



Managing peatlands in Indonesia:
A case study of small islands in
Riau Province, Sumatra



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Cover image

Riau, Indonesia (photo: WWF Indonesia)

Contents

Introduction	1
For peat's sake: Why tropical peat swamp forests matter.....	1
Riau: Province of peat, oil palm, and pulp.....	4
Sinking islands at Indonesia's edge.....	5
The sago industry in Kepulauan Meranti	7
The acacia invasion	9
PT RAPP in Pulau Padang.....	9
PT SRL in Pulau Rangsang.....	10
PT LUM in Pulau Tebing Tinggi	11
A New Type of HTI	12
Conclusion	13
References.....	14

Introduction

The government of Indonesia's 2009 pledge to reduce greenhouse gases emissions by 26 per cent from a projected business-as-usual baseline by 2020 depends on the country's ability to curb deforestation, particularly on peatlands (DNPI 2011). Peatlands store massive amounts of carbon in the form of organic matter accumulated in waterlogged soils. Conversion of peatland to other uses releases this carbon into the atmosphere, through removal of aboveground biomass, fires, and decomposition as a consequence of draining.

This report provides an overview of ongoing developments in three small islands located in the Kepulauan Meranti district of Riau province. These islands are comprised entirely of peat, and are classified by the national government as forest land. However, nearly 200,000 people call these islands home, and have lived and farmed there for about 100 years. Recently, the Ministry of Forestry issued industrial pulp plantation concession licenses to companies affiliated with Asia Pacific Resources

International Limited (APRIL), one of the world's largest pulp and paper companies. This has been met with protests and resistance from local communities and legal challenges from civil society groups.

Although representing only a tiny proportion of APRIL's plantation operations in the province, this case represents a microcosm of the pulp industry in Indonesia, and sheds light on the challenges Indonesia faces as it attempts to continue to grow its economy while still achieving its greenhouse gas reduction targets. This case illustrates the centrality of GHG mitigation to Indonesia's development: If the peat wetlands that make up most of these islands are converted to economically productive land uses, this releases tonnes of greenhouse gases into the global atmosphere, contributing to global warming and sea-level rise. At the same time, communities on the Meranti islands are seriously threatened by the consequences of sea level rise – as are populations living on thousands of other small low-lying islands across the archipelago.

For peat's sake: Why tropical peat swamp forests matter

Peat is an accumulation of partially decomposed vegetation. Peat forms in wetland conditions, where waterlogging obstructs the flow of oxygen from the atmosphere preventing dead leaves and wood from fully decomposing. These wetlands perform a number of vital ecological functions, including regulating water flow and stabilising regional evaporation rates, supporting unique flora and fauna that contribute to high levels of tropical biodiversity, and sequestering vast amounts of carbon in the organic matter trapped in waterlogged soil (Corlett 2009). Altogether, the world's 4 billion km² of peatlands, scattered across over 170 countries, contain between 180 and 455 billion metric tons of sequestered carbon (Page et al. 2011). Over geological periods of time, peat turns into lignite coal, accumulating at a rate of only about a millimetre a year (Andriess 1988). In cool climate regions like Ireland and Finland, peat has long been exploited directly as source of fuel. Peat used as fuel is classified by the UN as a non-renewable fossil fuel, with similar greenhouse gas emission characteristics as coal.

Tropical peat swamp forests are a particularly challenging environment for humans, due to the paucity of dry soils. Throughout most of human history they have been left largely undisturbed, beyond the subsistence activities of small indigenous communities (Page et al. 2011). Yet beginning in the 1980s and accelerating through subsequent decades, the peat swamp forests of places like

Sumatra, Borneo and New Guinea have been subjected to extensive logging, drainage, and plantation development – in addition to the expansion of landscape fragmentation by smallholder farms. These changes can be attributed to the depletion of forests in mineral soil areas, advanced land conversion technologies, and continuously rising demand for forest and agricultural products (Miettinen et al. 2012).

Logging and conversion of peatland to other uses releases carbon into the atmosphere, through removal of aboveground biomass, fires, and decomposition of the

Peat Swamp Forest



Photo: Jonotoro

peat as a consequence of draining. Drained peatland areas are extremely fire-prone. Once ignited, peat smoulders, and is difficult to extinguish. Underground peat fires can burn undetected for months or years, emerging each dry season to ignite new forest fires above ground (Usup et al. 2004). Even without fire, peat oxidizes when drained and exposed to the atmosphere, releasing CO₂. Converting peatlands to other land uses transforms these areas from carbon sink into major emitters of atmospheric carbon. Globally, CO₂ emissions from drained peatlands currently amount to two gigatonnes per year, representing almost 25 per cent of the CO₂ emissions from the entire land use, land use change and forestry (LULUCF) sector (Joosten et al. 2012). A further consequence of conversion of peatlands is threats to biodiversity, for peat swamp forests have become important refuges for endangered species such as the orangutan, tiger and elephant, which are already threatened by widespread deforestation on mineral soils (Miettinen et al. 2012).

Peat poses problems for both engineers and agriculturalists. Peat is highly compressible under even small loads, making construction of roads, buildings and other structures difficult. Tropical peat soils are generally infertile and highly acidic, with pH ranging between 3 and 4.5. As it dries, the physical and chemical properties of peat change, causing some dried peats to become

hydrophobic (Joosten et al. 2012). Tropical peats are particularly prone to this phenomenon of irreversible drying, making them unsuitable for shallow-rooted annual crops. Drainage causes peat soils to subside, initially from shrinkage as pores collapse and solid materials compress, then continuing as the carbonaceous materials oxidise.

Tropical peatlands account for 11 per cent of global peatland area, but contain an estimated 20 per cent of global peat carbon – with 77 per cent of that amount located in Southeast Asia (Hooijer et al. 2010). To put this in context, Southeast Asia's peat soils contain eight or nine times the amount of carbon released globally by fossil fuel combustion each year. More than half of the world's tropical peat swamp forests are located in insular Southeast Asia (Miettinen et al. 2012). Peat fires and decomposition are the primary reason that Indonesia now ranks third in the world (after China and the United States) in greenhouse gas emissions, contributing approximately 5 per cent of the global total in 2005 and projected to increase significantly throughout the 2010s and '20s (DNPI 2011).

In southeast Asia, the loss of peatland forests results mainly from the exploitation of extant forests for raw material for the timber, plywood, pulp and paper industries, and their conversion into plantations of oil palm (*Elaeis*

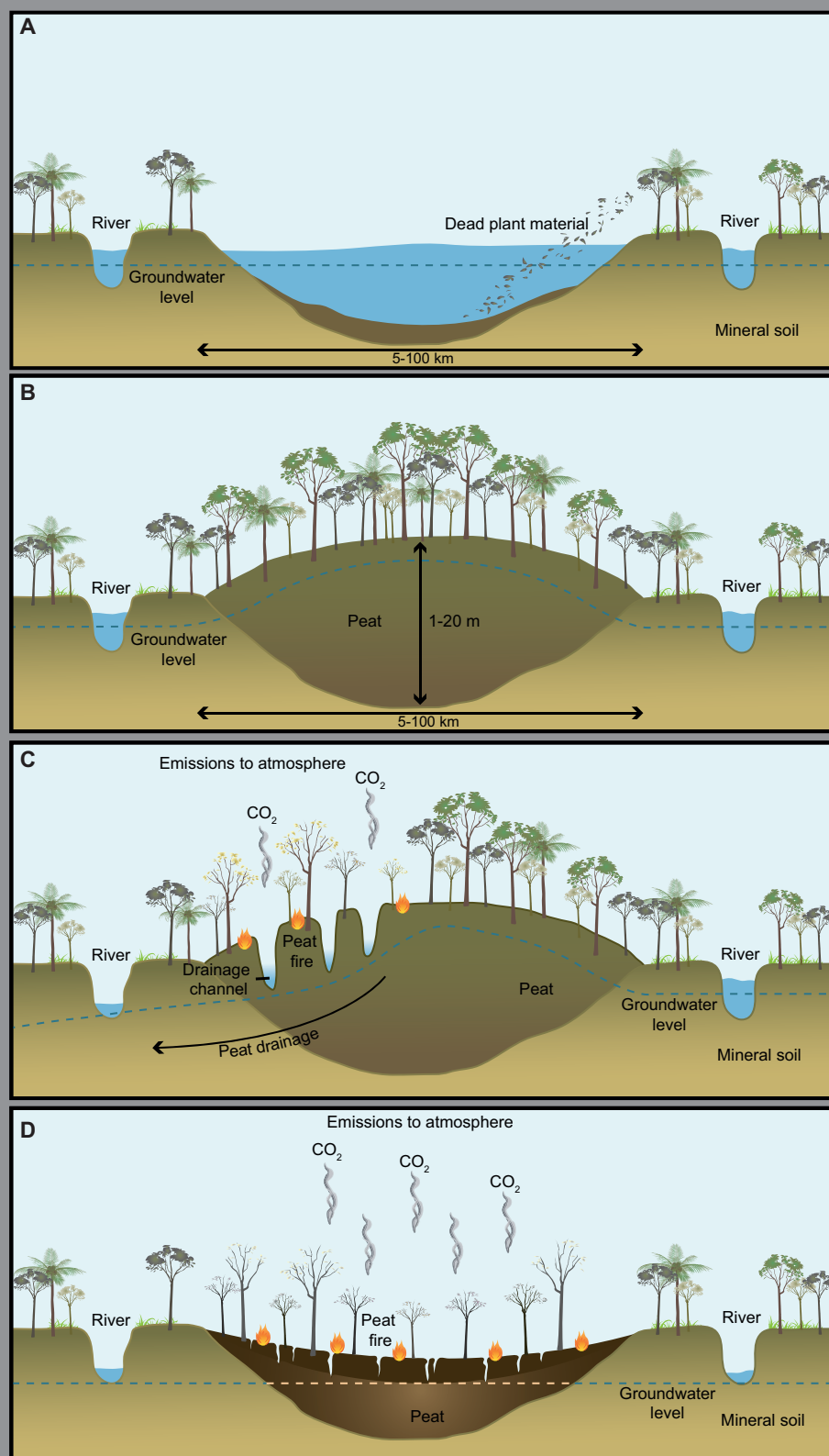
Farming on peatland



Photo: Craig Thorburn

Peat formation and degradation

Schematic cross-section of a typical tropical peat dome in Indonesia:



A. A peat dome develops where large amounts of dead incompletely decomposed plant material accumulate over thousands of years in waterlogged environments. The peat accumulation rate is only a few millimetres per year.

B. Fully developed peat dome. Peat domes generally have a convex-shaped surface and can be up to 20 meters deep and up to 100 kilometres wide, covering entire catchments between rivers.

C. Beginning of the degradation process. Construction of a network of drainage channels to control and lower the groundwater level to extract timber and/or for plantation or agricultural development. This leads to increased CO₂ emissions from decomposition and peat fires.

D. If no restoration measures are undertaken (e.g., blocking the drainage channels) these emissions will continue until no peat is left.

Adapted from Ballhorn 2012)

guineensis) and fast-growing pulpwood species (mainly *Acacia crassicarpa*, also smaller amounts of *Eucalyptus pellita*, *Anthocephalus cadamba* and *A. macrophylla*), for pulp production. Peat is actually not well suited for oil palm; subsidence can cause large numbers of trees to topple after about four years, just about the time they come into full production. In May 2011, Indonesian

President Bambang Susilo Yudhoyono enacted a moratorium on new industrial concessions in forest land protected by any form of legal conservation status, on steep slopes, and on peat greater than three meters in depth (Government of Indonesia 2011). The moratorium was extended for an additional two years in 2013.

Riau: Province of peat, oil palm, and pulp

The province of Riau in central Sumatra holds the largest stores of peat in Indonesia. Papua's and Central Kalimantan's peat swamps are bigger in terms of area, however Riau's peat soils – some over 10 meters deep – contain an estimated 16.4 gigatons of carbon, nearly a quarter of Indonesia's total (Uryu et al. 2008). Riau has experienced some of the most rapid and extensive deforestation in Indonesia, with total forest area declining by 65 per cent in the past quarter century. Riau's peat forest cover has declined from 80 per cent in 1990 to just over 36 per cent in 2010.

As in other areas across the region, the primary driver of peatland conversion has been development of oil palm plantations. Riau has been at the epicentre of this growth, leading the country in plantation establishment through the 1980s and '90s (Singer 2009). More recently, oil palm expansion has spread to other parts of the country, while the primary force behind forest conversion in Riau (also neighbouring Jambi and South Sumatra) has shifted to acacia and eucalyptus plantations for pulp and paper manufacture (Jauhiainen et al. 2012).

The distribution of pulpwood plantations is dependent on the location of pulp mills, which require far larger investments than the infrastructure necessary for palm oil processing. Riau is now home to two of the world's largest pulp mills, operated by Asia Pulp and Paper (APP), part of the Sinar Mas Group, and Asia Pacific Resources International Limited (APRIL), part of the Raja Garuda Mas Group. These two mills produce more than two-thirds of Indonesia's total pulp output, each with a capacity of over 2 million tons per year. Between them, these two companies hold industrial concession (HTI) rights to approximately 25 per cent of Riau's total land area. Around 75 per cent of APP's pulp plantation land, and 45 per cent of APRIL's, is located on peatland (Uryu et al. 2008).

Pulpwood plantations take about seven years to come into production; much of the more than 10 million cubic meters of wood used each year to feed these two mega-mills currently comes from land clearance for new pulp or oil palm plantations, or according to numerous allegations, from illegal logging. Until now, mill capacity has been expanding more rapidly than plantations (Barr et al. 2010).

RAPP Pulp Mill, Kerinci: Home to one of the world's largest single pulp production lines and fastest fine paper machines



Photo: WWF Indonesia

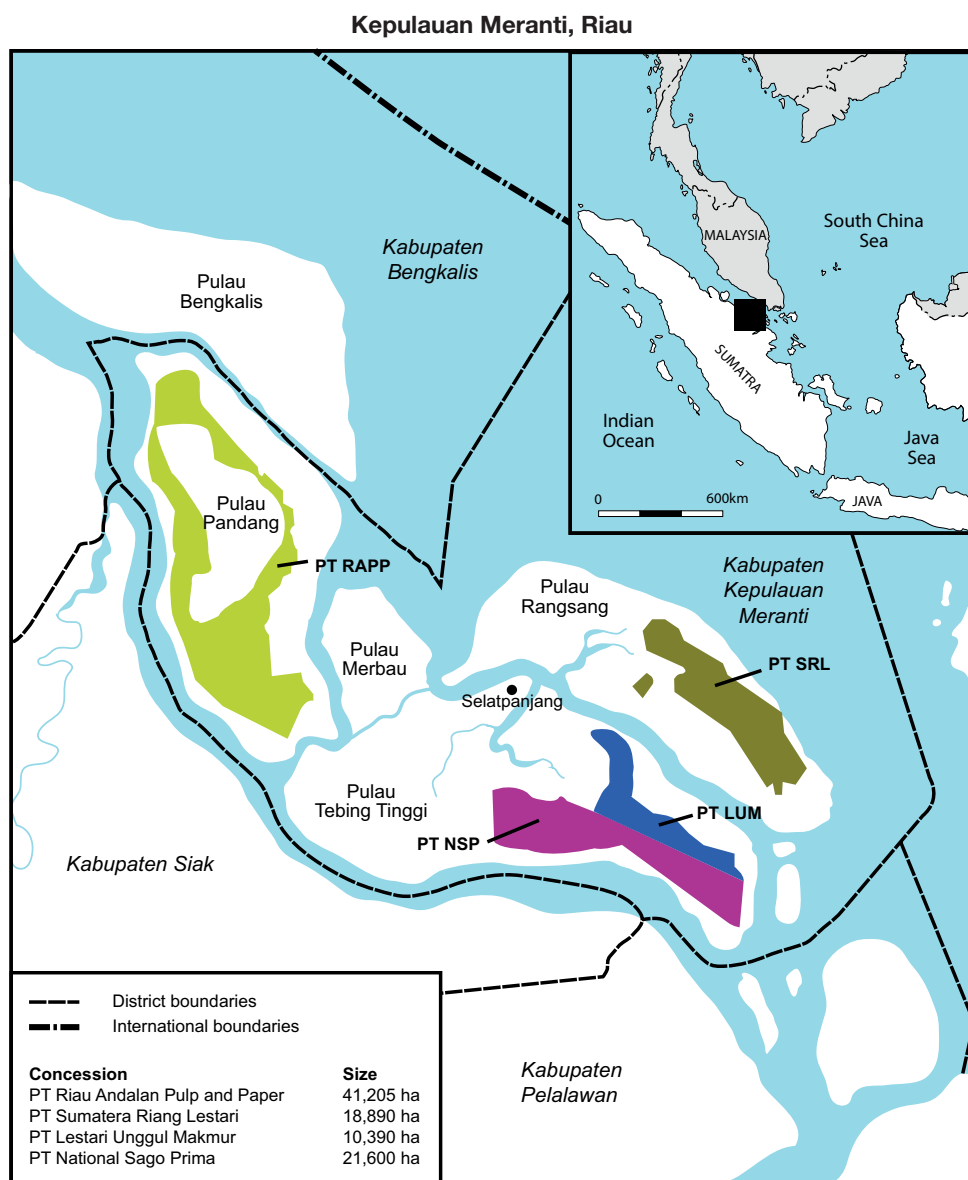
The APRIL mill, PT Riau Andalan Pulp and Paper (RAPP), is the larger of the two, and commenced operations nearly a decade after APP's Indah Kiat Pulp and Paper mill. APP has more HTI concessions than its rival, a situation that the Ministry of Forestry sought to redress in 2009 with a controversial decision to grant an additional 350,000 hectares of HTI concessions across five districts

in Riau, to RAPP (Ministry of Forestry 2009). Local NGOs have challenged the legality of the ministerial decision, pointing out numerous legal and administrative flaws in the environmental impact analysis and recommendation processes, while noting that many of the new concessions are situated on deep peat soil (TP2SK 2010).

Sinking islands at Indonesia's edge

Some of PT RAPP's HTI concessions are located on three main islands of the district of Kepulauan Meranti – the Meranti Islands. The district of Kepulauan Meranti was established in 2009, split off from the much larger district of Bengkalis. Since its establishment, the community and

government of Kepulauan Meranti have been embroiled in controversy over three HTI concessions located on the three main islands of Pulau Padang, Pulau Bengkalis and Pulau Tebing Tinggi.



Map: Kara Rasmanis

Kepulauan Meranti is a small district, with a population just over 175,000 living on four main islands (on a map, it looks more like three, as the strait separating the islands of Merbau and Tebing Tinggi is more of a slough). The highest point in Kepulauan Meranti is a mere seven metres above sea level. Nearly all the land is peat swamp, with small deposits of mineral soil along tidal rivers and some coastlines. According to the Indonesian Ministry of Forestry's Consensus Forest Map Governance Agreement (TGHK), the district is comprised entirely of state forest land, although official gazettement as state forests is yet to take place. TGHK classification indicates that the islands are comprised of 44 per cent limited production forest and 46 per cent conversion forest, with the remainder either mangrove or protected forest (BPS Kabupaten Kepulauan Meranti 2011).

The history of human habitation on the islands dates back only about one hundred years. The vast swamp and mangrove forests of Sumatra's eastern coast presented a harsh environment that even the traditional *orang asli* hunters and gatherers mostly avoided (Barnard 2003). During the pre-modern period, the east coast formed an important trading zone between the Straits of Malacca and the resource-rich Sumatran hinterland, but settlements tended to cling to riverbanks many kilometres upriver from the coast, where alluvial deposits allowed for some agriculture. The sole port of Bengkalis, on an island of the same name between the estuaries of the Siak and Rokan rivers, was an important outpost of the Malay states of Johor and later Siak. Bengkalis, inhabited by a mix of ethnic groups including Malay, Minang and Bugis, but also from China, India and Europe, was where exotic forest products and minerals from the interior of Sumatra were traded for salt, rice and foreign goods such as cloth, iron and tobacco (Hussin 2005).

For centuries, Eastern Sumatra's fine and abundant timber, including camphor, *medang* and *merbau*, supported a ship-building industry along the Siak River, and was also exported to ports throughout the region for use in ship construction and repair (Barnard 1998). The importance of the region's timber trade increased during the 19th century as other regions of Southeast Asia became deforested. In the 1850s, the Sultan of Siak began granting rights to Singapore firms to harvest timber in the region. These timber operations, which came to be known as *panglong* (a Hakka word meaning 'plank storage place'), formed the first semi-permanent settlements on the coastal islands. The port of Selatpanjang, now the district capital of Kepulauan Meranti, was established during this period; its oldest Chinese temple dates back to 1868 (Ukirsari 2012).

Panglong owners' trade quickly expanded beyond sawn timber, to include charcoal and firewood cut from the coastal mangrove forests, also sago, the starch extracted from the pith of *Metroxylon* palm stems (Vleming 1992).

By the 1880s and '90s, *penghulu* (headmen) of various *negeri* (autonomous settlements) from the eastern Sumatran sultanate of Siak were granting rights to establish gardens on the coasts or inlets of the islands where slightly elevated areas allowed cultivation of some tree crops. These early gardens were mainly areca nut palm, later accompanied by coconut and rubber groves. The pioneer farmers came mostly from islands further to the south or from upriver, and did not initially establish any permanent settlements. Eventually, they began building houses and bringing families. The origins of the 68 villages in the Meranti islands date back to this period. All are located near the shoreline.

This pattern of exploitation – selective logging of large hardwood trees, mangrove cutting for charcoal and firewood production, and smallholder areca, coconut and rubber groves, invariably leads to subsidence of the peat soils and increased saltwater intrusion. Landholders cut channels to drain the top layers of peat, piling the soil next to the channel to form a dry pathway. As peat dries, the process of subsidence begins, and will not stop until it reaches the new water table level and equilibrium is re-established. The only stable zones are a few small banks of mainly mineral soils scattered around the islands. Older rubber and coconut stands are notable by the height of the root structures protruding above ground, marking the elevation of the ground when they were originally planted – often a metre or more above the current ground level. Many older trees topple over, or die as a result of saltwater intrusion. Gardens and groves – and eventually settlements – have shifted inland as the coastal zone becomes

Coconut root balls showing peat subsidence



Photo: Craig Thorburn

untenable. Nearly all villages in the Meranti islands have had to abandon their original locations. Inhabitants can still show the foundation stones of the earlier settlements; these moves have occurred during the lifetimes of people now living on the islands.

Land use transformation accelerated in the 1980s and 90s, when a number of logging concessions were granted in the islands. Concessionaires practiced selective logging, taking only the largest and most valuable trees. They also dug canals to transport the logs out of the islands' interior, which often became permanent drains, leading to peat dehydration, oxidation and increased fire danger. As occurred elsewhere, local communities and some new migrants followed the logging tracks into the interior, creating clearings in logged-over areas to establish new rubber, coconut and sago groves. In the Meranti islands, this was a fairly orderly process, with village councils determining allocations, and some village government

issuing permits (initially known as *Surat Izin Tebang Tebas* – Land Clearance Permits, more recently replaced by a document called '*Sporadik*', basically a letter from the village government stating that the holder has been granted permission to utilise the cleared land) (Andiko et al. 2011). The choice of crop was determined by the land's elevation and hydrology; drier areas were planted in rubber or coconut, swampy areas with sago.

An expanding network of canals and pathways, including concrete roadways resembling sidewalks to support motorbike and small cart traffic, extended outward from villages as more land was converted to arboriculture. The twinned processes of land subsidence and saltwater intrusion have continued apace. The government has constructed tide gates in some channels to allow drainage while keeping seawater out, however these generally last a short time before falling into disrepair.

The sago industry in Kepulauan Meranti

One form of agricultural production that does not result in peatland subsidence is sago cultivation, as the *Metroxylon* palm thrives in a swampy environment (Ruddle et al. 1978). The large islands and coastal lowlands of eastern Sumatra are ideal for sago production, where few other food crops can be grown. The trade in sago in this region dates back hundreds of years. Sago is not indigenous to Sumatra or peninsular Malaysia; it was introduced by Bugis trading fleets or other ancient seafarers (Tan 1983). Before the Panglong timber stations came to dominate the trade in the late 19th century, sago was harvested and traded by indigenous Akit and Orang Laut communities. 'Siak sago'

has long been regarded as the highest quality; 15th and 16th century Chinese annals note its importance in the region (Barnard 2003).

The sago palm multiplies vegetatively by stolons growing from the base of the trunk, forming dense stands and can become the dominant plant across vast areas of swampland (McClatchey et al. 2006). It is easily propagated by separating suckers for replanting, and takes between seven to ten years to reach maturity. As mature stems are harvested, others replace them. An individual tree can reach ten meters in height and produce over

Sago grove, sago harvest and transport



Photos: Craig Thorburn

'Sago rakyat' mill in Tebing Tinggi



Photo: Craig Thorburn

300 kg of pure starch. As such, sago is a more productive plant than rice, in terms of both its output per area and labour input (Ruddle et al. 1978).

Sago is harvested by cutting the tree then splitting or peeling the trunk to expose the inner core. Often, the trunk is cut into meter-long pieces that can be rolled out of the forest and floated down rivers. The pith is scraped and pounded, reducing the fibre to small pieces and loosening the starch particles. The pounded pith is then washed and kneaded and mixed with water, then run through a filter into a settling vessel. The starch settles forming a thick paste, which is removed and further dried before packaging into moist cakes that can be stored for long periods. Sago in this form is used to produce a variety of traditional dishes, as well as commercial products such as pearl sago, flour and noodles. In the 19th and early 20th centuries it was traded by English and Dutch merchants for use as sizing in the textile industry, and some mechanised processing was introduced. More recently, its use in the garment industry has been replaced by easier to obtain and more uniform oxidized maize starch, but other modern uses of sago starch include the manufacture of monosodium glutamate (MSG) and industrial adhesives and lubricants (ibid).

For several decades, the sago trade in the Meranti Islands has been dominated by 40 or so mechanised mills operated by Chinese tauke, usually descendants of original panglong entrepreneurs. Most of these operations own several hectares of sago gardens, and also purchase sago trunks from villagers. These small factories include ovens, used to process the semisolid paste into sago flour or pearls. Most of their product is sent to Cirebon, West Java, for use in the manufacture of sohun glass noodles.

Most Malay villagers in the islands also grow a few stands of sago, which they harvest for use as a breakfast food or snacks, and sell some to the Chinese tauke. In the mid-1970s, sago cultivation expanded after the national government tried to promote rice cultivation on several thousand hectares of converted wetlands on the islands, as part of the national rice intensification program. After a few seasons, however, most villagers elected instead to plant sago on this land. Only about 1,500 hectares of rain-fed rice is still grown on Pulau Rangsang, while there are now nearly 40,000 hectares of sago groves on the islands. Sago is Kepulauan Meranti's major crop by volume: nearly 200,000 tons per year, compared to 22,000 tons of coconuts, 8,500 tons of rubber and 5,500 tons of rice.

In the late 1980s, the national Inpres Village Development Program provided four small mechanised mills to process villagers' sago.

A small diesel engine drives a rotary rasp to shred the sago pith and a small propeller located in a mixing vat. The vat is equipped with simple cloth sieve that separates the sago fibre from the starch as it flows into large settling vats. These simple mills are capable of processing between 10 to 20 sago trunks per day, producing between 20 and 30 tons of wet sago per fortnight. A number of local entrepreneurs soon constructed their own mills; presently there are 17 'sago rakyat' mills operating on Pulau Tebing Tinggi. Each mill employs about ten people: four or five sago harvesters, three mill workers who peel the trunks and grind the pith, labourers who transport the trunks to the mill and bag and load the wet sago, and a boat operator to take the raw product to the coast on the fortnightly tide. Profits are slim, particularly with rising fuel costs. The small mills lack any waste treatment or disposal facilities, dumping bark and fibre on surrounding land and waste water into streams or canals. The sago produced by these mills is of inferior quality, still containing some fibre and impurities. Their entire production is purchased by a sole trader operating from Selatpanjang, who often has difficulty collecting enough sago to fill his 150-ton boat for a fortnightly trip to Malaysia.

Labour – particularly the arduous task of harvesting, sectioning and rolling the trunks out to rivers or the coastline – appears to be the primary obstacle to increased sago production on the islands. Lately there has been a rash of sago theft, targeting harvested trunk sections awaiting transport to mills. According to many growers, however, the greatest threat to sago production is the alteration of the islands' hydrology expected to result from the establishment of pulpwood plantations on each of the three main islands.

The acacia invasion

Since 2007, the Ministry of Forestry has issued IUPHHK-HT Permits for three separate acacia plantations in the Meranti Islands to different companies affiliated with APRIL/RAPP. The permits were issued before the establishment

of the new district, when the islands were still part of the district of Bengkalis. All have been met by protests from local communities, with each case unfolding along a distinct trajectory.

PT RAPP in Pulau Padang

The largest and most controversial of the HTI concessions in Kepulauan Meranti is PT RAPP in Pulau Padang. This concession was part of the 2009 ministerial decision granting additional concession licenses to PT RAPP mentioned earlier in this article. The 41,205 hectare concession covers nearly 40 per cent of Pulau Padang's total area, and boundaries all 14 villages on the island. Local activists claim that the concession area encompasses villagers' ancestral land, and that the canals and land clearing will cause immense harm to the island's environment.

The concession stretches nearly the entire 60-kilometre length of the island. A large section of high conservation value forest on a peat dome is excised from its centre, leaving an elongated donut-shaped plantation. Of the 41 thousand hectares, only about two thirds (27,775 hectares) is to be planted in acacia, with the remainder set aside for timber species, 'livelihood plants', protected area,

company facilities, and one 'non-productive area' that includes the pre-existing operations site of a petroleum company.

During 2009 and 2010, PT RAPP secured letters from the Village Heads of 11 of 14 villages on the island approving the concession's operation, claiming that the company will provide hundreds of jobs for local villagers, new and improved roads, social and educational programs, and support for agricultural and small enterprise development. Three villages located in the south of the island rejected the concession altogether, and between mid-2010 and early 2012, the Village Councils (BPD) of at least eight of the eleven 'pro-concession' villages have also issued letters rejecting the concession. There began a series of public protests on the island, at district government and parliament offices in Selatpanjang, in the provincial capital Pekanbaru, and in Jakarta.

Anti-RAPP protest in Pekanbaru



Photo: Hariansyah Usman

The district government initially supported the communities' wishes, dispatching three letters – two from the Bupati's office, and one from DPRD – to the Ministry of Forestry requesting that all three HTI concessions in the district be reviewed. However, after the Director General of Forest Production responded in November 2010 that the concessions were legal and would go ahead, the district government has been left with little recourse other than attempt to implement the law, which has drawn it into conflict with groups in Pulau Padang opposing the RAPP concession.

The most outspoken segment of the opposition is supported and coordinated by *Serikat Tani Riau* (STR), the provincial branch of the National Farmers' Union (*Serikat Tani Nasional*, STN), which is affiliated with the largely student-based Democratic People's Party (*Partai Rakyat Demokratik*, or PRD). STR promotes mass mobilisation, frequently organising marches, tent cities, 'open seminars', *Istighotsah* mass prayer meetings, hunger strikes, and a 'blood stamp' event where demonstrators pressed bloody thumbprints onto a banner demanding that the RAPP concession be withdrawn. Angry crowds have disrupted 'socialization' events organised by RAPP, blockaded docks to prevent equipment being offloaded, thrown water on visiting government officials, and beset the Subdistrict Head (*Camat*)'s office demanding he retract statements he allegedly made that STR intimidates those who do not share its views.

PT RAPP began operations in March 2011, amid escalating tensions. The company rapidly dug several kilometres of drainage canals, cleared nearly 6,000 hectares of forest, and planted a thousand hectares of acacia. Numerous demonstrators were arrested and detained, and a climate of fear and intimidation prevailed. Violence broke out at the site in July 2011; two RAPP excavators were burned and an operator killed. In late 2011, demonstrators set up an 'operations post' outside the provincial parliament building, and five demonstrators

sewed their mouths shut in a dramatic protest gesture. In December, a delegation of 82 activists travelled to Jakarta, planning to sew their mouths and camp in front of the national parliament building. Not long thereafter, another six demonstrators announced their intention to self-immolate if the concession was not revoked. Twenty eight people had stitched their mouths shut by the time the Minister of Forestry ordered RAPP to temporarily suspend operations, and dispatched a mediation team to investigate the situation and propose solutions.

The mediation team submitted their findings in January 2012, and the Minister offered that the land of the three villages in the south of the island that reject the concession be excised from the concession, effectively halving its size. The compromise further stipulated that all community lands would be mapped, with existing groves and farmland to be 'enclaved'. Hard-line opponents in Pulau Padang have rejected this compromise, continuing to demand that the entire concession be cancelled. Individuals favouring conciliation claim to have been threatened and intimidated; some are afraid to return to their homes on the island. Meanwhile, the district government has proposed subdividing the sub-district of Merbau, to create a new sub-district on the northern portion of Pulau Padang comprised of 'pro-concession' villages. The impasse continues.

If the concession is revoked, the government will be required under Indonesian law to compensate the concession-holder RAPP. Meanwhile, the company continues to insist that it has done nothing wrong, that the environmental impact assessment and permit process were all conducted in accordance to Indonesian national law. On its website, RAPP's parent company APRIL maintains that they are 'a leader in Asia in applying best practice sustainable forestry management', and 'part of the solution to the challenge of balancing environmental conservation, social and economic development' (APRIL n.d.).

PT SRL in Pulau Rangsang

A second permit was issued to PT Sumatra Riang Lestari (SRL), another APRIL/RAPP affiliate, for an 18,890 hectare HTI concession on Pulau Rangsang. Local communities there were not nearly so unanimous or coordinated in their response, and the company was able to secure support letters from several neighbouring village governments. Canal and road construction, timber harvesting and forest clearance, and acacia plantation activities have proceeded at a rapid pace since late 2009. Three years on, nearly half the concession area has already been planted in acacia.

Villagers in neighbouring communities are fearful and confused. There is little or no clarity about concession boundaries, about who will receive how much compensation (called '*sago hati*' locally, more of a

symbolic acknowledgement that the recipient has invested some labour in the land, than compensation *per se*), or about the location of or access to the five per cent of the concession area set aside for 'livelihood plants' for local communities. As such, the PT SRL case is the one that most closely adheres to a 'business as usual' model, resembling scenarios that played out across Indonesia's outer islands throughout the HPH timber concession era of the 1970s and '80s, the height of Indonesia's logging boom (Gillis 1988; Barber et al 1994).

Any changes that occur, locals are quick to blame the acacia plantation. Villagers note with alarm that the local hydrology is changing; just a few days without rain and the canals from which they draw their water are reduced

Canal and clearing in the PT SRL concession on Pulau Rangsang



Photo: Hariansyah Usman

to a trickle, but just one night of rain and their yards and gardens are inundated. In 2012, the sub-district seat of Tanjung Samak experienced its first cases of dengue fever; most people believe this is somehow related to the HTI concession. Coconut groves are infested with beetles; local farmers are certain that these and other pests have been forced out of the diminishing forest to attack farmers' groves.

PT SRL has several other HTI concessions throughout Riau province, and many of these have encountered concerted opposition and protest from local communities and NGOs. Perhaps anticipating greater resistance in Pulau Rangsang, the company has publicised numerous initiatives to underscore their commitment to local communities and the environment. These include press releases about agreements with nine villages to grow 2,000 hectares of 'livelihood plants' (which, as previously noted, they are legally obliged to do), efforts to protect the island's coastline through mangrove reforestation, or, statements that the canals they are constructing are intended for hydrological management and fire suppression, thus potentially staving off disaster for island residents.

At the time this research was carried out in late 2012, the situation in Pulau Rangsang was becoming increasingly tense. There was concern that the sort of intimidation and violence that has plagued Pulau Padang might spread to Pulau Rangsang. If any sort of coordinated protest does eventuate, however, it will be too late to stop the plantation, which is nearly completely cleared and replanted. Communities can still organise around issues of compensation, access to livelihood plant zones, and watershed management, but to date, no one is taking a lead role in such an endeavour.

PT LUM in Pulau Tebing Tinggi

The first permit for a pulp plantation in the Meranti islands was issued in 2007, to PT Lestari Unggul Makmur (PT LUM, another RAPP/APRIL affiliate), for 10,390 hectares of former timber concession on Pulau Tebing Tinggi. The community of Sungai Tohor, the oldest and largest village in the sub-district of Tebing Tinggi Timur, had previously engaged in serious protests against PT Uni Serayu, the timber concessionaire that had formerly operated in the area, including the torching of a logging camp and the house of the former Village Head in 2002. A number of villagers served prison sentences for their role in the violence. At issue was damage to community members' rubber and sago groves in the concession area.

The community was more measured in its response to the arrival of PT LUM, quickly dispatching letters from Village Heads and Councils (BPD) of all seven villages bordering the concession area, organising numerous (peaceful) demonstrations at the village, sub-district and district levels, and seeking support and assistance from environmental NGOs. 'Eyes on the Forest' (2010) published an investigative report challenging the legality of the concession, pointing out that a significant portion

of the concession area contained natural forest in good condition, and noting as well that the concession impinged on community members' rubber and sago groves.

Despite these protests, PT LUM initiated its activities in 2008, cutting over 10 kilometres of canals and submitting an annual RKT work plan to the Ministry in 2009 to clear 2,832 hectares and remove over 260,000 cubic meters of wood. The company more-or-less ceased operations soon thereafter however, and since 2009 have neither removed any wood nor cleared any land, although they continue to submit annual RKT work plans to the Ministry each year, and each year send out crews at least once to plant new boundary posts or make small modifications to existing canals. They do this to keep the concession from being revoked for inactivity.

Villagers across Tebing Tinggi Timur, meanwhile, are engaged in a coordinated crusade to convert more land into rubber or sago groves – including the issuing of *Sporadik* documents by village governments. Their strategy – which has the explicit support of the *Camat* and implicit support of the *Bupati* – is to demand that

this land be excised from the concession area, eventually diminishing its size to the point that it will not be worth PT LUM's effort to clear and plant acacia on the remainder. Villagers also continue to petition the district and national government that the permit be reviewed, and hopefully revoked. Unlike the protesters in Pulau Padang, community leaders in Tebing Tinggi Timur have cultivated cordial relations with local government officials, frequently hosting exhibitions, fairs, ceremonies and celebrations.

Together with provincial environmental NGOs and concerned academics, community leaders in Sungai Tohor have established a 'young farmers association' and a number of experimental and demonstration plots to encourage agricultural diversification, conducted training courses in forest surveying techniques and seed and seedling identification and collection, and established tree nurseries to support afforestation and enrichment planting programs. They plan to establish Sungai Tohor as a 'Centre for Sustainable Peatland Agricultural and Horticultural Development' to support the efforts of the Riau Peatland Community Network (*Jaringan Masyarakat Gambut Riau*, JMGR). In early 2013, a workshop of local villagers, village and sub-district government leaders, and representatives of the district government produced a

Anti-PT LUM banner in Pulau Tebing Tinggi



Photo: Hariansyah Usman

'Notice of Understanding' (*Nota Kesepahaman*) outlining shared goals for community-based management of the Tebing Tinggi Timur Production Forest Management Unit (*Kesatuan Pengesahaan Hutan Produksi*, KPHP), that emphasised the establishment of a multi-stakeholder forum; active community participation; transparency; resolution of outstanding conflicts; improved community livelihoods and environmental conservation; and certainty of land use and boundaries established through a consultative process.

A New Type of HTI

Meanwhile, across the island, another new development could significantly alter the economic landscape in Kepulauan Meranti – hopefully without the dire social and environmental consequences already arising from the acacia pulpwood plantations. PT Sampoerna Agro, a subsidiary of the former tobacco giant engaged primarily in palm oil production, is developing Indonesia's first non-wood product industrial forest concession, to produce sago. The Indonesian government has long been interested in developing sago's economic and food security potential, categorising sago as a strategic national food crop. Sago is receiving renewed attention as a possible response to climate change, which is expected to adversely impact rice production in Indonesia and abroad (Alfons and Rivaie 2011).

Satellite imagery clearly shows a uniform pale green area in the southwest quadrant of Pulau Tebing Tinggi. This area is a logging concession formerly managed by PT National Timber and Forest Products (PT NTFP). After harvesting most of the available timber, NTFP management began emulating local villagers during the late 1990s and

early 2000s, planting sago in logged-over wetlands. They eventually planted around 4,000 hectares, much of which is now reaching maturity. Since then, the concession has changed hands a few times, most recently when PT Sampoerna Agro purchased the rights from PT Siak Raya Timber in 2010 to form PT National Sago Prima (NSP).

NSP has already planted an additional 4,000 hectares of sago, and established a nursery to produce 380,000 seedlings needed each year. Eventually, 14,600 of the concession's 21,600 hectare area will be planted in sago; with the remainder consisting of 'livelihood plants' (most likely sago as well) for local communities, timber species, conservation forest, and a buffer zone between their concession and the neighbouring PT LUM acacia concession. The company has already dug 170 kilometres of canals to control water levels, facilitate transport of harvested sago, and for fire suppression. NSP has constructed a modern processing facility to produce high quality sago flour on-site. They are experimenting with using the sago waste to run the factory's boilers.

PT National Sagu Prima concession, Pulau Tebing Tinggi



Photos: Craig Thorburn

Sampoerna Biofuels, another subsidiary of the Sampoerna Group, plans to explore the possibility of utilising sago to produce biofuel (Wibisono 2010).

The concession employs around 600 workers, with much of the low-skilled labour drawn from neighbouring villages. In addition to sago produced on their own plantation, the mill purchases sago log sections from local growers. Sampoerna Agro will also perhaps purchase raw sago from *sago rakyat* mills, and in the future could develop some sort of nucleus estate scheme to engage villagers in intensive sago cultivation on their own land.

Local villagers' attitudes toward the operation are somewhat ambivalent; some are disdainful that the new 'interlopers' have not consulted with local sago growers to deploy 'local wisdom', but rely instead on agronomists from national universities. They are dubious that thinning sago stands and controlling water levels will increase production.¹ Local *sago rakyat* mill owners fear that the new facility will drive down the price of raw materials, forcing them out of business. There have been some problems with the sale of cut sections from villagers to

the NSP mill; if these have been floating in the water too long, the ends soften and can clog the machinery at the mill. Others are keeping an open mind, waiting to see what form of 'Corporate Social Responsibility' largesse may eventuate.

The Indonesian business press has been rather sceptical of Sampoerna Agro's sago experiment, pointing out that the company has no experience in the production of staple foods, and that sago plants take ten years to reach maturity, as opposed to four for oil palm (Biofuels Digest 2010). If successful, however, this venture could present an important viable alternative model for the economic development in the Kepulauan Meranti district, as well as other peat swamp areas in Riau and elsewhere in Indonesia. Although NSP have not yet conducted any experiments to measure carbon emissions from their sago plantation, the fact that the peat is kept saturated precludes the sort of dehydration, oxidation and subsidence that occurs when peatlands are converted to either oil palm or acacia plantations (BAPPENAS 2009; Jauhiainen et al. 2012). Peat 're-wetting' is one of the major strategies proposed by the Indonesian National Council on Climate Change to reduce the country's GHG emissions (DNPI 2010).

¹ Initial results from PT NSP appear to indicate that these practices result in significantly increased yields (Utomo, pers comm. 2013)

Conclusion

The rather unimposing Meranti islands suddenly find themselves at the 'cutting edge' of Indonesia's response to climate change. On the one hand, the low-lying islands are especially vulnerable to the impact of sea-level rise, already having lost some coastal land to salt water intrusion caused by peat subsidence and mangrove harvesting. At

the same time, the islands are at the centre of debates over Indonesia's climate change mitigation strategy. Indonesian President Susilo Bambang Yudhoyono's 'progressive' and 'apparently sincere' statements on combatting climate change, reducing deforestation and developing sustainable forestry are clearly at odds with the national pulp and paper

industry's aggressive expansion, particularly on carbon-dense peatlands (Butler 2012). And the efforts of Meranti villagers, their leaders, smaller scale capitalists, and regional or national activists are forging ways – including the sago plantations – that seek to moderate the strong political and economic forces affecting their islands, possibly creating liveable compromises.

This is not the first time the Meranti islands have found themselves at the centre of controversy. In 1964, at the height of Indonesia's *Konfrontasi* with Malaysia, volunteers were posted to these and other islands in the Straits of Malacca to secure Indonesia's frontier and harass

Malaysian and British security forces in West Malaysia (Conboy 2003). This time, however, the stakes are much higher. Land-hungry, intensive industrial plantations, national development agendas, attempts at global climate change mitigation, and the spectre of sea-level rise all push and pull at the islands, their peat and their forests. Meanwhile, local residents, engaged with multi-scalar networks and processes of governance, protest and business, are themselves working– along different trajectories in different places, with potentially very different outcomes – to channel these major forces in ways that are, hopefully, better for them.

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