National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Deciphering the Hazards and Vulnerabilities Associated with Landfalling Tropical Cyclones Over the Indian Landmass
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Venue	: ER 303 CLASS ROOM
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Abstract	

: Tropical Cyclones (TCs) are notable catastrophic phenomena that cause loss of lives and infrastructure besides ecological-environmental damages. Globally, the tropical warm North Indian Ocean (NIO) basin is considered as an active breeding zone for TCs, and a higher population density over the coastal regions of India exacerbates the risk. Therefore, the study explores the variability in the individual and compound hazards owing to torrential rainfall, severe wind, and storm surges accompanied by landfalling TCs. Also, the contribution of societal, economic, and topographic vulnerability indices was examined. A statistical approach, viz., extreme value theory, is adopted to quantify risk probabilities induced by TC rainfall, extreme winds, and their co-occurring hazards. The results revealed that the rainfall hazards exhibit a dominant contribution across the north-eastern coastal states and hinterlands. However, the wind hazards are dominantly constrained along the north-eastern coast, followed by the western and south-eastern coasts of India. Notably, the compound hazards show maximum destructive potential in West Bengal and northern Andhra Pradesh over the eastern coastal side and Gujarat on the western coast. Besides, Odisha and its neighboring coastal and inland states, and Gujarat and Madhya Pradesh, are susceptible to extremely heavy rainfall events in the near-future (< 10 years). The highest destructive potential owing to the co-occurring events is prominently expected over the north of the eastern coast < 50 years, while moderate hazards are estimated to be experienced over the region < 20 years. Notably, the societal characteristics and topographic features, viz., higher built-up density, population, and proximity to the coastline of the urban agglomerations, predominantly account for their higher vulnerability compared to physical indices. Nonetheless, the inferences from this study are expected to aid policymakers and stakeholders in mitigation, capacity-building, and disaster preparedness to cope with future risks associated with TCs.