Beyond the haze

Lessons learnt from implementing the APFP in Malaysia

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Contents

Cover page:
Students celebrate World Wetlands Day 2013 by planting trees at the designated rehabilitation site in Raja Musa Forest Reserve, under the watchful eye of the Selangor State Forestry Department's forest rangers.

Foreword

The Association of Southeast Asian Nations (ASEAN) Peatland Forests Project (APFP) entitled "Rehabilitation and Sustainable Use of Peatland Forests in Southeast Asia" is a four year initiative (2009-2013) that aims to demonstrate, implement and scale up integrated management of peatlands in Southeast Asia. The project has four main objectives: (i) strengthening capacity and institutional framework for sustainable peatland management; (ii) reduction of peatland degradation; (iii) integrated management and rehabilitation of selected peatlands; and (iv) local communities and private sector involvement to sustainable peatland management.

The APFP consists of five components, i.e. a Regional Component which focuses on building a strong regional framework for partnership between all ASEAN member countries, as well as four Country Components for Indonesia, Malaysia, the Philippines and Viet Nam. The Malaysia Component focuses on the sustainable use and rehabilitation of degraded peatlands, particularly in the State of Selangor, through capacity building, fire prevention and control, local community participation, private sector partnership and demonstration of best management practices.

While the Malaysia Component was implemented according to the annual work plan and budget, a number of key lessons were learnt along the way, particularly in terms of how the effectiveness of various actions might be optimised towards achieving the intended outcomes in a large, multi-disciplinary and multi-stakeholder project such as the APFP.

In the spirit of continuous improvement, the goal of this booklet is therefore to capture the essence of the most important lessons learnt over the course of implementing the Malaysia Component, so that these lessons may be mainstreamed into sustainable peatland management practices, or re-applied to similar undertakings in the future. While some of these messages may be rather basic in nature, it must be remembered that often, the secret to success lies in getting the basics right and doing the simple things well.

Part of the North Selangor Peat Swamp Forest (NSPSF), where the pilot site is located. While most of the NSPSF falls within two forest reserves, some of the edges of the peatswamp complex have been converted to plantations and other land use.

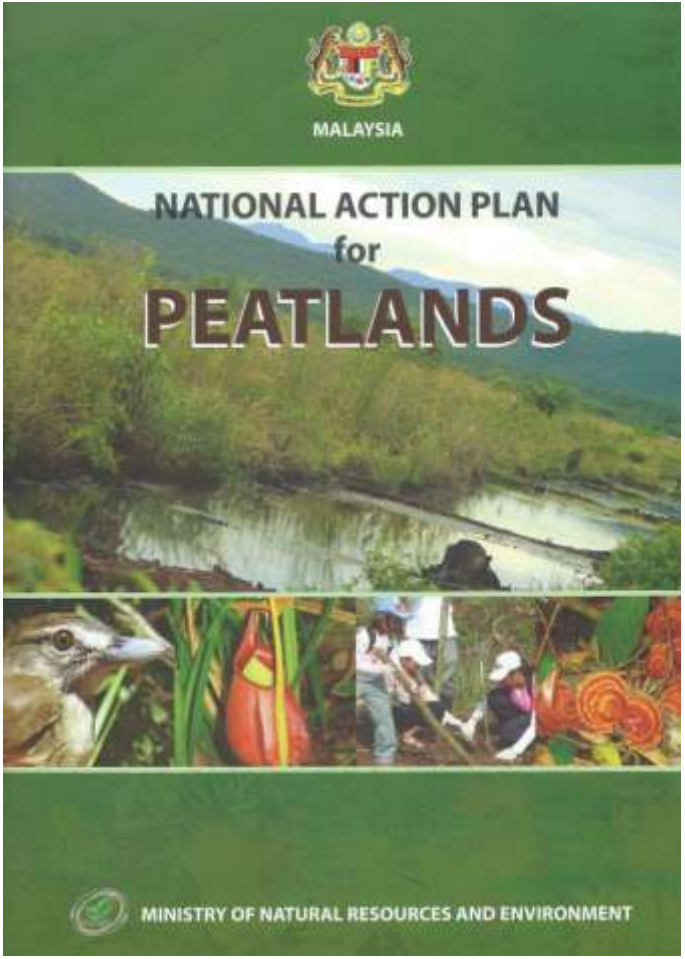
The Pilot Site

Under the APFP, each Country Component nominates one or more “pilot site” to serve as a testing ground for implementation of activities included in the National Action Plans, along with a network of “demonstration sites” to showcase good management practices for fire management, water regulation, sustainable forestry and community participation. A 4,000 ha area within the North Selangor Peat Swamp Forest (NSPSF) complex was nominated as the pilot site for the Malaysia Component, whereas three demonstration sites, i.e. the South East Pahang Peat Swamp Forest (SEPPSF) in Pahang, Loagan Bunut National Park in Sarawak and Klias Peninsula in Sabah were selected.

Half of the pilot site (2,000 ha) lies within the Raja Musa Forest Reserve, an area under the management of the Selangor State Forestry Department, while the other half falls within land that has been alienated to two State government linked entities, i.e. Selangor Agriculture Development Corporation (SADC) and Kumpulan Darul Ehsan Berhad (KDEB).

With a history of commercial timber extraction that began in the 1940s, the NSPSF, which covers an area of around 73,392 ha (consisting of two forest reserves, i.e. the Raja Musa Forest Reserve and Sungai Karang Forest Reserve), has been highly degraded over the years. In particular, the vast network of canals that were first constructed to transport the logs out of the swamp, and in latter years to drain certain areas for agriculture, had a devastating impact on the ecosystem, by lowering the groundwater table and drying out the peat soil. As a result, the forest became prone to fires, which contributed to haze events as well as the loss of the globally important carbon that was stored in the soil and above ground biomass. Poor agriculture practices and illegal encroachment, especially on the fringes, further added to the degradation of the peatswamp complex.

Concrete actions to rehabilitate the NSPSF began in 2008. All logging activities in the area were halted and a massive exercise was undertaken to remove over 500 illegal settlers from the area. In the same year, the Selangor State government, though the Selangor State Forestry Department (Selangor SFD) entered into partnership with the Global Environment Centre (GEC) to rehabilitate the NSPSF. The aim of the Raja Musa Forest Reserve Rehabilitation Programme, which began in December 2008, is to rehabilitate over 1,000 ha of degraded forest within and adjacent to the southern section of the Raja Musa Forest Reserve.



A total of 1,500 copies and 100 CDs of the National Action Plan for Peatlands were published, in both English and Bahasa Malaysia. These were then distributed to the relevant government agencies for implementation.

LESSON 1:

Plot a clear road map

Clear plans and policies, which contain goals, strategies and actions that are accepted all relevant stakeholders are critical towards setting a common vision for peatlands.

Although a number of important initiatives on peatlands, such as the GEF/UNDP-funded project "Conservation and Sustainable Use of Tropical Peat Swamp Forests and Associated Wetlands Ecosystems" had previously been undertaken, there was still a need for a clear national agenda for peatlands in the country. Therefore, one of the top priorities of the APFP in Malaysia was to develop a national-level road map for peatlands.

The National Action Plan for Peatlands was prepared through a consultative process that included all relevant stakeholders involved in peatland management. Adopted by the Malaysian Cabinet in May 2011, the plan sets out the goals, objectives, strategies for peatland management in the country, along with 78 national actions, arranged under 13 focal areas. Each action is given a priority level and a time-frame for implementation that is linked to the 5-year Malaysia Plans. Implementation of the plan is now being pursued by the various stakeholders and monitored by the Ministry of Natural Resources and Environment (NRE) as well as the National Peatland Steering Committee.

While the National Action Plan for Peatlands provides the overall framework for peatland management in Malaysia, a number of other plans have also been prepared to provide a more detailed road map at the local level, with focus on Selangor, where the pilot site of the Malaysia Component of the APFP is located. Based closely on the national plan, the Selangor Action Plan for Peatlands, sets the overall strategies, actions and responsibilities for the sustainable management of peatlands in the State.

At the pilot site level, the Integrated Management Plan for North Selangor Peat Swamp Forest (2015-2024) focuses on specific actions to be implemented (both within the forest reserves as well as on state- and privately-owned land in the buffer zones).

A blueprint for another significant peatland area in the State, i.e. the Kuala Langat South Forest Reserve has also been prepared. While not as detailed as a management plan, the blueprint sets out the overall actions that need to be taken in order to rehabilitate and protect the site.

The second meeting of the National Peatland Working Committee for 2013 was held in Dungun, Terengganu in October 2013. The meeting was chaired by the Director-General of Forestry Peninsular Malaysia Dato' Prof. Dr. Hj. Abd. Rahman bin Hj. Abd. Rahim.

LESSON 2:

Co-ordinate to ensure efficient use of resources

Peatland management is a complex undertaking, as it involves the interest and inputs of many different stakeholders including many different technical agencies, land owners, local community and NGOs. As such, an effective framework for cooperation and coordination between the various parties is critical to optimise the use of resources and efforts.

In implementing the Malaysia Component of the APFP, all of the relevant agencies involved in areas related to peatland management were brought together under two main platforms, i.e. the National Peatland Steering Committee (NPSC) and National Peatland Working Committee (NPWG). While it was soon realised that many of these agencies were already carrying out the various actions listed in the APFP work plan under their own initiatives, the NPSC and NPWG were able to increase the efficiencies of the existing initiatives, by facilitating better coordination and communication between the various parties.

As the APFP National Project Executing Agency for Malaysia, the Forestry Department of Peninsular Malaysia (FDPM) took on the unenviable task of facilitating coordination and developing synergies to link the streamline the various efforts with the APFP.

The effects of improved coordination has manifested at various levels in many of the various components of the project. An excellent example is the collective approach that has been taken to curb and suppress forest fire incidences in the pilot site.

In this, the various agencies, particularly the Fire and Rescue Department, Selangor State Forestry Department, Kuala Selangor District Office, along with the local community and Global Environment Centre (GEC) have worked well together to monitor and respond to forest fires. As a result, there have been no major fire incidences in the pilot site since the start of the APFP.

Apart from the NPSC & NPWG, a number of working groups have also been set up through smart partnerships, to look into issues affecting peatlands in the State and the pilot site in particular.

Julia Lo, Technical Officer of the Global Environment Centre's (GEC) Forest and Peatland Programme providing practical training session in 2011 to FDPM's forest rangers on sampling methods for core samples.

LESSON 3:

Work with NGOs

NGOs can provide vital expertise and resources that complement the efforts of the government. Engaging the right NGO partners can be crucial towards ensuring that project milestones are achieved.

In December 2010, the Selangor State government signed a Memorandum of Understanding (MOU) with the Global Environment Centre (GEC) to pave the way for GEC to provide technical assistance to the Selangor State Forestry Department (Selangor SFD) in areas related to peatland management and conservation for an initial period of three years.

With its vast experience in peatland management throughout the region, and especially in the rehabilitation of pilot site in the North Selangor Peat Swamp Forest (NSPSF), GEC was the perfect technical partner for this job. Perhaps more importantly however, as an NGO, GEC was able to engage with the various stakeholders, especially the public and local community living around the pilot site, in ways that a government agency cannot. For example, the success in bringing aboard local communities, volunteers and the private sector to contribute towards the rehabilitation of the pilot site and the creation of a dedicated local community group to champion the conservation of the pilot site (see Lesson 10), were due largely to the hard work put in by GEC, in marketing, publicizing and selling the concepts.

In another instance of NGO collaboration that paid dividends, the Forestry Department of Peninsular Malaysia and the Selangor State Forestry Department partnered the Malaysian Nature Society (MNS) to organise the North Selangor Scientific Biodiversity Expedition 2013.

With its strong traditions in organizing large-scale expeditions, such as the landmark Endau-Rompin and Temengor expeditions, MNS was the perfect partner for the task. Each of the agencies and MNS leveraged on their respective strengths to ensure a successful expedition. While the Selangor SFD provided manpower and resources to prepare the trails into the NSPSF and transport researchers safely to and from the research sites, MNS provided the legwork to invite and organize the scientists, prepare food and lodging at the Kuala Selangor Nature Park (a site managed by MNS) and prepare the proceedings of the expedition seminar.

HSBC Bank Malaysia Berhad is a key corporate partner in the effort to rehabilitate the NSPSF. Apart from contributing funds, HSBC staff have been mobilized to help plant trees, build dams and take part in outreach activities to raise awareness of local youths on peatland conservation .

LESSON 4:

Build public support

The tremendous support provided by civil society and the public sector towards the rehabilitation of the pilot site is clear proof that peatland conservation is a cause that can generate strong public support and action.

In 2008, the Selangor State Forestry Department together with the Global Environment Centre (GEC) embarked on an effort to rehabilitate a badly degraded area within the pilot site at the North Selangor Peat Swamp Forest (NSPSF). As a result of recurring forest fires, the area within compartments 99 and 100 of the Raja Musa Forest Reserve had lost its original forest cover, and was left covered in lalang (*Imperata cylindrica*) grass.

The rehabilitation strategy was simple; i.e. to block the canals to reduce the flow of water out of the site, and to plant pioneer tree species that would subsequently provide shade for other more valuable peat swamp species to survive.

At the heart of this effort was a massive mobilization of volunteers, the likes of which the country had not seen before. Between 2008 and 2013, almost ten thousand volunteers planted over 250,000 trees in the rehabilitation site.

Provided with a meaningful environmental cause – to help rehabilitate a degraded piece of globally important peatlands – armies of volunteers thronged the rehabilitation site each week to plant trees and build check dams. They came from many different segments of society – volunteer movements and NGOs; religious groups and government agencies; school children, college and university students, government agencies; residents of the surrounding villages and even Facebook friends; all eager to their bit for the earth.

The rehabilitation effort also managed to bring in substantial Corporate Social Responsibility (CSR) support. In addition to the efforts of the general public, 912 volunteers from various companies planted 13,635 trees in the rehabilitation site over the same period. CSR support was also important for co-funding for the Malaysian Component, which totaled USD1,203,000.00 for the period of 2009-2012. The major contributors for co-funding, apart from the Selangor State government, included HSBC Bank Bhd. and Bridgestone Tyres (M) Bhd.

An aerial photo of the clay bund that was constructed by SADC to reduce the water flowing out of the peat swamp, while also serving as a fire break between the forest and mining concession area (in the foreground).

LESSON 5:

Communicate with your neighbours

The greatest threats to the integrity of peatlands generally occur at the edges of the peatswamp complex, especially in areas where agriculture, mining or other economic activities take place. Land owners and managers in these areas must be encouraged and assisted to incorporate best management practices for peatlands into their plans and operations.

A fire broke out at the southeastern fringe of the North Selangor Peat Swamp Forest (NSPSF) in July 2012, in an area just beyond the boundaries of the Raja Musa Forest Reserve. The fire occurred in a clay mining concession area managed by the Selangor Agriculture Development Corporation (SADC), a State government owned entity. The fire was attributed to poor water control measures in the clay mining operations. Canals that had been constructed to serve as a fire break between the forest and the mining area had led to the drainage of the peat soil, thus increasing the risk of fire.

SADC had been caught unprepared when the July 2012 fire broke out – the organisation did not have any response plans, equipment or trained personnel to fight the fire. However, the Fire and Rescue Department, aided by the Selangor State Forestry Department's fire team and volunteers from the local community group Sahabat Hutan Gambut Selangor Utara (SHGSU) managed to put out the fire and restrict the damage to a 150 ha area.

This fire proved to be somewhat of a blessing in disguise. Greater co-operation was established between SADC and the relevant agencies, in particular the Selangor State Forestry Department and GEC. SADC established its own fire fighting team and Standard Operating Procedures (SOP). The use of canals as fire breaks was abandoned. A clay bund was constructed between the developed and undeveloped land within the SADC area. While serving as a fire break, the clay bund also allows the water table to be maintained at or near the surface.

SADC also provided assistance to the Selangor State Forestry Department to rehabilitate the area within the adjacent forest reserve that was damaged from the fire.

Perhaps most importantly, long-term strategies for management of the buffer zones, including the roles and responsibilities of the various land managers of these areas, such the SADC, are now being drawn up in the new Integrated Management Plan for NSPSF.

The Director-General of Forestry Peninsular Malaysia Dato' Prof. Dr. Hj. Abd. Rahman bin Hj. Abd. Rahim and members of the National Peatlands Working Committee listening intently to a briefing by the Department of Agriculture on the various soil profiles of the Jambu Bongkok Forest Reserve. The briefing was part of a field trip conducted during the second meeting of the committee for 2013, which was held in Dungun, Terengganu.

LESSON 6:

Learn at every opportunity

As peatlands are extremely unique and complex ecosystems, a strong basic understanding of how they work is critical if they are to be wisely used and effectively conserved. Instilling the basics, as well as more in-depth knowledge for more specific activities, in the relevant stakeholders is therefore vital towards the sustainable management of peatlands.

The APFP provided the relevant stakeholders in relation to peatland management in Malaysia with numerous opportunities to develop their technical abilities and know-how. One of the ways that it did this was by facilitating the cross-fertilisation of ideas among participating ASEAN countries. Malaysian stakeholders benefited from participating in a BMP workshop held in Palangkaraya, Kalimantan Tengah, Indonesia in 2011, as well as a Peer Learning Programme on BMP on Peatlands for Community Groups held in Thailand the following year. In turn, Malaysia hosted a "Training of Trainers" workshop at Kuala Selangor in 2011.

Among the important lessons learnt at these workshops include various innovative methods for agriculture on peat soil applied in other countries, and the initiatives taken by peatland communities to enhance their livelihoods in an ecologically-friendly manner.

Within Malaysia, visits to the three pilot demonstration sites, i.e. the South East Pahang Peat Swamp Forest (SEPPSF) in Pahang, Loagan Bunut National Park in Sarawak and Klias Peninsula in Sabah were conducted to enable stakeholders to learn about the strategies and actions that have been taken or planned for each site.

Learning opportunities were not confined to just the more obvious stakeholders (i.e. government departments and the local community). Volunteers who participated in the rehabilitation of the pilot site were also provided with "in-situ" lessons on peatlands. An outdoor classroom was built to strengthen the educational aspect of the weekly volunteer traffic. Consisting of a simple shed equipped with interpretative material, the "Virtual Centre" ensured that volunteers were able to learn more about the peat swamp while they contributed to the tree planting and dam building effort.

One of two concrete check dams that have been constructed at the pilot site in Raja Musa Forest Reserve, with technical assistance from the Department of Irrigation and Drainage (DID).

LESSON 7:

Control the leaks

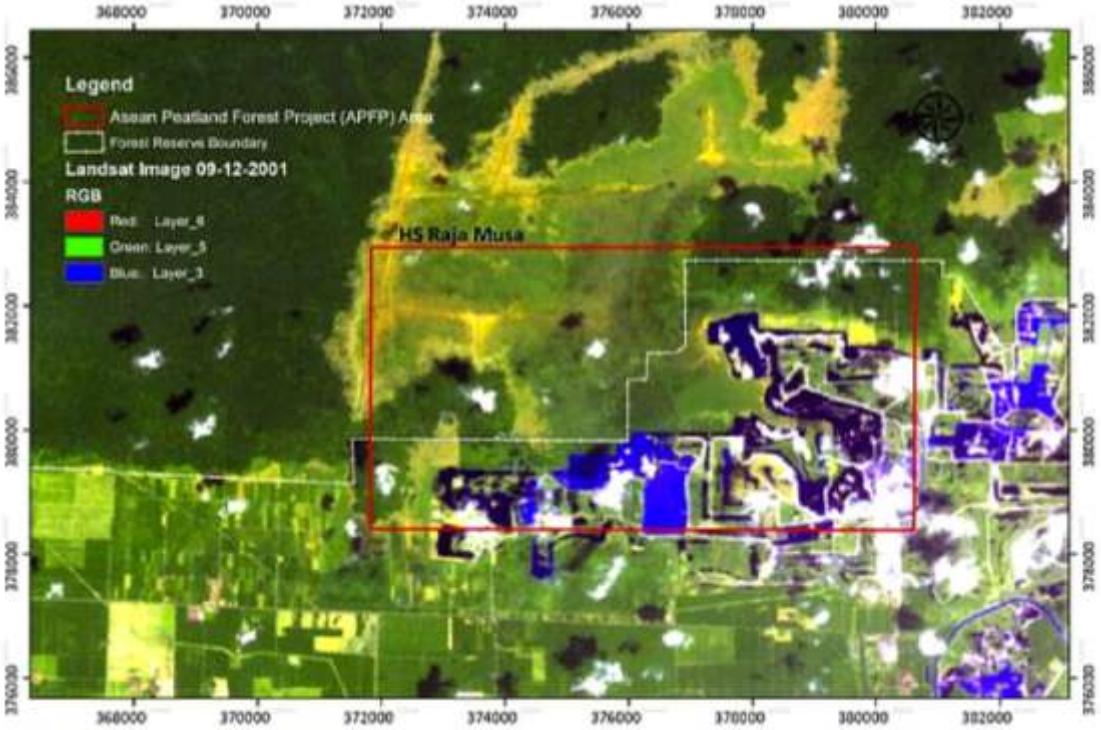
Good management of water is vital for the sustainable management of peatland ecosystems. In degraded systems, priority must be given towards re-establishing the water table and maintaining optimum moisture levels in the peat soil.

A vast network of canals, that are estimated to stretch over hundreds of kilometres, crisscross the NSPSF. The older canals were constructed to transport logs out of the area, while the more recent ones were excavated to drain the soil in order to make it suitable for agriculture.

With a better understanding of the peat swamp hydrological system, it became clear that these canals were causing a great deal of damage to the NSPSF. The tremendous amount of water flowing out of the system through the canals effectively lowered the water table, thus causing the peat soil to dry out and become prone to fire. Carbon that had been sequestered in the peat was also being lost from the system via two main pathways, i.e. dissolved organic carbon in the water, and loss of carbon stored in the above and below-ground biomass during forest fire events.

Blocking these canals to reduce the outflow of water and maintain the height of the water table and integrity of the peat soil is therefore a major strategy in the rehabilitation efforts at NSPSF led by the Selangor State Forestry Department and GEC. Many different materials have been used to construct rudimentary “check dams” since canal blocking efforts began in 2005. A standard design for these check dams was eventually adopted. Made from timber poles and gunny sacks filled with peat soil, this design was chosen as it is relatively effective, cheap and can be easily built by volunteers without the use of heavy machinery.

Over 850 check dams have been constructed to date with the help of local community, corporate partners and other volunteers. However, with an average lifespan of two years, these type of check dams are essentially just a short-term measure. With more funds now available from the APFP, a number of more permanent structures have been installed, including concrete check dams built in 2012 with assistance from the Department of Irrigation and Drainage (DID). The standard of check dams are set to improve with the publication of a guideline by DID, based on DID's experience in constructing numerous check dams in peatlands across Malaysia.



A Landsat-TM satellite image with a 30 metre spatial resolution was utilised to determine land use and carbon stock for the year 2001.

LESSON 8:

Take stock of the carbon

Remote sensing technology can be used to provide a reliable and cost effective estimation of changes in aboveground carbon in peat swamp forests

An assessment of changes in land cover and above-ground carbon stock in the pilot site at Bestari Jaya over a period of 20 years was conducted by the Forest Research Institute Malaysia (FRIM). About half of the 4,000 ha pilot site is located within the Raja Musa Forest Reserve (RMFR) while the other half comprises of a mix of forest and non-forest land use outside of RMFR.

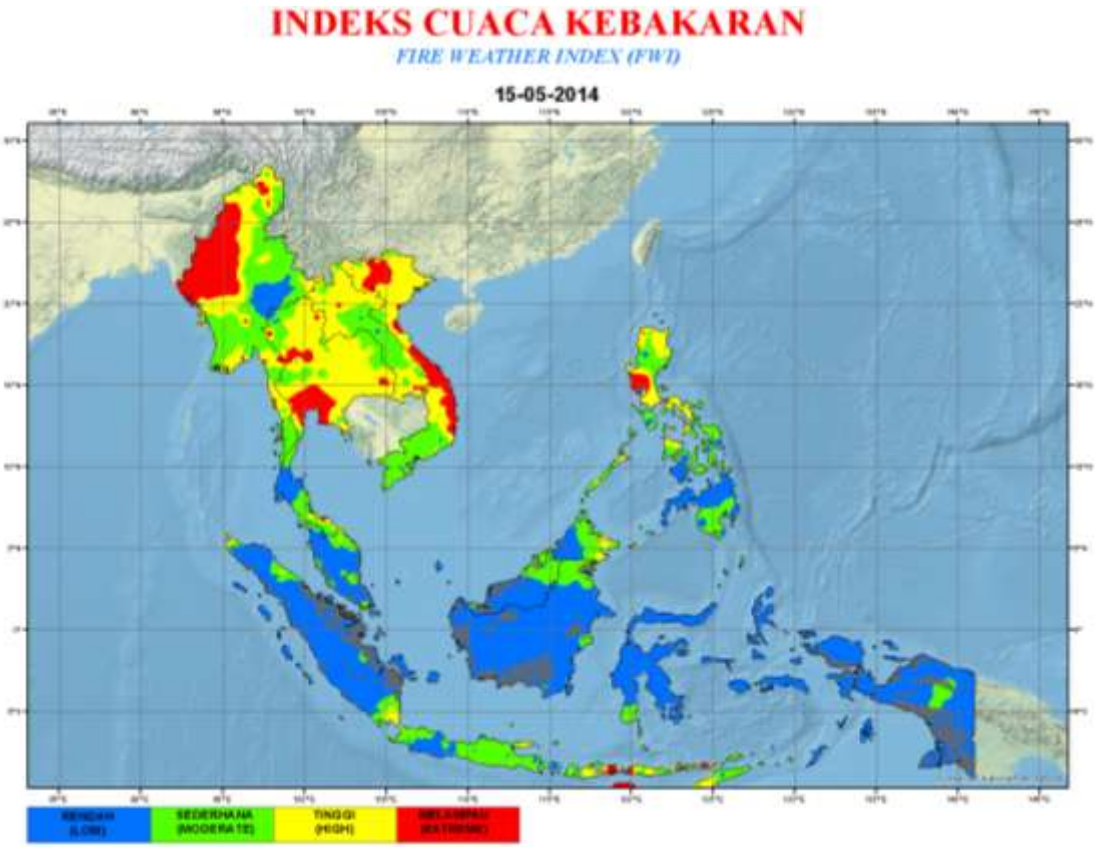
Three satellite images, i.e. for years 1989, 2001 and 2010 respectively were utilised for the assessment. While a comprehensive forest inventory could not be carried out due to the limited resources available, a set of ground inventory data from 2000 was used to generate the aboveground carbon stock prediction equation over the study area.

It was found that 342,756 tonnes of carbon had been lost from the pilot site from 1989 to 2001, a decline from 386,266.60 tonnes in 1989 to 44,510.42 tonnes in 2001. This decline, which corresponded with a decrease in percentage of forest cover in the pilot site, from 60% in 1989 to 39% in 2001, was due mainly to a series of forest fires that occurred within this period.

In the following decade, however, it was found that the above ground carbon stock increased by 57,337 tonnes, to 101,847.49 tonnes in 2010. This increase is attributed to the regeneration of some of the burnt areas during this period.

This exercise demonstrated that remote sensing is a useful and cost effective method to estimate the aboveground carbon stock in peat swamp forests. Validation and verification of results showed that estimation error and accuracy of the method are of acceptable level. Apart from carbon stock, the assessment also provided a better understanding of the past changes in land use patterns within the pilot site.

In future, this inventory-based approach can also be a useful starting point for negotiating emission reductions or trading carbon credits. However, a more precise calculation of carbon stock would require long term measurement, comprehensive forest and peat inventory, and use of higher resolution satellite images.



The Fire Weather Index for Southeast Asia on 15th of October 2015. For the latest FDRS forecasts, go to the Malaysian Meteorological Department website: www.met.gov.my

LESSON 9:

Increase the accuracy of fire predictions

The accuracy of fire forecasting is crucial towards prevention and management of forest fires. This accuracy can be improved significantly with increased quality and quantity of the raw data, i.e. meteorological and fuel factors.

An important component of the Regional Haze Action Plan initiated by the Environment Ministers of ASEAN in response to the 1997 haze disaster was the development of an early warning system for forest fires. The ASEAN Forest Fire Danger Rating System (FDRS) was initially developed and managed by the Canadian Forest Service in collaboration with the Canadian International Development Agency. "Fire Danger Rating" is the evaluation of meteorological and "fuel" factors that influence the ability of a fire to start, spread and cause damage. Responsibility for the FDRS was handed over to the Malaysian Meteorological Department (MMD) in September 2003, and the agency has been producing Fire Danger Ratings on a daily basis ever since, both for South East Asia as a whole and for Malaysia in particular.

At the 11th Meeting of the Sub-Regional Ministerial Steering Committee on Transboundary Haze Pollution in February 2011, Malaysia was asked to fine-tune the FDRS through a pilot project. The MMD, together with the Department of Environment (DOE), Department of Drainage and Irrigation (DID), Forestry Department Peninsular Malaysia (FDPM) and Global Environment Center (GEC) prepared an action plan for this pilot project in Malaysia, with specific focus on Selangor. The objective was to enhance the accuracy of the FDRS outputs by identifying all of the peat soils in Selangor, as well as to expand the meteorological inputs for these areas.

In order to increase the meteorological inputs, DID provided rainfall data from all of its relevant weather stations throughout the country, while DOE contributed funds towards the purchase of additional Automatic Weather Stations (AWS), increasing the total number of AWS from an initial 39 to 168. This improved system, which has also been updated to incorporate Google Earth technology, has since been expanded to Malaysia and other ASEAN countries.

This exercise proved one very important point, i.e. that the accuracy of fire predictions can be improved significantly just by enhancing the quality and quantity of the inputs, namely the meteorological and soil data.

Sahabat Hutan Gambut Selangor Utara (SHGSU) was launched at the State-level World Wetlands Day celebrations held at Raja Musa Forest Reserve on the 18th of February 2012.

LESSON 10:

Empower the locals

The well-being of the communities living within and around peatlands is intricately tied to the health of the peatland ecosystem. Given a suitable platform, these local communities can become effective champions for the conservation and sustainable management of peatlands.

There are four villages located around the pilot site at the North Selangor Peat Swamp Forest (NSPSF). In 2012, an organisation named Sahabat Hutan Gambut Selangor Utara (SHGSU) or "Friends of North Selangor Peat Swamp Forest" was created as a platform for collaboration between the local community with the government and other stakeholders in managing the NSPSF.

Now with over 106 members from the four villagers, SHGSU plays a critical role in supporting the various efforts by the government to protect and rehabilitate the NSPSF. For example, SHGSU runs a monitoring programme to detect occurrences of fire or illegal encroachment along the boundaries of the Raja Musa Forest Reserve. While it does not have the legal mandate for law enforcement, SHGSU acts as the eyes and ears of the authorities, by alerting the relevant agencies when it detects any threats to the forest. SHGSU members also serve as volunteer fire fighters to help the authorities control the spread of any fires that may occur in the area. In addition, SHGSU members contribute their time and resources to participate in various outreach events organised by the Selangor State Forestry Department and Global Environment Centre (GEC), such as the monthly tree planting programme and road shows.

SHGSU also serves as a conduit to develop and nurture small businesses run by the local community, especially those initiatives linked to ecosystem services provided by the NSPSF. These include the establishment of nurseries that provide saplings for tree planting activities via a buy-back system, support for an existing ecotourism outfit in the area, as well as the development of the local handicraft industry, using raw materials that are sustainably sourced from the peat swamp.

In addition, the Peatland Forest Ranger programme was established by the GEC in 2011 to educate school children in peatland conservation. The programme is targeted mainly at secondary schools located close to the NSPSF. Among the activities organized include camping trips and tree planting. At present, 210 students from five schools have signed up, with many more expected to join in the near future.

Abbreviations

APFP	ASEAN Peatland Forest Project
ASEAN	Association of Southeast Asian Nations
AWS	Automatic Weather Station
BPM	Best Management Practices
CSR	Corporate Social Responsibility
DID	Department of Irrigation and Drainage
DOE	Department of Environment
FDPM	Forestry Department Peninsular Malaysia
FDRS	Fire Danger Rating System
FRIM	Forest Research Institute Malaysia
GEC	Global Environment Centre
GEF	Global Environment Facility
KDEB	Kumpulan Darul Ehsan Berhad
SADC	Selangor Agriculture Development Corporation
SEPPSF	South East Pahang Peat Swamp Forest
SHGSU	Sahabat Hutan Gambut Selangor Utara / Friends of the North Selangor Peat Swamp Forest
MNS	Malaysian Nature Society
NPSC	National Peatland Steering Committee
NPWG	National Peatland Working Group
NRE	Ministry of Natural Resources and Environment
NSPSF	North Selangor Peat Swamp Forest
UNDP	United Nations Development Programme

Published in 2014

ISBN:

Printed in Malaysia

Text and layout by Denai Bhumi

Photographs courtesy of the Forest Research Institute Malaysia (FRIM) and Global Environment Centre (GEC).

This publication is supported by the ASEAN Peatland Forests Project (APFP) with funding from the Global Environment Facility (GEF) and the International Fund for Agricultural Development (IFAD).

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