurotoxic methylmercury. Thaw fens, bogs, and lakes have been shown to have conditions just right for enhancing microbial methylmercury production.

The increasing hydrological connection between these thaw features and downstream rivers may send the toxin all the way to the ocean, entwined with dissolved carbon as a carrier. Methylmercury has the ability to infiltrate aquatic microorganisms, magnifying in concentration as it moves up the food chain to top predators like fish. In northern Indigenous communities, fish is both a nutritious and culturally important food source, and eating fish contamination by methylmercury poses harmful health risks. Understanding the dynamics of methylmercury in thawing permafrost peatlands is an important task given these public health implications.

I had two primary objectives for my 2019 fieldwork, supported by the Allan Robertson Grant via the International Peatland Society. My first was to examine seasonal patterns of methylmercury in two streams fed by thawing peatlands. I set up high frequency sampling stations at Scotty Creek near Fort Simpson, NT and Smith Creek near Wrigley, NT. A spectro::lyser in each stream collected a snapshot of stream light absorbance, an indicator of dissolved carbon, every three hours from April to September, accompanied by bimonthly sampling of methylmercury (Photo 2).

I am currently exploring the relationships between the light absorbance, dissolved carbon, and methylmercury data. Despite the closure of NT borders this summer, the sampling campaign is continuing in collaboration with Dehcho-AAROM (Aboriginal Aquatic Resources and Oceans Management), where community members will monitor the streams and collect water samples.

My second objective was to travel a 1700 km transect from northern Alberta to the Arctic Ocean, sampling ponds and streams in peatland catchments to compare methylmercury concentrations in regions with varying permafrost conditions. I used a "space for time" method



where southern sites can act as an analogue for eventual conditions of more northern sites as permafrost thaws. Our research team (Photo 3) had a wonderful time exploring methane, microbes, and mercury in permafrost peatland catchments despite having to carry a formidable quantity of equipment on our bags as we walked through seemingly endless bogs and fens.

I have presented these data at the American Geophysical Union Fall Meeting and am further exploring the results - permafrost conditions do not seem to explain methylmercury patterns in the streams and ponds. Instead, local land cover and water chemistry seem to have a greater influence. I greatly appreciate the support from the Allan Robertson Grant, which helped offset sampling equipment costs. Remote field sites in Northern Canada are logistically challenging and expensive to access, but understanding the biogeochemistry of mercury in thawing peatlands is important given potential human health risks.

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A Fieldwork Experience in the Tropical Peatlands of Central Kalimantan, Indonesia

Ithough the riverbank was less than one hundred metres away it was barely visible. The brown river water merged with the thick brown smoke haze that enveloped us in our boat. The usual view of people going about their daily lives fishing, washing or chatting on the riverbank was hidden behind the dense curtain of haze.

In any case, most people weren't out today, but had stayed at home to try to find some refuge from the haze, even though most live in unsealed timber cabins that provide no real barrier. With the sound of the outboard motor thrumming in team was travelling to a remnant patch of tropical peat swamp forest on the Mawas peat dome in Central Kalimantan on the island of Borneo to conduct fieldwork. The annual peat fires, which are the cause of the haze, were smouldering across the landscape.

This fieldwork was part of my PhD, which investigates the effects of peatland degradation and restoration on the physical and chemical properties of peat. 'Degradation' and 'restoration' are relatively benign words when you read them on a page. But when you experience the personal, physical effects of peatland 'degradation'

our ears and the haze prickling our eyes, nose and throat, and without strong visual features to orientate oneself, hurtling along the river felt surreal, like we weren't really moving forward.

We'd edge toward the riverbank and see the looming outline of some forest or building; a landmark to keep us on track.

This was part of my journey to a field site in the Indonesian peatlands in September 2019. Our



Burnt, degraded peatland on the journey to the field site. Photo: Amanda Sinclair



in Indonesia, when the smoke from the peat fires hurts your eyes and throat, the truth of 'degradation' and the importance of 'restoration' take on a whole new meaning.

Fortunately for our team, our field site was north of the worst peat fires, and so once we made our way through the haze we enjoyed the relief of some relatively fresh, clean air.

But the same can't be said for the millions of people who must live through what has become an annual 'haze season' in these regions. It illustrates the truly urgent need to address tropical peatland degradation in Indonesia.

Southeast Asian peatlands are some of the most significant tropical peatlands worldwide, storing approximately 68.5 Gt of carbon across 247,778 km² ¹. Sadly, only 6% of tropical peat swamp

forest across Southeast Asia remained in pristine condition as of 2015².

In Indonesia, the smoke haze is a product of deforestation and drainage; people start fires for various purposes such as land clearing, cooking and hunting, and in drained peat these fires are difficult to control and can smoulder above and



below ground for months until the rainy season starts and properly extinguishes them.³ Another less visible but important consequence of tropical peatland degradation is the vast quantity of greenhouse gas emissions resultant from oxidation of the drained peat.⁴

Encouragingly, peatland restoration efforts have taken off across the country, with efforts to



revegetate landscapes and reverse draining through canal blocking. My PhD research is part of a large collaborative project called "Gambut Kita: Improving community fire management and peatland restoration in Indonesia", in which the Forestry and Environmental Research Development and Innovation Agency of the Government of Indonesia, the Australian Centre for International Agricultural Research and multiple other Indonesian and Australian organisations have partnered to deliver outcomes supporting President Joko Widodo's mandate to restore two million hectares of degraded peatland by 2020.

In the dry season of 2019, I worked with the Borneo Orangutan Survival Foundation (BOSF) Mawas team to take peat samples from the Mawas peat dome. These samples will be used to understand how peat physical and chemical properties change when peatlands are degraded and subsequently restored through revegetation and rewetting.

This is an important part of accurately monitoring the progress of restoration efforts, whilst also managing degraded peatlands awaiting restoration. I was grateful to receive the Allan Robertson Grant in 2019, which helped cover costs associated with my fieldwork. I started this article with a rather sobering memory of my fieldwork. Some other memories include the unwavering good-humour and generosity of my Dayak field team of Dayaks (indigenous people of Borneo). Their knowledge of peatlands is extraordinary, and I learnt so much from them about the peat, forests and rivers that were our home whilst in the field.

I also will never forget the hilarity of the midnight attack of ants in the bush-kitchen, catching giant centipedes to use as bait for fishing after fieldwork, picking kalakai (a native fern) on the walk back to camp to cook up for dinner, and





swimming in the clear, cool river after a day up to our thighs in muddy peat-sampling pits.

My fieldwork was an extraordinary experience, and I am grateful to the International Peatland Society for the Allan Robertson Grant that helped to support it.

My sincere thanks also to my Indonesian and Australian Gambut Kita colleagues for their support throughout my PhD.

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Rehabilitating the Southeast Pahang peatland landscape with the Jakuns

he Jakun, Bateq, Temuan, Mah Meri and Semai are some of the many tribes of Orang Asli or indigenous people in Malaysia. In 2018, there were about 178,000 of indigenous peoples in Peninsular Malaysia, equivalent to about 0.6% of the country's population [1].

Like many other indigenous groups in the world, these indigenous peoples are a minority in Malaysia, and they are facing issues such as land dispossession, disempowerment from their native rights and lack of necessity. In the prism of the world's climate crisis, they are the first to face the direct consequences of climate change, owing to





their dependence upon - and close relationship with - the environment and its resources. Climate change exacerbates the predicament in which this vulnerable community finds itself.

Nevertheless, the cultural nexus of the Orang Asli people, with their land and ecosystems, has been incredibly strong and resilient. This factor is imperative for conservation. One study found that forested areas managed by local communities see less deforestation, compared to protected forest [2].

Therefore, their involvement could help to enhance the resilience of their surrounding ecosystems. Their interpretation and reaction to the impacts of climate change in unorthodox ways, drawing upon traditional knowledge and other technologies, may help us find solutions which could benefit society at large in terms of adapting to and mitigating impending changes.

As an environmental NGO that advocates for sustainable management of peatland, spearheading peatland rehabilitation and conservation initiatives with community involvement, the Global Environment Centre (GEC) embarked upon an initiative in 2018 to rehabilitate degraded peat forests and prevent fire in peat swamp forests (PSFs) in Pahang, with indigenous community participation from the Jakun tribe.

Pahang has the largest peatland landscape, with approximately 230,000 hectares, which include 108,920 ha of PSF in Permanent Reserved Forests (PRFs) and 122,000 ha of private plantations, village and state land [3].

In 2019, the Department of Orang Asli Development (JAKOA) recorded that the peatland area inhabitants numbered more than 9,000 indigenous Malaysians, mostly Jakun. More than 63% of Malaysia's peat swamp forests have already disappeared due to land clearing for agriculture, plantation and development [4].

Confined to a shrinking forest landscape, the Jakuns are a vulnerable community, living in 19 villages scattered along the fringe of the forest. One of these villagers is Tanjung Kelapa, nestled on the western boundary of Southeast Pahang Peat Swamp Forest (SEPPSF) and palm oil plantations.

Members of the Jakun community in the Tanjung Kelapa village live in impoverished conditions with almost no basic necessities, and water resources are limited. Peatland forest fire has affected the culture and lifestyle of these forest-dependent inhabitants in terms of food, medicines, water and other resources. Although fish are the main source of food, the fish population has been reduced due to degradation of the peatlands and contaminated water. Vegetable cultivation has also been impeded due to lack of water resources.

While protection of the PSF from degradation is important, we believe immediate assistance must be given to these people to improve their living conditions before empowering them through rehabilitation efforts targeted at adjacent forest land.

Improving the living conditions

Convincing the Jakuns was not an easy task as we are strangers to them. Distrust and reluctance were the main barriers. After six months of repeated consultations and meetings, the Tok Batin (community leader) accepted our proposition because he knew that this would help them to protect the PSF, their livelihoods and their living environment.

A prominent issue in this area is that none of the houses built have electricity. The inhabitants use kerosene lanterns and firewood for their lighting needs. Kerosene lanterns are a major fire hazard; they provide poor quality light and people are at risk of respiratory illness due to indoor air pollution. With support from GEC funding providers and partners, we managed to distribute 50 solar lamps, benefiting 25 families in the indigenous community, and we installed three solar systems, generating a total of 1500 watts of electricity to power up household appliances and water pumps, to access a clean water supply, benefiting 11 families.

Supported by government agencies, we organized a series of capacity-building training to empower and enrich these people with entrepreneurship knowledge and skills, and to help them become self-sufficient. Backyard nurseries, fish farming, beekeeping and *mengkuang* weaving are among the main livelihood activities introduced. It is hoped that these economic activities will elevate their current income of less than USD95 a month.

Mak Nyap is one of the most successful women in this community. In 2019, she started out with 500 wildings collected from the forest, raising them in her backyard for the rehabilitation activity. Now, she has more than 2,000 wildings and seedlings, and currently implements a sapling buyback system. This system allows her to earn money by selling the plants to interested parties. Supported by the State Department of Fisheries, she has also established a catfish farming business, which enables her to sell fish to nearby communities.





After half a year of operating her business, she now has the capacity and resources to increase fish production to meet the growing demand from her customers.

Women in this community have also benefited from mengkuang training. Handicraft training





was given to them, teaching them to weave the *mengkuang* leaves into baskets and mats, as well as Jakun's traditional *Epok* and *Keban Gila* handicrafts, which will be sold to the locals.

Sales of the handicrafts will help to support these indigenous artisans and preserve the peatland area, which is abundant with *mengkuang* plants of the *Pandanus* species.





Lan Asa is from one of the three families that have established *Kelulut* (stingless bee) farming.

The farming not only helps his household income but is also used for self-consumption, to add nutritional value to his family's daily diet.



Honey from stingless bee.

Rehabilitating the degraded peatlands

In Malaysia and the Southeast Asia region, peatland degradation and fires are two major sources of greenhouse gas (GHG) emissions. The cause is extensive peatland drainage and fires linked to human activities, including land clearing, peatland draining and poaching.

PSF is a unique ecosystem. In nature, the forest represents a unique wetland ecosystem that supports highly specialized species and is thus





The brown shaded area in the first photo is the degraded area of the peatland forest (caused by a forest fire outbreak between September and October 2018).

Since then, the GEC and the local community have been rehabilitating the degraded area, restoring its hydrological function by building canal blocks and consistently monitoring to prevent fire occurrences (see the right-hand photo, which illustrates the difference).

very important for the conservation of biological diversity and storing freshwater resources. It also serves as a carbon sink (having the ability to sequester and store atmospheric carbon for thousands of years).

In recent years, however, PSFs in Malaysia have been continually exploited for their timber resources and subsequently cleared for agricultural and land development purposes. Poor management of forested areas has resulted in

peatlands being drained and left dried, leading to oxidation of the desiccated topsoil, which has, in turn, produced tons of GHG emissions. On top of this, a drained and degraded peatland is more susceptible to fire. Smoke from peat fires has resulted in haze problems, which have had a huge impact on the economy, politics and also public health.

In the case of the Southeast Pahang Peat Swamp Forest, 170 hectares of the forest land adjacent to Tanjung Kelapa village have been degraded due to land-use change. Through a series of assessments, we found that canals that were built to drain peat water from previous logging activities are one of the causes of the degradation.

All hands on deck were needed to tackle the prevalent issues related to peatland management in the forested area. Hence, the GEC initiated a multi-stakeholder partnership, consisting of government agencies, corporates and local communities, to develop a long-term programme that consists of an integrated landscape approach to implementing rehabilitation activities in the



degraded peatland forest and preventing peat fires, to reduce GHG emissions and support sustenance of the indigenous community.

As a result, 10 canal blocks have been constructed to re-wet 1,500 hectares of degraded peatlands. Through continuous monitoring and assessment, there has been a very positive impact on the water table, promoting natural regeneration of peat vegetation species, including sedges and tree species, in the degraded area. This is evident from the "before" and "after" photos captured through the aerial survey.

To facilitate conservation and rehabilitation efforts, in March 2019, the Jakuns formed a communitybased organization known as the Friends of Kampung Tanjung Kelapa Peat Swamp Forest or *Sahabat Hutan Gambut Kampung Tanjung Kelapa* (SHGKTK) in *Bahasa Malaysia*. They are actively involved in collecting wildlings and raising them in a community nursery that will be planted at designated peatland areas within the forest reserve. To date, the SHGKTK, together with employees of the IOI plantation, have planted about 5,000 wildlings raised from the nursery (covering an estimated 10 hectares of the degraded forest area).

Members of the SHGKTK have also been appointed as fire patrollers to monitor fire-prone peat areas. They were given training to help them understand the root causes of fires in this area and develop a range of fire-prevention solutions, which include installing "Fire Danger Rating System" (FDRS) signboards and water-level markers, to monitor the peat water table and enable proactive steps to be taken prior to fire occurrences.

Moving forward

The Jakuns of Tanjung Kelapa are now more receptive to ideas that could help them improve their living standards and protect their living environment. They are also keen to take the lead and amplify conservation efforts among other Jakun-tribe communities living in different villages along the forest fringe. Against this backdrop, we hope that more corporations, government agencies and funding agencies will step forward and support this initiative.

Funding providers and partners in the rehabilitation activities, community welfare and livelihood activities are as follows: the Jakun Orang Asli; Pahang State Forestry Department; JAKOA; Pekan District Office; Department of Agriculture; Department of Fisheries; other government agencies, social enterprises and the Bursa Malaysia Foundation; IOI Plantation; Bunge Loders Croklaan; Ladang Seri Jelutong; UNDP Orang Asli Micro Grant Facility; and the International Fund for Agricultural Development (IFAD).

About GEC

The Global Environment Centre was established in 1998 to work on environmental issues of global importance. It is a non-profit organization which works regionally and internationally to support information exchange and capacity building. Find out more about our work at www.gec.org.my or call +603 7957 2007. 2nd World Peatlands Day 2 June 2021 Join us!

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Online workshop: Exploring criteria and indicators for tropical peatland restoration

n 2nd September 2020, the Centre for International Forestry Research (CIFOR), in collaboration with the Indonesian Ministry of Environment and Forestry (MoEF), Peatland Restoration Agency (BRG) and the International Tropical Peatlands Centre (ITPC), held the first of four online workshops, on 'Exploring the Criteria and Indicators for Tropical Peatland Restoration'.

The Food and Agriculture Organization of the United Nations (FAO), UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), and Global Peatlands Initiative (GPI) are international partners in this effort. The main objective of this workshop was to discuss suitable methodologies and identify key contributors for identifying/selecting appropriate criteria and associated indicators for peatland restoration monitoring.

Background

Indonesian peatlands, including peat swamp forests, comprise 36% of the world's tropical

Screeshot of the webinar website.

Online Workshop Series Exploring Criteria and Indicators for Tropical Peatland Restoration

2 September 2020, 1.30-4.00 PM (GMT+7)



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peatlands by area. In natural condition they provide important ecosystem services, including sequestration and storage of carbon. Despite their important benefits, Indonesia's peatlands have suffered from deforestation and drainage since the 1980s, mainly for plantations and agriculture.

Greenhouse gas (GHG) emissions caused by peatland degradation and fires have placed Indonesia amongst the top five global emitter countries. In its Nationally Determined Contribution (NDC) under the UNFCCC Paris Agreement (2015), Indonesia has committed to restoring more than 2 million hectares of degraded peatland to reduce GHG emissions.

Peatland restoration needs to be underpinned by monitoring that allows an adaptive approach. Peatland monitoring, guided by science-based practice, will increase transparency, and ensure accountability of reporting under the United Nations Framework Convention on Climate Change (UNFCCC). A scientifically robust, reliable, simple, and practical set of criteria and indicators (C & I) will help to assess progress and measure outcomes of restoration efforts. Identified C&I should cover four aspects: (1) biophysical, (2) social, (3) economic, and (4) governance.

Objective

The main objective of this initial online workshop was to identify key contributors and suitable methodology for selecting criteria, and associated indicators based on characteristics such as relevance, ease of application, responsiveness, representativeness, consistency, and sensitivity to local conditions.

A panel of experts presented information and discussed specific topics in the following areas:

- The principles of existing C & I in multilateral environment agreements, monitoring schemes and networks, and their implications (Session 1)
- Initial criteria and measurable indicators to evaluate restoration performance: biophysical, economic, and social aspects (Session 2).

There was a moderated general discussion session with questions and recommendations. Expected outputs included: Set of validated C & I to monitor and assess peatlands restoration success; Participants familiarised with validated C & I; Knowledge exchanged, through discussions, on scientific ways to use a C & I approach for monitoring and evaluation of peatland restoration.

Webinar

The webinar was opened by Daniel Murdiyarso of CIFOR who outlined the purpose of the meeting and introduced the speakers and expert panel. He also mentioned that the subject of this webinar would have been presented at the 16th International Peatland Congress in Tallinn in June 2020, had it not been postponed until May 2021 owing to Covid-19.

The keynote address was given by Alue Dohong, Vice Minister at the Indonesia Ministry of Environment and Forestry who presented his Government's view of peatland restoration, and the determination of President Jokowi to address the problems and reduce peatland greenhouse gas emissions.

This was followed by a presentation by Nazir Foead, Head of the Indonesia Peatland Restoration Agency who outlined the work of his organisation, and some of its activities towards restoring two million hectares of drained peatland. He mentioned his teams were working at both landscape and village levels and were educating villagers on the benefits of integrating sensible peatland management into their livelihood practices. Then followed the first of two sessions - setting the scene - facilitated by Huruni Krisnawati of the Indonesia Forestry Research, Development, and Innovation Agency (FORDA) and the International Tropical Peatlands Centre. There were three presentations explaining the criteria and indicators in international multilateral environmental agreements, monitoring schemes, networks, and implications.

First up was SPM Budisusanti, Director for Peatland /degradation Control at the Ministry of Environment, and forestry. She was unable to attend in person and her presentation on the history of and progress on peatland restoration in Indonesia was given by her deputy. She was followed by Lera Miles from the UN World Conservation Monitoring Centre in Cambridge, UK who gave examples of criteria and indicators developed in the biodiversity sector, suggesting how some of these could be applied to peatland restoration. Lastly, in this session Maria Nuutinen of FAO spoke about restoration goals, the importance of natural peat swamp forest, peatland mapping, and monitoring. She also referred to the forthcoming UN Decade on Ecosystem Restoration and the importance of highlighting peatland restoration in this international programme.

The second session on potential peatland restoration criteria and indicators was facilitated by Rupesh Bhomia of CIFOR. Information was presented on possible criteria and measurable indicators to evaluate restoration performance.



The four speakers presented information on peatland restoration progress in Indonesia (achievements and challenges), together with physical, biological, and socioeconomic aspects of peatland, peat, and communities dependent on them.

Budi Wardhana, Deputy for Planning and Cooperation at the Indonesia Peatland Restoration Agency (BRG) outlined the activities of this agency since its establishment in 2015, and specifically its work with local communities.

Azwar Ma'as of Gadja Mada University, Yogyakarta provided information on the ecology, hydrology, and biodiversity of peat swamp forest. He explained the mapping of peatland hydrological units and the importance of maintaining high water tables and monitoring them, mentioning that peatland converted from natural peat swamp forest loses the ability to form and accumulate peat, so it subsides.

The possible role of paludiculture as a means to mitigate greenhouse gas emissions from tropical peatland was presented by Agustinus Tampubolon, a researcher at FORDA and Chair of its Paludiculture Forum. He stressed that local species should be used without disturbing the ecological functioning of peatland. Some concerns were expressed in the webinar chat that paludiculture would not lead to restoration unless native peat swamp trees were reintroduced because these are the peat-forming plants. Finally, Sonny Mumbunan of the University of Indonesia, provided details of case studies involving drain blocking, water table monitoring and mapping.

Following these detailed and intensive presentations there was a short period for discussion, followed by a closing presentation on 'The Way Forward' by Haris Gunawan, Deputy for Research and Development of the BRG. He gave a short summary of the presentations, putting them into context, and pointing towards the next webinar that will focus more specifically on peatland restoration monitoring criteria and indicators. The meeting closed after three and half hours.

Comment

Although it was said that more than 200 participants had registered and logged on, there was little interaction. The meeting was mostly top down presentations that, although informative, did not provide much that was new.

Discussion was limited and controlled. Questions had to be submitted in writing and comments could not be made verbally. The most useful interaction was via the sidebar 'chat' facility that was copied to everyone and feedback could be made.

Since I am more familiar than most people with the peatland restoration scene in Indonesia, I could follow the presentations most of the time, but I expect many participants would have been struggling to know how things related to each other. There is a lack of standardisation and understanding of some of the terms used. For example, 'restoration' means returning a degraded, drained peatland back to as near as possible its former natural condition, complete with its original ecosystem services, including peat accumulation and carbon storage. No one knows if this is possible or how long it might take. The livelihood needs of local people make this virtually impossible to achieve. Rewetting to mitigate GHG emissions is about as far as it goes.

The other word that is misused and poorly understood is 'sustainable' when applied to peatland management. In the literature, there are reputed to be over 300 definitions of sustainable and sustainability, so I do not know which one is being applied to tropical peatland. To refer to sustainable peatland management is an oxymoron, i.e. it is contradictory. 'Management' implies human intervention to do something to an ecosystem that would not happen naturally. It is an action that will disrupt and change an ecosystem's functioning, be it deforestation, drainage, crop planting or whatever, and none of these are sustainable practices.

I could criticise further, but I realise the enormity of the task the Indonesia Peatland Restoration Agency has taken on, and they need all the encouragement and support we can give them. One thing became obvious is that there is a lack of knowledge on and understanding of the nature of peatlands and peat, their ecology, hydrology, biodiversity, and relationships with climate, and more. Perhaps we need to back to basics!

Jack Rieley

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Peat Moss complete processing line: ASB Greenworld Case Study (2018)

SB Greenworld is a family run business since 1958 and is one of the leading providers in the manufacturing and the distribution of first-class garden products including potting soil and growing media for horticulture.

It is one of the biggest peat moss companies with 5 facilities in Europe and 2 facilities in Canada. ASB Greenworld exports to 72 countries worldwide. While in 1996-1997 the first production was 26,000 m³, today it reaches 450,000 m³, so that is the development that was made in the last 20 years. "In our range, we have 12 different grades of peat that we use," says Jüri Tiidermann, the Production Director. "Firstly, at the screening station we divide all raw peat into different grades and then we mix those grades in different proportions back again. Then we add the fertilizer, lime, clay perlite, all depends on our own custom-made recipe according to the customer specification. Then those materials are mixed together, add the wetting agent, and later on, the mix is forwarded for packaging."

All the mixing lines were built by ASB Greenworld themselves and lasted for more than 20 years.





half months. "Volume-wise the project of Premier Tech was the biggest one but they surprisingly succeeded and were one of the best groups that were present here on the site," added Mr. Tiidermann.

"During the project development,

However, due to the fact that quality requirements and dosage precision in the industry were increasing, they were forced to make a major investment into new equipment in order to keep their share in the market. Consequently, the company had to completely rebuild the whole factory. After thorough research of equipment vendors, their choice fell on Premier Tech Systems and Automation.

Premier Tech Systems and Automation installed a complete mixing line for ASB Greenworld, which holds 8 dosing hoppers for raw materials, which in their case was peat moss. Additionally, 5 dosing hoppers for fertilizers and line and 2 dosing hoppers for clay and perlite were installed as well. There was a very short timeframe given in order to finalize the whole project. All the infrastructure and machinery were changed in just two and a they knew what they were talking about and gave us many pieces of advices. Which means that the group was professional enough to run this project."

Due to the cold weather conditions, ASB Greenworld was losing 1 month of production every year. The reason for this was the mixing line not getting heated enough and the hoppers working at negative temperatures.

With the new complete heating system installed throughout the whole factory of 6,000 m², the problem has been solved. The company was planning to build winter storage for all the materials used on a daily basis independent from the temperature. So Premier Tech Systems and Automation provided the company with a box loading system to create internal storage.



The company had to choose equipment that would answer the needs of the present day to minimize the labor cost and to bring them to the next level of automatization. So they bought the VP-410 baler from Premier Tech. "From my point of view, there is no alternative for the

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present day that is comparable to that baler," says Mr. Tiidermann. "It's very easy to handle, very easy to change products, to change packaging bags. It takes only 10-15 minutes and we are back live again."

Nowadays more and more customers require private labels, or the companies are getting merged, they are going bigger and they want to represent their brands in the market. The baler VP-410 gives you a very simple possibility to change from product to product just within 10-15 minutes. Furthermore, the cleanup of the machine is very simple as well. In ASB Greenworld's case, they have many fill-and-form machines for other purposes (for loose bags and half compressed bags) but the Production Director explained that change for those machines takes way longer than for the 4 stations baler from Premier Tech. One of the problems the company has is that customers do not always order in advance and ahead of time, but usually they order the last moment and want to have the product immediately.

This requires the company to react in the next few hours. With the new solution from Premier Tech, they have the possibility to react much quicker on the market requirement, logistical requirements, etc. This complete installation has increased

ASB Greenworld's production capacity for around 30%.

"The first piece of equipment we purchased from Premier Tech was a Vacuum Harvester back in 1996, so I know this company for more than 20 years," says Mr. Tiidermann. "The experience of the company is there, they know what they are doing and that gives an advantage when we choose equipment even for the future projects. We have big plans for expansion."

Eliza Mammadova

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Peat and Peatland Events

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

IPS Scientific Advisory Board Meeting 22 September 2020, online

United Nations Summit on Biodiversity "Urgent action on biodiversity for sustainable development" New York, USA & online 30 September 2020 www.un.org/pga/74/united-nations-summit-onbiodiversity

IPS Executive Board Meeting 13 October 2020, online

9th Asian Wetland Symposium Suncheon, South Korea 23 - 27 November 2020 http://rrcea.org

IUCN World Conservation Congress Marseille, France 7 - 15 January 2021 www.iucn.org

IV. ISHS International Symposium on Horticulture in Europe (SHE)
Stuttgart, Germany
8 - 12 March 2021
https://she-ihs-fav2020.de

16th International Peatland Congress 2nd Global Peatland and Peat Industry Summit Tallinn, Estonia 2 - 7 May 2021 www.peatlandcongress2021.com

Tenth International Symposium on Land Subsidence (TISOLS) Delft-Gouda, the Netherlands 17 - 21 May 2021 www.tisols2021.org Convention on Biological Diversity COP 15 Kunming, China 17 - 30 May 2021 www.cbd.int

2nd World Peatlands Day 2 June 2021, online www.peatlands.org/event/world-peatlands-day

9th SER World Conference on Ecological Restoration and Québec RE3 Conference 2021 "From Reclaiming to Restoring and Rewilding" Quebec City, Canada 19 - 24 June 2021 www.re3-quebec2021.org

ISHS-IPS II International Symposium on Growing Media, Soilless Cultivation, and Compost Utilisation in Horticulture Ghent, Belgium 22 - 27 August 2021 www.ishs.org/symposium/712

SER Europe: 2021 Conference Alicante, Spain 31 August - 4 September 2021 https://sere2020.org

AsiaFlux Conference 2020 Kuching, Sarawak, Malaysia 21 - 23 September 2021 www.asiaflux.net

UNFCCC COP 26 CMP 16 CMA 3 Glasgow, Scotland, United Kingdom 1 - 12 November 2021 https://unfccc.int

German Peat and Humus Day 2021 Bad Zwischenahn, Germany 4 November 2021 www.ivg.org/veranstaltungen/deutschertorf-und-humustag

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