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# Water table evaluation post the construction of canal blocks on peatland in West Kalimantan, Indonesia

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# BACKGROUND

- To start agricultural practices in wetlands: dry the wetlands
- Started by Bugis and Malay with limited capacity in 1960's
- in line with transmigration and food self-suffiency program in 1970's
- is used as a clear regional boundaries

**The creation of canal network**

- Water flow out easily through canals
- Excessive drainage in dry season
- Loss of peatland's ability to store water
- Decline in water table In peatland
- Land subsidence, release of greenhouse gasses, peat fires.

Indonesia's Peat Restoration Agency (BRG-RI)

**The construction of canal blocks**

**Objective: To asses and evaluate changes of water table in peatland**

# WATER MANAGEMENT ON PEATLAND

## The Impacts:

- Retain critical water level in dry season
- Prevent flooding during rainy season

## The Requirements:

- Maintain the water level at the relevant level, typically less than 40 cm

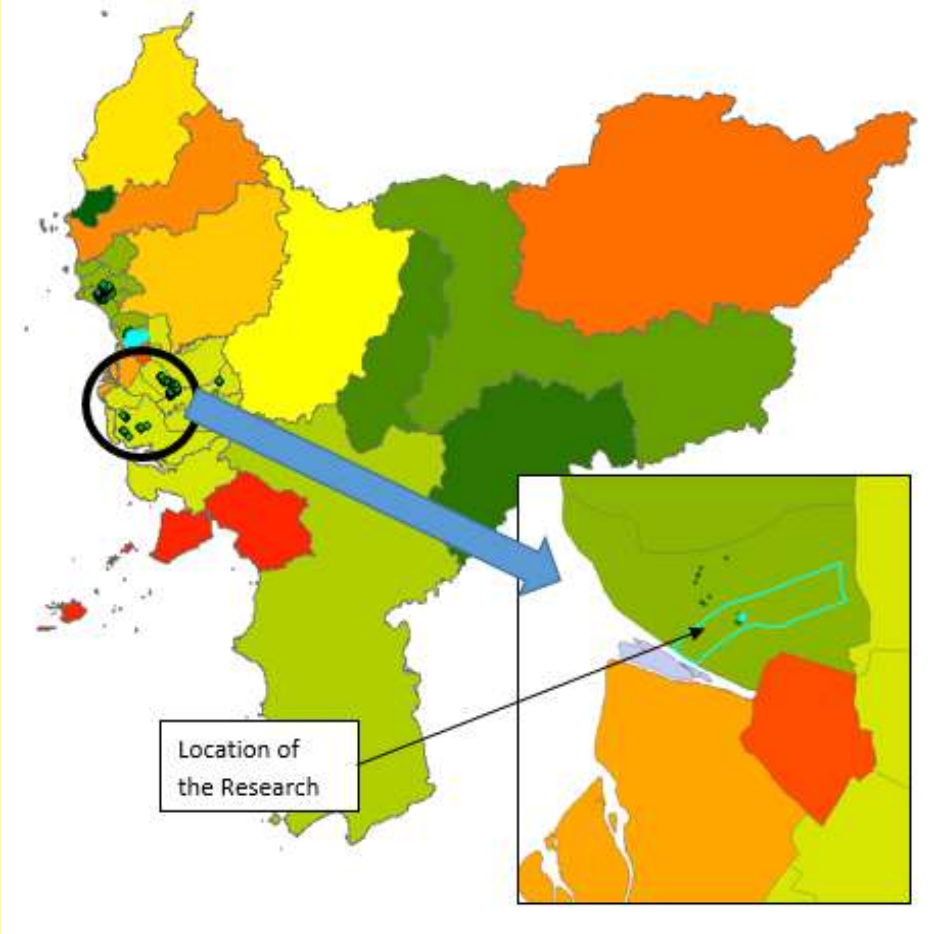
## Possible mechanisms:

- Blocking the canal on peatland
- Building sluice gates on peatlands
- Creating pond as a water reservoir on peatlands
- Establishing long storage on existing canals in peatlands by installing canal blocks.

# STUDY AREA

## Wajok Hilir Village

- has long been endeavored by most local communities as agricultural land
- has high rainfall potential
- is affected by tides
- is not supposed to experience drought
- is one of the target villages of Indonesia's Peatland Restoration Agency
- has several canal blocks built in 2017




Orientation of Wajok Hilir Village
in West Kalimantan Province

# STUDY AREA

Construction of canal block in Wajok Hilir Village, Documentation on January, 2018

# METHODOLOGY

## Observation time

- Consider periodic time of the tides
- from Feb to March 2018

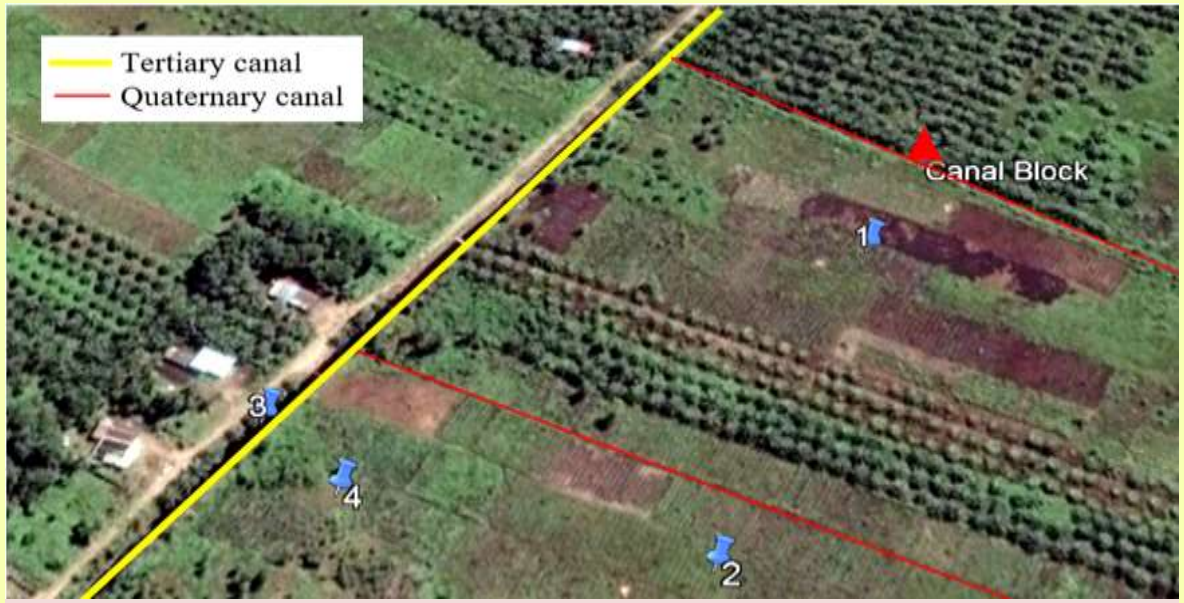
## Data collection method

- Every day in a month at 06.00 a.m. and at 06.00 p.m.
- reading the water level elevation on a peil scale/piezometer on peatland

## Sampling points

- Compared area where canal block is built and surrounding areas where canal block is not built.
- Compared location around tertiary canal with location around quaternary canal

# RESULTS




1 : land around quaternary blocked canal
2 : land around quaternary non-blocked canal
3 : tertiary canal non-blocked canal
4 : land around tertiary non-blocked canal

| Average water table at observation point(cm) | | | | |
|---|---|---|---|---|
| Item | Observation Point | | | |
| | 1 | 2 | 3 | 4 |
| max | 73,3 | 69,5 | 79,5 | 77,8 |
| min | 45,5 | 14,5 | 45 | 22,5 |
| interval | 27,8 | 55,0 | 34,5 | 55,3 |

- **water fluctuation**: land surrounding blocked canal **(1 = 27,8 cm)** << around non-blocked canal **(2 = 55,0 cm)**
  - ➢ **Canal block** helps retain water table longer + **tidal effect** is now capable of injecting groundwater into lands
- **Decline in water table**: Tertiary **(4 = 77,8 cm and 22,5 cm)** >> Quaternary canal **(2 = 69,5 cm and 14,5 cm)**
  - ➢ **Dimensions**: Tertiary >> Quaternary canal → Large canal dimensions being able to **carry more water out of the land**

# DISCUSSIONS

Water table tend to be far deep below the ground in dry season

Water table on peatlands is important to maintain

Water table <50 cm reduce dryness of the peat

Minimize potential for land fires

Field measurements have shown that water tables in peatlands around blocked canals have an average water table of <50 cm

Canal block may also be a water retainer in the canal → canal serves as water container in the form of **long storage**

## PREVIOUS STUDIES

### Research by Fitriati, et. al, 2017

- Canal blocking can increase water content of peat soil↓
  Non-blocked canal area → water content ± 60%
  Blocked canal area → water content ± 250%.

### Research by Lundin, et. al, 2017

- 2 previously degraded hydrological function of peat returned to natural / semi-natural condition after subjected to peatland rewetting for 15 years

### Research by Grand-Clement, et. al, 2015

- The construction of canal block is proven to reduce carbon release and increase biodiversity.

# CONCLUSION AND RECOMMENDATION

After the construction of canal blocks→ decline in water table in peatlands can be maintained

Canal blocks may also be utilized to retain water in the canal
→ making a water reservoir in the canal that serves as a long storage
→ to meet the water needs for irrigation in area surrounding the canal

Recommendation: to control water table in peatlands ↓
Construct canal blocks on tertiary and quaternary canals for all locations on peatlands.

# Thank You....