Happiness Grows from Trees

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Best Practices in Managing Peatlands by Forest Concessionaires

The 4th Indonesia-Japan Forest Talk (IJFT-4)

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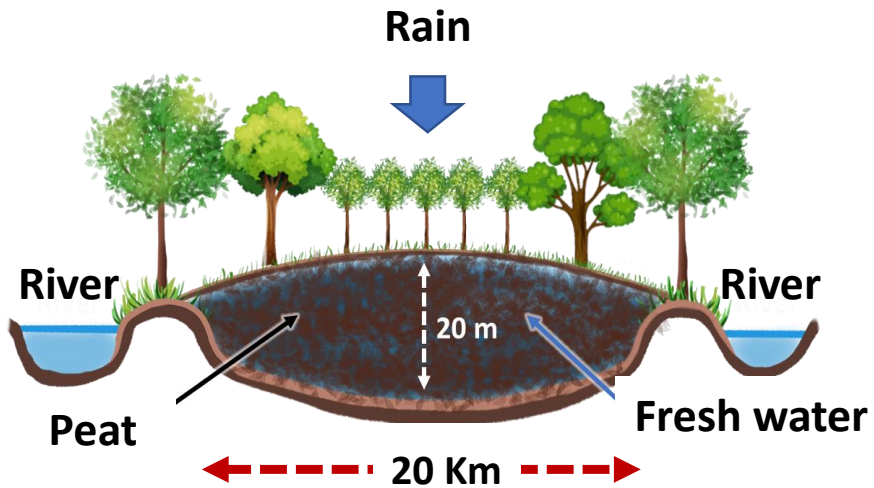
Tropical peatlands: important ecosystem yet challenging to manage



Source: Osaki et al. (2021)

(Courtesy of Asahi Shimbun)

Peat fires → huge CO_2 emission, air pollution

The importance of tropical peatlands:

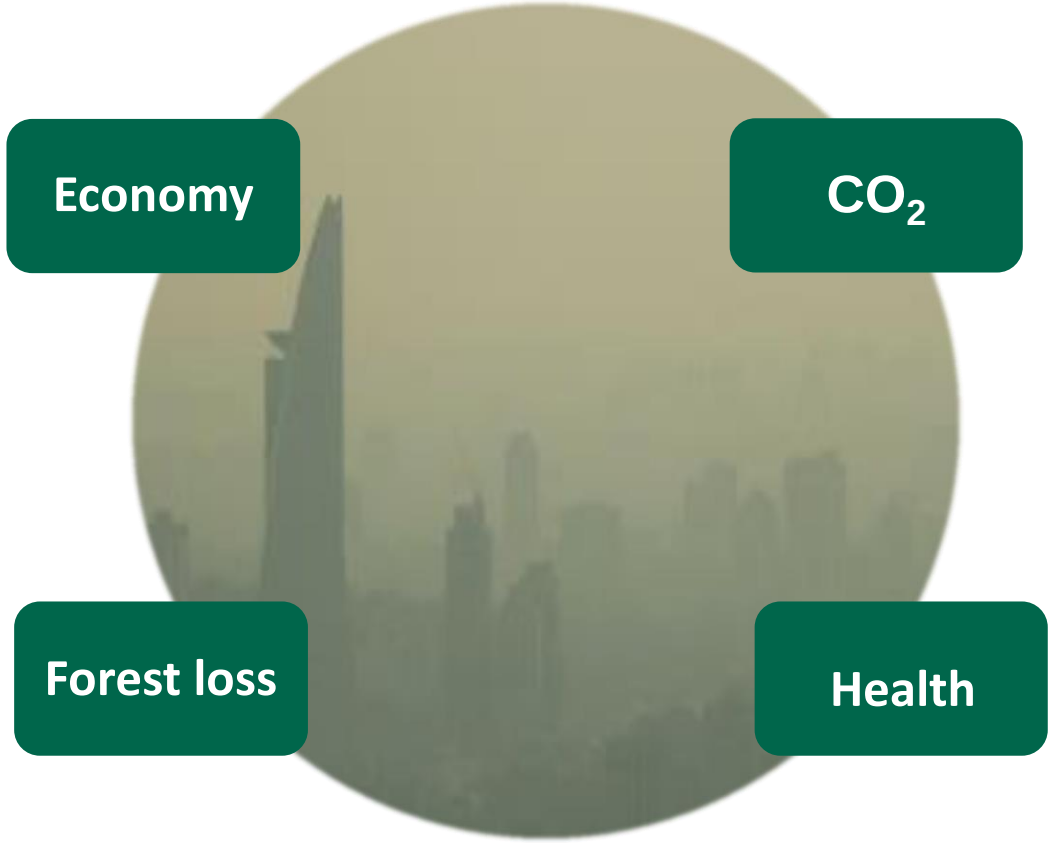
- Not only has a vital carbon-water storage function, but also host to huge diversity of plant and animal species
- Peatlands have the greatest potential for fulfilling Indonesia's NDC targets (74%) (Novita et al., 2022)

- Peatland degradation and fire are the main source of GHG emission in AFOLU sector
- In 2015, Indonesia experienced its worst peat fire since 1997, drawing global criticism for its far-reaching effects

Global economic and environmental impacts

- The 2015 fires cost Indonesia approx. USD 16.1 billion, equivalent to 1.9% of 2015 GDP

- The 2015 Indonesia fires released roughly 1.8 million ton CO_2



A city covered in smoke pollution

- About 2.6 million ha of Indonesian land burned between June and October 2015

- More than 100,000 people are likely to have died from smoke exposure

Source: World bank (2016); Koplitz et al. (2016)

Linkage between peatland management and peat fire

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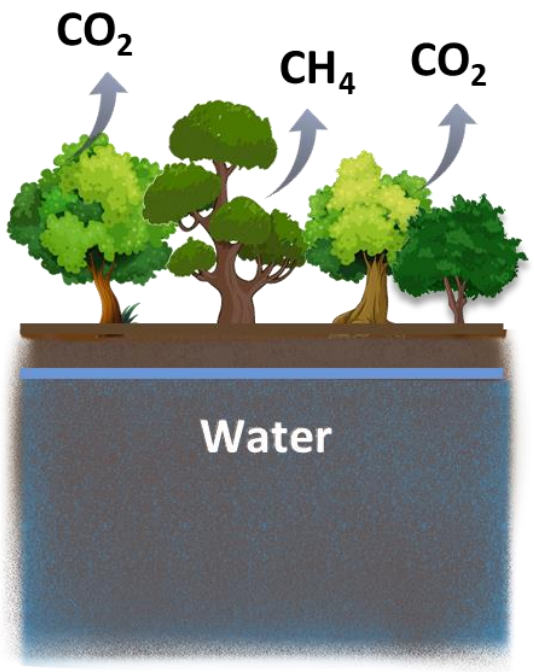
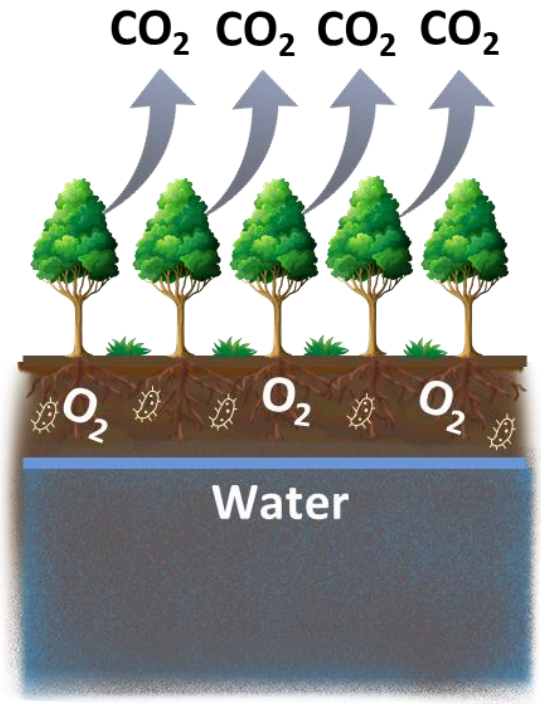
Natural forest



- Water level is close to the ground surface
- Low fire risk
- No human intervention, no fires.

Agriculture and afforestation areas (drainage)

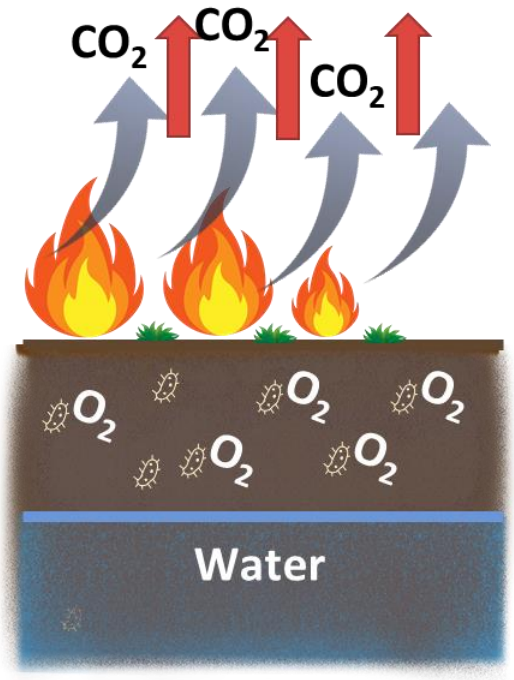
no appropriate water control



- Intentionally lowering the GWLs below the roots
- A potential fire risk
- More workers, higher fire risk
- As the peat dries, microbial oxidation happens which leads to CO_2 emissions

Degraded areas (drainage)

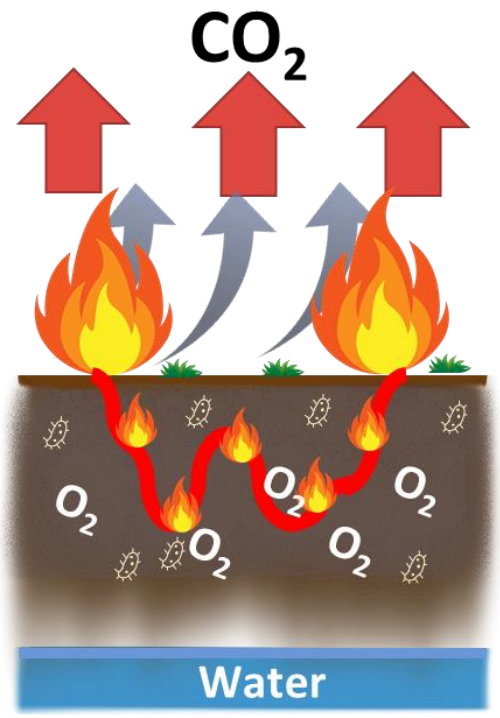
dry season



- Oxygen makes it easier to ignite dry fuel (organic matter)

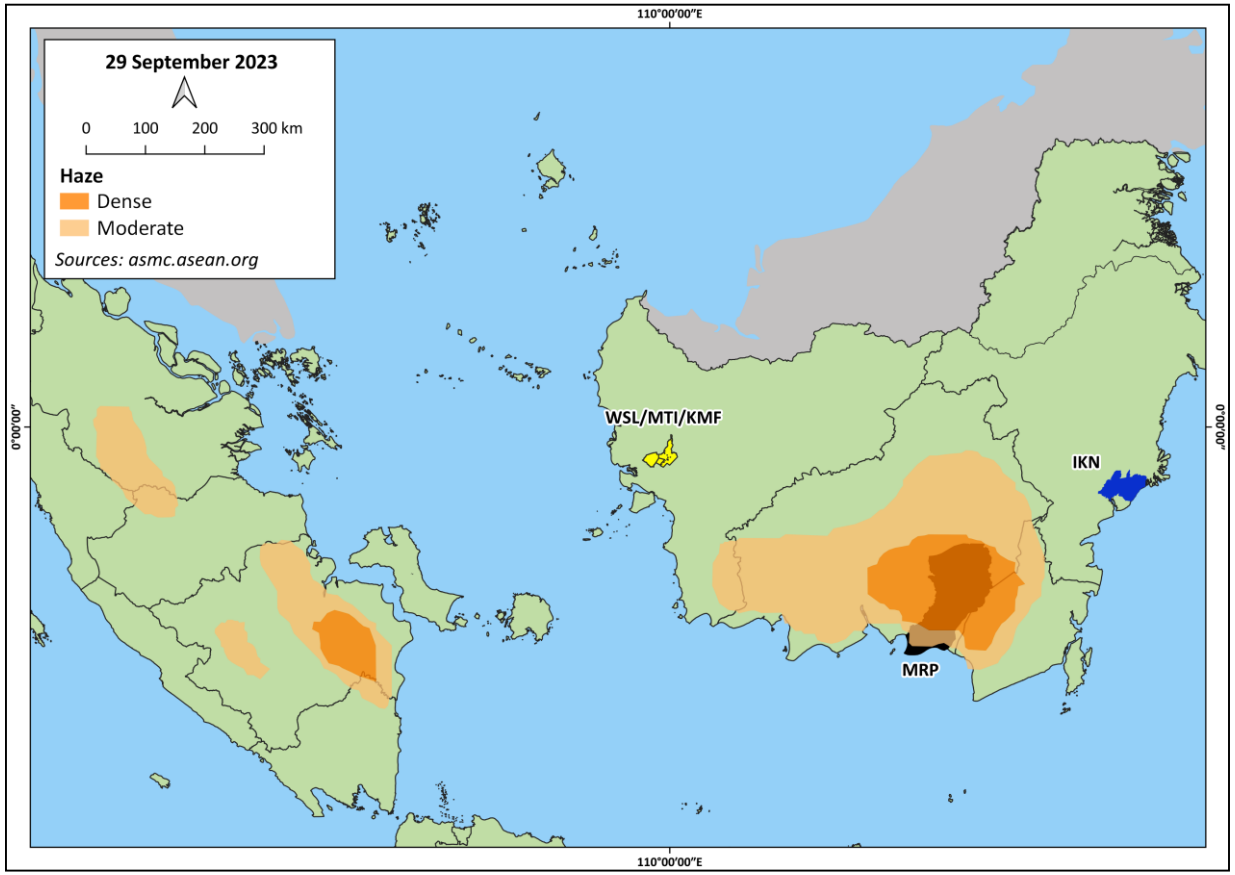
Degraded areas (drainage)

dry season, El Niño

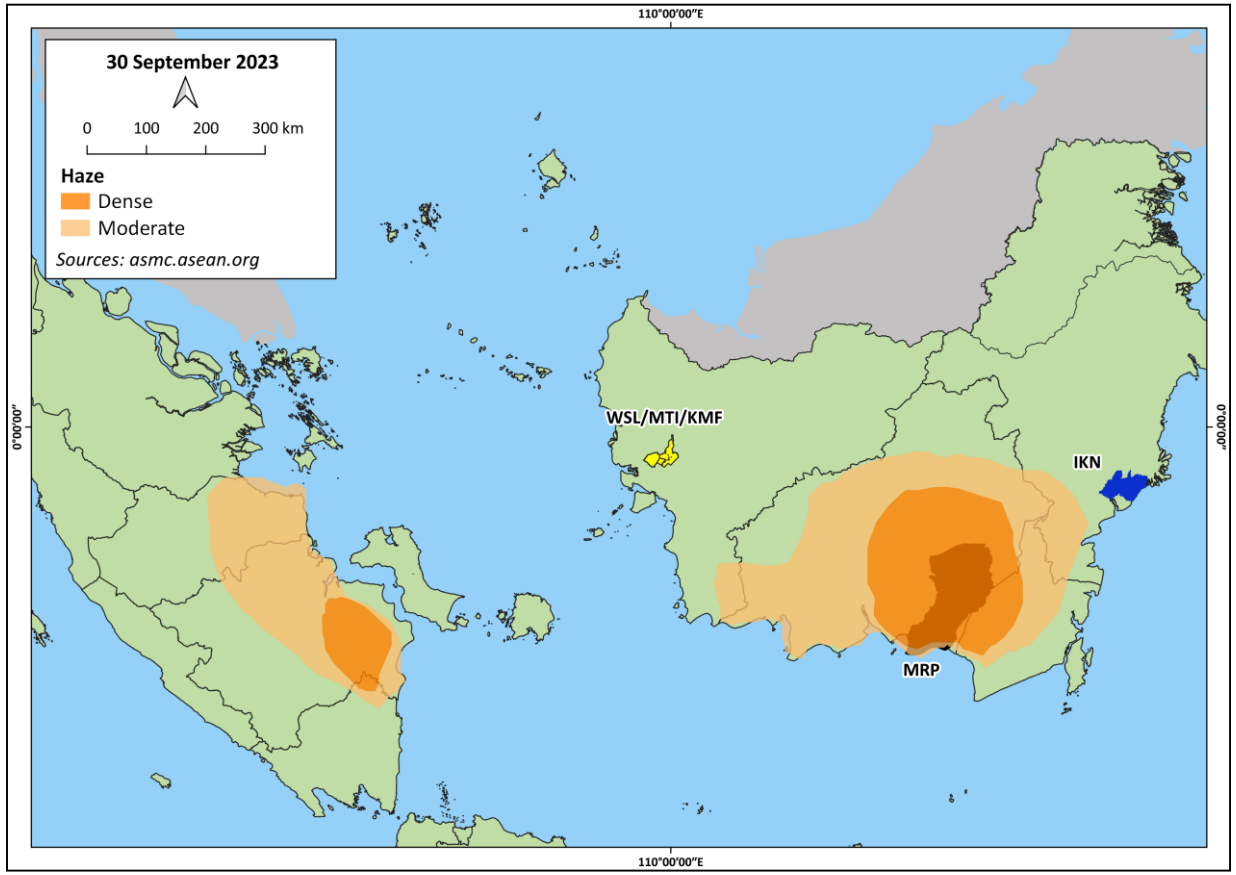


- The GWLs drop even further
- Increased CO_2 emissions as fire spreads
- The underground fire, which extremely hard to extinguish

Effects of fire is more prevalent in the dried peatlands



Distribution of smoke haze on September 29, 2023



Distribution of smoke haze on September 30, 2023

Dried peatlands combined with the prolonged dry weather has contributed to an increase in hotspots and smoke haze distribution as observed in parts of Sumatra in Kalimantan

Source: asmc.asean.org

A landscape level peatland management in West Kalimantan

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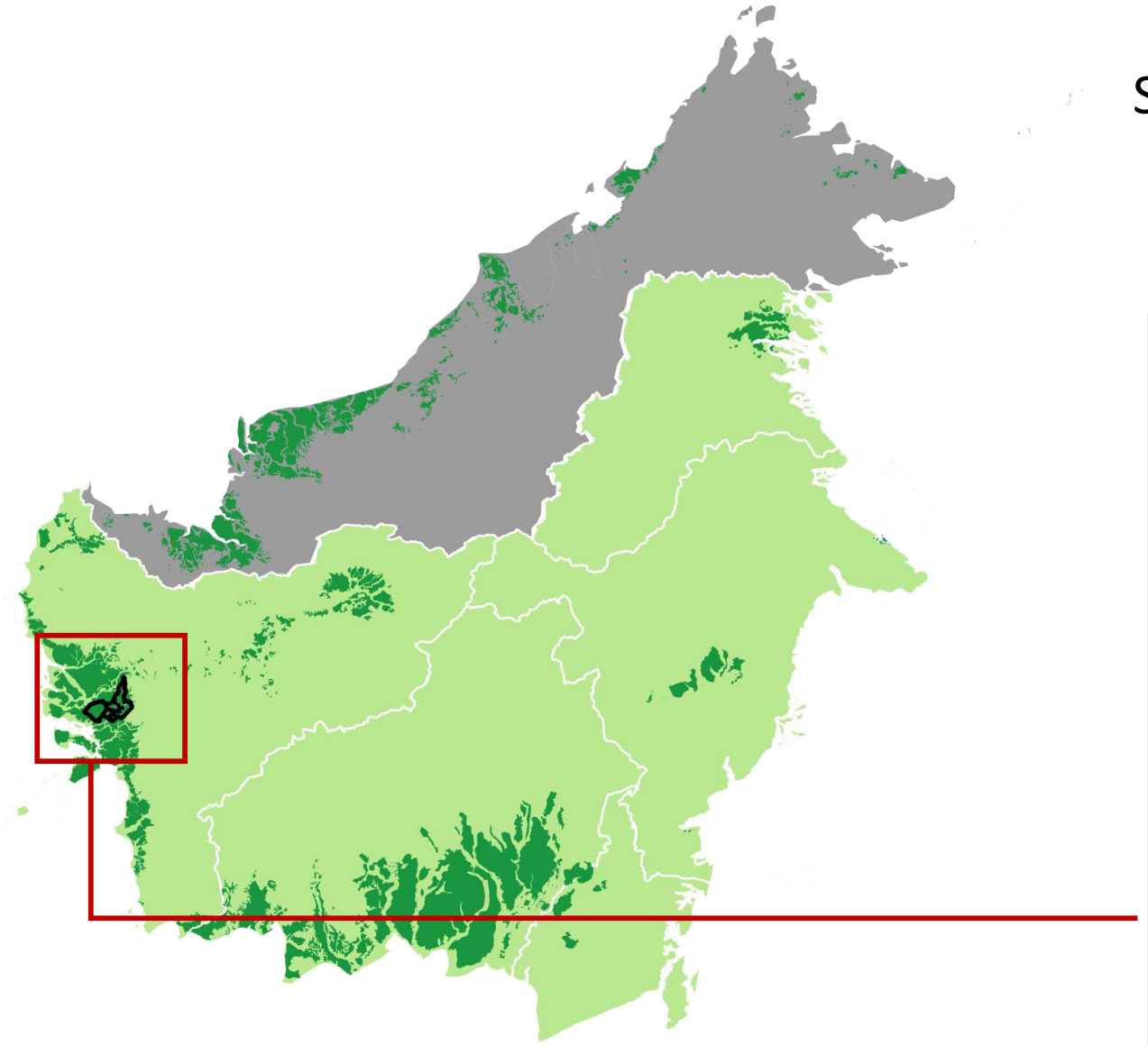
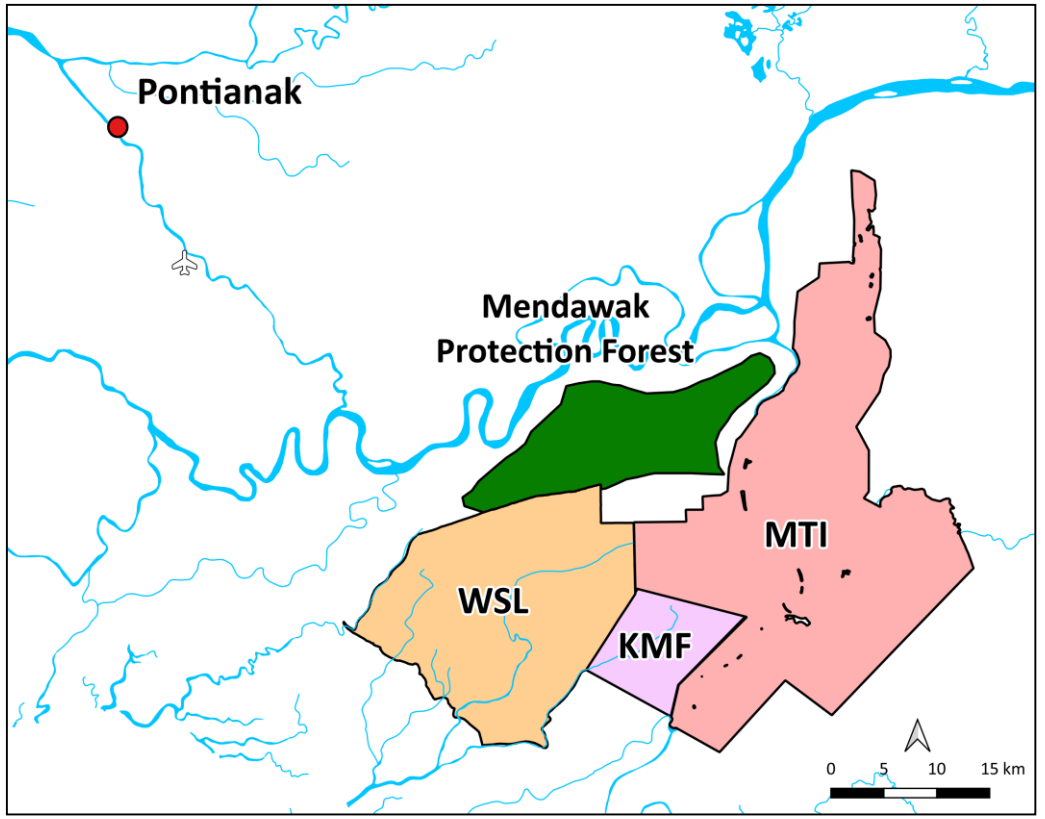
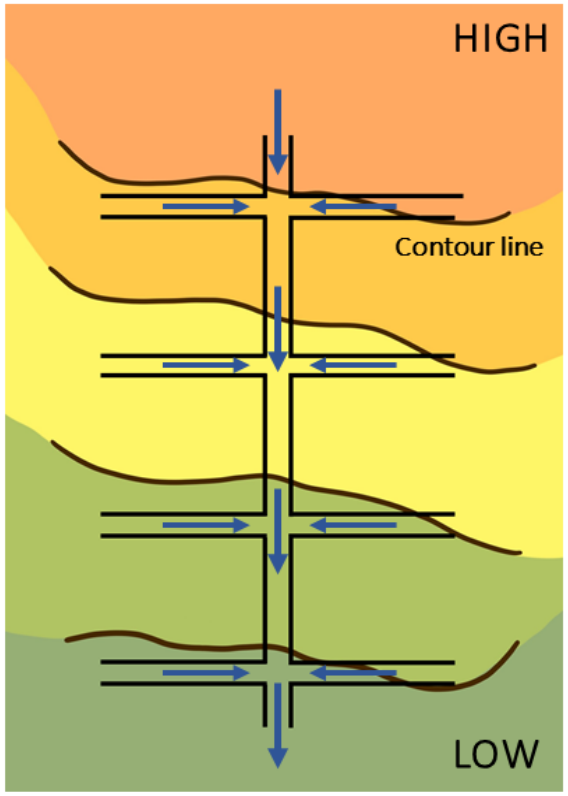


Peatlands (Xu et al., 2018)

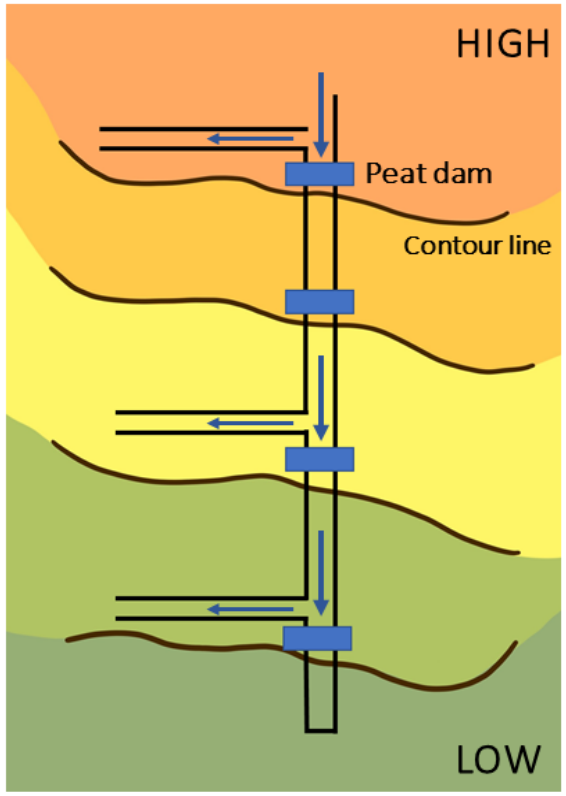
SFC manages three concessions operating on peatland with the total area of ±120,000 ha



Comparison of drainage- and stock-based water management



Drainage-based WM



Stock-based WM

- **Drainage-based WM**
  - Canal network ignores topographic information
  - During the dry season, water cannot be stored and dryness worsens, leading to peat fires that are difficult to distinguish
- **Stock-based WM**
  - Canal network designed based on detailed topographic map
  - High GWLs are maintained throughout the year
  - Water are stored and will be evenly distributed during the dry season

Drainage-based WM cannot prevent peat fires.

Intensive survey before starting operation

Surveys was conducted over five years by involving experts and local communities

Topography
(> 1,800 km)

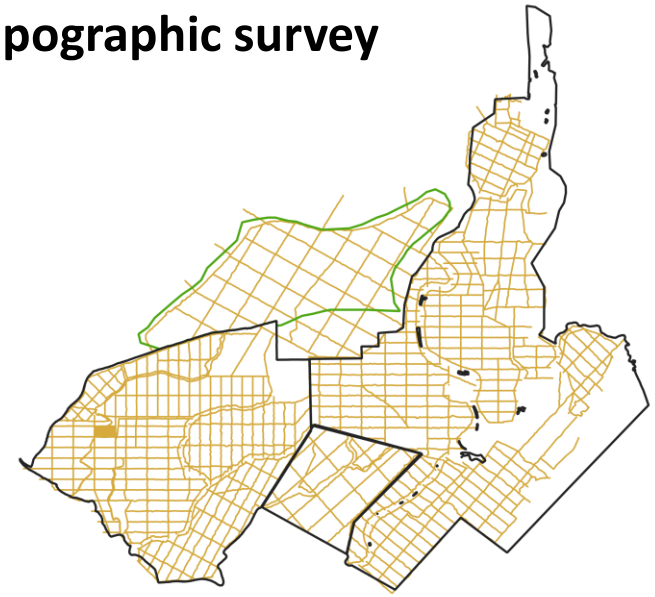
Peat depth
(> 1,400 points)

Soil characteristic

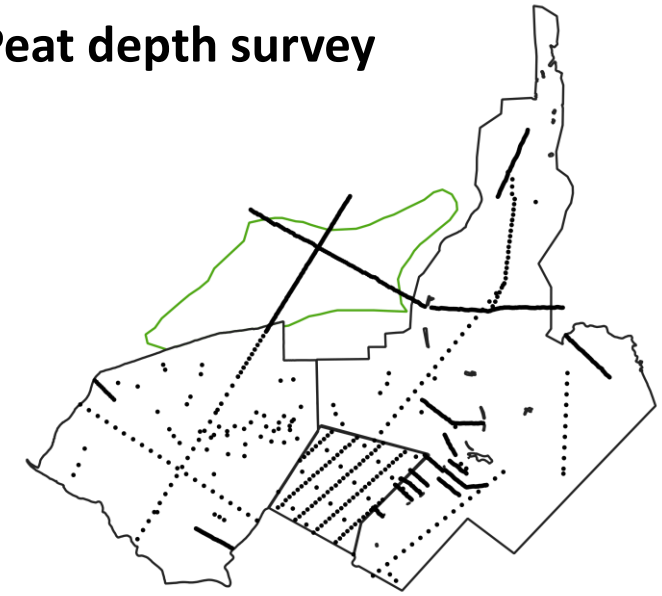
Vegetation

Water management zones at a landscape level

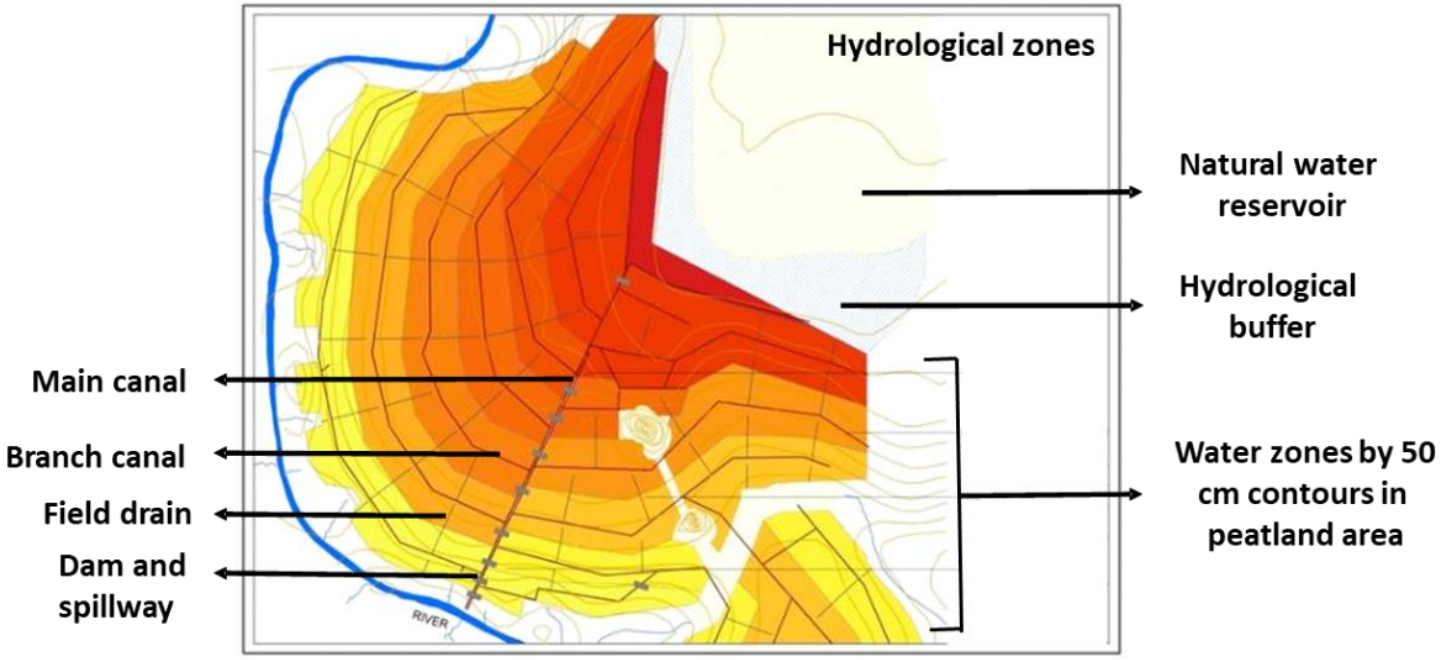
Topographic survey



Peat depth survey



Water zone was designed based on the topographic map with 0.5 m contour interval



Canal network design

- **Main canal**: align across contours
- **Branch canal**: align along contours

CO_2 reduction through stock-based water management

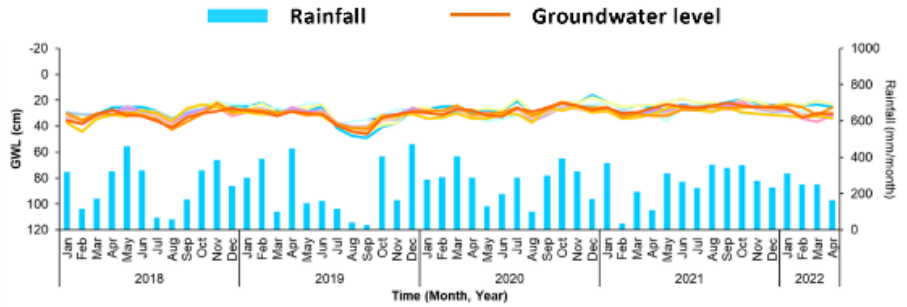
Maintaining proper groundwater levels can reduce CO_2 emissions by more than 50%

→ Thorough management of the groundwater levels can prevent the peatlands from drying, while keeping the tree growth.

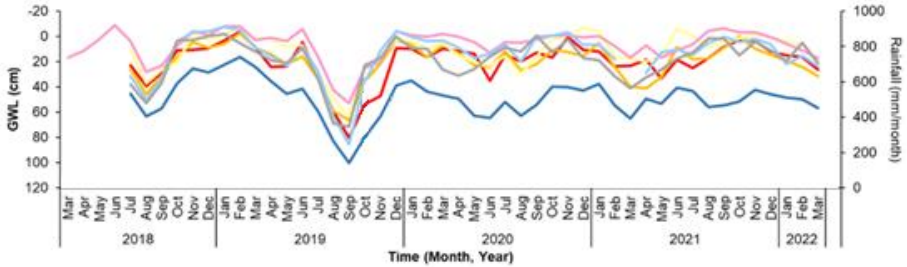
→ Making accurate topographic maps to figure out water flow, which can keep the amount of water constant at all times across the area.

→ While conventional peatland management methods emits 128 ton CO_2/ha, SFC's peatland management methods emits 28 tons CO_2/ha only, reducing emissions more than 50%.

Fluctuations of groundwater levels (SFC managed area)



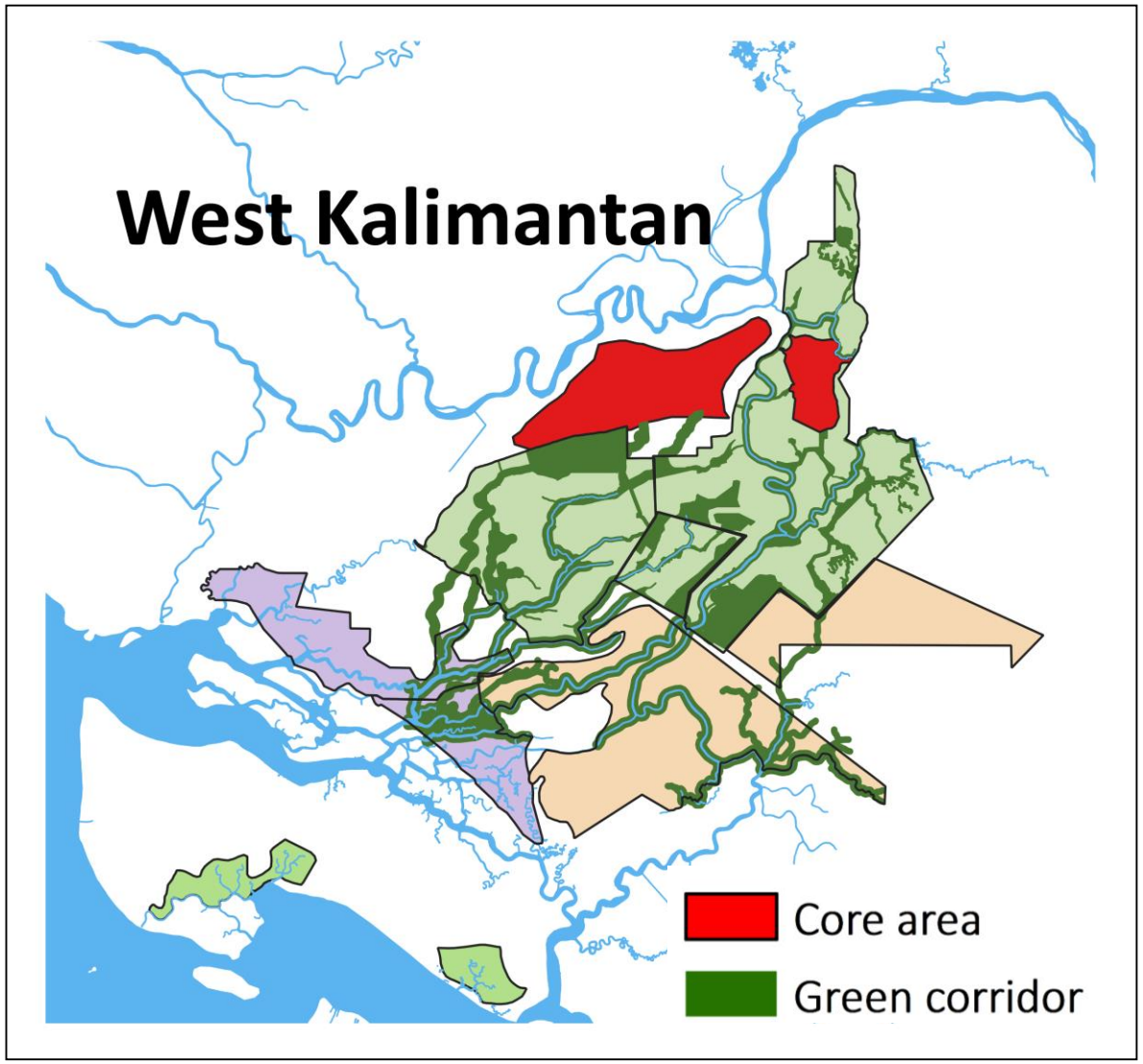
Fluctuations of groundwater levels (unmanaged areas)



Peatland Management Methods	CO_2 emissions (ton CO_2/ha/yr)
Drainage-based	36 – 222※ (median: 128)
Stock-based	**28※※**

※Based on various studies of the Ex-Mega Rice Project
※※Based on SFC's field data

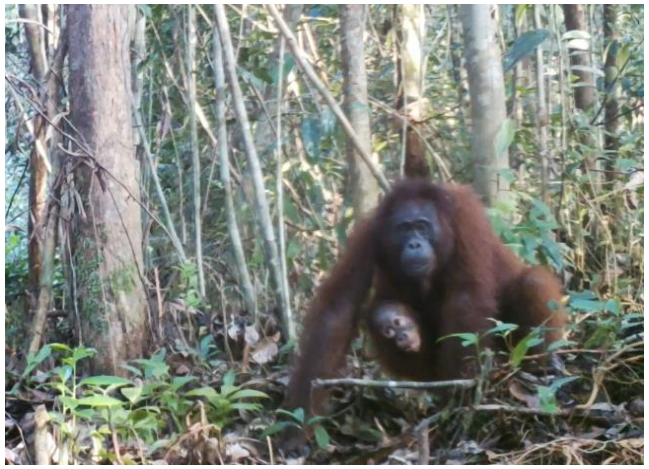
Protecting biodiversity through conservation network

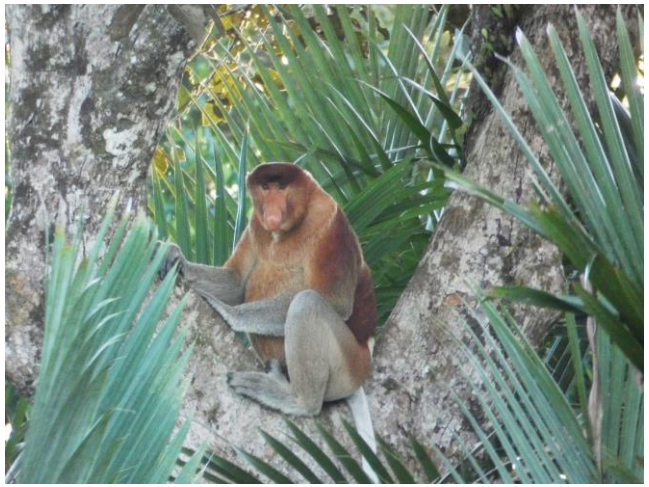


- Among the first to realize biodiversity conservation, which is currently being discussed around the world
- Collaboration with neighboring concession comprising areas from lowland to mangrove forest
- Consists of core area and green corridor

Vast landscape peatland management model

Biodiversity monitoring





Key species

Vegetation diversity

Aquatic biota

Contribution to local economic and social development

- **Creation of employment opportunities**
  → Approx. 87% of total workers are locally hired
- **Contribute to enhancing skills and increasing incomes of local people**
  → Approx. 18% of women are employed
- **The peatland management methods can be practiced locally**
  → The concept of peatland management technology is "simple, low-cost, and easy maintenance”

Creation of employment opportunities

Woman working at a plants production facility

Water structures technologies used by local communities

Contribution of peatlands to food security and nutrition

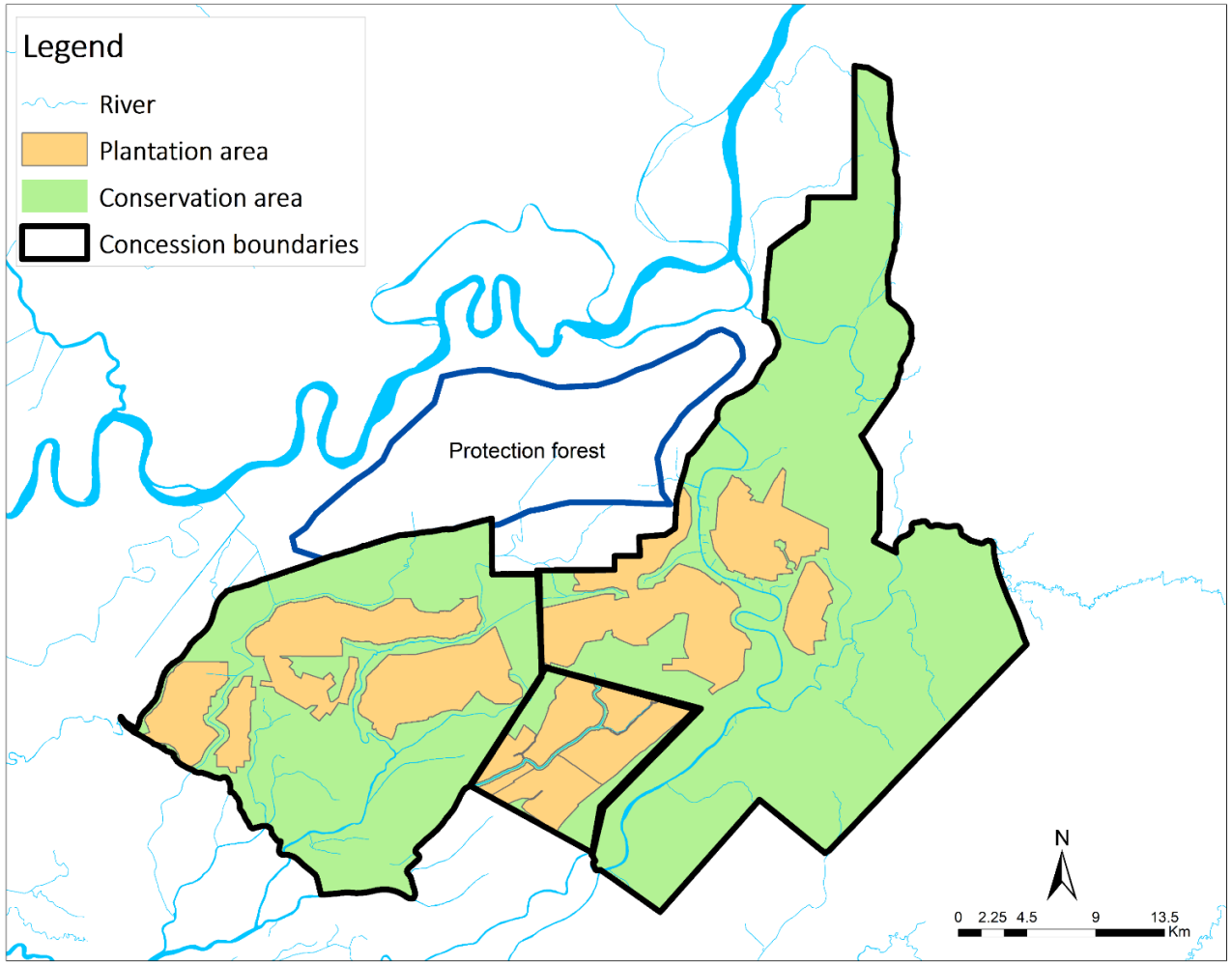
Developed and sharing knowledge on peatland utilization for agriculture activities

→ Increasing the availability of fresh, healthy, and more nutritious foods
→ Promoting crop diversity and reliance on industrial agriculture
→ Help build local economies by raising household income and keeping money within community

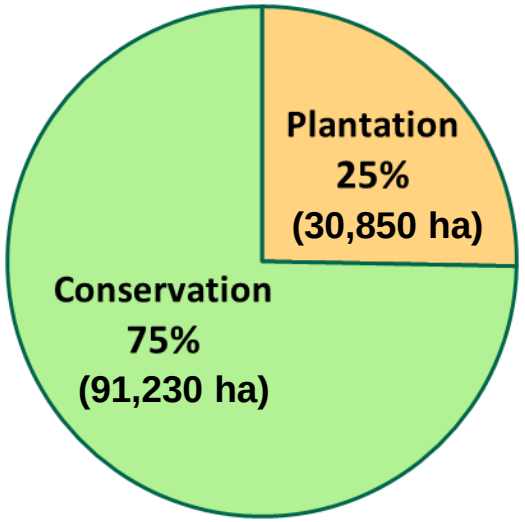



Some fruits and vegetables planted in surrounding MTI areas

A sustainable business: a pioneer model for the 30 by 30 initiative



Only about **25% of the total areas are allocated as plantation areas**, but SFC has proven that it is possible to achieve an economically and environmentally sustainable business.



Thank you

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