

Lahan Gambut Lestari Sumber Penghidupan Masyarakat

by A. Noyara Rahmasary



Outline

01 Berkenalan dengan Gambut

02 Ada apa dengan Gambut?

03 Jasa Gambut untuk Kita

04 Lestari itu Apa?

05 Pengelolaan Gambut Lestari





Perkiraan luas lahan gambut di dunia mencapai 423 juta hektar atau sekitar 3% total daratan di Bumi.

Gambut bisa ditemukan di berbagai belahan dunia, dari negara temperate hingga tropis.

North America (32%)	Europe (12%)
South America (11%)	Asia (38%)



Mires, fens, moors,
peat swamp

Indonesia memiliki sekitar 14,8 juta hektar* lahan gambut (atau 3.5% dari total gambut dunia). Sebaran di Indonesia berada di wilayah dengan *highlight* hijau.



*tergantung sumber pemetaan

Kenapa gambut lain dari yang lain?

Gambut berasal dari sisa tumbuhan yang terendam air begitu lama sehingga melapuk menjadi tanah.

- Tergantung kematangan, ada bagian vegetasi yang belum lapuk
- Sangat berpori
- Komposisi air > tanah; 90% air
- Kandungan karbon tinggi
- pH rendah (asam, 3-4.5), warna airnya merah *coca-cola*





gambut



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tanah



ciri ciri



kelapa sawit



hutan rawa gambut



kebakaran hutan gambut



luas lahan



kebun sawit



padi



Setop Permanen Izin Baru Hutan Alam dan ...
ekonomi.bisnis.com



Lahan Gambut Rawa Tripa Kembali ...
harianrakyataceh.com



Ekosistem Gambut di Kalsel Semakin Terancam
mediaindonesia.com



Lahan Gambut Kini Dimonitor Dengan Alat ...
ekonomi.bisnis.com



Hasil pencarian gambar 'gambut'





peatland



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drainage



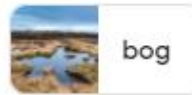
carbon



palm oil



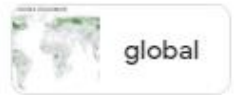
indonesia



bog



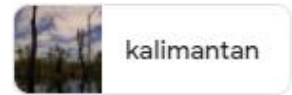
ireland



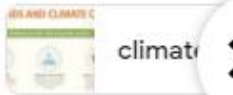
global



forest



kalimantan



climate



What are peatlands? - International ...
peatlands.org



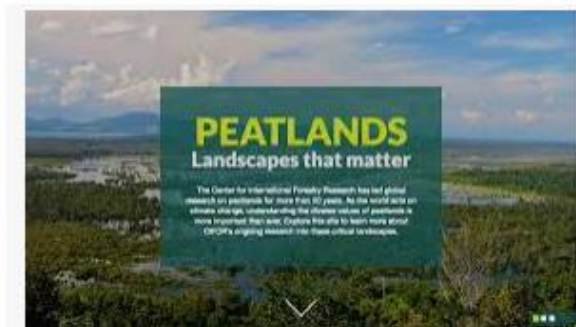
Wetlands International Indonesia
indonesia.wetlands.org



Second World Peatlands Day ...
peatlands.org



fragile peatland carbon sinks ...
news.un.org

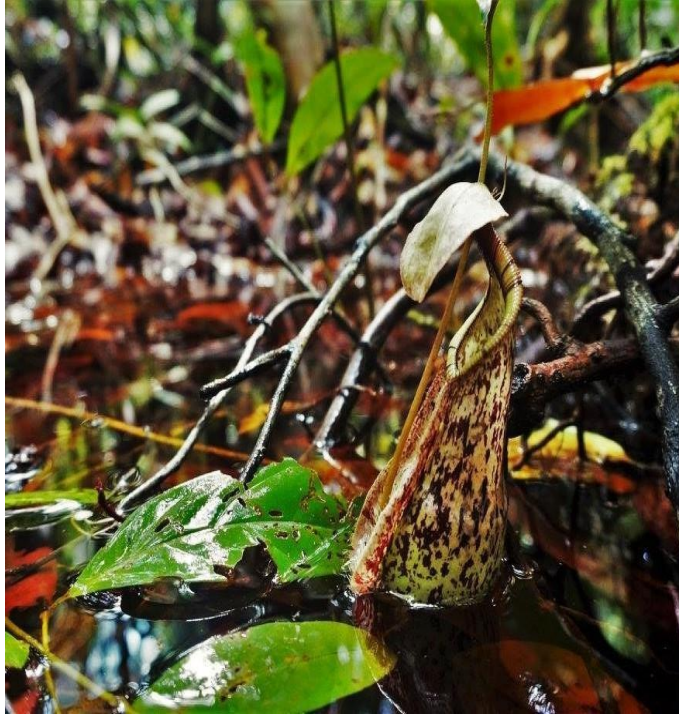


Hasil pencarian gambar 'peatland'



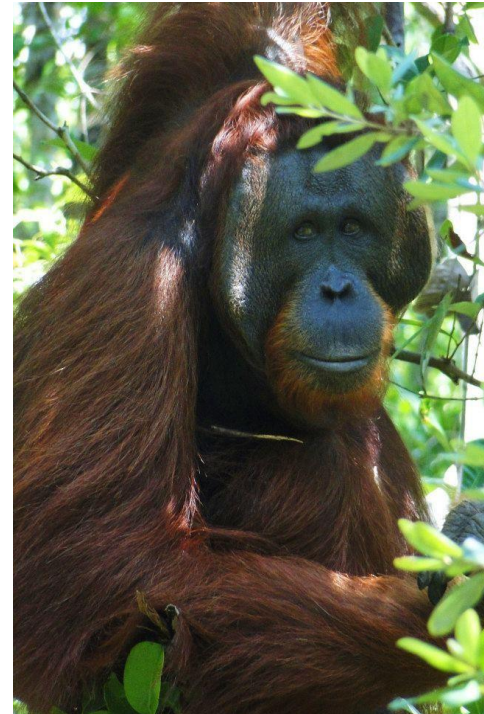
Menilik sisi lain gambut yang perlu lebih diekspos: *its ecosystem services* (jasa lingkungan)

- *Provisioning* (penyedia)
- *Regulating* (pengaturan)
- *Cultural* (budaya)
- *Supporting* (pendukung)



Sumber keragaman hayati

Mamalia darat
Vegetasi
Hewan air endemik

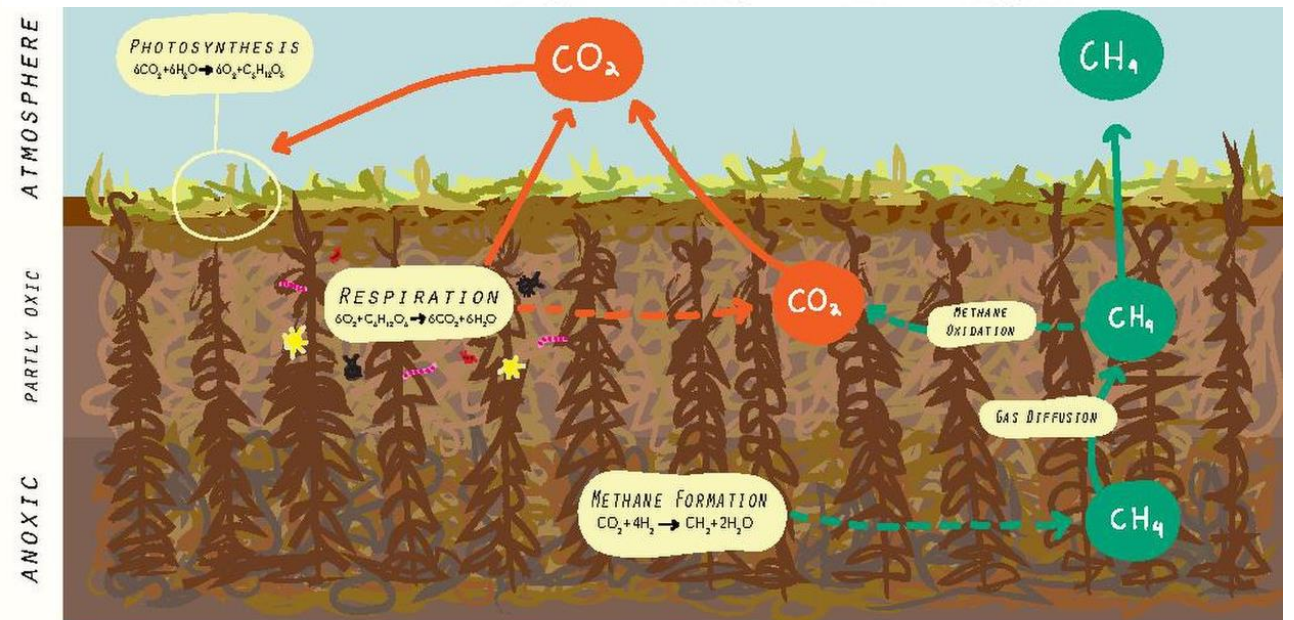
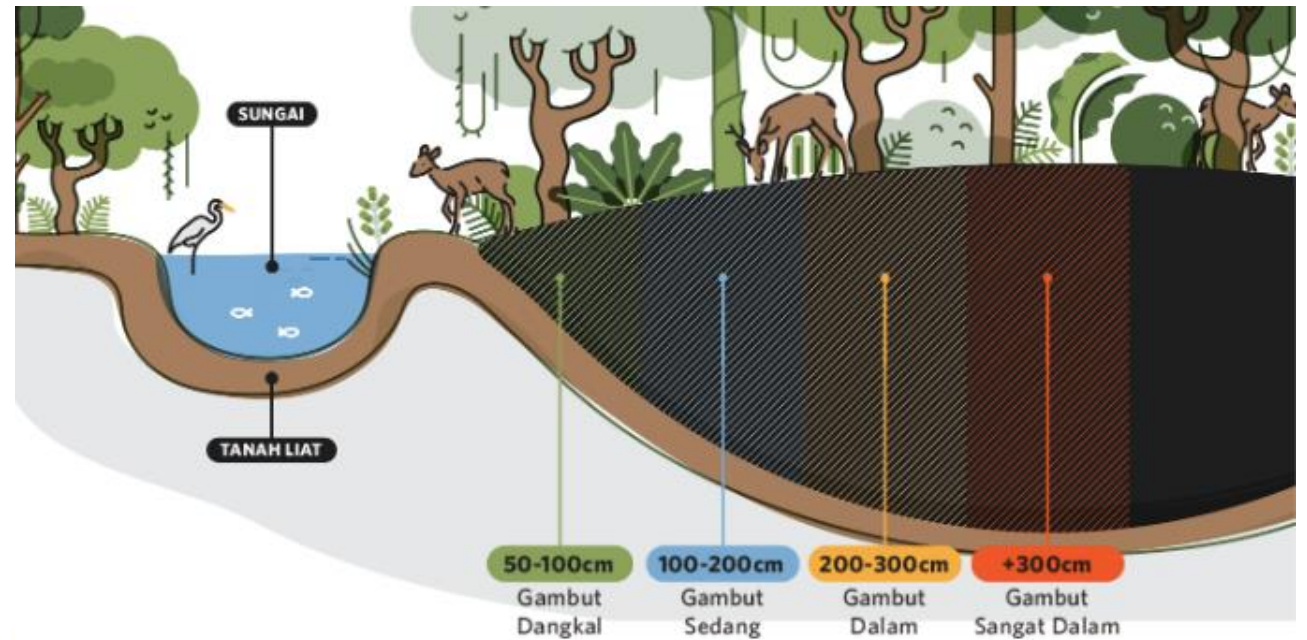
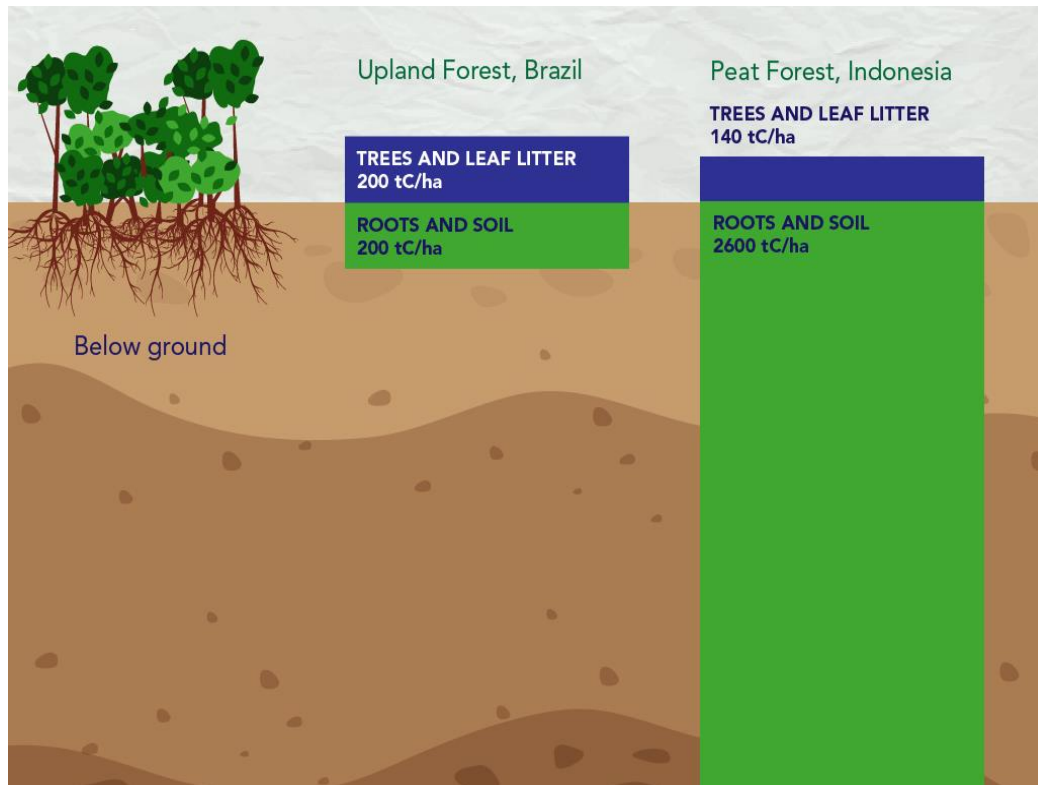




Regulasi air

Gambut bisa berfungsi layaknya spons yang bisa menampung air berlebih saat musim hujan dan melepaskan perlahan saat musim kemarau.

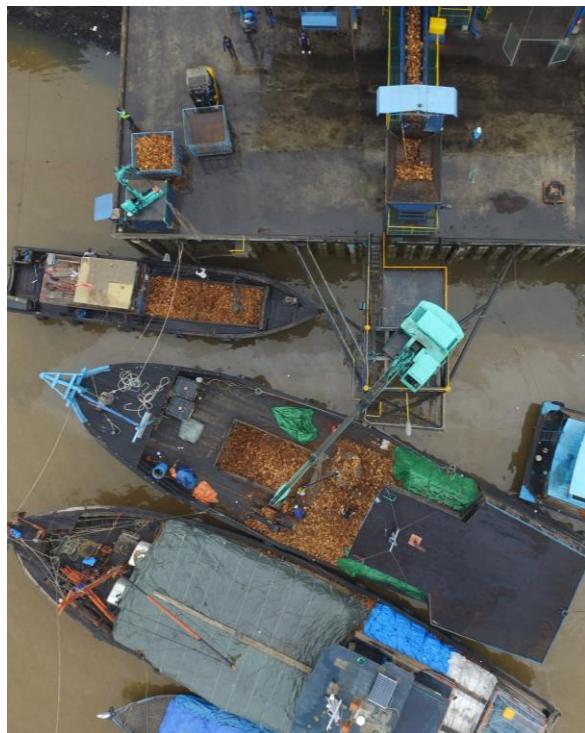




CARBON CYCLE IN PEATLANDS

Penyimpanan karbon

Total penyimpanan karbon (*carbon storage*) mencapai 18% dari total reservoir daratan.



Sumber penghidupan

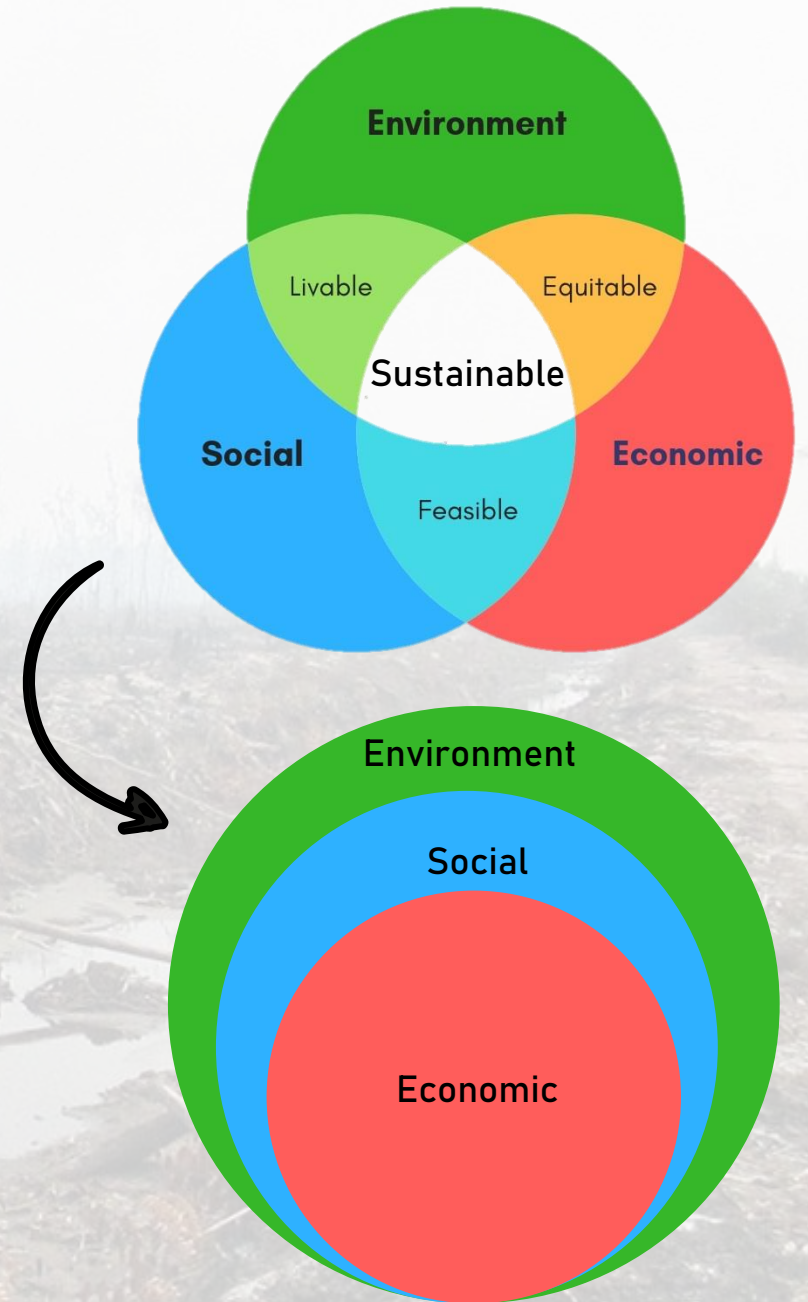
Mulai dari sarana transportasi utama, lahan produktif pertanian dan perikanan, hingga *ecotourism*.





Lalu apa penyebab pengelolaan gambut seperti pertanian dan perkebunan sering berujung pada kebakaran? Padahal katanya sudah lestari atau *sustainable*?

Pengelolaan gambut yang lestari (*sustainable*) seringkali bertumpu pada aspek lingkungannya.



Parameter lingkungan yang sering dipakai: laju subsiden, kebakaran, tinggi muka air >> neraca karbon



- Subsiden adalah penurunan muka tanah, salah satunya akibat hilangnya komponen air
- Resiko kebakaran di lahan gambut semakin tinggi jika tanah kering >> tidak hanya di permukaan namun juga di dalam lapisan tanah
- Subsiden & kebakaran melepaskan karbon tinggi ke atmosfer. Pencegahan: menjaga muka air tanah yang tinggi

Prinsip mengelola gambut yang lestari >>

- 01 **Pengelolaan air**
Anti-drainase, namun mengatur volume dan tinggi air supaya bisa menjaga kelembapan tanah gambut.
- 02 **Pengelolaan tanah**
Terutama di pertanian, dilakukan tanpa bakar. *Slash and burn* dikurangi. Amelioran bisa digunakan untuk menambah nutrisi di lahan gambut.
- 03 **Pemilihan varietas**
Hewan dan tanaman endemic/lokal, *paludiculture*, serta varietas yang adaptif



Cerita #1



*PENGELOLAAN LAHAN GAMBUT
TANPA BAKAR DENGAN TEKNOLOGI
WANATANI (AGROFORESTRY)
PENGALAMAN AKHMAD
TAMANURUDDIN*

Oleh: Indra Nugraha

- Petani transmigran di Kalampangan, Palangkaraya
- Membakar lahan seringkali cara termudah (dan termurah) untuk bisa bercocok tanam digambut
- Pak Taman membuktikan bercocok tanam bisa tanpa bakar
- Mencampur tanah subur, menggunakan abu dan pupuk
- Mengubah karakter gambut supaya lebih ramah pertanian >> lebih dari 10 tahun

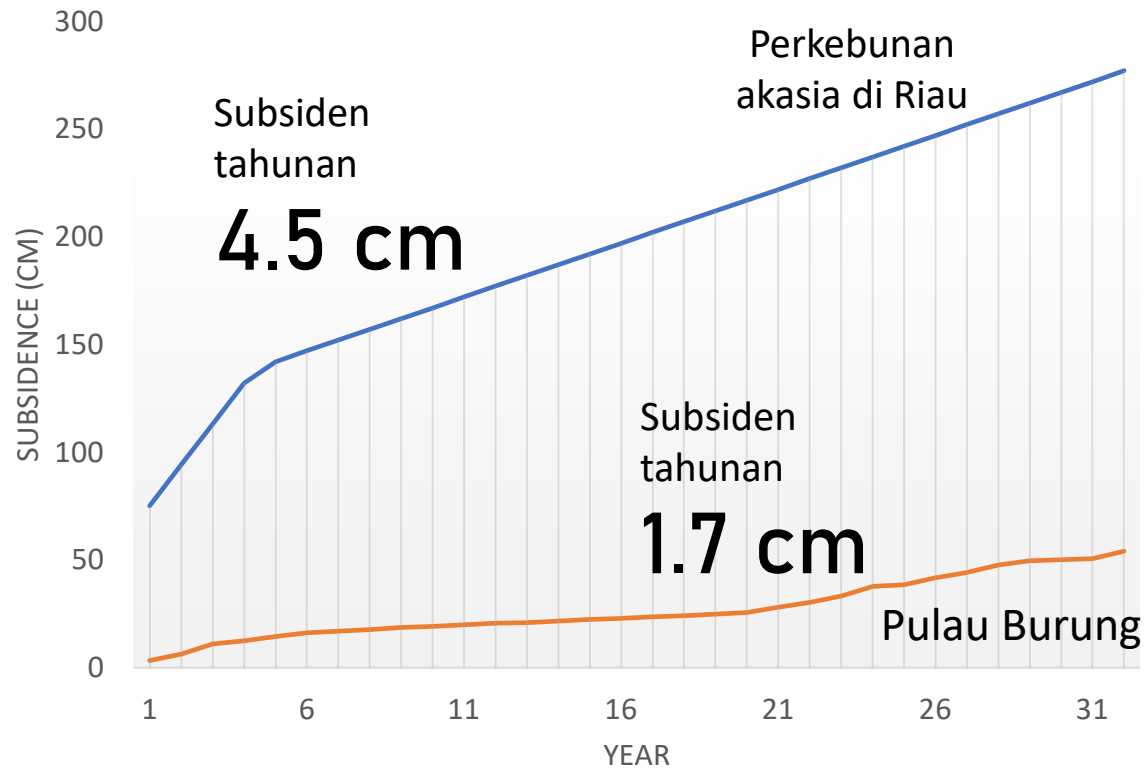
Cerita #2

Community-based business models

Model	Model 1	Model 2	Model 3	Model 4
Land ownership	Public (2.2 ha)	Communal (3.3 & 3.7 ha)	Private (1, 0.6, & 0.3 ha)	Private homegarden
Land manager	<i>Masyarakat Peduli Api</i> (Fire care community group)	Farmer groups including woman group	Group of farmer households	Farmer household
Business model	Timber and ecotourism	Pineapple agroforestry	Coffee agroforestry	Home garden agroforestry
Restoration treatment	<i>Rewetting, revegetation, revitalization</i>	<i>Rewetting, revegetation, revitalization</i>	<i>Rewetting, revegetation, revitalization</i>	<i>Revegetation & revitalization</i>



Cerita #3



- Emisi karbon: 12.94 t C/ha/tahun; Sekuestrasi karbon 34.31 t C/ha/tahun
- 'Trio tata air' meregulasi air dan terdiri dari kanal, tanggul, dam serta pintu air – sistem yang berguna sebagai reservoir/penyimpanan air (seperti gambut).



Perkebunan kelapa

Mengelola gambut lestari = mengelola sumber daya air, selain itu...

Persepsi

Ekstensifikasi pertanian dengan mengkonversi gambut harus dilakukan dengan lestari dan adil -> rawan disalahgunakan.

Inovasi & Investasi

Selalu dibutuhkan untuk mengadaptasi praktik pertanian berkelanjutan.

Kerjasama Antar-Stakeholder

Akses ke berbagai modal berperan penting untuk meningkatkan kapasitas aktor terkait untuk mengelola lanskap.

Rethink our relationship with the environment and others



Minimizing carbon loss through integrated water resource management on peatland utilization in Pulau Burung, Riau, Indonesia

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ABSTRACT. Sustainable utilization of peatland is required for balancing production and conservation efforts. On peatland, one of the main components for ensuring sustainability is understanding the carbon balance. This research was conducted in Pulau Burung, Riau, Indonesia, which has a long history of peatland utilization for agriculture. The site of interest was integrated water management of water management on peatland supported by water table and water table, used to control density of peat soil. The results showed the function of integrated water resource management made the yearly average water table depth to 60 and 60 cm in 2013 and 2018, respectively. The average water table in between 10 cm to 70 cm due to water variability and crop requirement. Consequently, the rate of annual subsidence was ranging at 1.7 cm with subsidence subsidence at 32 yr to 54.1 cm. Since the water source showed water the subsidence rate of the first five years is averaging only at 0.3 cm yr⁻¹. From subsidence rate estimate annual carbon loss during the peatland utilization period (10 to 200 Mg C ha⁻¹ yr⁻¹). In 10 yr, the water management on peatland utilization in Pulau Burung has prevented 2 000 Mg C ha⁻¹ yr⁻¹ to 4 000 Mg C ha⁻¹ yr⁻¹ loss compared to other cultivated area in peatland. Further, this paper discusses the practice that resulted in low emission of carbon agriculture in Pulau Burung in case of sustainability dimensions, which suggest the other sustainability aspects, that is the living level livelihood.

1 Introduction

Indonesia is the largest country with peatland expansion in the tropical area. It covers approximately eight percent of the country's land surface [1]. Peatland is an accumulated organic matter deposition under permanent flood-water conditions [2]. The land plays important roles in the global ecosystem, including biodiversity conservation, water preservation, carbon pool and sequestration, carbon and non-carbon products, and balancing climate change. The carbon storage in peatland in Indonesia is estimated at around 25.8 – 38.8 gigatonnes of carbon [3].

Despite its vital roles, the condition of the peatland ecosystem all over the world is deteriorating. Peatland degradation in Indonesia is mainly due to over-drainage in past region conversion into agriculture, where the process requires drained soil for optimal growth [4,5]. Draining results in a system to drain peatland water has been widely practiced to support large-scale agriculture and plantations. Under natural conditions, peatland has a high water table which makes it dry season. Peatland is like a sponge with a critical function to store water [6]. Over-drainage causes the soil organic layer of peat soil decomposed and leads to land subsidence.

The impact of over-drainage leads to at least two combinations of consequences – direct drainage,

subsidence, wildfire, and large carbon release. The function of storing water is disturbed which results in flooding during the rainy season. During the dry season, the drainage system removed its water storage function. This dry soil condition makes it vulnerable to wildfire, especially when the effect of the El Niño Southern Oscillation (ENSO) is stronger. The wildfire was responsible for 4 000 to 10 000 t of carbon dioxide released per hectare (Mg CO₂ ha⁻¹) [7, 8]. In peatland, there is a relationship between a low water table with a high subsidence rate [9]. The problem caused by the subsidence of peatland is also releasing greenhouse gases or carbon emissions. Higher subsidence rate contributes to higher carbon emissions [10–12].

On the other hand, peatland is increasingly important for economic development and livelihood. Peatland conversion for agriculture purposes is inevitable since demands for commodities and food resources keep rising. The growing number of the world population and shortages of land availability has contributed to the growth of global land-use conversion [13]. At the same time, in twenty years of observation (1990–2010), carbon areas increased 18 million ha, from 53.2 to 71.3 million ha, while 16.3 million ha was converted from cropland area [14].

y10.1016/j.landurb.2018.03.001

of land-use management, and in building life of the highest standard. Most of households in all in the coastal region, but the principle is to account floodwater coming in, and this involves high water level risk. If the sustainability of an, this research aims to a carbon loss in Pulau Burung highlighted the greatest by exploring the environmental benefits, that is. Finally, this study will ing carbon emissions that is.

a Pulau Burung District, Province (Figure 1). The Kampar – Sungai Gungung (KSG). The KSG is a river flows in area that movement in managing water – Sungai Gungung – Peatland utilization for a life cycle back into circulation. A historical 1 harvest transportation area is in building life.

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Fig. 1. The map research location in Pulau Burung District, Riau Province, Indonesia. The blue lines represent the water management network in the area.



More research at
www.tayjuhanafoundation.org/resources