

Toward forest-based management of the peat lands in Riau, Indonesia

In Southeast Asia, wet peat lands are rich in biomass and water resources, but extremely vulnerable to human induced environmental changes. They form a part of tropical forests where decomposed organic matter accumulates over many years, creating carbon-rich soil. Southeast Asia's peat lands account for 11-14% of the total global peat carbon pool.¹ Even though peat lands are not suitable for cultivation, they have been increasingly turned into an economic resource over the past 20 years. They have undergone unprecedented large-scale exploitation, leading to serious degradation, large scale fires, and carbon emissions across the region. Seeking to understand how peat lands are changing, a joint team of researchers from Kyoto (Japan) and Riau (Indonesia) have been undertaking a two-phase multidisciplinary initiative in Bengkalis (Riau) to shed light on forest use. Our research aims at a holistic analysis of forest use in a socio-economic context and an assessment of the ways in which local people can potentially participate in the rehabilitation of degraded peat lands toward long-term improved management.

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Peat land forests in context

In recent years, our understanding of the role of forests at a local and global level has led advocates to emphasize the importance of conserving remaining peat lands. They have argued for the restoration of degraded peat land hydrological systems and other sustainable vegetation cover, and called for a water management 'master plan' for peat land areas, including plantations.² Peat lands need to be recognized as a pan-regional environmental asset, which can be passed on to future generations without blame being laid at the feet of those who misuse them at present.

In Indonesia, as early as the 1930s, research looked at the distribution of peat lands, examining the chemical, physical and biological characteristics of vegetation.³ Topographical and soil studies have been thoroughly conducted on original peat lands,⁴ and after the Kyoto Protocol, studies on peat land carbon emissions greatly increased.⁵ Yet, most studies have been conducted by natural scientists, and few have been willing to tackle the social issues that are acutely related to the livelihoods of people who live off tropical peat lands. As such, collaboration with the social sciences is necessary.

In Sumatra, two main groups of people make use of peat swamp forests. The first are the Malay people and their 'culture of transit'. Tropical soils are quickly depleted by intensive cultivation, but the Malay people have preserved them by engaging in sporadic swidden agriculture, fishery, and trade – selectively felling noble aromatic trees, collecting useful products and strategically creating swidden parcels.⁶ Through these activities, they have left great swathes of forests intact. The other group includes immigrants such as the Javanese, who have moved in and used the peat land tidal forests on a large scale in order to produce rice. Over the years, they have become permanent residents in the areas they have settled in.⁷

Right top:
Harvesting oil palm.

Right below:
Collection of
raw rubber by
the middleman.

The traditional practices of the Malays in Sumatra have a limited ecological footprint and are ecologically compatible with the peat land's natural resource functions. Yet since 1965, new imperatives aimed at economic growth have seen peat swamps subjected to repeated rapid land-use change. Degradation has resulted from transmigration (both spontaneous and official), large-scale logging (legal and illegal), oil palm plantations, and the short-rotation of timber plantations to supply pulp and paper industries and fires. Shockingly, by 1988, over 93% of the peat swamp forests of Sumatra and Kalimantan were degraded, leaving only a few areas in a primary state.⁸

Rehabilitation through collaboration

Over the past few years, we have studied these degraded peat lands in Riau in collaboration with local people whose livelihoods depend on the health, regeneration and sustainable management of peat lands, with the aim of developing 'forests for people'. Through a group of experts whose fields include economics, anthropology, hydrology, soil analysis and ecology, we have holistically approached the peat lands. Any comprehension of the bio-diversity of peat lands must factor in the plant diversity as well as the role of birds and mammals, water flows, and human transformations of the environment. And yet, we have to also bear in mind the different degrees of conservation taking place in natural forests, timber plantations, oil palm estates and local communities. The wise use of peat land will relate to crucial issues such as water management and plant use. As such, plant diversity studies can help us to understand how we can sustainably introduce plants that are crucial to land use.

Biomass studies – those that look at key issues of biomass society such as production, land use, natural forests, timber plantation, oil palm estate, and local community interactions – are also necessary to understand the specific biomass production processes, peat land conditions, their productivity and material cycling. Biomass production flows are closely related to profit maximization; however, the stock of biomass production is closely related to conservation.

Multidisciplinary studies such as ours that depend on the active involvement of people who live in and around forests, and the local knowledge they possess to preserve it, can allow us to clearly pinpoint causes of degradation. How human societies and their subsequent needs shape them must be included in any form of people-oriented sustainable forest management and the revitalization of their place in our world.

Gradual land transformation in Riau

Until the early 1980s, the local Bengkalis society (Riau) maintained features of balanced peat land society. That is, the population was small and people made use of peat lands through traditional means, such as fishery activities, small-scale logging and trade in jungle rubber, without drastically altering their landscape. However, fast-paced production changes occurred in the 1990s and 2000s, radically transforming the area. Large-scale logging commenced in 1998 and led to oil palm cultivation. Subsequently, over a fifteen-year period, the exploration and opening of timber plantations as well as the oil palm estates led to an influx of people and the further degradation of peat lands. People in the area are enthusiastic for oil palm cultivation, but such cultivation has not lived up to everyone's economic expectations as productivity has been far below national or provincial standards and exposed to fire risks, in spite of the continued use of fertilizers and agricultural chemicals. Lands have become increasingly less fertile and there are frequent fires.

However, we find that people continue to hold multiple occupations and do not rely solely on income from peat land cultivation; they also earn from fishery, trade, public services, construction, grocery stores and cooperatives. Jungle rubber, for example, is a stable source of income; it is something that people inherit, and it has not noticeably changed the peat land landscape. Although its productivity is low compared to national standards, it provides a fairly good income as cultivation expenses are minimal. The past fifteen years have seen people's survival strategies make the most of available opportunities presented by the cultivation of palm oil, employment at timber companies and a subsequent rise in large-scale illegal logging and smuggling.

Although people have inherited good use practices that intensively relied on peat land, large-scale timber plantations, logging, deforestation and oil palm cultivation, have changed them and made them vulnerable to fire. As a result, land has suffered severe degradation, and finally become barren or abandoned, much to the unfortunate expense of people's livelihoods and the environment's carrying capacity.

Toward the rehabilitation of degraded peat lands

Our research has now reached the second stage: to rehabilitate and conserve the degraded peat lands based on the information

gathered in our study. By far the biggest threat is posed by fires so to rehabilitate the landscape we aim to reintroduce and replant original swamp forest species such as *Bintangur* [*Calophyllum lowii*], *Ramin* [*Gonystylus bancanus*], *Meranti bunga* [*Shorea teysamanniana*], or *Jelutung* [*Dyera lowii*] on abandoned peat land. These trees can grow quickly (within eight to ten years) and can be cut and sold on domestic and international timber markets. The goal is to rehabilitate dried degraded land, convert it to wet and plant covered land and create conditions that can generate income for local people. We expect that forestry that includes the needs of the people will enhance the function of conservation, while also securing income as part of a survival strategy driven by small farms. Environmental conservation can be promoted by local people if they feel benefits from this conservation oriented program. In effect, this is a win-win solution from the perspective of both conservation and survival strategies.

We hope that companies will make use of the idea of a 'people's forest' to enhance the protection zone among *Hutan Tanaman Industri* (HTI) (Industrial Timber Estate) forests. Ultimately, we hope for a production growth path that does not compromise survival strategies (i.e., the household economy) and conservation factors (i.e., the rehabilitation of peat land). This path brings together multiple actors, interests and business needs and works as a bottom-up model of sustainable forest management that integrates multidisciplinary efforts to revitalize our environmental heritage for present and future generations.

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Notes

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