West Kalimantan Peatland Restoration: Between Canal Blocking, Peat Dome, and Exploitative Policies



Repeated fires in West Kalimantan peatlands show that canal blocking construction, although important, has not yet been able to solve the root cause of peat degradation. The main problem is not merely a technical failure of canal blocking, but a development model that places the expansion of plantations, industrial tree plantations, land clearing, and peat drainage above the protection of the hydrological function of peat domes.

West Kalimantan has approximately 1.72 million hectares of peatland according to WALHI's inventory, although some sources cite figures up to 2.9 million hectares due to differences in base maps, definitions, and mapping years. In this context, major fires in 2015, 2019, 2023, and forest and land fire pressure in 2026 show that peat damage is not a momentary occurrence, but a long-term degradation process worsened by spatial planning, licensing, and land-use policies.

Peat Dome Function

Peat domes are the highest part of the Peatland Hydrological Unit (KHG). Because their position is higher than the surrounding area, peat domes naturally function to absorb, store,

and slowly release water to the surrounding region. In simple terms, a peat dome works like a "water battery": retaining water during the rainy season and supplying it back during the dry season.

This function is crucial because peat domes maintain the water balance of the entire landscape. During rain, they retain excess water, thereby reducing the risk of flooding; during the dry season, the stored water helps keep the peat wet and suppresses fire risk. Peat domes also store massive carbon reserves and support biodiversity, making them policy-designated areas that must be protected.

Therefore, the protection of peat domes should be the primary priority in any restoration policy. Canal blocking is only meaningful if the canals draining the peat already exist and need repair; canal blocking must not be used as a justification to dig new canals or sacrifice peat domes.

Impacts of Peat Drainage

Peat drainage causes permanent land surface subsidence. When the groundwater level drops, peat loses water, compacts, shrinks, and its organic matter is oxidized by microbes. This process releases carbon into the atmosphere in the form of CO2 while simultaneously reducing peat thickness and volume.

Research in Indonesia shows that drained peat can subside by around 3–5 cm per year, especially in the early stages of drainage. A study in Sumatra found that the rate of peat subsidence in smallholder oil palm plantations reached around 4.7 cm per year, while residual forest recorded around 1.8 cm per year. These numbers may seem small, but cumulatively they can reach tens of centimeters in a decade and meters over several decades.

The impacts are very serious. A continuously subsiding peat surface can drop below river or sea levels, especially in coastal areas, making those regions more vulnerable to permanent flooding. Dried peat is also far easier to burn, including deep soil layers that are difficult to extinguish. Thus, peat drainage creates a vicious cycle: canals drain the peat, dry peat burns easily, fires deepen the damage, and restoration becomes increasingly expensive and slow.

Canal Blocking: Functions and Limits

Canal blocking (canal blocking) is a structure built on drainage canals to retain water flow and keep groundwater levels high. Under ideal conditions, canal blocking helps slow water discharge from peat, increase moisture, and reduce fire risk.

Studies in Indonesia show that canal blocking can raise groundwater levels and expand rewetting areas. Some research records a rewetting radius of less than 100 meters, around 15–35 hectares per block, or up to hundreds of meters depending on hydrotopographic conditions, canal dimensions, and structure design. However, this effectiveness is severely limited if large canals continue to function as water drainage channels or if peat domes have already been damaged.

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Peat hydrologist from Universitas Sriwijaya, Momon Imanudin, emphasized that canal blocks must be equipped with gates or water control. Without water control, blocks can fail during the dry season because water still escapes downstream, leaving the peat to dry out. Meanwhile, peat hydrologist from Universitas Riau, Sigit Sutikno, stated that canal blocking only provides limited relief; the primary issue remains landscape damage and drainage canals that drain the peat.

Peat researcher from Universitas Palangka Raya, Kitso Kusin, also emphasized that canals draining peat destroy the peat's function as a "sponge", trigger land surface subsidence, and increase uncontrolled runoff. From a restoration practice perspective, Agus Salim even stated that as long as there are no canals draining peat domes, canal blocking is actually unnecessary.

These experts' statements reinforce one important principle: canal blocking is a repair tool, not a primary solution. It is only useful for fixing hydrological damage that has already occurred, not for replacing the protection of intact peat domes.

Evidence of Failure in West Kalimantan

Fire data shows that canal blocking in West Kalimantan has not been able to adequately prevent degradation and fires. Pantau Gambut found that around 70% of the observed canal blocks were in damaged condition, mainly because many were constructed from wood and bamboo, which decay quickly without routine maintenance.

Worse still, 52% of restoration intervention sites still have groundwater levels below the safe threshold of 40 cm. This means that canal blocking has not succeeded in keeping peat wet at the level required to prevent oxidation and fires. This condition demonstrates that building restoration infrastructure does not automatically mean restoration succeeds; what determines success is whether groundwater levels actually rise and remain high throughout the year.

The failure of canal blocking cannot be separated from an exploitative development model. Since the mid-2000s, numerous business permits have been issued in the peatland hydrological units of West Kalimantan. These business activities drove land clearing, canal construction, and peat drainage for plantations and industrial tree plantations.

Canals built to drain land do facilitate cultivation in the short term, but destroy the hydrological function of peat in the long term. Canals lower groundwater levels, accelerate water discharge, increase peat oxidation, and make the land more prone to burning. In other words, infrastructure designed to support commodity production actually creates conditions that trigger forest and land fire disasters.

Development policy is still overly oriented toward extractivism. Poor forest and land governance, peat damage resulting from monoculture industrial canalization, weak law enforcement, and government reactivity that only steps in after fires occur. This opinion aligns with findings that hotspots and repeatedly burned peat areas are still heavily located within extractive industry concessions, including oil palm plantations and industrial tree plantations.

National data also reinforces these indications. Pantau Gambut found 1,824 hotspots located within concession areas in early 2026, with 1,617 of those points situated within oil palm plantation Hak Guna Usaha permits, particularly in West Kalimantan. These findings indicate that fires are not solely caused by El Niño or drought, but also by land governance, licensing, and business practices in peat areas.

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