Hydrological restoration of Indonesian peatlands to mitigate carbon dioxide emissions

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Summary

Indonesia has made a non-binding commitment to reduce its GHG emissions by 26-41% by 2020.

With about 21 million hectares of peat land that contribute in the order of 1 billion tons of CO2 emission per year, the government is assessing policies to meet this target. This study presents the provisional results of an analysis commissioned by the National Development Planning Agency (BAPPENAS) to assess the scientific basis, economic and legal aspects for reducing emissions in Indonesia's peat land.

Current annual average emissions between 2000 and 2006 are estimated to be 0.64 $GtCO_2$. Based on current trends, a Business as Usual (BAU) scenario is estimated to result in emissions of 1.12 $GtCO_2$ by 2025. A provisional analysis of the current economic contribution of Indonesia's peat land area highlights that the utilization of peat land probably contributes less than 1 percent of GDP yet accounts for almost 50 percent of emissions, resulting in a highly carbon intensive economy in peat land regions.

The potential emissions under each of three main policy measures are estimated and compared to the BAU scenario. The initial results from this analysis show that:

- *Legal compliance and best management practices in existing land under production* could yield 0.14 Gt CO_2 emission reductions by 2025 *(12.87 % of potential reductions).*
- *Peat land rehabilitation and prevention of uncontrolled fires* potentially may add a further 0.28 $GtCO_2$ emission reductions *(38.24% of potential reductions, accumulated with policy measure 1).*
- *Revision of land allocation, forest conservation and land swaps* that direct future development away from peat land could create an additional 0.27 $GtCO_2$ emission reductions *(62.74 % of potential reductions accumulated for all policy measures).*

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Natural peat swamp forest

Reservoirs of:
- water
- biodiversity
- carbon

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Threats to natural peat swamp forest

land use → optimal water table level → subsidence → carbon loss

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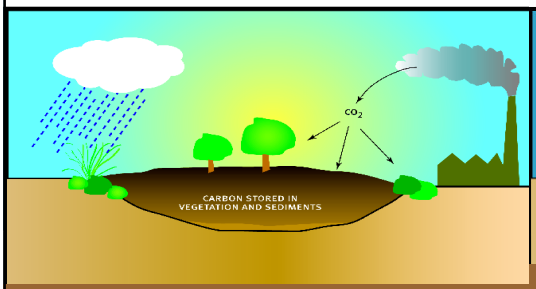
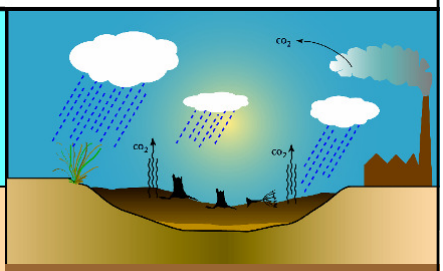
Peatlands and carbon

- Peatlands world wide store 528 Gigatonne (Gt) Carbon,
- Equivalent to:
  - 30% of terrestrial carbon
  - 75% of all carbon (C) in the atmosphere
  - 70 times current annual global emissions from fossil fuel burning
- Carbon storage in peat is very long-term



Peatlands store large amounts of carbon



Peatland degradation leads to CO_2 emissions which contribute to global warming

Change in mind set

- The Voluntary Carbon Standard (VCS) regulations under the Reduced Emission from Deforestation and Degradation (REDD) program offer new possibilities

- Measurement, Reporting, and Verification (MRV) are important elements of VCS

- Implementation of VCS needs to be done in a People, Planet, Profit context in order to make the system sustainable

- Implementation requires a change in mind set from ”making money by cutting trees” to ”making money by saving trees”

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Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD): good or bad ?

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Scope of the study

Cooperation with WWF Indonesia in bringing parts of the Sebangau catchment under the VCS regulations by restoring the hydrological integrity of the area

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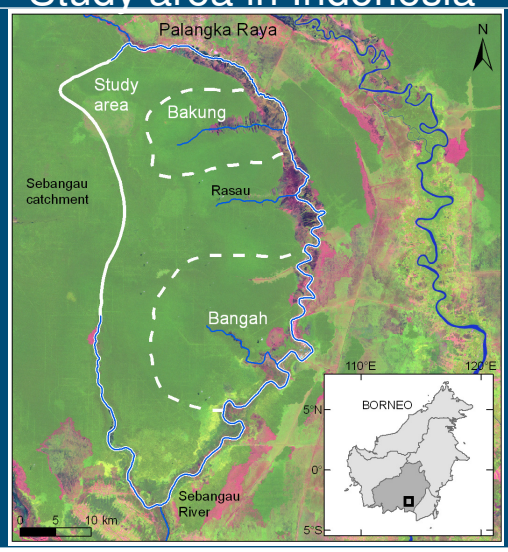
Study area in Indonesia



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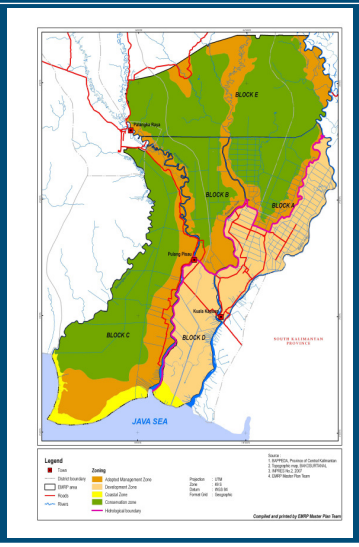
Spatial Zoning

- Cultivation 295,500ha
- Protection / Conservation 773,500ha
- Limited development 353,500ha
- Coastal 40,000ha



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Accessibility of the area

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Logging canals in the area

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Peat swamp hydrology

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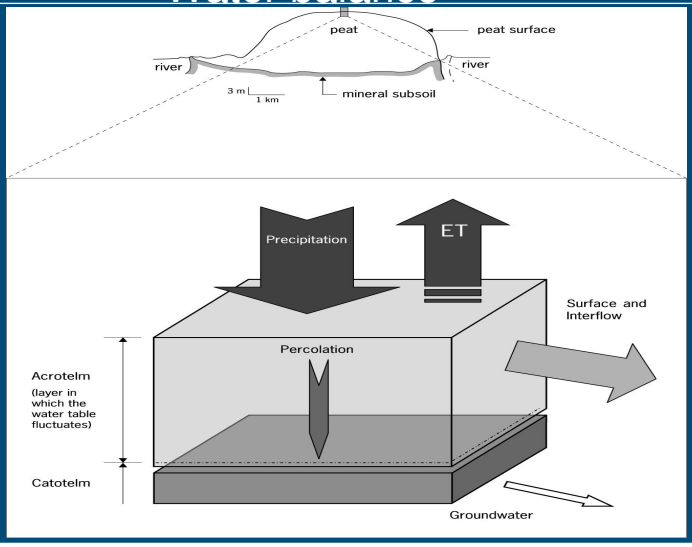
Water balance



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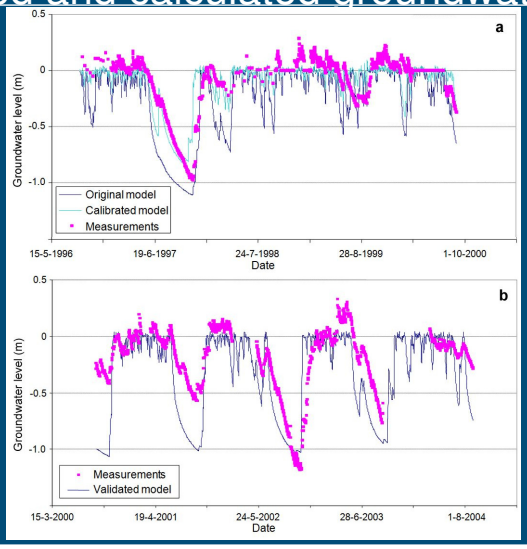
Measured and calculated groundwater levels



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Dam construction

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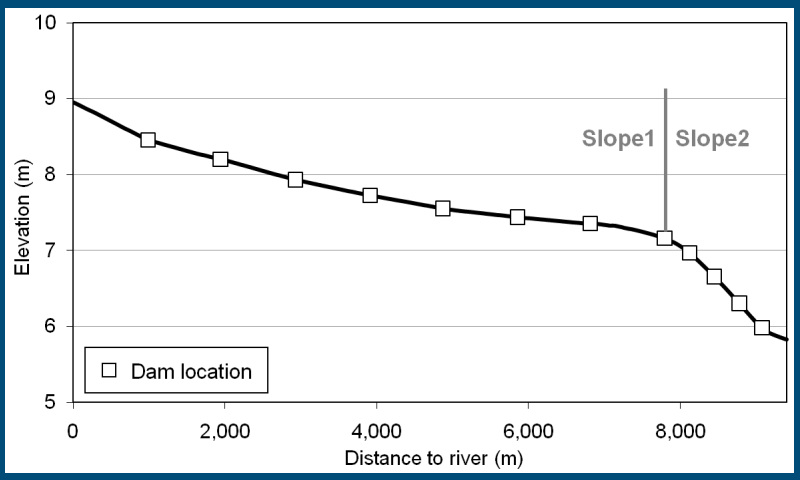
Positioning of dams in a canal



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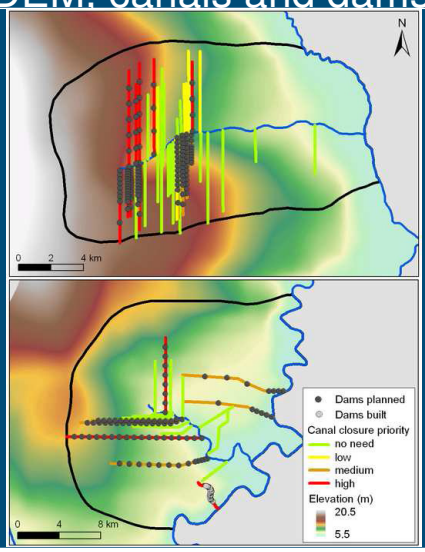
DEM, canals and dams



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Dam construction using local material

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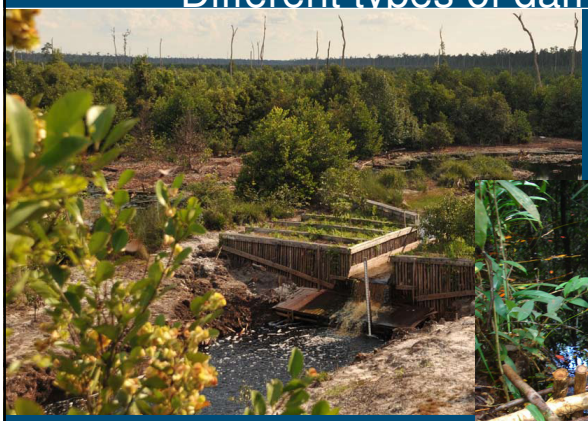
Different types of dams



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Raising groundwater levels and its effects on carbon savings

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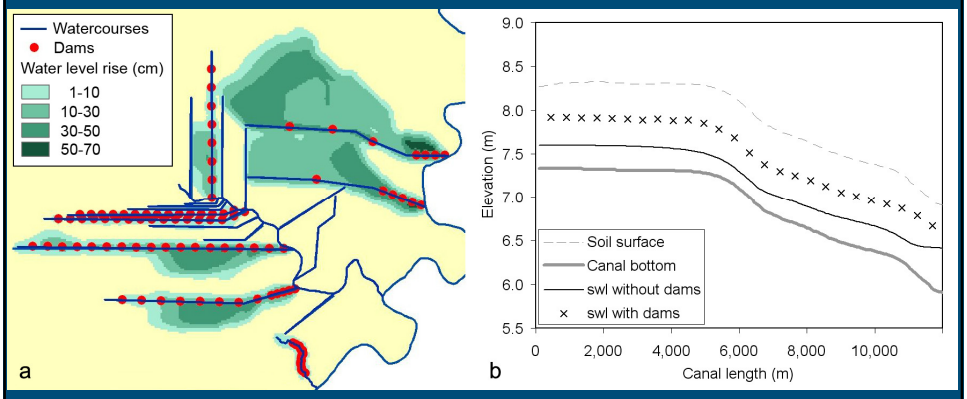
Rise in groundwater levels



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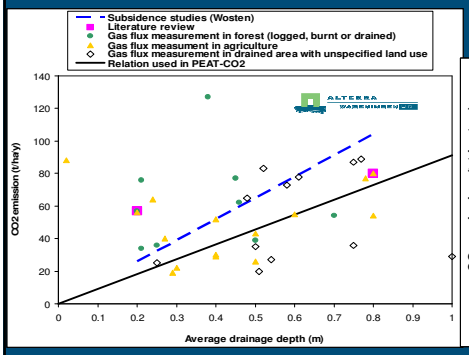
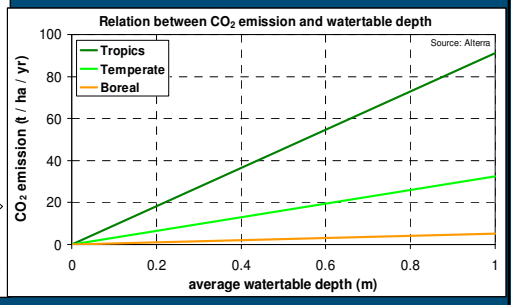
Relationship between GWL and CO_2 emission





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Conclusions

- A cascade of dams (water retarders) is required to restore the hydrological integrity of drained peatlands

- It is recommended that relatively simple dams are built in the small drainage canals in the upper-catchment area and that bigger, more expensive dams are built in the downstream area

- Dams may result in an annual average groundwater level rise of 20 cm resulting in a mitigated carbon emission of 1.4 – 1.6 million tons CO_2 annually for the area

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Conclusions

- REDD could help to secure both the economic and ecological stability of peatlands because voluntary CO_2 emission trading may be a mechanism enhancing the amount of money people receive for protection and sustainable use of peatlands

- Who owns the carbon in existing forests? Who gets paid: local communities, governments, or plantation holders?

- How can carbon stock and its growth be monitored correctly?

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Proposition

REDD as a CO_2 management/climate change mitigation instrument will only be successful if the obtained payments are controlled locally

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Thank you for your attention

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