



PB INSTITUTE OF RESEARCH AND TECHNOLOGY

P.O Box 21457-00100

Nairobi - Kenya

Mobile: +254 721 214 795

Email: info@pebblesinstitute.org

Climate-Smart Infrastructure Design & Development Training

Duration: 4 days

On-Site

01 Who Should Attend

- Government infrastructure officials
- Municipal and county government officials
- Project and programme managers
- Disaster risk reduction and resilience professionals
- Water and energy infrastructure specialists
- Transport and mobility professionals
- Sustainability and ESG professionals
- Development finance and investment professionals
- Policy makers and public-sector planners
- Consultants involved in infrastructure development
- Professionals responsible for infrastructure asset management and resilience

02 About the Course

This advanced training equips professionals with the knowledge and practical tools to design, plan, finance, and manage infrastructure that can withstand current and future climate-related risks. It explores climate risk assessment, adaptation planning, resilient infrastructure design, nature-based solutions, climate-smart technologies, and approaches for integrating resilience into infrastructure investment and development. Participants will examine how changing temperatures, flooding, drought, sea-level rise, extreme storms, wildfires, and other climate hazards affect infrastructure systems. The course emphasizes practical approaches for incorporating climate projections, vulnerability assessments, resilience standards, lifecycle considerations, and adaptive design principles into infrastructure projects.



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03 Workshop Objectives

- Understand the fundamentals of climate change adaptation in infrastructure planning
- Conduct climate risk and vulnerability assessments for infrastructure systems
- Design and retrofit infrastructure to withstand climate-related hazards
- Apply principles of sustainable, low-carbon, and green infrastructure
- Integrate nature-based solutions into resilient infrastructure planning
- Align infrastructure design with global climate and development goals
- Evaluate financial, environmental, and social trade-offs in adaptation decisions

04 Module Topics

Module 1: Climate Risk and Vulnerability in Infrastructure Systems

- Overview of climate hazards and impacts on built environments
- Identifying exposure and sensitivity of infrastructure assets
- Sector-specific vulnerability diagnostics and baseline mapping
- Use of climate projections in infrastructure planning
- Tools for risk-informed development decisions

Module 2: Principles of Resilient Infrastructure Design

- Characteristics of climate-resilient infrastructure systems
- Performance-based design standards for resilience
- Lifecycle assessment and adaptive design principles
- Risk reduction through redundancy and modularity
- Engineering solutions for multi-hazard resilience

Module 3: Nature-Based and Hybrid Infrastructure Approaches



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- Benefits and applications of ecosystem-based adaptation
- Blue-green infrastructure for flood, drought, and heat resilience
- Integration of natural systems into urban design
- Hybrid solutions combining engineering and ecological functions
- Case studies in coastal, watershed, and urban environments

Module 4: Climate-Smart Urban and Regional Planning

- Embedding adaptation in land-use and spatial planning
- Resilient zoning, building codes, and development controls
- Infrastructure planning in informal and high-risk settlements
- Urban heat island mitigation and stormwater management
- Community participation in infrastructure decision-making

Module 5: Financial and Economic Tools for Resilience Investment

- Cost-benefit and cost-effectiveness analysis of resilient infrastructure
- Accessing climate finance for adaptation projects
- Public-private partnerships in infrastructure resilience
- Risk transfer mechanisms including insurance models
- Mainstreaming resilience into public investment systems

Module 6: Regulatory and Institutional Frameworks for Resilience

- Policy instruments supporting climate-resilient infrastructure
- Roles of government, private sector, and civil society actors
- Inter-agency coordination for cross-sector resilience
- Monitoring and compliance mechanisms in infrastructure projects
- International standards and reporting tools

Module 7: Technologies and Innovations for Climate-Resilient Infrastructure



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- ▶ Smart technologies for early warning and performance monitoring
- ▶ Digital twins and modeling for infrastructure resilience
- ▶ Geospatial data and climate analytics in infrastructure planning
- ▶ Materials innovation for climate durability
- ▶ Promoting innovation through pilots and demonstration projects