Coalition for Disaster Resilient Infrastructure

CDRI
Coalition for Disaster Resilient Infrastructure

Strengthening Capacity of Power Sector Practitioners in the Indo-Pacific Region: Technical Workshop under the Quad Infrastructure Coordination Group (QICG)

04 June 2024, New Delhi, India

Context Setting

Launched at

UN Climate Action Summit in 2019

What we need is a global people's movement to bring about behavioral change…….therefore India is here today to present a practical approach and roadmap.

In order to make our infrastructure resilient in the face of disasters, India is launching a Coalition for Disaster Resilient Infrastructure. I invite all member states to join this Coalition.

UN Climate Action Summit in September 2019

1. **Global Coalition & Governance**
2. **Advocacy for Disaster Resilient Infrastructure (DRI)**
3. **Knowledge & Capacity Development**
4. **Programmes & Technical Support**

Shri Narendra Modi
Hon. Prime Minister of India

About CDRI

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Coalition for Disaster Resilient Infrastructure

The **Coalition for Disaster Resilient Infrastructure (CDRI)** is a partnership of national governments, UN agencies and programmes, multilateral development banks and financing mechanisms, the private sector, and knowledge institutions that aims to promote the resilience of new and existing infrastructure systems to climate and disaster risks in support of sustainable development

A Solution-Focused Centre of Excellence for DRI

As a Centre of Excellence for DRI, the Coalition strengthens the individual and collective capacities of its members and partners by aggregating and sharing knowledge, brokering need-based partnerships, and strengthening capacities through collaborative learning and action.

Global Coalition

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39
COUNTRIES

7
ORGANIZATIONS

ADB
WORLD BANK GROUP
European Investment Bank
arise
UNDRR
UN Office for Disaster Risk Reduction
UNDP

- AFGHANISTAN
- ANTIGUA AND BARBUDA
- ARGENTINA
- AUSTRALIA
- BANGLADESH
- BHUTAN
- BRAZIL
- CANADA
- CHILE
- CUBA
- DOMINICAN REPUBLIC
- FIJI
- FRANCE
- GERMANY
- GHANA
- GUATEMALA
- GUYANA
- HAITI
- HONDURAS
- INDIA
- ITALY
- JAMAICA
- JAPAN
- MALDIVES
- MADAGASCAR
- MAURITIUS
- MONGOLIA
- NAURU
- NEPAL
- NETHERLANDS
- PERU
- SAMOA
- SOUTH SUDAN
- SRI LANKA
- TAJIKISTAN
- TONGA
- TÜRKIYE
- UNITED KINGDOM
- UNITED STATES OF AMERICA

Benefits to Members

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- Capacity strengthening of government, private enterprises, and communities
- Technical assistance for climate and disaster risk-informed development and investment
- Access to learnings, solutions from other countries, knowledge resources and cutting-edge expertise
- Access to financial instruments, partnerships, additional investments
- Multi-stakeholder platform for DRI knowledge-sharing, planning and action
- Contribute to global policy processes and forums, especially to amplify the voices of the vulnerable

Governance

Governing Council

Co-Chairs
India-UK, 2020-22 | India-US, 2022-24 | India-France, 2024-26

Governing Council Meeting: April 2024

Governing Council
Co-Chairs Dr. P. K Mishra, Govt. of India, Ambassador Aurelien Lech evalier, Govt of France

Former Co-Chairs: Administrator Samantha Power, USAID

Former Co-Chairs, The Rt Hon'ble Alok Sharma MP, Govt. of UK

Strategic Work Plan 2023-2026

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"**By 2050, over $10 trillion of new and existing infrastructure investments and services are resilient to natural hazards and climate change** through enhanced capacity, informed policy, planning, and management leading to improved quality of environment, livelihood and life of over **3 billion people.**"

SO1

Advocacy, Governance, Partnerships

SO2

Research, Knowledge Management and Capacity Development

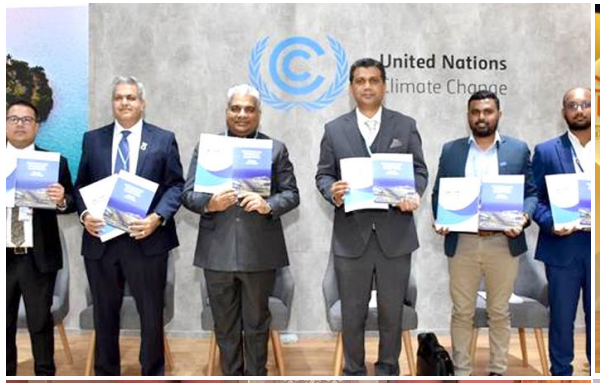
SO3

Programmes and Technical Assistance

SO1

A strong Coalition that has the membership, resources, and global leadership to drive global, national, regional and local DRI action.

Global Advocacy



Global Flagship Advocacy Events

International Conference on Disaster Resilient Infrastructure **(ICDRI) 2024 and ICDRI Americas 2023**

Advocacy on Global and Regional Platforms

UNFCCC accredited CDRI as an Observer IGO

COP28, G20, WEF, GPDRR

SIDS4 Conference, APMCDRR

Key Outcomes

- Global Leadership for DRI
- Increase finance to support climate adaptation in developing/vulnerable nations
- Create and share best practices
- Build capacity and find new solutions for critical infrastructure
- Incorporate disaster risk information in project financing

International Conference on Disaster Resilient Infrastructure (ICDRI)

- Annual flagship conference to strengthen the global discourse on disaster and climate resilient infrastructure
- **Six** global editions | **Over 470 global experts** from more than **40 countries** engaged since 2021 | **1500 Participants from 40 countries** in 2024 | First regional conference in Americas '23
- **Objectives:** Building partnerships, sharing knowledge, and fostering complementarity on DRI solutions
- **ICDRI 2024 – April 2024, New Delhi | Thematic focus: Finance and Investment for Infrastructure Resilience**

Snippets from ICDRI over the years

Hon. Sheikh Hasina, PM of Bangladesh, speaking at ICDRI 2023 opening ceremony

SO2

Global DRI research, Coalition-led peer engagement, & CDRI-curated and generated knowledge promote risk informed policy/practice.

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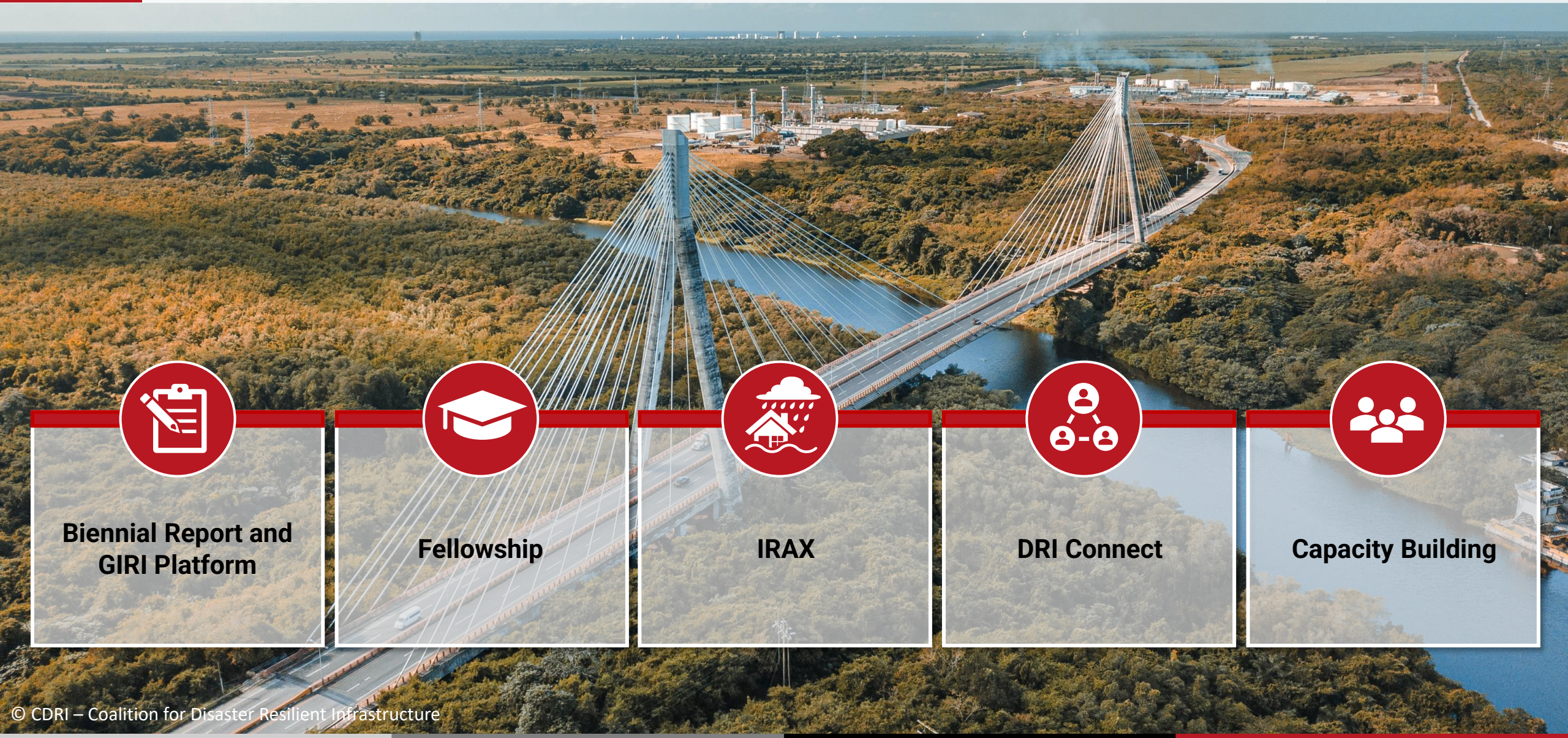

- Biennial Report and GIRI Platform
- Fellowship
- IRAX
- DRI Connect
- Capacity Building

Biennial Report and GIRI Platform

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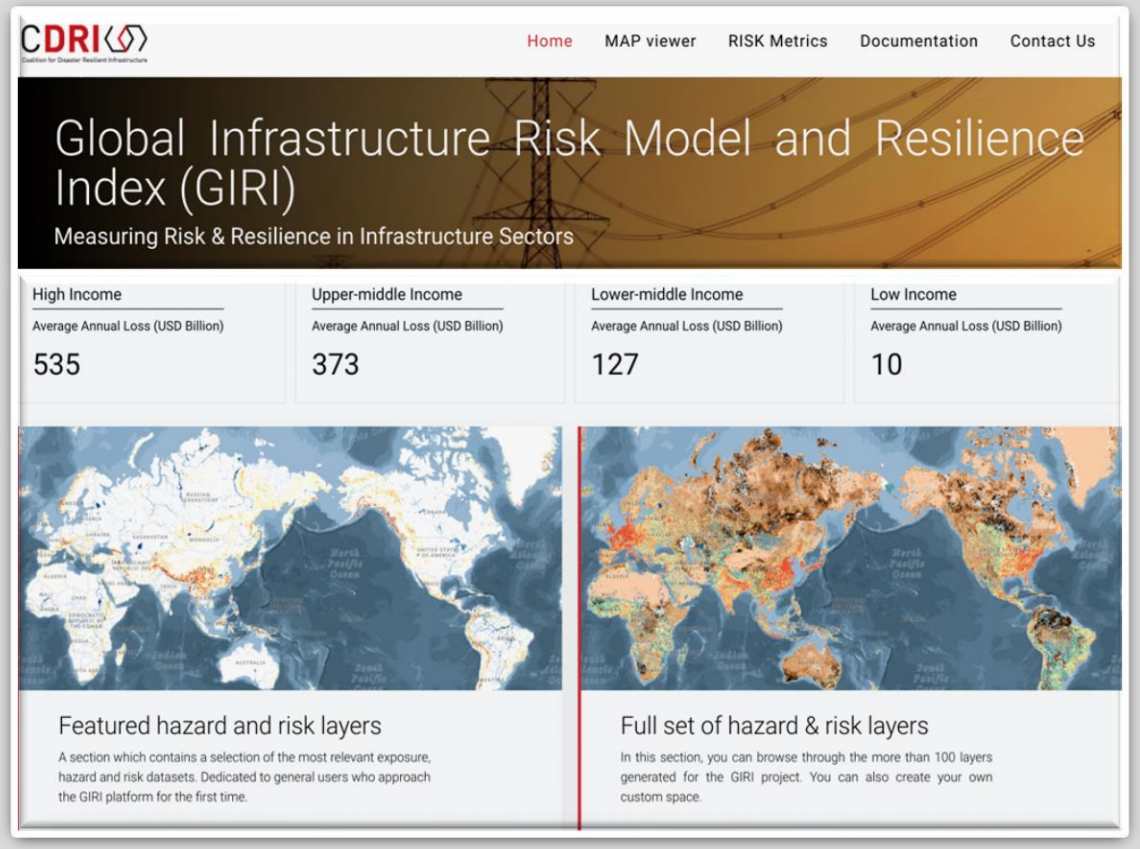
First global report on infrastructure resilience



Global database of risk to infrastructure sectors

Fellowship Programme

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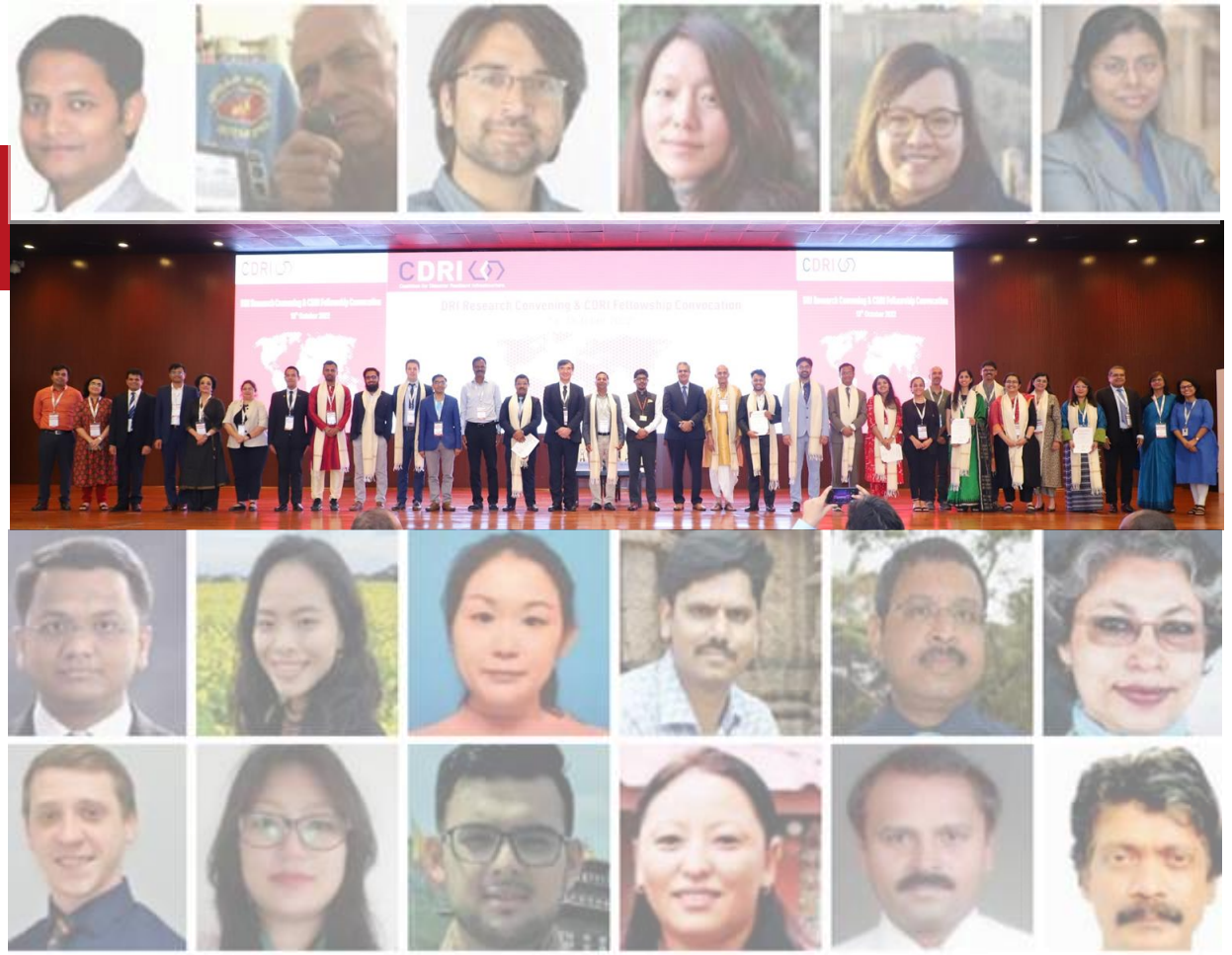
Supporting local innovation and actionable solutions for DRI

166 Fellows 27 Countries 30% Women

- Patented earthquake resistant building technology for hospitals **(India)**
- Cyclone classifier model to predict potential damages and risks along the coastal zones **(Bangladesh)**
- GIS data-based modelling on river morphology changes for bridge stability analysis **(UK)**
- Distributed optical fibre sensor network-based condition monitoring system facilitating early warning for road collapses **(Sri Lanka - Australia)**



Afghanistan, Australia, Bangladesh, Nepal, Peru, Sri Lanka, Thailand, Turkey, The Netherlands, United Kingdom and United States of America, Bhutan, Brazil, Canada, Chile, Dominican Republic, Ghana, India, Italy, Japan, Madagascar, Mauritius, Mongolia, Germany, Cuba, Jamaica, Benin

Infrastructure Resilience Academic Exchange (IRAX)

‘Infrastructure Resilience Academic Exchange’ (IRAX) programme has been conceptualised by CDRI as a structured engagement initiative with global academic institutions for academic mainstreaming of DRI.

IRAX aims at fostering an entire ecosystem of higher learning that encourages professionals to think and engage beyond the boundaries of their individual disciplines.

- **Network Modality**
- **Curriculum**
- **Industry Connect**
- **Research**
- **Fellowship**
- **Training and Capacity Building**

DRI Connect

CDRI Coalition for Disaster Resilient Infrastructure

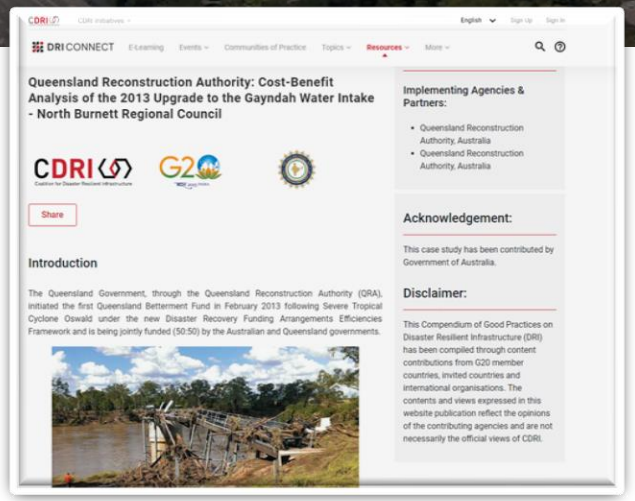
CDRI | CDRI Initiatives | EN | Sign Up | Sign In

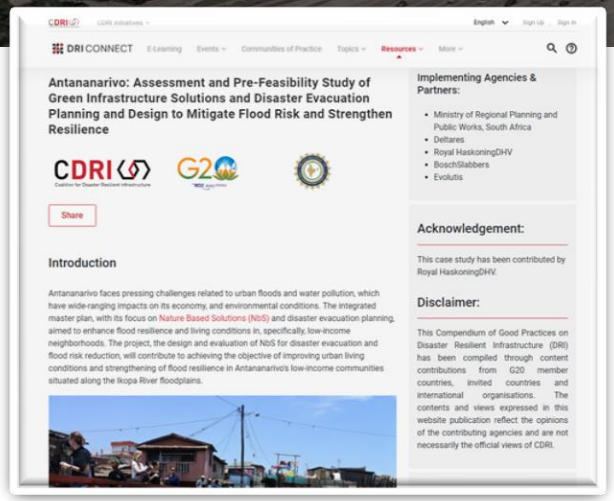
DRI CONNECT | E-Learning | Events | Communities of Practice | Topics | Resources | More

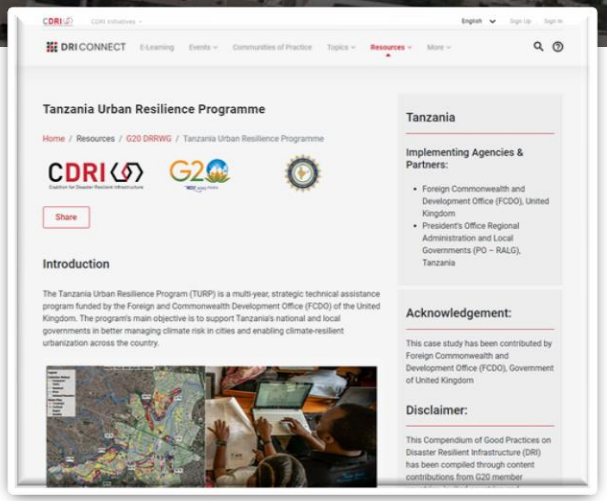
DRI CONNECT

Connecting Professionals Across the Globe for a Resilient Future

Announced at COP28







Capacity Development

FOCUS AREAS

Capacity building of member countries through

Training needs and capacity gaps assessment framework.

Development of sector specific training modules and self-paced E- Learning Programmes.

Delivery of in-person and online training programmes by capitalizing the capabilities of the member countries and harnessing the expertise of various institutions and partners

STAKEHOLDERS

Top level officials/policy makers/decision makers, Planners, Designers and Infrastructure project managers Students, Researchers and Faculty

INSTITUTIONS

Infrastructure Ministries/ departments/ authorities , private sector, training institutions and Academic and Research Institutions

SO3

Enhanced capacities of government, private enterprises, and communities to implement post-disaster recovery and DRI action at scale.

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1. Power Sector Resilience
2. Transport Sector Resilience
3. Telecom Sector Resilience
4. Health Sector Resilience
5. Disaster Risk Financing
6. Urban Resilience Programme
7. Infrastructure for Resilient Island States

1. Power Sector

Odisha Power Infrastructure Resilience

Component I: Disaster preparedness and management

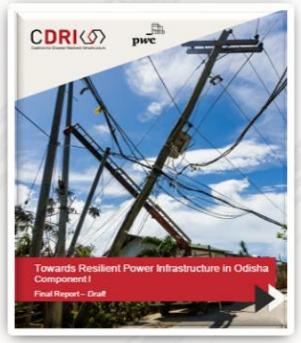
- Preparedness and survival
- Recovery and reconstruction
- Social and community resilience

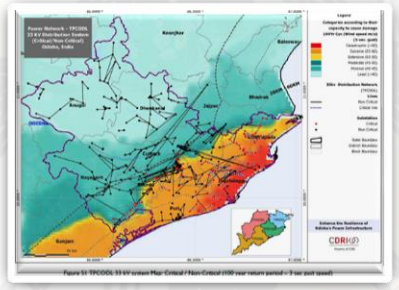
Component II: Risk mapping and improvement of infrastructure

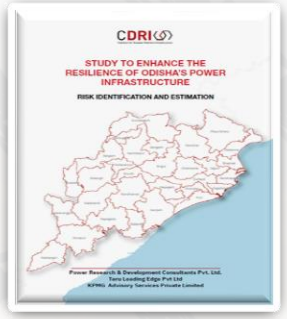
- Risk identification and estimation
- Codes, standards, design and regulation
- Technology and innovation

Component III: Institutional capacity and financing for resilience

- Risk based governance and policy development
- Financing resilience and adaptation
- Capacity mapping and development, and knowledge management







CDRI, in collaboration with the Government of Odisha, is launching the report titled "**Disaster Resilient Power Systems**" for Odisha's **Transmission and Distribution (T&D) infrastructure** at the **state-level workshop in June 2024**. The workshop will feature dignitaries from the Government of Odisha, and stakeholders from the power sector utilities, disaster management authorities, officials, regulators, etc. It is a novel and comprehensive study which maps and assigns vulnerability scores for the **T&D assets within 60 kms** of Odisha's coastline, followed by a **prioritization matrix** to enable **long term resilience building** in the power sector.

Other Engagements in Power Sector

Regional Collaboration

South America: Chile

- Supporting Chile on National Study on:
  - Map exposure of power infrastructure to natural hazards and climate change
  - Measure vulnerabilities and quantify risk
  - Roadmap and recommendations for power infrastructure resilience

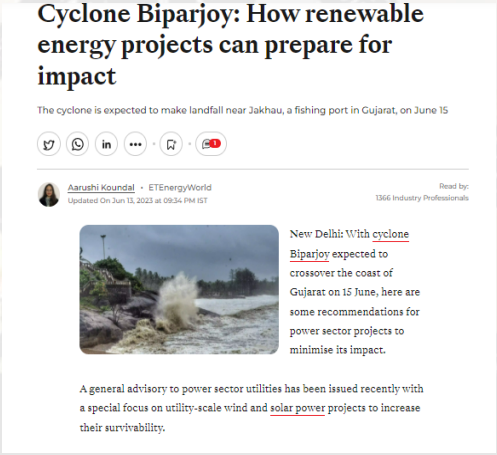
Indo-Pacific region

- **Capacity Building Workshop for Power Sector Practitioners in the Indo-Pacific region:**
  - CDRI, in collaboration with the Ministry of External Affairs, is hosting a capacity building workshop (in June 2024) for power sector practitioners under the aegis of Quad Infrastructure Coordination Group (QICG) at New Delhi, India.
  - The workshop will comprise of 30 participants from over 15 countries from the Indo-Pacific region.
  - Quad member countries, i.e., Japan, Australia, India, and United States (NREL and EPRI) will be a part of the workshop for technical expertise.

Small Island Developing States (SIDS)

- Building capacity of power sector professionals in the Pacific SIDS conducted a virtual workshop with more than 30 participants from 10 countries in the Indo-Pacific region.
- National Workshop in Mauritius- Capacity Building Workshop is being planned for the Power sector.

Technical Support on Disaster Preparedness



Cyclone Biparjoy: How renewable energy projects can prepare for impact

The cyclone is expected to make landfall near Jakhau, a fishing port in Gujarat, on June 15

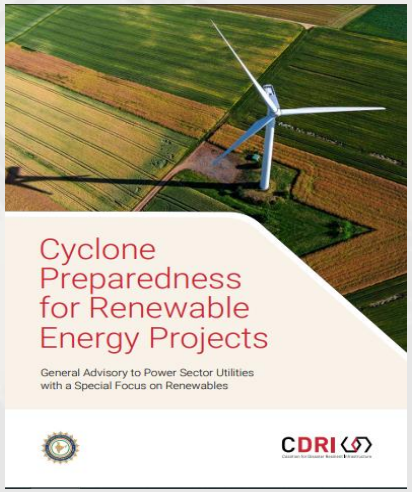
Aarushi Koundal · ETEnergyWorld
Updated On Jun 13, 2023 at 09:34 PM IST

Read by: 1366 Industry Professionals

New Delhi: With cyclone Biparjoy expected to crossover the coast of Gujarat on 15 June, here are some recommendations for power sector projects to minimise its impact.

A general advisory to power sector utilities has been issued recently with a special focus on utility-scale wind and solar power projects to increase their survivability.

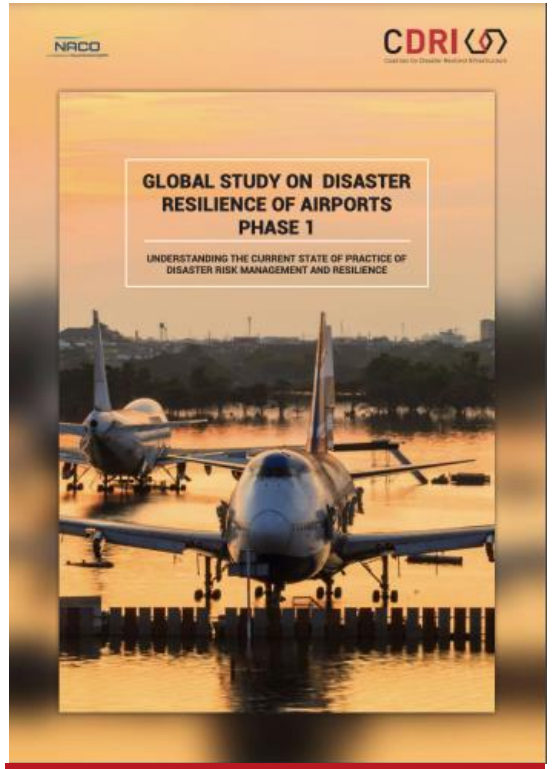
Developed Advisory on Cyclone Preparedness for Power Utilities and Renewable Energy Projects – Adopted by MNRE and Ministry of Power, India



2. Transport Sector

Global Study on Disaster Resilience of Airports (GSDRA)

Focus of ongoing work: Airports and Seaports | Planned focus in 2024: Roads, Metro in urban areas



Report launched in **ICDRI' 23**

Phase 1

- Report captures **perception of airport managers on hazards, exposure, vulnerability and resilience of infrastructure and its systems**.
- Provides case examples and recommendations for airports, governments and knowledge institutions.

54 COUNTRIES | 111 AIRPORTS | 25 INDIAN AIRPORTS

Phase 2 (ongoing)

- **Comprehensive in-depth study** on
  - **DRM and resilience** of airport infrastructure
  - **Investment mechanism** towards risk and resilience financing.
- Provide understanding to aviation sector on
  - **Investment and non-investment bottlenecks**
  - **System interdependencies** Resilience measures on stressors and **business continuity plans**.
- Covers airports in India, Bhutan, Japan, Mauritius, Germany, Madagascar, Italy, USA, Peru, Australia, and Fiji.

11 COUNTRIES | 12 AIRPORTS | 02 INDIAN AIRPORTS

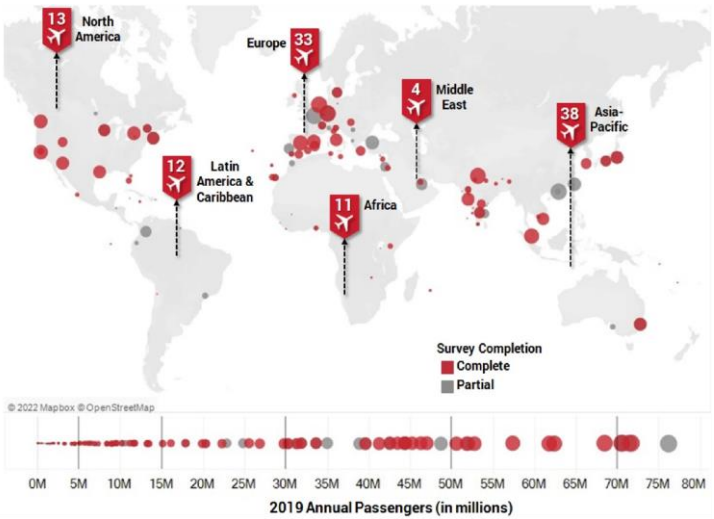
Biju Patnaik International Airport, Bhubaneswar

Kempegowda International Airport, Bengaluru.

Phase 3 (to be initiated)

- Study aims to assess **thematic and causal factors influencing disaster resilience.**
- **ACI World** has convened a **Task Force on Climate Change Adaptation and Resilience** to support CDRI and GSDRA.
- Consultation with airports through Taskforce is in progress **to identify and define the scope and objective of the study.**

Disaster Resilience of Airports



Key Priorities

- ✓ **Need for risk and resilience studies, regional studies** for airports on resume operations, recovery and resilience.
- ✓ **Integrate frameworks like Taskforce on Climate-related Financial Disclosures** (TCFD) to assess and address physical and transition risks.
- ✓ **Mandate risk and resilience studies and quick hazard assessments for all new airports**.
- ✓ **Airports and insurers should collaborate** to mitigate climate risk, for mutual benefit.
- ✓ Engage local and **regional stakeholders, cross-industry knowledge and learnings** sharing.

Challenges

Financial Constraints: impact redundancies in infrastructure and utilities.

Data: Scarcity of scientific studies, lack of updated and affordable public data sets to predict hazards and requisite actions.

Insurance: Currently challenging to include natural hazards in insurances.

Jurisdiction and Collaboration: Developing mitigation and recovery plans due to jurisdiction issues and lack of collaboration among stakeholders.

Key Actors / Stakeholders

Policy Makers/ Regulators: Airport Authorities: Ministry/ Directorates of Civil Aviation, Disaster Management Organizations (Ex: Airport Authority of India, International Civil Aviation Organization (ICAO), NDMOs)

Practitioners/Implementors: Airports and Airport Associations (Ex: Airport Council International (ACI) World and regions)

Knowledge and Research Institutes: Ex: Airport Cooperative Research Programme (ACRP), International Forum for Aviation Research (IFAR), CAPA-Centre for Aviation.

Seaport Resilience

1. Development of Systemic Risk Assessment Framework for Seaport Ecosystem in India

Scope: Identify risks, interconnected drivers of resilience, classify the degree of direct and cascading impacts of hazards on port ecosystem and understand their magnitude of the disruption.

Ports covered: Paradip, Visakhapatnam (Phase-1); Mundra, Mumbai, Port Blair (Phase-2)

Partners: CDRI, National Maritime Foundation (NMF) and Keio University, Japan.

Status: Consultations and field visit to phase-1 ports is complete.

Outcome: The framework will enable ports to better understand interconnected and interdependency of systems in the port ecosystem. The framework has potential to be adopted by SIDS Ports.

2. Indo Pacific Regional Resilient Seaport Infrastructure Programme (under Quad)

- To enhance port infrastructure resilience **facilitating knowledge sharing and capacity building**, thereby strengthen the port's preparedness and adaptation to disasters.
- **To provide technical support of Indo-Pacific countries** by sharing tools, resources and expertise from Quad partners' Government/Agencies appropriate to integrate and enhance resilience of seaports in the region.
- Supported by the Min of Ports, Shipping and Waterways (MoPSW), GoI; National Maritime Foundation (NMF).
- **Quad Leader's Summit in India 2024** : Four virtual capacity strengthening workshops, **'Call for Action-Enhancing Seaport Infrastructure Resilience in Indo-Pacific Region' document are envisaged for 2024**.

3. Telecommunications Sector

Disaster Risk & Resilience Assessment Framework (DRRAF) for Telecommunications Sector, India (ongoing)

Objective: Enhance the resilience of the Indian telecommunication sector at national and state levels for various disaster phases

1. Development of a **Comprehensive Disaster Risk & Resilience Assessment Framework (DRRAF)** for the Indian Telecom sector

2. Development of an actionable roadmap to achieve telecommunication sector resiliency at national and state level (Assam, Odisha, Uttarakhand, Gujarat & Tamil Nadu)

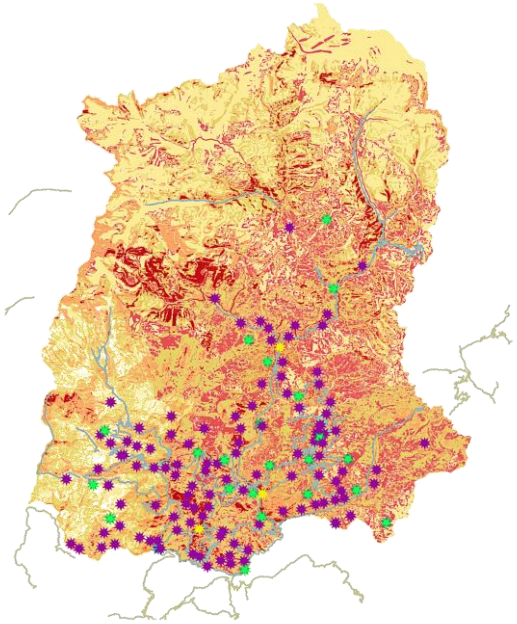
Salient features

- Focus on all natural hazards and disaster events' impact on the telecom sector at national and state level.
- Focus on the interdependencies and interconnectedness with other infrastructure sector.
- Assess the system-level risk dynamics of the overall Indian telecom network.

4. Health Sector

Roadmap for Resilient Health infrastructure for Sikkim (Ongoing)

Profile



- 178 health facilities
- Currently 1780 beds (+900 upcoming)
- Ranked high in health sector performance (GoI*)
- Majority of facilities in vulnerable zones
- Limited capacities on DM & resilience
- 6 facilities damaged in Oct 2023 floods

Approach

- SSDMA led
- Consultative process
- Multi-Hazard
- Cross Dept.
- System of systems
- Preparedness to resilience
- Entire value chain
- Inclusive (disability, gender)

Interventions

Outcomes

Risk & Resilience Assessment

- Hospital Resilience Assessment
- Framework & Software
- Asset to systems level
- Aim to integrate into govt. portals

Capacity Building

- 500+ (health & infra. staff sensitized)
- Hospital DRM & Resilience Plans under preparation
- Enabled efficient response in Oct. floods
- Modules for future capacity building

Technical Support

- Graded resilience plans with Visual Vulnerability Assessments
- Support for detailed structural vulnerability assessments
- Support for PDNA

Governance & Policy

- Resilience roadmap for Health infra.
- Risk informed planning & investment
- Integration into the state DM plans
- Integration with national schemes

Partners

5. Finance for Resilient Infrastructure Programme (FRIP)

Aim: to support MCs *in developing & implementing coherent risk financing strategies for (re)building resilient infrastructure.*

Pillar 1: **Financing for new and resilient infrastructure**

Pillar 2: **Financing for build-back-resilient infrastructure**

Ongoing initiatives

1. National – 4 Countries

Fiji, Mauritius, Nepal & India

2. Sub-National (4 States)

Himachal Pradesh, Gujarat, Odisha & Tamil Nadu

Study on Fiscal Risk Assessment (FRA)

- Assess the government's **fiscal burden** due to disaster damages in critical infrastructure sectors
- **Design Disaster Risk Assessment tools** using probabilistic and econometric modelling approaches
- Tools could **estimate losses** (direct and indirect).
- **Recommend layered financing solutions** to address funding gaps

3. National – India

National Infrastructure Pipeline (NIP), India Contractual Document Assessment Study

- **Evaluate standard agreement and contractual documents** to incorporate disaster resilience measures at design, planning, approval stages
- Sample infrastructure **projects assessed from multi-hazard perspective** (e.g. power, roads, railways) at various lifecycle stages
- **Interactive toolkit, decision support guidance document** & resilience checklist based on cost-benefit analysis
- **Guidelines to evaluate** opportunity cost of different investment scenarios

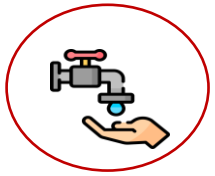
6. Urban Infrastructure Resilience Programme (UIRP)

UIRP aims to enhance urban livability by promoting resilient infrastructure planning and implementing data-driven decision-making processes to manage urban shocks and stresses

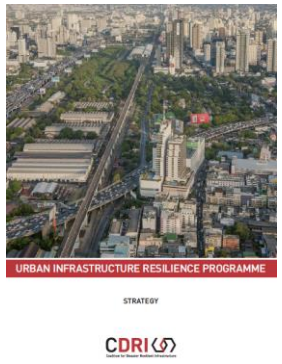
The initial work will focus on climate change-related hydro-meteorological challenges, such as

Temperature extremes

Flooding



Water scarcity & security



OUTCOME

Improved Urban Infrastructure Resilience Across Low- and Middle- Income Countries

OBJECTIVES

City infrastructure environment, services and systems are resilient against climate extremes through:

- **Improved engagement with Member Countries and Partner Organizations**
- **Increased access to infrastructure finance through MDBs/investment banks/financing corporations**
- **Access to data, tools and knowledge by Urban Local Bodies (ULBs) leading to improved design, operation, and maintenance of infrastructure.**

Infrastructure for Resilient Island States (IRIS)

- **Launched** in COP26 by the PMs of India, UK, Australia, Jamaica, Fiji, Mauritius
- **Funding** from India, UK, EU, Australia
- Under the **First Call for Proposals** - Funding support to 13 SIDS on themes like Early Warning Systems, Infrastructure Standards, Critical and Social Infrastructure etc.
- **Second Call for Proposals announced** at SIDS4 Conference in Antigua and Barbuda to **support 57 SIDS**

Resilient Infrastructure fostering sustainable development in SIDS

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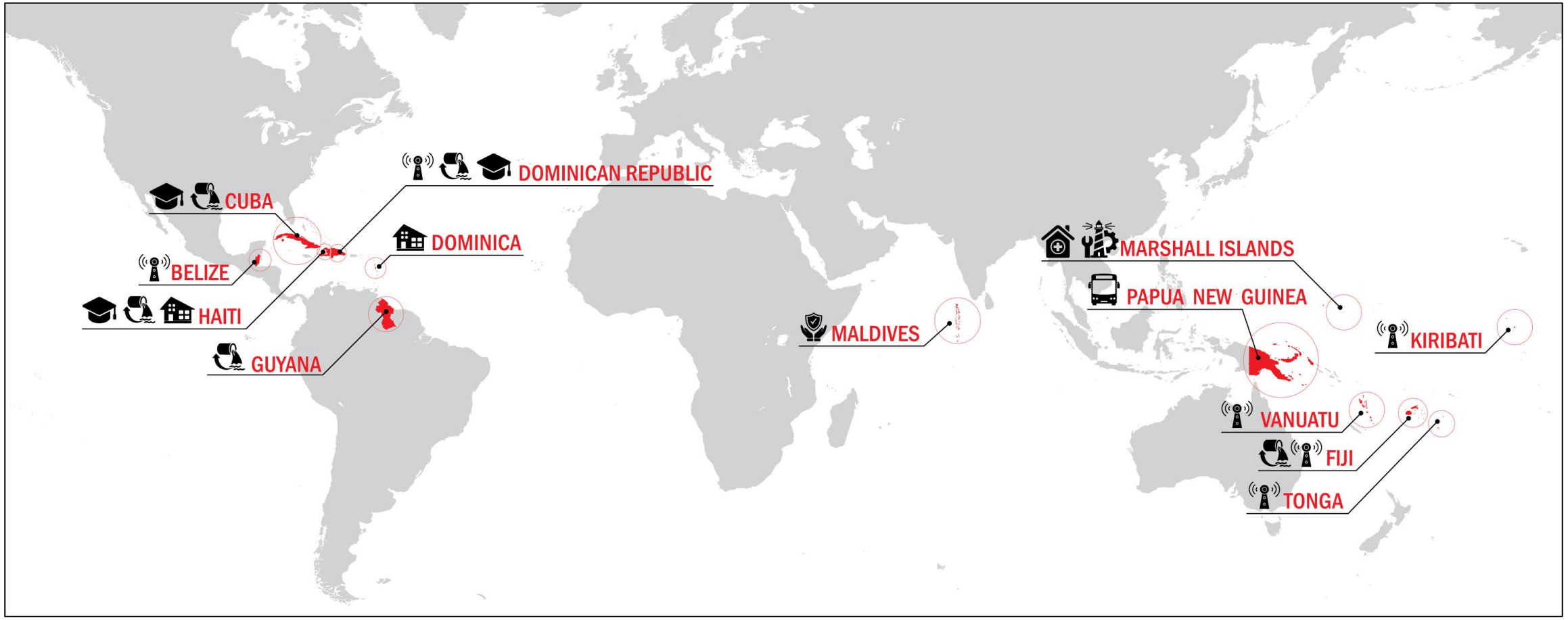
IRIS
INFRASTRUCTURE FOR RESILIENT ISLAND STATES



Health Infrastructure

Coastal Infrastructure

Disaster Risk Finance

Water Infrastructure

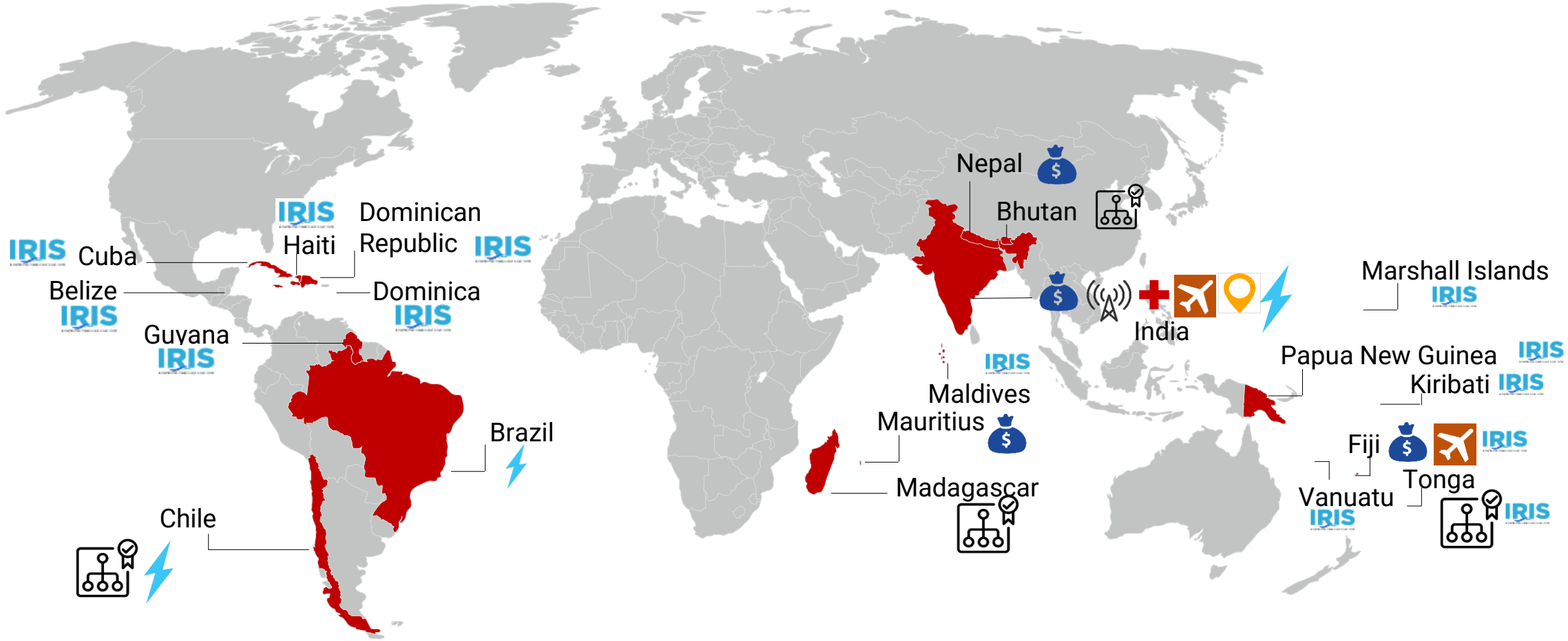
Housing

Data and Multi Hazard Early Warning Systems

Transport

Education

Global Programmes & Initiatives



Power Sector Resilience

Transport Sector Resilience

Telecom Sector Resilience

Health Sector Resilience

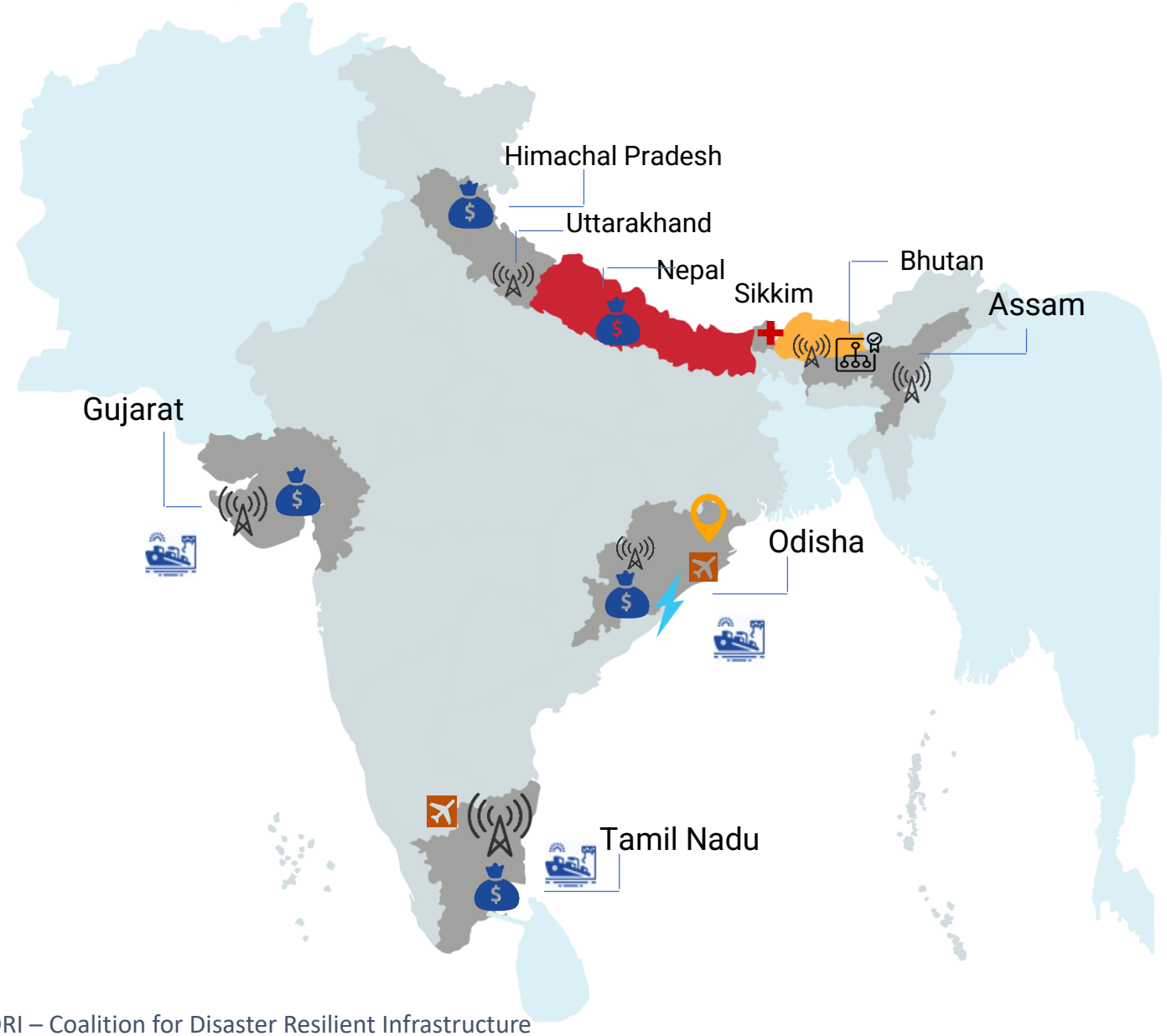
Disaster Risk Financing

Governance Study

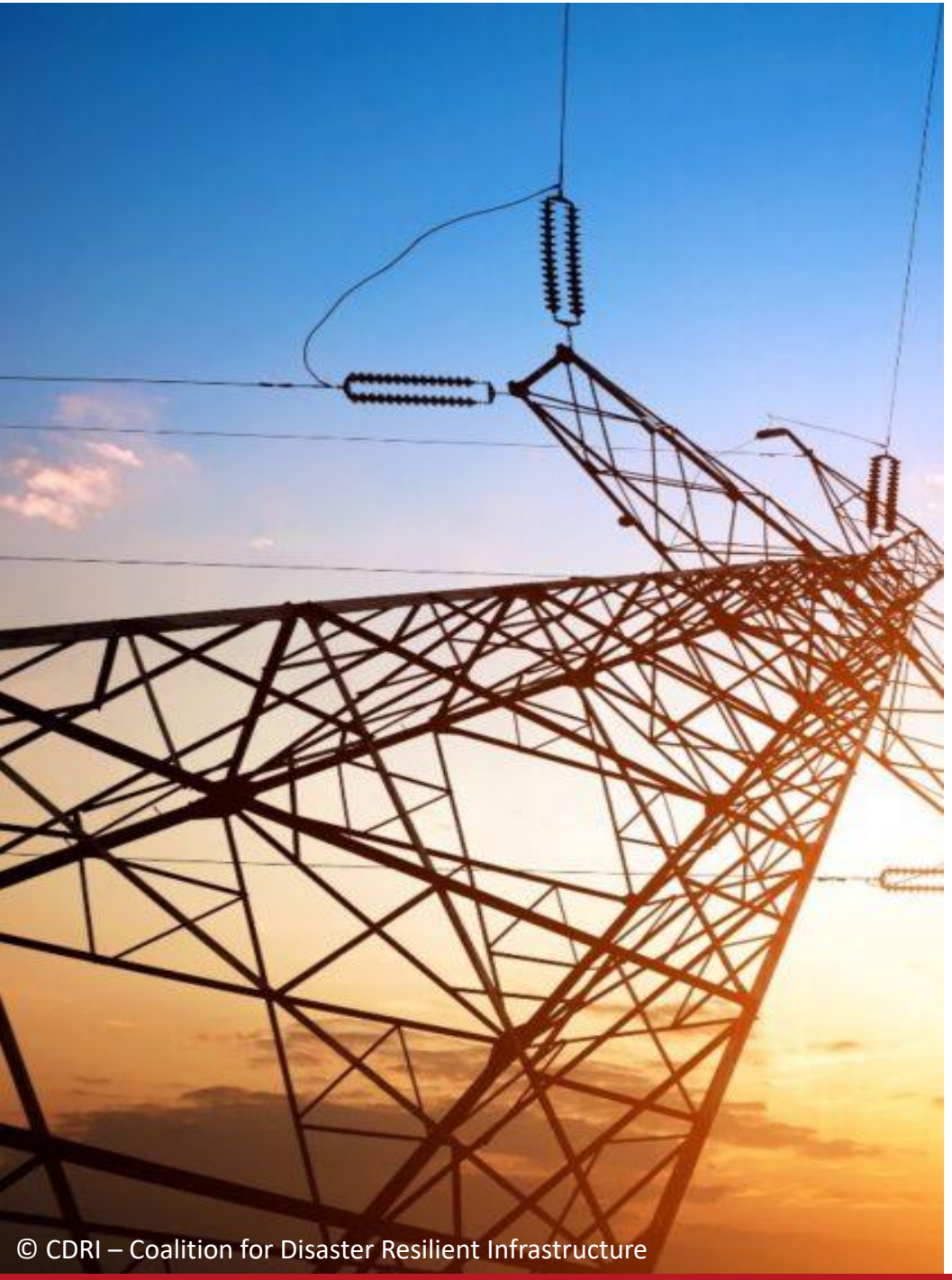
Urban Resilience Programme

IRIS

Programmes and Initiatives across South Asia



- Power Sector Resilience
- Transport Sector Resilience
- Seaport Resilience
- Telecom Sector Resilience
- Governance Study
- Resilient Health Infrastructure
- Finance for Resilient Infrastructure
- Urban Resilience



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Coalition for Disaster Resilient Infrastructure

Strengthening Capacity of Power Sector Practitioners in the Indo-Pacific Region: Technical Workshop under the Quad Infrastructure Coordination Group (QICG)

FOUR DAY TECHNICAL WORKSHOP

Objectives

1. Facilitate knowledge exchange, sharing of good practices sharing, and promote policy dialogue amongst the stakeholders from the Indo-Pacific region.
2. Deliberate upon strategies to enhance the resilience of the power sector in the face of disaster events with a focus on the Indo-Pacific region including SIDS from Pacific.

Partners

1. **Quad:** Australia, India, Japan, USA
2. **Quad Infrastructure Coordination Group and MEA**
3. **Coalition for Disaster Resilient Infrastructure**

Sessions Overview

Session 1: Physical and Climate Risk and Guidelines

***Objective*:** Understand the current scenario and effects of physical and climate risk on the energy infrastructure sector

- Indo –Pacific Region: Current scenario for climate risk data and guidelines
- Good Practices and Solutions
- Implementation enablers and barriers
- Tools and Technologies

Session 2: Power Systems and Assets Vulnerability Assessment

***Objective*:** Assess various climate vulnerabilities of the energy infrastructure sector and various mitigating measures

- Power Infrastructure Risks
- Interdependency risk Identification and management
- Risk management tools
- Criticality Analysis

Session 3: Resilience Planning and Investment Prioritisation

***Objective*:** Evaluate various avenues of financing mechanisms and regulatory frameworks for climate proofing of energy infrastructure

- Investment prioritisation
- Energy Transition management
- Resilience integration in legal and regulatory frameworks
- Innovative financing options

SITE VISITS

Site Visit 1

National Load Despatch Centre – GRID-INDIA, New Delhi

- Founded in 2009
- Monitoring of operations and grid security of the national grid
- Apex centre that provides oversight over 5 RLDC
- Nodal agency for disaster management coordination for preventive measures and quick restoration

Visit 2

Taj Mahal, Agra

- Built in Agra between 1631 and 1648 by order of the Mughal emperor Shah Jahan in memory of his wife
- One of the 7 wonders of the World
- Taj Mahal is located on the right bank of the Yamuna River in a vast Mughal garden that encompasses nearly 17 hectares

Source: Taj Mahal, Image. UNESCO (2024).

Site Visit 2

Multi-terminal UHVDC transmission link, Agra

- First 800 kV HVDC link in India
- World's longest 800 kV multi-terminal HVDC transmission project
- Spanning 1,775 kms across challenging terrains in four states, comprising four terminals across three converter stations in Assam, West Bengal, and Uttar Pradesh
- At full capacity, serves 90 million people, significantly reducing transmission losses associated with long-distance power delivery

Expected Outcomes

1. Create awareness and learnings on building resilience of power sector

2. Understand various data platforms, innovations and technologies available for building resilient energy infrastructure systems and assets

3. Identify the Challenges and Enablers in Power Sector Resilience Planning

Thank You

Coalition for Disaster Resilient Infrastructure

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