

elsewhere, is richer in carbohydrate moiety and is more oxygenated. Results of UV-Vis analyses suggest the prominence of aliphatic components while the relatively lower range of molecular weights found suggests the dominance of smaller-sized humic molecules. These structural attributes suggest that the HS occurring in the tropical peat of Sarawak (and possibly elsewhere) may exhibit a strong complexing capability.



A logistics road in sago plantation

Published data on biomass production and turnover in different ecosystems indicates annual biomass production of agricultural crops, especially perennial crops, to be greater than those of tropical forests and CO₂ emissions from tropical forest to be higher than from a number of perennial crops. The agronomic life of the peatlands can thus be sustained or prolonged by adopting the right choice of crop mix that will maximize carbon assimilation through rapid vegetative growth and appropriate surface residue management under controlled drainage. An experiment was conducted in the Dalat Sago Plantation to explore the possible use of sago palm residues to partially offset or mitigate the peat subsidence. Emissions of CO₂ (an indirect measure of the peat subsidence due to organic matter decomposition) from plots having four levels of surface placement or mulching with vegetative residues (0, 1.2, 2.4 and 3.6 kg/m² of dry frond leaflets) were periodically monitored. Data gathered during a period of six months did not indicate any correlation between the rate of CO₂ emission and levels of vegetative surface placement. Thus, one strategy to mitigate the impact of peat subsidence and loss of carbon is to sustain high crop production levels and to retain on site the maximum amount possible of the vegetative residues.

The third aspect of the program includes activities related to the rehabilitation of large-scale (commercial) plantings of sago on deep peat in Mukah Division. Sago, a little known plant, has traditionally been grown on mineral soils and shallow peat in a low-input production system. Large scale plantings on deep peat face major production constraints, in particular the poor ability of the palms to develop trunks. Studies are being conducted to gain comprehensive and deeper understanding of the palm species as an agricultural crop and in overcoming the various production constraints. Crop analyses of trunking and non-trunking sago palms in the plantations and neighbouring smallholdings on shallow peat provided information on biomass allocation with age and early insight into the dynamics of mother palm and sucker relationships. Peat soil investigations pointed to the possible positive correlation between sago palm performance and the stage of humification. Palm performance was better on shallower peat and where there was regular fluctuation in the water table compared to continuous waterlogged conditions. While large leaf area index was achievable under natural unfettered growth, pruning and desuckering favoured trunk development. These results have significant implications on sustainability of the production system. In particular, computation of biomass production suggests a likelihood of achieving high production, part of which could be returned to the soil to offset peat decomposition.

As almost all the peatlands of Sarawak are located in the populated coastal lowlands, an important question is how do local communities living on and around peatlands sustain their livelihood? A case study has been conducted to determine the socio-economic conditions and livelihood strategy options of the communities living on peatland in the Mukah watershed. From a descriptive survey on a sample of 300 respondents from seven villages, strategies and recommendations are being formulated on how to further develop and sustain the livelihood of the local communities in order to prevent further degradation to the peatlands they inhabit.

Researchers: Prof Wan Sulaiman, Prof Murtedza Mohamed, Prof Peter Songan, Assoc. Prof Gabriel Tonga, Assoc Prof Isa Ipor, Dr Petrus Bulan, Sim Siong Fong and Hafsah Nahravi

Conference proceedings available

The conference proceedings from the International Symposium and Workshop on Tropical Peatland, held in Yogyakarta, Indonesia last August, are available from the Publications section of the CARBOPEAT website (www.carbopeat.org). In addition, selected papers on tropical peatlands from the 13th International Peat Congress, held in Tullamore, Ireland in June 2008, will shortly be available in the same area.



Carbon–Climate–Human Interactions in Tropical Peatlands: Vulnerabilities, Risks & Mitigation Measures

CARBOPEAT News

Issue 5 August 2008, Kuching Symposium and Workshop Edition



A European Union (EU) funded project involving partners from both the EU and Southeast Asia. The aim is to promote better understanding and awareness of the issues surrounding carbon-climate-human interactions in tropical peatlands.



Welcome to this special edition of the CARBOPEAT newsletter published to coincide with the International Symposium and Workshop on Tropical Peatland in Kuching, Sarawak, Malaysia. For this reason, this issue has a Malaysian focus, starting with a report, from Profs Murtedza Mohamed and Wan Sulaiman Wan Harun, on an inter-agency meeting in Sarawak and ending with a description of the work of UNIMAS. Elsewhere, Dr Sarah Jewitt provides an outline of the work of Working Group 5 (*Policy Guidance on Tropical Peatland Carbon–Climate–Human Interactions*) and we preview a few of the presentations by CARBOPEAT partners at the Kuching meeting.

Dr Chris Banks, Leicester, August 2008

Inter-agency Dialogue on Peat Research in Sarawak

An inter-agency dialogue focusing specifically on the future direction of peat research in Malaysia in general and Sarawak in particular was held at Universiti Malaysia Sarawak (UNIMAS) on 21 July 2008. Among the 12 key researchers and stakeholders present were Datuk Sabri Ahmad, Chairman of Malaysian Palm Oil Board; Mr Chaiti Bolhassan, Permanent Secretary of the Ministry of Land Development of Sarawak; Prof Murtedza Mohamed and Prof Wan Sulaiman Wan Harun of UNIMAS and Dr Lulie Melling of Department of Agriculture, Sarawak. The meeting started with a short briefing on the four EU-funded projects, namely STRAPEAT, PEATWISE, RESTORPEAT and CARBOPEAT in which UNIMAS have or are participating.

This was followed by discussions on issues and options related to the development of peatland, with particular emphasis on its utilisation for oil palm plantation. While acknowledging the eventual unavoidable loss of peatland resources upon reclamation for agro-industrial uses, the dialogue partners regret distorted perceptions and over-generalisation of impacts presented by certain quarters. The consensus of this special dialogue include (1) dialogue partners and other Malaysian research bodies such as MARDI are to collaborate more closely in their research activities in order to maximise the outcome and impacts, and as well avoid duplications; (2) jointly identify short, medium and long-term research focus, and (3) attend to major gaps in knowledge where there are data urgently needed to bridge uncertainties



Delegates at the recent inter-agency meeting

Contact

Dr Chris Banks
Dept of Geography
University of Leicester
University Road
Leicester LE1 7RH
UK

+44 116 2523441
+44 116 252 3854
chris.banks@le.ac.uk

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and correct misconceptions. All agencies agreed to cooperate and collaborate closely through the Tropical Peat Research Institute being established under the Ministry of Plantation Industries and Commodities.

Prof Murtedza Mohamed and Prof Wan Sulaiman Wan Harun, UNIMAS

Working Group 5

The main focus of Working Group 5 (WG5) is 'Policy Guidance on Tropical Peatland Carbon-Climate-Human Interactions'. WG5 membership comprises specialists from the CARBOPEAT International Expert Network (who have agreed to exchange ideas and information with project members). When required WG5 can call on the expertise of members of the International Advisory Group (who have agreed to observe and monitor Carbopeat's progress and forward their reports to the European Union).

Membership of WG5

Dr Sarah Jewitt, University of Nottingham (Chair)

Dr Herbert Diemont, Alterra

Dr Vo Thi Guong, Can Tho University

Dr Ir Suwido Limin, CIMTROP/IEN

Prof Edward Maltby, University of Liverpool/IAG

Prof Daniel Murdiyarso, CIFOR/IAG

Prof M Murtedza, UNIMAS

Faizal Parish, Global Environment Centre/IEN

Prof Bostang Radjaguguk, Gadjah Mada University

Prof Jack Rieley, University of Nottingham

Dr Ir Bambang Setiadi, Agency for the Assessment and Application of Technology/IEN

Mr Jaakko Silpola, IPS/IAG

Marcel Silviu, Wetlands International/IEN

Dr Fachurrozie Sjarkowi, University of Sriwijaya/IEN

Prof Wan Sulaiman, UNIMAS

Dr Jan Verhagen, Alterra

As WG5 seeks to provide policy guidance on tropical peatland carbon-climate-human interactions, it aims to gather together and promote policy-related recommendations made by Carbopeat's other four working groups. In particular, WG5 will be responsible for:

1. synthesising policy-relevant knowledge about tropical peatlands, determining the most appropriate people in European Union (EU) and developing world governments (local, state, national) to discuss carbon-climate-human related policy issues and transferring knowledge and understanding of carbon-climate-human interactions on tropical peatland to such people
2. ensuring stakeholder participation in policy-recommendations by implementing measures to transfer policy information back to 'Stakeholder Platforms'.
3. paying special attention to public awareness of and involvement in carbon-climate-human interactions on tropical peatlands through media and press interviews and reports, and newspaper and magazine articles in local languages.

To date, a range of WG5 outputs have been achieved including the use of policy-related recommendations (formulated during the International Symposium and Workshop on Tropical Peatland held in Yogyakarta, Indonesia from 27-31 August 2007) by the Finnish Foreign Ministry while preparing the official visit of the Finnish President to Indonesia. Finland and Indonesia's Joint Declaration on Climate Change and Sustainable Forest Management draws on policy-relevant recommendations produced by the RESTORPEAT and CARBOPEAT projects. Other anticipated outputs from Working Group 5 will include:

- ◆ Dissemination of recommendations regarding tropical peatland carbon-climate-human interactions at the 14th session of the Conference of Parties (COP14) to the UNFCCC (United Nations Framework Convention on Climate Change) to be held in Poznan, Poland in December 2008.
- ◆ Production of an executive summary of the RESTORPEAT and CARBOPEAT manuals for distribution at COP14.
- ◆ The development of key recommendations for distribution to policy-makers and representatives from the Finnish, Dutch, Malaysian, Indonesian and Vietnamese embassies during the International Symposium and Workshop in Kuching in August 2008.

News Short - IPS announce Commission on Tropical Peatland

At the recent 13th International Peat Congress it was announced that the International Peat Society (IPS) are set to launch a Commission on Tropical Peatland. See www.carbopeat.org for further updates.

CARBOPEAT at Kuching

A number of CARBOPEAT partners will be presenting their research during the Kuching conference, below are brief details of just three of these.

Land use change in tropical peatlands & current uncertainties in greenhouse gas emissions Harri Vasander and Jyrki Jauhiainen, University of Helsinki

This presentation focuses on the principal human impacts on tropical peatland carbon stores and their contribution to climate change processes. It will review data on greenhouse gas exchange between tropical peat and the atmosphere, and threshold factors influencing the processes in various land use types. As there is a high rate of peatland land use change and expected changes in the regional climate of SE Asian peatlands, projections of future carbon emissions from tropical peatlands under different land use scenarios are needed. This must lead to development of best peatland management practices that can reduce carbon loss now and in the future.

Restoration ecology of tropical peatlands: Opportunities and challenges Susan Page and Laura Graham, University of Leicester

Restoration ecology is the *study* of renewing a degraded, damaged, or destroyed ecosystem through active human intervention, whilst **ecological restoration** is the *practice* of reviving the natural resource functions of degraded ecosystems, thus reinstating the environmental and economic services that these provide. The discipline of restoration ecology can be an ambiguous science because social realities are often as important to restoration plans as scientific theories and predictions. This paper will address some of the opportunities and challenges facing those involved in both the restoration ecology and ecological restoration of tropical peatlands. It will review and illustrate the current state of knowledge and consider some of the opportunities that large-scale restoration efforts could offer in terms of recovering natural resource functions of tropical peatlands and thus reinstating the environmental and economic services that these provide.

Coastal development in peatlands: a challenge or a curse – are experiences from The Netherlands useful in the tropics?

Henk Ritzema, Alterra

The Malaysian Government has identified the coastal peatlands of Sarawak as a major region for development. Innovative solutions, e.g. floating roads, buildings and structures, buildings on piles, etc., are required to reduce and counterbalance the never-ending subsidence. Higher water levels and more space for water will fundamentally change the way peatlands are being managed. Cooperation between Universities and research institutions in Southeast Asia and Europe is most relevant with respect to the coastal development as in both regions coastal areas are dominated by densely populated peatlands with the challenge of climate change, including sea level rise.

Meet the partners

Tropical Peatland Research at UNIMAS

Universiti Malaysia Sarawak (UNIMAS) has been actively engaged in tropical peatland R&D since 2002. The multidisciplinary study of the Peatlands of Sarawak focuses on wise use of peatland - covering the ecology and biodiversity of peat swamp forests, characterization of peat soils and sustainable use of peatland. Characterization is focused on the humification process - looking into the carbon dynamics, estimation of extent and carbon storage and effects on water quality. Our research looks at the impact of peat swamp forest clearance and drainage for agriculture and the mitigation of the impacts with particular emphasis on minimizing surface subsidence to extend the agriculture or agronomic life of the peat and reduce greenhouse gas emissions. This article highlights four aspects of the program demonstrating the wide spectrum of speciality within UNIMAS on peatland issues.

In the context of natural resource functions of peatland, an important attribute to sustain is the role of peat humic substances (HS) as a natural sink for pollutants. A study on the chemical characteristics of HS occurring in the peat of Sarawak and the possible relationship of their molecular structural features with pollutant complexing potentials showed that tropical peat of Sarawak has higher carboxylic and phenolic contents than peats

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