GLOBAL BEST PRACTISES IN FLOOD RISK MANAGEMENT - ENVIRONMENT

NEWS: Climate change is increasing severe floods, making resilience vital. Global best practices such as Tanzania's Msimbazi Basin Project shows how nature-based solutions and modern infrastructure can reduce risks and strengthen climate resilience, offering lessons for India's flood management strategies.

Leading Global Best Practices in Flood Risk Management

Tanzania's Msimbazi Basin Development Project

A World Bank–funded initiative in Dar es Salaam. Focuses on dredging the Msimbazi River to improve its carrying capacity. Enhances drainage and urban infrastructure to reduce waterlogging. Relocates vulnerable residents to safer areas, while redeveloping floodplains into green, climate-resilient zones for recreation and ecological balance.

Netherlands's Floating Homes

Designed with concrete bases and glass walls, these houses float during floods. They rise and fall with water levels, preventing water intrusion. Equipped with solar panels and heat exchangers for self-sufficient energy. An example of living in harmony with water rather than resisting it.

Vienna's Flood Protection System

In 1969, Vienna built a 21-km flood relief channel running parallel to the Danube River. This channel absorbs excess floodwater and reduces pressure on the main river. It functions only during high flows, minimizing ecological disruption in normal times. Ensures long-term urban safety for a growing population.

China's Sponge Cities

Emphasize nature-based flood control strategies. Use permeable pavements, green roofs, wetlands, and retention ponds. Designed to absorb and retain rainwater, recharging groundwater instead of rapid surface drainage. Aim to make urban areas mimic natural ecosystems in water absorption.

Denmark's Green Climate Screen

Innovative rainwater harvesting and absorption technique. Channels water from rooftops and gutters into mineral wool layers behind willow panels. Moisture is naturally absorbed, with excess directed to planters or green zones. Reduces flood risks without expensive infrastructure or energy consumption.

Texas (AI and Satellite-Based Flood Mapping)

Collaboration between the University of Arizona and Google's Flood Hub. Uses AI algorithms and satellite imagery to generate detailed flood maps. Provides 7-day advance flood forecasts, enhancing preparedness. Focuses on "flood justice," ensuring vulnerable communities receive timely warnings.

India's Vulnerability to Flood Risks

Extent of Flood-Prone Areas

Out of India's 329 million hectares of land, over 40 million hectares are highly flood-prone. India has the largest number of urban slum dwellers (over 158 million) exposed to flood risks.

Human Displacement - In 2024 alone, India recorded 5.4 million internal displacements due to floods, storms, and related disasters.This is the highest displacement figure in the past 12 years.

Economic Impact - Floods account for around 63% of India's annual disaster-related economic losses. Sudden extreme rainfall events disrupt livelihoods, transport, agriculture, and industry. Unpredictable monsoon patterns lead to a cycle of destructive floods followed by droughts.

Key Strategies Adopted for Flood Risk Management in India

Institutional Framework

Flood control is primarily a State subject under the Constitution. State Governments are responsible for flood management, while the Centre provides technical support, research, and funding assistance.

Engineering/Structural Measures

Interlinking of Rivers – Under the National Perspective Plan (NPP), river interlinking helps divert excess water from flood-prone basins (e.g., Ganga–Brahmaputra–Meghna) to water-scarce regions, reducing peak discharge.

Reservoirs – Store excess water during peak flow and release it gradually later. Their effectiveness depends on storage capacity and proximity to vulnerable areas.

Detention Basins – Modified natural depressions, built with embankments, to temporarily store floodwater. Used in states like Rajasthan and Bihar.

Embankments – Barriers to prevent river overflow. Widely used in Assam and Bihar, though long-term risks include raised riverbeds and erosion if not maintained properly.

Channelization and Dredging – Improve hydraulic efficiency of rivers by desilting and straightening courses, allowing better water flow.

Diversion Channels and Spillways – Redirect floodwaters away from habitations. Examples include the Krishna–Godavari Drainage Scheme and Thottapally Spillway in Kerala.

Administrative/Non-Structural Measures

Flood Forecasting and Warning – Central Water Commission issues real-time forecasts, enabling timely evacuations and reduced losses.

Flood Plain Zoning – Identifies and regulates development in flood-prone areas to prevent unplanned urbanization.

Flood Proofing – Raising settlements, houses, and infrastructure above flood levels in vulnerable states like Uttar Pradesh, Assam, and West Bengal.

Community Involvement – Local population participation ensures quick response, better preparedness, and sustainable adaptation.

Conclusion

Building flood resilience in India requires a 3F approach – Forecasting, Financing, and Frontline Preparedness.The focus must shift from reactive relief after disasters to proactive risk reduction, combining global best practices, technological innovation, and community-led adaptation.

Source: https://www.downtoearth.org.in/africa/africas-climate-adaptation-how-tanzania-is-transforming-flood-zones-into-resilient-green-spaces