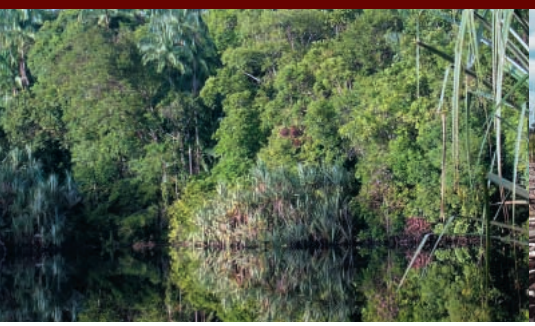
Water for Food and Ecosystems

The case of the Air Hitam Laut peat swamp forest river basin, Indonesia



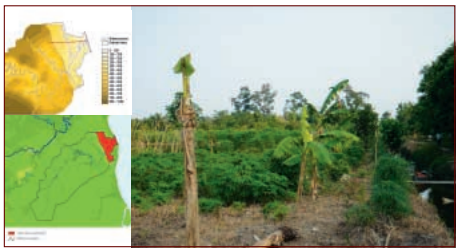
Objective of the project

To improve the understanding of the hydrological and ecological functioning of South-East Asian lowland peat swamp forest and contribute to an enhanced science base for policy and decision making in relation to integrated management of peat swamp river basins in the tropics, in particular for the Berbak National Park.

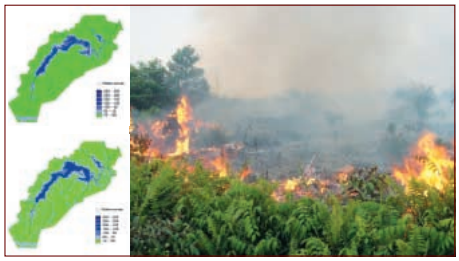
Findings

A significant connection between the land-use in the upper-catchment of the Air Hitam Laut river basin and the peat swamp forest hydrology downstream exist:

1. Expansion of oil palm plantation in the upper catchment of the river basin results in significant soil subsidence in this area due to drainage. The topography of the plantation will probably change and water will no longer flow to the Air Hitam Laut river basin but to the nearby Kumpeh river. The water flow to the park and coastal areas will be reduced resulting in lower water levels, higher fire risks, salt water intrusion and acidification of potential acid sulphate soils downstream. Unprecedented loss of biodiversity in the Berbak National Park as well as devastation of the agriculture along the coast is expected. Alternative land-uses that could prevent or decrease drainage requirements such as Jelutung plantations identified.



2. Expansion of agriculture downstream results in an average subsidence of 2-3 meters over 50 years. The peat in the agricultural areas will disappear. As the mineral subsoil consists partly of potential acid sulphate soils, a significant increase with acidification problems could be expected.



3. Fires will expand the area of deep flooding with a factor 5. Deep and prolonged flooding causes a significant constraint to possible reforestation efforts in the Berbak National Park.

Conclusions

The many human induced land-use changes observed in the Air Hitam Laut river basin all cause groundwater levels to be lowered by drainage resulting in increased soil subsidence and fire susceptibility as well as salt water intrusion and acidification problems in the coastal agricultural areas.

Sustainable development, forest restoration, fire prevention and biodiversity conservation will require reinstating the hydrological integrity of the catchment with groundwater levels at or close to soil surface. This needs to be accompanied by economic measures to improve the livelihoods of local people and requires an appropriate policy basis accompanied by effective law enforcement and good governance. The importance of tropical peat swamp forests for rural livelihoods highlights the necessity of community based planning and action.

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