Unique and Diverse Tropical Peat Swamp Forests Need Good Restoration Practice

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Important impacts of climate change on tropical peat forests

• The majority tropical peats in Southeast Asia is distributed in Indonesia, between 15 to 21 million hectares
• Globally, all tropical peats are about 40 million hectares
• Peats are extremely important for carbon and water storage,
• Tropical peat forests consist of both aquatic and terrestrial ecosystems, which are very rich in biodiversity
• Global warming, and change of rainfall intensity and frequency are detrimental to tropical peats
• In addition to climate change, tropical peats mostly suffer from anthropogenic disturbances:
  ➢ Loss of peat forests due land use change
  ➢ Large carbon emission due to rapid decomposition of organic matters
  ➢ Recurrent fires on dry peats, which pollute major cities with transboundary haze
Biodiversity in tropical peat forests

(see Posa et al 2011)
Uniqueness of tropical peat swamp forest

• Geo-morphology
  o A variety of formation modes: terrestrialization; paludification; ombro-ogenesis; topo-ogenesis
  o A variety of spatial and temporal distributions: Late Pleistocene; Late Holocene; Early Holocene; and coast, inland, and highland
  o A variety of organic matter origins: mangroves; freshwater swamp trees; heath forest trees

• Have both aquatic fauna and swamp flora:
  o Home of keystone endemic species of tropical peat swamp forests, e.g., orang utan (Pongo spp); ramin tree (Gonystylus bancanus); and kayu cin (Dacrydium spp)
  o Provision of breeding site for many kinds of fish species, e.g., arowana fish (Sclerophagus formosus); Clown loach (Botia spp), and Tiger fish (Datnioides microlepis)

• Major characteristics:
  o Growth of vegetation highly adapted to poor soil quality (low pH and nutrient shortage) and high water table
  o A very productive, closed nutrient cycle system

• Environmental services:
  o Carbon preservation (Deeper peat larger carbon stock)
  o An archive of natural history (e.g., past climate, water level, and forest succession)
  o Water shortage prevention
  o Protection from natural fires
Peat Restoration Policy in Indonesia

• Regulations on the protection and peatland ecosystem management have been stipulated in 2014
• In 2016, Peatland Restoration Agency (Badan Restorasi Gambut, called BRG), an government body under the President Joko Widodo, was established
• BRG has targeted 2.67 million hectares (m Ha) of peatland restoration in five years (2016-2020)
• About 1.7 m Ha of those degraded peats are located in oil palm and timber plantations. The rest is located in public lands and protected areas
• The restoration consist of three main actions:
  ➢ Rewetting;
  ➢ Revegetation and;
  ➢ Revitalization
Implications of restoration policy enforcement

• The government responsible for restoring publicly degraded peatlands

• Private sector (mainly oil palm and industrial timber plantations on peats) must:
  o collect detailed peat properties,
  o record elevation for keeping high water level, which is important for conserving carbon stock and preventing peat fires
  o Replant protected peats, which have thickness greater than 3 meters
  o Revitalization of livelihoods for local communities living in peatland areas

• As the above management practices are new, the government not only uses law enforcement but also provides technical advices and guidelines for community and private sector to properly manage cultivated peats, and restore protected peats

• BRG has provided the advices since 2008
Concluding remark

• Tropical peat swamp forest are a unique and diverse forest ecosystem in the world

• This ecosystem is fragile to climate change and is absolutely threatened by human disturbances

• The enforcement of laws is very important

• BRG provides technical advices to stakeholders to practice a responsible peat management scheme as required by laws

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