Review Article

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Erratic rains and falling trees: biological signals of a planetary health imbalance in Malaysia

Abstract

Malaysia is increasingly experiencing erratic rainfall patterns, stronger-than-usual wind episodes and widespread incidents of uprooted trees that have resulted in loss of life, property damage and disruption of ecosystem functions. These phenomena are not isolated meteorological events but early biological signals of a destabilizing Earth system, demonstrating the interdependence between atmospheric dynamics and terrestrial ecological health. This commentary examines and discusses the underlying climatic drivers, including Indian Ocean Dipole fluctuations, El Niño Southern Oscillation (ENSO), and anthropogenic greenhouse gas accumulation, that have altered the monsoonal behaviour historically responsible for Malaysia's rainfall stability. It further interprets the biological consequences of extreme weather, particularly the uprooting of urban trees, as indicators of compromised soil integrity, ecological stress and planetary health disequilibrium. By synthesizing data from the Malaysian Meteorological Department (MetMalaysia), recent news reports from *The Star*, and *New Straits Times* (2023–2025), and peer-reviewed scientific literature, this paper argues that falling trees and erratic rains are not random hazards but symptoms of a larger ecological imbalance triggered by altered energy dynamics in the atmosphere. This commentary calls for an integrative planetary health framework that reinterprets these events not as disasters to be cleaned up, but biological warnings requiring preventive ecological governance, restoration of biosphere integrity, and resilient urban ecosystem planning.

Keywords: erratic rainfall, uprooted trees, biosphere integrity, planetary health, Malaysia, extreme weather

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Introduction

The atmospheric conditions depicted in Figure 1 indicate a high likelihood of erratic rainfall in Kuala Lumpur. The dense cumulonimbus clouds and sudden darkening of the sky suggest rapid convection processes, which are often associated with unpredictable and localised rain events typical of the inter-monsoon period. The blurred city skyline and reduced visibility are signs of heavy moisture content and unstable air masses. Such conditions often lead to intense but uneven rainfall distribution across the city, triggering localized flooding, strong gusts, and abrupt temperature drops, reflecting the increasing climatic variability observed in recent years.

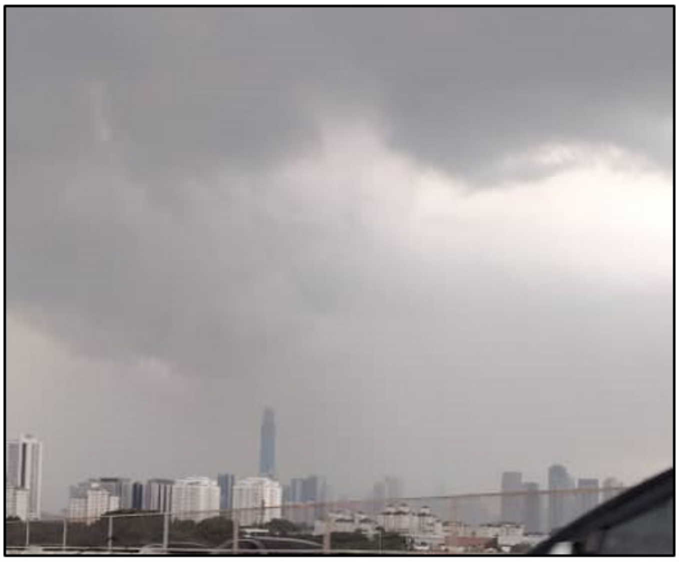

Figure 1 Afternoon skyline of Kuala Lumpur on 23 October 2025 showing the development of cumulonimbus storm clouds indicative of impending heavy rainfall. The dark, low-hanging cloud base and reduced horizontal visibility suggest high atmospheric moisture and unstable weather conditions characteristic of convective storm formation during the inter-monsoon period in Malaysia.

The sky shown in Figure 2 illustrates a classic pre-storm atmosphere over Kuala Lumpur, with thick stratocumulus clouds signalling unstable air masses and imminent convective activity. Such cloud formations often precede sudden and intense rainfall episodes, reflecting the increasingly erratic nature of urban precipitation patterns influenced by rising temperatures and atmospheric moisture. The dense cloud cover indicates strong vertical uplift processes that can trigger thunderstorms with minimal warning, contributing to the growing unpredictability of rainfall in the city.

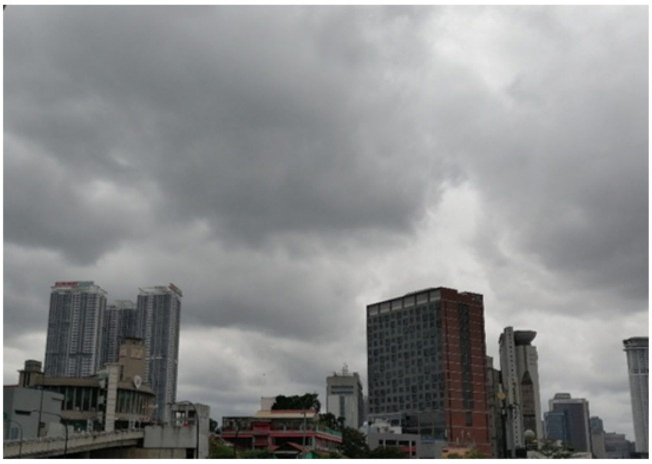

Figure 2 Cloud-laden skyline of Kuala Lumpur on the afternoon of 23 October 2025 displaying extensive stratocumulus cloud cover associated with unstable atmospheric conditions preceding rainfall. The thick, low-lying clouds indicate high humidity and atmospheric convergence, signalling the onset of erratic rain events typical of urban convective systems during transitional monsoon periods.

Figure 3 captures the peak of an erratic rainfall episode in Kuala Lumpur, where heavy downpour severely reduced visibility and created hazardous conditions on the road. The intensity of the rain, evidenced by large water streaks across the windshield and obscured surroundings, reflects a rapid atmospheric shift typical of convective storms. This visual scene underscores the growing prevalence of sudden, high-intensity rainfall events in the city, driven by urban heat accumulation and moisture-laden air masses, contributing to flash floods and traffic disruptions.

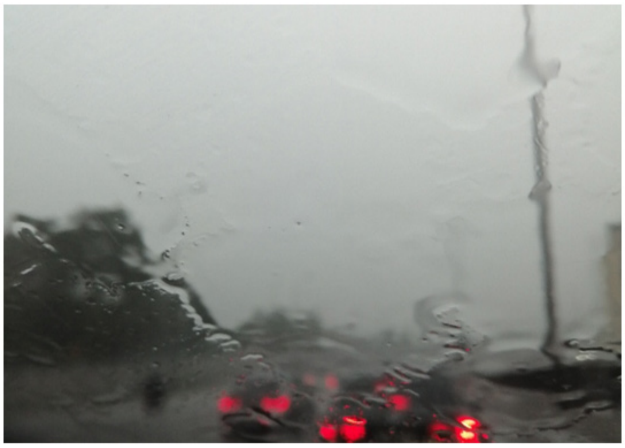

Figure 3 Intense rainfall event in Kuala Lumpur on 18 August 2025, captured through a vehicle windshield showing heavy raindrop accumulation and significantly reduced visibility. The blurred outlines of vehicles and light reflections highlight hazardous driving conditions associated with sudden cloudbursts, characteristic of erratic urban storm events driven by convective instability and atmospheric moisture saturation.

Urban tree hazards are increasingly recognised as a public safety issue in Malaysian cities due to falling trees causing fatalities, property damage, and traffic disruption. Drawing on survey data from 480 respondents across nine city councils, Hasan et al.[1] identify five key social and management-related factors that significantly contribute to hazardous street trees: uncontrollable tree planting, vandalism, proximity to neighbourhoods, lack of public awareness, and poor nursery stock with inadequate maintenance. The findings emphasise that poorly planned urban greening policies, combined with weak public engagement and insufficient arboricultural practices, directly increase the risk of tree failure, especially during storms and monsoon seasons. The authors argue that proactive governance, species selection, and public education are essential to prevent future incidents and ensure that urban trees continue to provide environmental and social benefits without posing threats to safety.[1]

In recent years, Malaysia has experienced an unprecedented increase in extreme rainfall events, destructive windstorms, and reports of large trees being uprooted in urban centers. In April 2025, a severe storm in Kuala Lumpur caused multiple trees to fall across major roads, leading to at least two fatalities.[2] Similar incidents in Johor Bahru,[3] Penang (2023), and Melaka (2024) demonstrate a growing pattern that the public often interprets as isolated natural disasters. However, from an ecological and biological standpoint, these are measurable indicators of environmental stress within interconnected climatic and terrestrial systems. While Malaysia historically experienced predictable monsoon dynamics, rapid shifts in atmospheric temperature, ocean heat content, and precipitation intensity now reflect a destabilized climate regime consistent with the planetary health crisis.[4,5]

Traditional climate studies examine rainfall and wind anomalies in isolation, but a planetary health perspective reinterprets these anomalies as symptoms of biosphere distress. Tree falls, in particular, are not only accidents of wind force; they are biological failures of root systems impaired by soil compaction, pollution, fungal infection, and waterlogging. These conditions are exacerbated by erratic rainfall, which causes rapid alternations between drought stress and saturation-driven instability.[6] In this commentary, falling trees are presented metaphorically and biologically as "canaries in the coal mine" of planetary health: warning signals emerging from biological systems destabilized by human-induced climatic disruption.

Atmospheric instability and changing rainfall patterns in Malaysia

Intensifying short-duration storms in Peninsular Malaysia have produced clustered impacts that are operationally significant for mobility, safety, and emergency response. In Kuala Lumpur, several large trees collapsed on 22 September 2025 after a heavy rainstorm at multiple sites including an exit near Jalan Damansara toward KL Sentral and Bangsar, Jalan Istana toward Jalan Sungai Besi, and Jalan Pantai Murni in Bangsar near the Desa 2 Aman police quarters, causing lane blockages and major congestion.[7] A day later, a surge of heavy rain and gusty winds again brought multiple incidents of structural damage, fallen trees and broken branches across key corridors in the city, triggering emergency calls and widespread disruption.[8] On 22 October 2025, a heavy thunderstorm uprooted trees across Kuala Lumpur, with the Fire and Rescue Department receiving clustered calls between 4 p.m. and 5.30 p.m.; one collapse in Persiaran Dutamas killed a man in his forties and another along Jalan Metro Prima in Kepong Baru injured a woman.[9,10] On the same morning, Penang recorded trees toppling at seven locations during the 6 a.m. to 8 a.m.

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commute window and authorities reported major congestion until obstructions were cleared.[11] These observations are consistent with enhanced atmospheric moisture and convective energy compressing rainfall into shorter bursts that interact with saturated urban soils and aging trees to produce disproportionate damage, complementing recent national reporting on intense rainfall anomalies and flash-flood behaviour.[12,4,13]

Historical monsoon stability and current deviations

For centuries, Malaysian rainfall patterns were governed by the Northeast and Southwest monsoon systems with relatively stable intra-annual distributions. Recent years show departures from that baseline. The late-September to October 2025 sequence in Kuala Lumpur demonstrates the compression of hazardous weather into narrow time windows that repeatedly destabilise urban trees and mobility networks, with large trees collapsing on 22 September 2025, renewed damage on 23 September 2025, and fatal or injurious failures on 22 October 2025 (Wahab, 2025).[8–10] In Penang, heavy rain and strong winds toppled trees across seven road segments on the morning of 22 October 2025 and monsoon-season rainfall has produced pluvial flooding, landslides and multiple tree falls including a landslide at Anjung Indah and a tree collapse near Lam Wah Ee Hospital during peak hours.[11,14] These clustered episodes align with assessments that a warmer atmosphere holds more water vapour and yields intense, short-lived downpours that overwhelm drainage and destabilise slopes and root plates, thereby elevating the risk of uprooting and trunk failure in urban corridors.[4,12,13]

Drivers of enhanced wind and convective storms

Enhanced convective available potential energy, sharp gust fronts and urban heat island effects combine to amplify storm impacts in Malaysian cities. Warm, moisture-laden boundary layers over impervious surfaces encourage vigorous updrafts. Subsequent downdrafts and microbursts can translate into damaging surface winds that act on saturated soils to dislodge shallow root systems. The September and October 2025 Kuala Lumpur cases around Jalan Damansara, Jalan Istana, Persiaran Dutamas and Kepong Baru match this mechanism, with fatalities and injuries during narrow storm windows that coincide with peak traffic exposure.[7,9,10] Penang's simultaneous multi-site failures on 22 October 2025 and the monsoon-season landslide at Anjung Indah indicate a similar coupling of hydrometeorological forcing with local exposure and slope processes.[11,14] Earlier Klang Valley episodes further show that this pattern is not new: mid-September 2024 storms in Penang collapsed more than 200 roadside trees statewide, a 28 March 2024 thunderstorm in Kuala Lumpur damaged fourteen cars, while severe evening storms on 2 October 2024 and heavy rain on 19 September 2023 also produced widespread tree failures (Free Malaysia Today, 2023).[15–19]

Uprooted trees as ecological and biological indicators

Root biology, soil health, and urban vulnerability

Storm-time tree failures reflect the interaction of biological condition and soil physics rather than wind intensity alone. Urban trees often occupy constrained pits with compacted subsoils, limited aeration, and impaired drainage. Erratic rainfall exacerbates this stress. Extended dry spells desiccate fine roots and reduce microbial activity. Subsequent intense rain produces rapid waterlogging and low shear strength in the root zone, lowering root–soil friction and increasing the likelihood of plate uplift and trunk failure during gusts. The Kuala Lumpur events on 22 September and 22 October 2025 are consistent with these below-ground vulnerabilities acting in concert with convective winds, while Penang's landslide at Anjung Indah during monsoon-season rainfall underscores the role of slope saturation and drainage limits in compounding risk.[7,9,10,11,14] Public advisories that urge residents to monitor leaning trunks, exposed roots and overhanging branches around homes and power lines during storm season directly target these biological and geotechnical precursors.[20]

Recent Malaysian incidents as biological warnings

Recent incidents form a coherent signal of ecological stress in urban tree systems. In Kuala Lumpur, large trees collapsed at multiple sites on 22 September 2025, with additional damage and emergencies on 23 September 2025.[7,8] On 22 October 2025, a decades-old tree failure in Persiaran Dutamas killed a motorist and a separate fall injured a woman in Kepong Baru.[9,10] On the same morning, Penang recorded seven separate road blockages from fallen trees during the commute window, with authorities reporting widespread congestion until clearance.[11] Monsoon-season disruptions included a landslide at Anjung Indah and tree-related congestion near Lam Wah Ee Hospital.[14] Earlier cases demonstrate continuity in this risk profile, including the collapse of more than 200 roadside trees during a severe storm in mid-September 2024 in Penang, the damage to fourteen cars in Kuala Lumpur on 28 March 2024, the entrapment of a driver at Taman Megah LRT Station on 2 October 2024, and multiple uprootings of trees across Kuala Lumpur on 19 September 2023.[15–19] A well-known earlier incident beside Muzium Negara on Jalan Travers, where a decades-old tree engulfed two vehicles and trapped motorists who survived, highlights the latent hazard from mature roadside trees at busy interfaces even outside the most recent storm clusters.[21] The consolidated picture is that falling trees are biological indicators of a system under stress, linking atmospheric instability with compromised urban biophysical conditions.

Climate variability: natural cycles vs anthropogenic disruption

ENSO, Indian Ocean dipole, and anthropogenic intensification

Natural modes such as ENSO and the Indian Ocean Dipole continue to modulate Malaysian rainfall variability, but recent impacts indicate these cycles operate on a warmer, more energetic baseline. The tight clustering of high-impact storm days in late September and October 2025 across Kuala Lumpur and Penang suggests episodic convective surges superimposed on enhanced moisture content and boundary-layer instability, yielding violent gust fronts and short-duration deluges that drive tree failures and landslides.[7–11,14] Reports from 2024 and 2023 across the Klang Valley provide antecedents of the same coupled hazards, indicating a multi-year transition rather than a single anomalous season (Free Malaysia Today, 2023).[15–17,4,12]

Evidence for climate transition in Malaysia

Operational statistics reinforce the sense of transition. The Fire and Rescue Department of Malaysia handled 3,245 fallen-tree incidents in the first nine months of 2025 compared with 4,825 in 2023 and 5,232 in 2024, with at least six fatalities to date, including the 22 October 2025 Persiaran Dutamas death and a separate injury in Kepong Baru the same day.[9,10,20] Combined with event narratives from Penang on 22 October 2025 and prior Klang Valley cases in 2024 and 2023, these data portray a climate regime that increasingly compresses intense

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rainfall and wind into short hazardous bursts that exploit existing biophysical vulnerabilities in urban soils and tree architecture, consistent with broader assessments for a warming tropics.[4,12]

Planetary health implications

Biosphere integrity and ecological signals

Planetary health emphasizes that human wellbeing is inseparable from ecological stability.[22] In this framework, erratic rainfall and fallen trees are not isolated hazards; they are biological feedback signals. The biosphere is responding to stress through ecological symptoms: tree mortality, soil erosion, landslides, reduced pollinator activity, and freshwater contamination. These symptoms align with a warmer, moister, and more energetic atmosphere that compresses rainfall into short, high-intensity bursts, increasing wind damage and hydrological stress in urban systems.[4,12,13] The vulnerability of Malaysian urban trees under such regimes reflects compounded below-ground constraints such as soil compaction, waterlogging, and impaired microbial functioning that weaken anchorage and resilience.[23,24] Above-ground, changes in wood density and xylem integrity under climatic stress can further predispose trees to mechanical failure during gust fronts and microbursts.[25]

Fallen trees therefore symbolize a loss of biosphere integrity. Trees regulate microclimates, store carbon, stabilize soil, and host biodiversity. Their collapse indicates cascading ecological failure where planetary boundaries related to climate change, land-system change, and biosphere integrity are being breached.[26] The pattern is consistent with amplified regional drivers such as strong El Niño events that heighten hydro-climatic volatility across Southeast Asia[5] and with observed storm-time wind damage across Malaysian cities.[3,18]

Human health and socioeconomic risks

The consequences extend beyond environmental damage. Flooding from heavy rainfall increases vector-borne diseases such as dengue by expanding breeding habitats during and after storms.[27] Strong winds and short-duration deluges disrupt infrastructure, cause injuries and fatalities, and impose significant economic costs, including traffic paralysis and emergency response surges.[3,19] According to *The Star* (2025), cleanup operations from the April Kuala Lumpur storm cost RM12 million, excluding hospital expenditures. These stressors strain public health systems, disrupt food and logistics chains, and erode community resilience, which are clear hallmarks of planetary health deterioration.[4,22] The cumulative risk is magnified in urban corridors where aging roadside trees with shallow lateral roots are exposed to strong gusts on saturated soils and constrained rooting volumes.[6,28]

Governance, urban planning, and ecological resilience

Current gaps

Current response strategies remain largely reactive—clearing fallen trees and pumping floodwaters—rather than addressing underlying biophysical causes. Municipal audits note gaps in routine root health assessments, soil remediation, and mycorrhizal restoration for street trees, while design guidelines still treat trees as ornamental rather than as living climate infrastructure integral to urban cooling, storm buffering, and public health.[23] In parallel, planning rarely couples hydrometeorological outlooks with tree-risk inventories that reflect species-specific root architecture and windthrow susceptibility documented for Malaysian roadside taxa.[28] Given increasing inter-monsoon convective storms and regional climate teleconnections, these governance gaps exacerbate exposure and vulnerability.[4,5,12]

Biological indicators for climate risk management

A shift is needed from meteorological forecasting alone to integrated eco-biological monitoring. Tree root health, soil structure and compaction, microbial diversity, and near-surface hydrology should be incorporated into national and municipal risk assessments, alongside high-resolution storm nowcasting.[13,23,24] Analogous to the use of aquatic organisms as biomonitors for metal pollution, urban trees can serve as bioindicators of atmospheric instability and terrestrial stress, with sentinel sites aligned to storm tracks and land-use mosaics.[6,28] Practically, this means routine decompaction and engineered soils in verge zones, species selection guided by root system architecture and windthrow data, and adaptive maintenance schedules timed to inter-monsoon peaks. Embedding planetary health principles into urban governance reframes climate change as a systemic ecological disruption to life-support functions rather than a narrow environmental issue, and aligns local action with the broader safe-operating-space agenda.[4,22,26,29,30]

Conclusion

The increasing frequency of erratic rainfall, destructive windstorms and uprooted trees across Malaysia reflects the biological consequences of a destabilizing Earth system. These events are not anomalies within a stable climate, but early warning signals that Malaysia has entered a new phase of planetary health imbalance. Trees, as living organisms intimately connected to soil, atmosphere, and hydrology, are responding to climatic and ecological stress. Their collapse is a visible manifestation of invisible planetary disruptions. Addressing this challenge requires a paradigm shift, from reactive disaster response to proactive ecological resilience grounded in biological understanding, planetary health science, and integrated environmental governance. Malaysia stands at a crossroads of whether Road 1 signboarded: Ignore these signals and face worsening consequences, or Road 2 signboarded: Acknowledge them as nature's biological warning system calling for urgent planetary stewardship. Which road do you choose?

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None.

Conflicts of interest

The author declares there is no conflict of interest.

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