



Catastrophic Landslide
Dam Formation and
Failure in Eastern
Taiwan: Lessons from
the 2025 Matai'an Event

Analyzing geological hazards and disaster response insights

Why the 2025 Matai'an Landslide Dam Matters

Rapid Formation and Scale

The Matai'an landslide dam formed quickly, creating a 200-meter high natural dam holding 91 million cubic meters of water, comparable to medium reservoirs.

Flood Hazard and Risk

The dam accelerated lake rise and increased flood risk downstream, threatening multiple settlements along the river corridor.

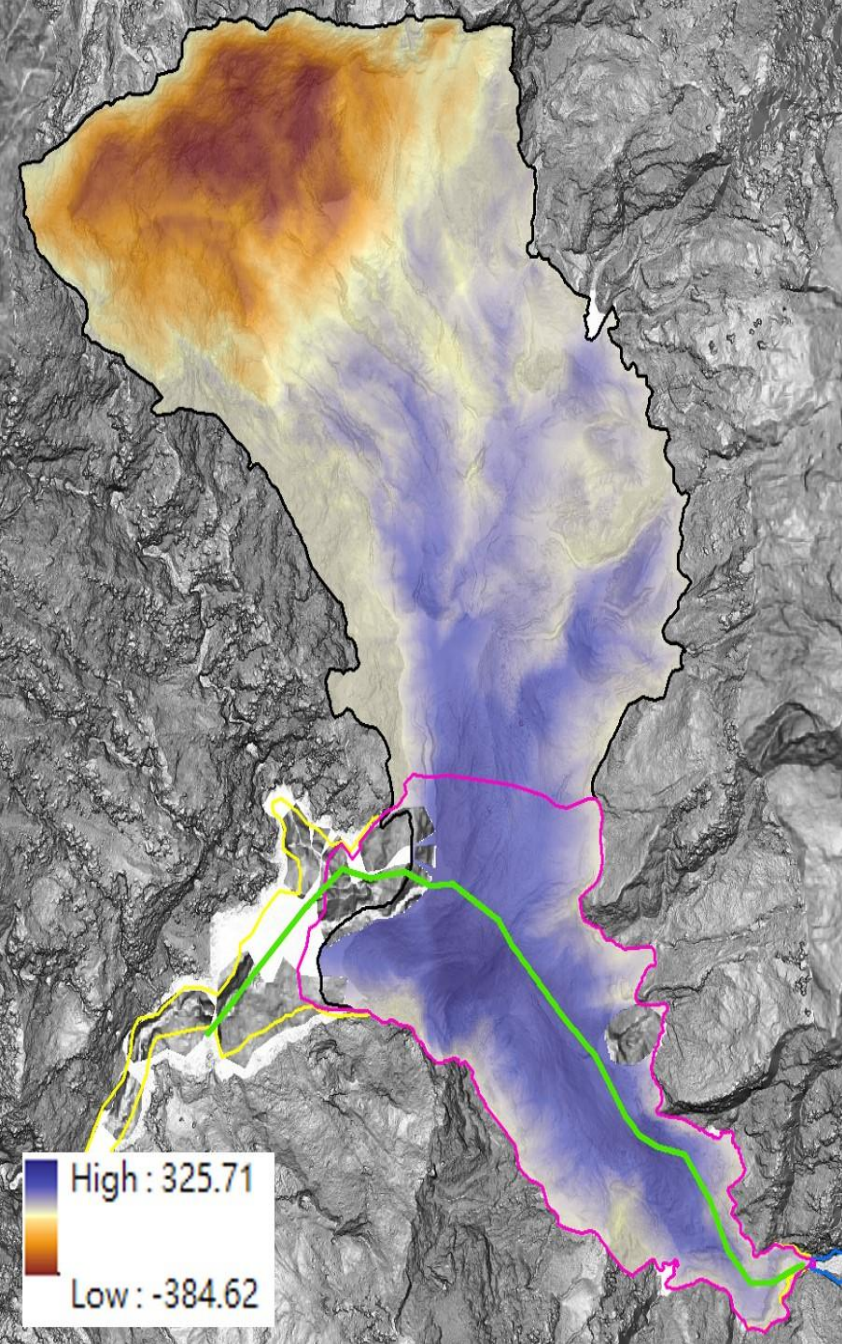
Comprehensive Monitoring

Coordinated satellite, aerial, and ground monitoring captured the full dam lifecycle, enabling detailed understanding of its formation and failure.

Governance and Preparedness Gap

Landslide dams lack statutory disaster classification in Taiwan, complicating coordinated response and evacuation during crises.





Key Findings from Formation to Failure

Rapid Dam Formation and Water Rise

The landslide dam formed quickly, capturing half the catchment area, causing lake water levels to rise rapidly.

Overtopping-Induced Erosion Failure

Dam failure occurred due to overtopping and surface erosion, leading to a rapid 33-meter water level drop in one hour.

Risk Monitoring and Evacuation

Real-time monitoring provided early risk indicators enabling timely evacuations that minimized casualties despite severe flooding.

Impact of Hydrological Forcing

Typhoon-driven hydrological forces dramatically shortened dam lifespan, challenging static breach prediction models.