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

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What is peatland and why is it matter?

Peatlands are wetlands with almost entirely of organic matter derived from the remains of dead and decaying plant material.
Why peatland utilization is in bad place?

Drainage made peatland dry and vulnerable to fire

Canal for draining peatland in MRP

Peatland fire contribute to global GHG emission
Pressing issue of global food production

Currently

~800 million people malnourished

Population in 2050:

~10 billion

Needed resources:

50%
Food and energy

21%
Water

Agricultural loss:
~150,000 ha per year

How we suffice food supply if the fertile land continue to decrease?
The need for sustainable peatland agriculture

Opportunity

Available peatland area suitable for agriculture. Inherently use by local communities for farming. Growing research on new innovation.

Challenges

- Severe limitations for agricultural use i.e. acidic condition
- Subsidence that leads to carbon loss.
- Fire risk.

Key to sustainable peatland utilization: Keeping the peatland wet
Examining how an integrated water resource management can reduce carbon emission from peatland management.
Study Area

PULAU BURUNG DISTRICT

Is a lowland, flatland, and peatland. Has a climate type A based on Schmidt-Fergusson. Within Sungai Gaung-Kampar PHU.

In 1986, via PIR-Trans scheme, transmigrants were given houses and land for coconut plantation.

A local, private company facilitate the agriculture practice. Including building the water management system.
Method

Water management

Water table depth from 106 points.

Carbon emission

Subsidence

Fire occurrence based on field observation and interview.

Emission = Carbon Density x Subsidence
Result – water management

Water Management Trinity

An integrated water resource management.
Canals - dikes - water gates and dams.
A close system.
Canal is not to drain but to store water and transportation.
Result - water table range

Water table depth - 2019

- Keep the soil moist
- Balance the requirement for soil moisture and crop growth
- Very low fire risk
- Low subsidence rate
Result - subsidence rate

Pulau Burung Subsidence – 1987 to 2019

Average 1.7 cm per year
Cumulative 54.1 cm in 32 years

Comparison with cumulative subsidence in plantation with drained peatland
Result - carbon emission

Carbon emission in different peatland utilization

![Graph showing carbon emission in different peatland utilization]
Discussion and conclusion

- Proper water management means regulating the water in peatland, not draining. It is the key to sustainability.
- With a regulated water table, subsidence is lower. It can reduce CO₂ emission up to 30 – 200 Mg CO₂ per ha per year.
- Effort to do sustainable peatland agriculture is even more pressing with climate change (increasing variability).
- To support the sustainability practice, regulation should be made accordingly and enforced thoroughly.
- More importantly, this effort should support local community. When the locals understand the benefits, they can commit to safeguard the peatland as well.