

# Are peatlands carbon sink or Mentimeter carbon source?

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ш CH, R PHOTOSYNTHESIS CO2 ATMOSPHE  $\delta \mathrm{CO}_{2} + \delta \mathrm{H}_{2} \mathrm{O} \twoheadrightarrow \delta \mathrm{O}_{2} + \mathrm{C}_{3} \mathrm{H}_{12} \mathrm{O}_{3}$ DIXO RESPIRATION 602+C3H1203-+6C02+6H20 C0. CH METHANE OXIDATION PARTLY GAS DIFFUSION S METHANE FORMATION ANOXI CH4 CO\_+4H\_ -> CH\_+2H\_O

### CARBON CYCLE IN PEATLANDS



## Carbon balance 101: A case of undrained coconut plantation in peatland



by A. Noyara Rahmasary

## Challenges

In 2050



Hundred thousands hectares lands are converted from arable to developed areas every year.

# ... drive peatland agriculture

The challenges drive the utilization of more and more 'new' lands to be utilized for agriculture.

One of efforts is to use peatlands, which is part of suboptimal lands, as agriculture lands.



#### Is it possible to have sustainable peatland agriculture?

YESI But peatland sustainability leans more into environment aspects.

# What we want in peatland agriculture is a positive carbon balance.

Carbon sequestration > carbon emission. Carbon sink > carbon source. How plants in peatland capture and release carbon? **Capture**: Photosynthesis to increase plants biomass **Release**: Subsidence and fire/land burning



## Our latest research

#### Pulau Burung, Riau, Indonesia





#### Result:

Carbon emission 12.94 t C/ha/year

# Carbon sequestration $34.31_{t C/ha/year}$

#### Carbon emission Subsidence-based

300



See the different slopes between two subsidence rates?

### It matters!



#### **Carbon sequestration Above ground biomass-based**

Coconut

Tree 1 Coconut (stem, leaf, root, nuts) 2 Pineapple (fruit)



Understory (grass and other litters – fallen stem, leaf, and nuts)





The coconut (and pineapple) plantation in our study case have **a positive carbon balance** of

21.37<sub>t C/ ha/year</sub>

#### What is the main reason that cause a positive carbon balance?



The existing water management consist of canals, dikes, dams and water gates – **all act as reservoirs. The peatland is undrained,** resulting in available water all year long, a lower subsidence & fire risk (leads to lower emission). The lands are also productive.

### Managing peatlands = managing the water ... but it's not only that

#### **Innovation & Investment**

While water management is partial, land and commodity management are also vital. Innovation and investment are always welcome to adopt the good practices.

#### Perception

Agriculture extensification by converting peatlands must be done in right and sustainable manners. It is also prone to abuse.

### **Stakeholders** Cooperation

Resources are necessary to do everything, including to increase the capacity of main actor, i.e., farmers and local communities.

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

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#### 1 Introduction

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#### **Peatland Series**

More research at www.tayjuhanafoundation.org/resources

