The Indo-Dutch Research Center on Climate Change Law Research and Education.

Eco Intel Series: Chapter 3

Recurring Western Ghats Slope Failures:

A Call for Rethinking India's Environmental Governance and Regulatory Jurisprudence.



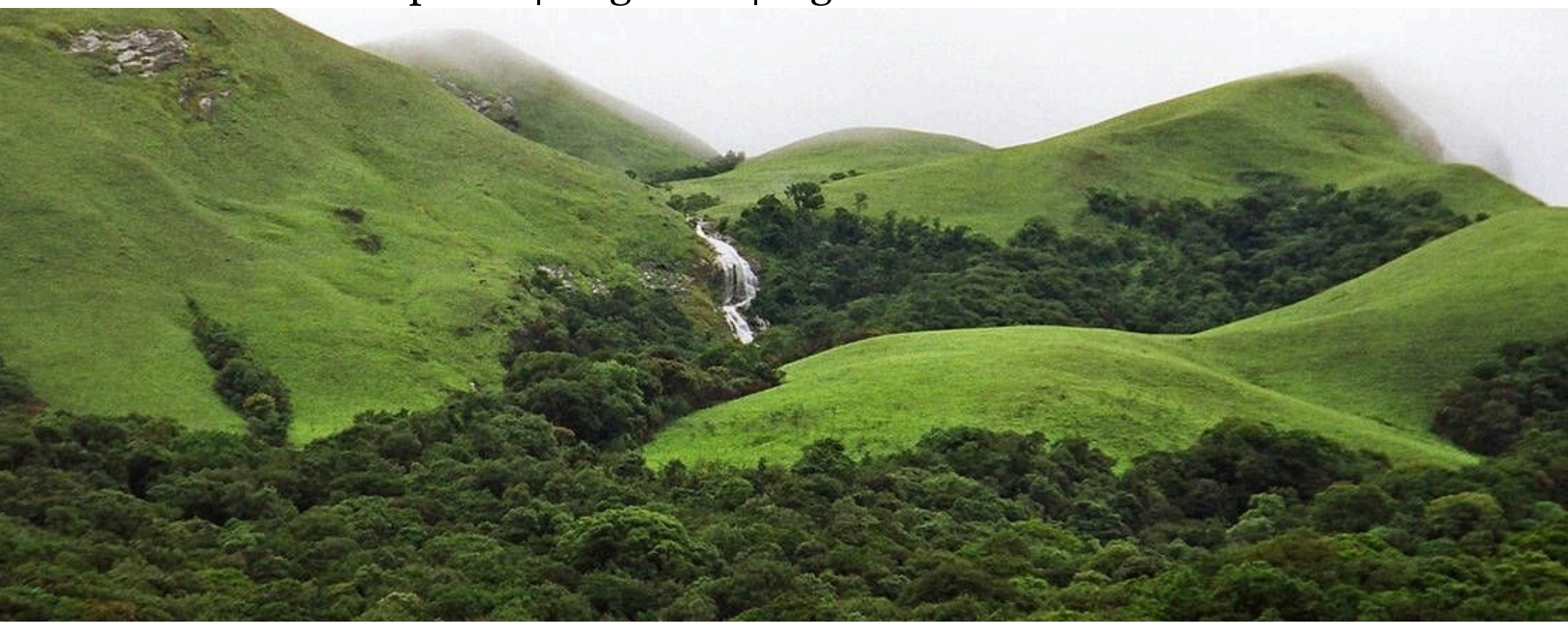
Physical Characterization of the Disaster-

Spatial Extent: Recurrent mass wasting over the Wayanad plateau and the mid land slope zones of Meenachil river basin (Kottayam).

Mechanisms: High velocity debris flows and shallow landslides triggered from short duration, high intensity rainfall.

Ecological Shock: Critical infrastructure, agriculture systems and habitat loss, especially affecting socially marginalized communities in the hilltops.

Context: The event take place in UNESCO World Heritage, a biodiversity hotspot, indicating extreme destablisation of ecosystems.



Systemic impact and socio-economic cascade-

Geomorphology: Steep slopes and highly weathered lateritic mantles and saprolites with high potential for quick saturation.

Hydrological Stress: High sensitivity to orographic rainfall at certain locations which can cause a surge of pore-water pressure and a decrease in shear strength along slip planes.

Ecological Fragmentation: Progressive reduction in the continuous canopy cover, shrinking the root-cohesion networks that have traditionally helped to stabilize slope architecture.

Baseline Sensitivity: Terrain which is geologically sensitive to anthropogenic micro-interventions resulting in macro-scale structural failure.

Geomorphology: the study of landforms and the processes — endogenic (internal) and exogenic (external) — that shape them.



Multi-factor causal analysis-

Livelihood Instability: By destroying high-value agro-ecosystems, including smallholder coffee, tea and rubber economies, insert crop yield loss data.

Hydrological Disruption: Extreme changes in the natural drainage basins; siltation of rivers; long term water insecurity.

Ecological Degradation: Permanent loss of habitat in an Endemic rich Biological Corridor. The state government of Kerala reported a direct financial and physical infrastructure loss of ₹1,200 crore from the July 2024 Wayanad landslides and the 2026 reports are not yet fully published.

Governance Cost: Repeated cycles of relief, rehabilitation and restoration of infrastructure that add to the fiscal burden on state resources.



Multi-Factor factual Analysis-

Climatic Drivers: Warming of Arabian Sea causing an increase in convective activity and increase in cloud burst like precipitation.

Anthropogenic Stressors: Large scale hillside cutting, unscientific road construction and commercial land use changes destabilising hill slopes.

Regulative Failures: Uncontrolled rock quarrying and excavations which modify slopes that are degrading the structural integrity of the rock mass.

The Disaster Multiplier: Anthropogenic terrain modification turns natural extreme weather to catastrophic hydro-geomorphic disasters.



Cumulative Anthropogenic Sources-

Land Cover Alteration: Transforming native multi-tiered evergreen forest into plantations of a single species, also changing the slope hydrology.

Infrastructure-Overdevelopment: Construction or development into high hazard areas without geo-technical risk assessments.

Regulatory Avoidance: Dilution of environmental clearances in a systematic manner, and continual non-compliance with regional carrying capacity limits.

Institutional Memory Loss : A long-term vulnerability that is caused by continued neglect of historical scientific warnings such as WGEEP benchmarks.



Statutory & Regulatory Framework-

Environment (Protection) Act, 1986 & ESA Regime: Parent law enabling notification of Ecologically Sensitive Areas — the legal tool meant to zone out mining, red-category industry, and townships from fragile Western Ghats terrain.

Spatial Extent & Jurisdictional Standoff: Gadgil Committee (WGEEP, 2011) recommended blanket protection across the full Western Ghats via graded Ecologically Sensitive Zones (ESZ 1–3), based on watershed-level ecological scoring.

Kasturirangan Committee (HLWG, 2013): Cut protected area to ~37%, shielding only "natural landscapes" — leaving high-hazard "cultural landscapes" (settlements, plantations) like Wayanad's slopes outside ESA cover.



EIA Notification, 2006 (Regulatory Thresholds): Requires clearance for major infrastructure, but threshold loopholes let hill-resorts, road-widening, and small quarrying/excavation — the very activities destabilizing slopes — escape assessment.

Disaster Management Act, 2005 (Institutional Mandate): Set up NDMA/KSDMA with power (Sections 23, 30) to plan preventive land-use risk mitigation — but on the ground, action stays limited to post-disaster relief, not slope-failure prevention.

Legal Concepts

1. Spatial Extent in Environmental Law:
Refers to the physical, geographic, and cadastral boundaries (village, taluk, watershed, or altitude-based) across which specific statutory prohibitions or land- use restrictions legally apply.

2. Carrying Capacity & Zonation:
The legal requirement to restrict human intervention based on what the ecosystem can absorb without irreversible slope failure, determined via geological and hydrological micro-zonation.

3. Threshold Loopholes:
A regulatory design flaw where project proponents fragment large construction or mining projects into smaller phases to stay just below statutory assessment limits.



Administrative & Judicial Intervention-

Post-2018 Paradigm Shift: Post-flood judicial orders led to greater multi-hazard mapping being done by Geological Survey of India (GSI).

Quarrying Regulations: Intermittent judicial bans and buffers around blasting operations - often offset by policy changes.

Structural Shortcoming: Institutional responses remain overwhelmingly reactive, focusing on emergency compensation rather than proactive spatial planning.



Contemporary Governance Deficits-

Structural Shortcoming: Institutional responses remain overwhelmingly reactive, focusing on emergency compensation rather than proactive spatial planning.

ESA Notification Stalemate: Decadelong political delays of finalizing the boundaries of Western Ghats ESA continue to create legal ambiguity.

Political Economy: Economic priorities and pressures often prevail over ecological risk assessments.



Policy-Driven Way Forward-

Statutory Integration: Incorporate slope capability and hazard-zonation mapping into the state town and country planning act.

Rigorous ElA Enforcement: Eliminate threshold exemptions for mining, quarrying, and commercial construction in high-hazard zones.

Nature Based Bio-Engineering: Require vegetation to secure slopes and restore natural hydrological flows within natural drainage corridors.

Proactive DRR Shift: Institutionalize risk-informed spatial planning, from post- disaster relief to proactive disaster risk reduction (DRR).



Conclusion-

The disasters in Wayanad and Meenachil represent structural failures of environmental governance rather than unpreventable natural calamities.

Accelerating climate change acts as a growing shock that exposes and amplifies existing regulatory, planning, and enforcement gaps.

Ecological protection in fragile biomes is not an impediment to development, it is the foundational prerequisite for climate resilience and socio-economic survival.