

D4S Q&A #4

Co-benefits of tropical peatland restoration

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The interest in investments in tropical peatland restoration is still limited, and largely driven by their potential for producing carbon emission reduction credits. Few investors are weighing the high biodiversity of tropical peatlands, and the depletion of regional environmental values that is caused by the loss of these ecosystems. Maybe investment interest would be higher in an integrated approach that also considers the co-benefits of restoration for biodiversity, environmental and social conditions in the region?

Some considerations based on our experience and insights:

What is so special about the biodiversity of tropical peat swamp forest (PSF)?

Tropical peatlands in Southeast Asia (primarily in Indonesia and Malaysia) are critically important, high-biodiversity ecosystems. They have high rates of endemism, i.e. species that occur nowhere else, particularly in fauna specialized for black water and swamp tree habitats. But they also form a last refuge for many species that used to occur in other habitats such as riverine lowland swamp forest that has recently disappeared from much of the region (except Papua). Studies report over 1,500 higher plant species (mostly trees) occurring in SE Asian PSF. Between half and a quarter of mammals and bird species in PSF are on the IUCN Red List, i.e. are endangered. These included well-known species like the orangutan, gibbon species, Sumatran tiger, clouded leopard, sun bear, false gaviel and several hornbills, but also little-known animals like the earless monitor lizard (*Lanthanotus borneensis*), that lives secretively underground and is considered a 'living fossil'. These species are lost after fire or conversion to agriculture.

What other environmental roles do intact tropical peatlands play?

Intact PSF ecosystems are often described as 'sponges', storing rainwater water to slowly release it to streams in dry periods. Indeed, the typical 'black water streams' that drain larger peat domes have relatively constant flows. This benefits the stability of discharge in larger downstream coastal rivers, reducing both flood risk in the wet season and salt water intrusion in the dry season. Moreover the acidity (low pH), low nutrient content and high carbon content in peat water helps regulate coastal water quality, which also maintains mangrove ecosystems as spawning grounds for marine fish, supporting regional fisheries. After peatland drainage, the 'sponge' function is lost, and with it the peatland role in regulating river water flows and coastal water quality.

Why does peatland restoration reduce emissions over a greater area?

In most cases, efforts to reduce emissions or enhance carbon stocks through land management only affect the intervention areas, e.g. by allowing forest regrowth or preventing fires. In the case of tropical peatland restoration however, canal blocking raises water levels up to several kilometres away, especially in deep peat that has high water transmission

capacity. In a typical situation where a (former) plantation area is rewetted, this means that peatland emissions several kilometres outside of the plantation are reduced as well.

Can ecosystem values return through peatland restoration?

Where peatland restoration involves full rewetting, and interventions to allow the natural forest to return, it is expected that not only carbon emission is reduced but biodiversity and environmental values will be restored as well. This will take time however. The 'sponge' function will gradually recover as blocked canals are filled in with vegetation while the peat surface again develops the water-storing rough 'hummock and hollow' terrain that was flattened by fires and plantation activities. Once rewetted, PSF species can return through natural succession from nearby forest remnants. Where such remnants are far away, or fast forest regrowth is required, targeted planting of native trees will accelerate the restoration process. While some highly specialized PSF species may be slow to return to restoration areas, some of the target species like tigers and bears are seen to return quickly.

SELECTED FURTHER READING (D4S PUBLICATIONS)

Distance to forest, mammal and bird dispersal drive natural regeneration on degraded tropical peatland (<https://www.sciencedirect.com/science/article/abs/pii/S0378112719315907>)

Benefits of tropical peatland rewetting for subsidence reduction and forest regrowth: Results from a large-scale restoration trial (Benefits of tropical peatland rewetting for subsidence reduction and forest regrowth: Results from a large-scale restoration trial (<https://www.nature.com/articles/s41598-024-60462-3>))