

RESILIENT RAILWAYS FACING HEAVY RAINS (RERA-RAIN)

ABSTRACT The Resilient Railways Facing Heavy Rains (RERA Rain) project introduces a practical framework to enhance railway resilience against increasingly frequent and intense heavy rainfall events driven by climate change. Co-developed with infrastructure managers from multiple countries, the RERA Rain Framework reflects real-world operational experience and is aligned with actual sector needs, making it both actionable and implementable.

The framework addresses the urgent need to plan beyond historical climate patterns and respond to evolving hydrometeorological risks. Heavy rainfall can cause landslides, flooding, and erosion, which compromise infrastructure integrity and disrupt operations, posing serious safety and reliability challenges.

Structured in three interconnected phases, the framework begins with Climate Impact Analysis, assessing projected precipitation under various climate scenarios. The second phase, Vulnerability, Risk, and Criticality Assessment, identifies high-risk assets and prioritises them based on network relevance. Finally, the Adaptation Planning phase provides guidance for selecting and implementing risk mitigation measures.

Flexible and scalable, the framework can be applied to assets, line sections, or full networks depending on data, resources, and risk exposure. It supports both strategic and technical users, enabling coordinated, proactive adaptation. The RERA Rain Framework offers a concrete tool to maintain railway safety, reliability, and sustainability under changing climate conditions.