



Protecting Muara Siran Peatland Ecosystem: A Hope for Climate Change Mitigation in East Kalimantan

OVERVIEW OF INDONESIA'S PEATLANDS:

INDONESIA is a home to nearly one third of the global tropical peatland. This ecosystem plays important roles in providing a broad array of environmental services, including climate mitigation, livelihood supplies, water regulation, and biodiversity hotspot. Recent comprehensive peatland mapping conducted by Anda et al. (2021), showed that peatlands occupied 13.4 million ha distributed over four major islands: Sumatra, Kalimantan, Papua, and Sulawesi, with exceptionally deep (>700cm) peatlands occurring in Sumatra and Kalimantan. Tropical peat swamp forests store an immense amount of carbon which should be considered a high priority in climate change mitigation strategies. About 7% of Indonesia's land area is peatlands, but their roles are underappreciated as a climate change mitigation strategy (Leifeld & Menichetti, 2018). Indonesia has NCS mitigation potential of $1.3 \text{ GtCO}_2 \text{ e yr}^{-1}$ (Novita et al., 2022), which is equivalent to about 6% of global NCS mitigation potential (Griscom et al., 2017) and 10% of NCS mitigation potential across the tropics (Griscom et al., 2020). 74% of this potential comes from peatlands. At the current state, over half of the total peatland area in Indonesia is in various levels of degradation (Miettinen et al., 2016). This degradation of the peatland ecosystem is associated with significant greenhouse gas (GHG) emission, which threatens our efforts in tackling climate change and improving the community's livelihood surrounding such ecosystem. Further, climate change may exacerbate shifts of peat swamp forests from significant carbon sinks to sources of GHG sources.



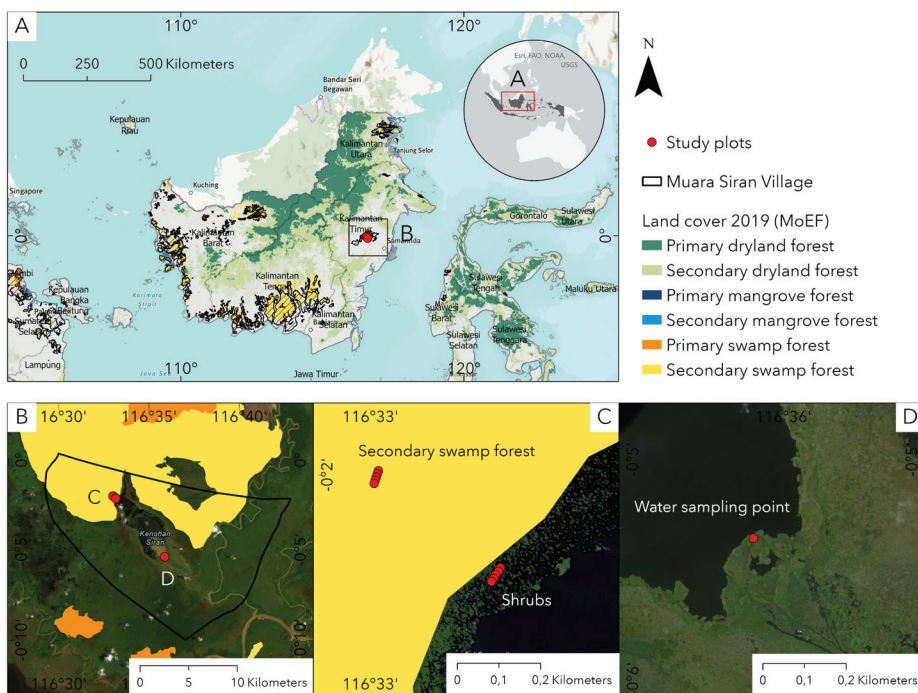
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Project Background

East Kalimantan has 183,050 ha of peatland, in which 42,200 ha can be found in Muara Siran Village. Within the past decade (2009-2019), 7% of peat swamp forest in East Kalimantan has been converted into other uses. In 2019, based on satellite imagery analysis, 34% (61,407 ha peat swamp forest of total 183,050 ha peatland area in 2019) of the peatland area in East Kalimantan remains covered by forest, while the rest of the area has been converted into largely oil palm plantations. The Muara Siran peatland is crucial for the livelihoods of surrounding communities and provides habitat for many endemic species. Despite its positive environmental values, Muara Siran peatlands have experienced massive threats due to land use conversion, logging and slash and burn practices. The economy in the area is centered around agriculture and fisheries, and slash and burn practices are a common way to open new land during the dry period, resulting in peat fires, which permanently destroy the peat and accelerate carbon dioxide emissions, reversing the natural role of tropical peatland ecosystems from carbon sink to carbon source.

Muara Siran Village is situated on the bank of Mahakam River, in the East Kalimantan province of Indonesia. The area can be considered as a unique peat swamp landscape, typical to those from the Middle Mahakam region. The land cover in the area is dominated with secondary peat swamp forest and wet shrubs, with notable presence of water body in the form of Siran Lake in the middle of the area. The Siran River flows south of the lake to join Kedang Kepala River downstream of the village and functions as an outlet for the upper catchments. There is an apparent hydrological control on the ecosystem functions of the landscape, with frequent flood episodes throughout the year. During the flood episode, prolonged inundation can be expected for up to three months. The area has a humid tropical climate with average air temperature ranging between 25 to 30°C. The average annual rainfall for the five-year period is about 2,175 mm and characterized by high seasonal variability with two rainfall peaks, one around May and one around December, in which monthly rainfall typically exceeds 200 mm.

Project Location: Muara Siran Village



[figure 1] Project Location in Muara Siran

Since 2020, Yayasan Konservasi Alam Nusantara, the main partner of The Nature Conservancy in Indonesia, has been building partnerships and local support for peatland restoration in the Muara Siran landscape. We are working to support the community to support the protection of remaining peat swamp forest in Muara Siran and improving livelihood for people who depend on this natural resource. Our activities rely on strengthening collaboration and commitment of multi stakeholders in the community-based peatland restoration and protection program within the framework of Low Emission Village Development through social economic development and village governance improvement approach. We are also developing an extensive study to understand the impact of waterlogged peat swamp conversion to other land use types on greenhouse gas (GHG) emissions. We know of no studies that have quantified GHG emissions and carbon loss in water body in this unique ecosystem.

Project duration:



2 years
(05/2022 - 06/2024)

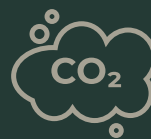
Project objectives:



Improving capacity and livelihood of local communities in relation to peatland protection based on local potential in Muara Siran as part of low carbon village development strategy



Strengthening the capacity and skills of local institutions in protecting, restoring and managing peat swamp forest areas



Developing GHG emission factors and fluvial organic carbon export from degraded and intact anoxic water-logged peat swamp forest in Muara Siran



Quantifying ecosystem carbon stock and radiocarbon dating of the Muara Siran tropical peatland ecosystem



[figure 2] Muara Siran Peatland Ecosystem

“In Muara Siran, YKAN along with collaborators conducted a combined science and implementation project at one of the remaining natural tropical peat swamp forests in the heart of Borneo.”

Adibtya Asyhari

Peatland Scientist, YKAN

“About 90% of the villagers got their main income from various activities associated with peatland ecosystem, from forest product harvest, swiftlet-nest extraction, and fisheries.”

Abdul Agus Nuraini

Head of Pokdarwis (Tourism Awareness Group), Muara Siran

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About YKAN

Yayasan Konservasi Alam Nusantara (YKAN) is a science-based organization which was established in Indonesia in 2014. With the mission to protect lands and waters on which all life depends, YKAN provides innovative solutions for realizing harmony between people and nature, through effective management, non-confrontational approaches, and building collaborative partnerships with all stakeholders for a sustainable Indonesia.

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