

The Role of Deforestation, Fire, and Ecosystem Restoration in Supporting a Sustainable Environmental Future

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Background

Global climate change, characterized by increasing average global temperatures and greenhouse gas (GHG) emissions, poses serious challenges to environmental sustainability. Indonesia, with the world's largest tropical peat ecosystem, plays a strategic role in climate change mitigation. However, deforestation and fires, particularly on peatlands, remain significant sources of carbon emissions and have widespread impacts on the environment, health, and the economy. Meanwhile, peat restoration efforts through rewetting, revegetation, and community empowerment have been recognized as an important solution, although their effectiveness requires scientific data-based evaluation.

Methodology

Burnt areas are identified using the Normalized Burn Ratio (NBR) Index.

A high NBR value indicates healthy vegetation, while a low value indicates bare soil and recently burned areas.

$$NBR = NIR - SWIR / IR + SWIR$$

Deforestation Analysis

Vegetation index can be analyzed using the NDVI (Normalized Difference Vegetation Index) method, which measures the amount of green vegetation in an area and can be used to assess vegetation health.

$$NDVI = NIR - RED / NIR + RED$$

The equation used to estimate emissions from peat fires is as follows:

$$Epfi = ADpf \times DBpf \times BD \times Cfi \times Gefi \times GWPi \times 10^{-1}$$

The equation used to estimate fire emissions due to biomass burning is as follows (18).

$$Ebbi = ADburntj \times DMj \times Cfj \times EFi \times Cfrac \times GWPi \times (44/12)$$

Analysis of Peat Management and Restoration Actors

Results

As of the date of this poster's submission, the research has not yet been conducted. However, it is hoped that, based on the results of the research to be conducted, the following outcomes will be achieved:

1. Availability of information on the dynamics of deforestation and peat fires, along with estimates of the resulting GHG emissions in Jambi Province, as a basis for assessing their impact on sustainable development.
2. Delineation of the roles and interests of key actors in peat ecosystem management and restoration, as well as the extent to which restoration efforts have a positive impact on environmental, social, and economic aspects.
3. Development of a comprehensive baseline confirming that fire and deforestation control directly contributes to achieving sustainable development goals in Jambi Province.