Workshop on Sediment Management

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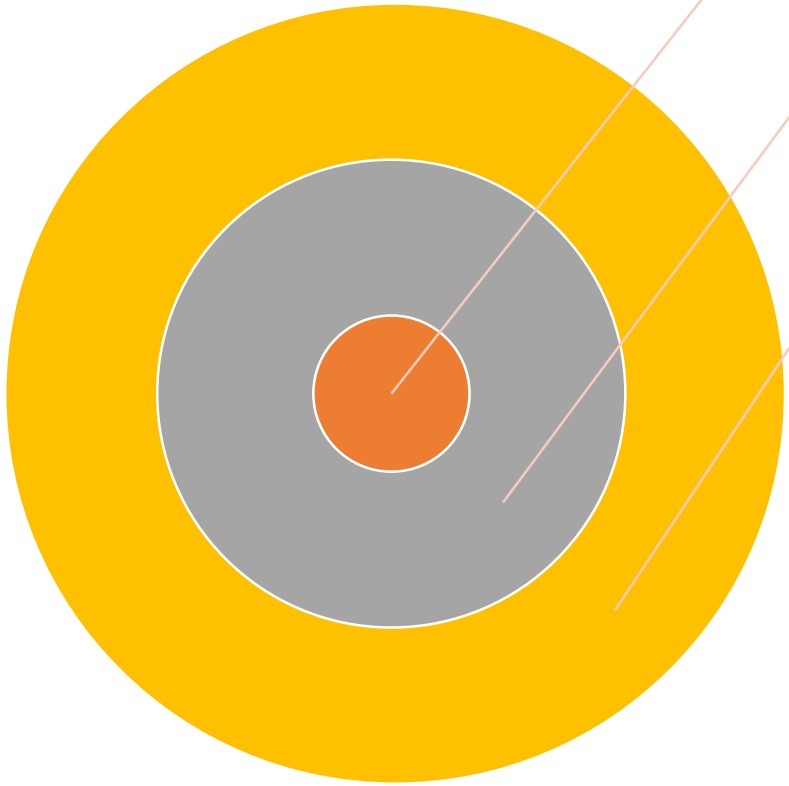
Objective

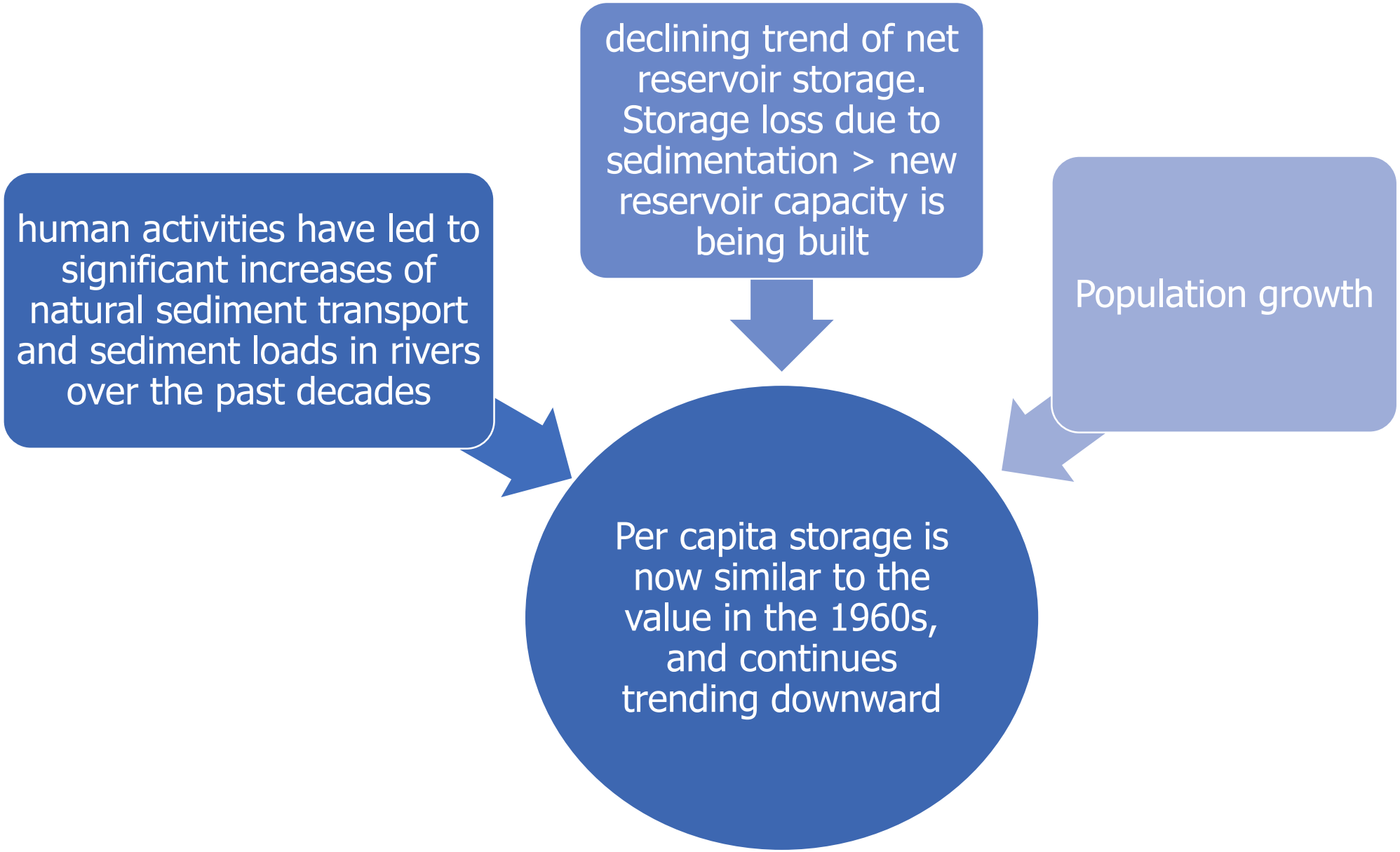


eliminate extreme poverty by 2030 and boost shared prosperity for the poorest 40% in a sustainable manner

address the world's water and energy challenges

use of a broad array of sustainable water and power sources, including storage reservoirs and Run-of-River hydropower

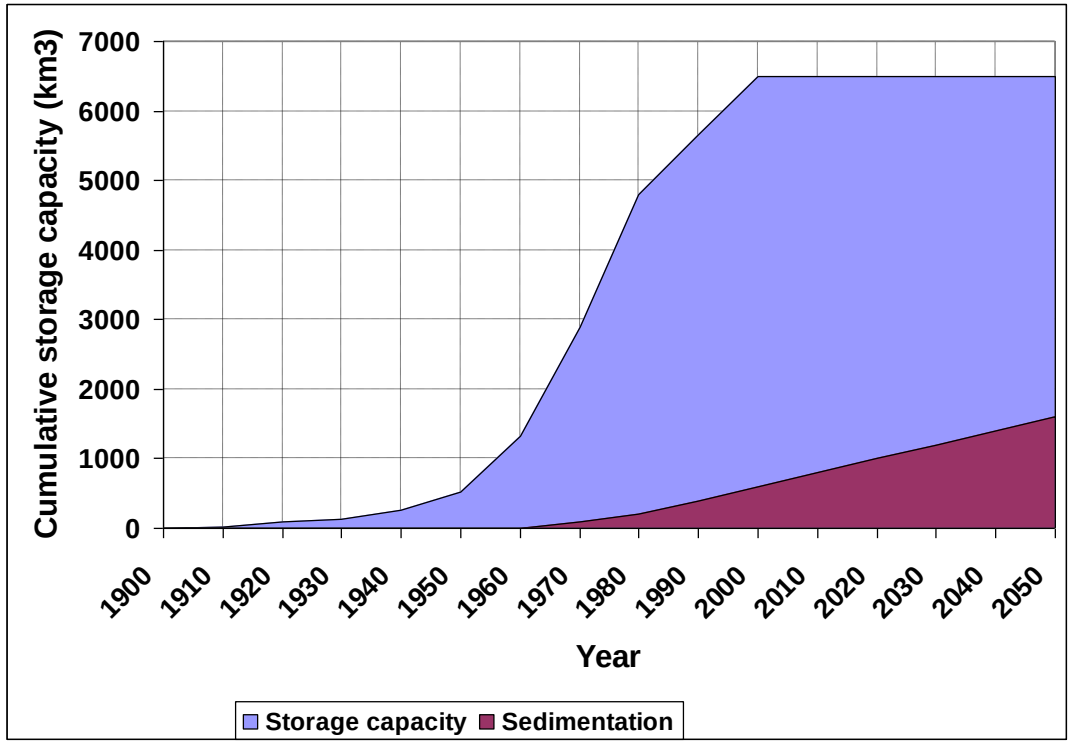
Problem statement



Sedimentation is a major challenge in hydropower development

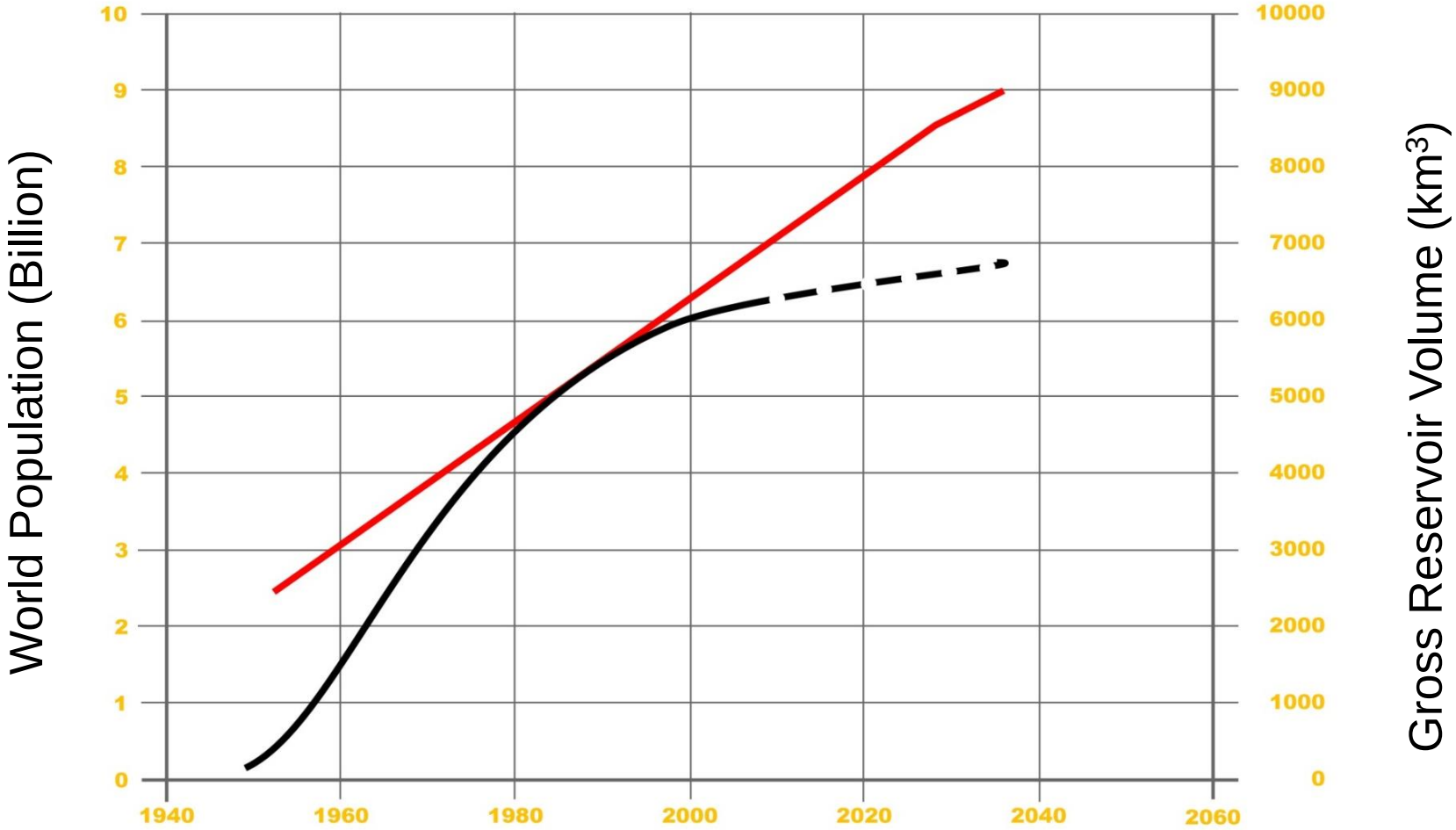
- Total storage capacity is about 7 000 km^3
- Average storage loss is about 45 km^3/year (300-400 large dams annually)
- The cost of replacing the lost storage is about USD13 billion

(Palmieri et al., 2003)



(ICOLD , 2004)

Dam Construction And Global Population



Impacts of sedimentation

Environmental

Interruption of sediment transport continuity and river continuity

- River morphology
- Fish habitat
- Ground water level
- Coastal erosion

Operational

Loss of reservoir active storage

- Reduction of reliability of water supply and irrigation
- Reduction of peaking
- Abrasion of generating equipment
- Reduction of flood retention

Safety

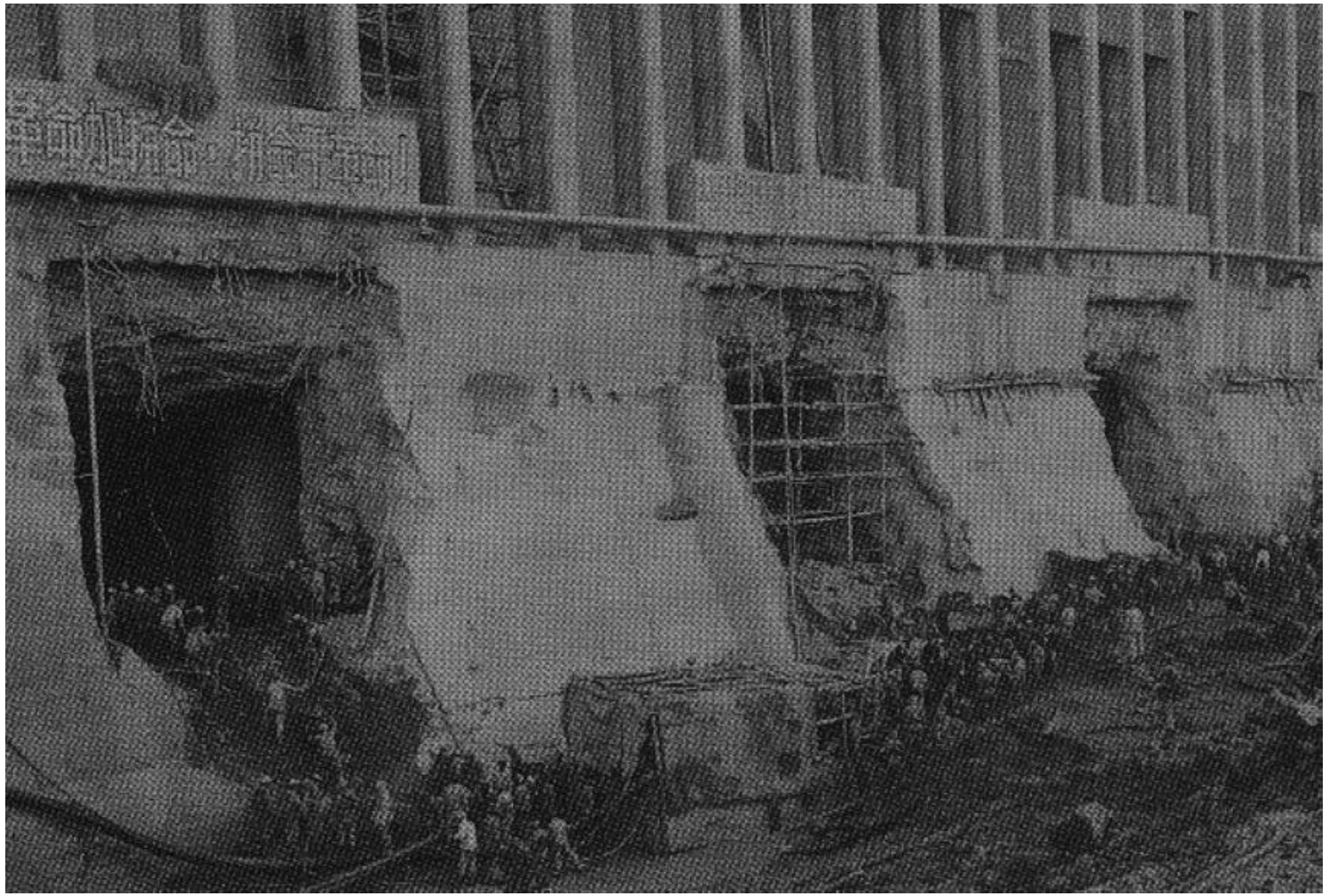
- Structural stability due to downstream scouring
- Sediment loads at dam and intake structures
- Reduction of spillway discharge capacity

The increased hydrologic variability associated with climate change will exacerbate the impacts of sedimentation

Mitigation

Effective and sustainable sediment management

- Re-establishment of river connectivity and sediment transport continuity
- Conversion of non-sustainable reservoir to sustainable, renewable resources
- In agreement with the virtues of intergenerational equity
- Increase of the resilience of water infrastructure against climate change
- Improvement of the economic performance of the facility on the long-term



Sanmexia Dam. 12 bottom outlets were opened for sediment releases.

Headworks:
Five Performance Standards

Performance Standard	Consequences of Compliance Failure
1. Passage of all floods, including hazard floods	**Poor safety during flood time**
2. Passage of ice, trash, and floating debris	**Poor safety during normal operations**
3. Passage of sediments	
4. Bed control at intake	
5. Exclusion of suspended sediments and air	

HIGHER MAINTENANCE COSTS

Basu Chu, Bhutan

Global Sediment Management Study

Partnership

World Bank

Energy Sector Management Assistance Program

Hydropower Development Facility

Austrian Federal Government

Ministry of Finance

Project

Sediment Management in Reservoir and Run-of-the-River

Global Sediment Management Study

Objectives of the Study

- improve
  practitioners' understanding of sedimentation impacts

- support
  planning, implementation and operation
  of effective and sustainable sediment management
  in storage reservoirs and Run-of-River hydropower plants

Global Sediment Management Study

Project Activities

- Case studies
- Design guidelines and technical toolkit
- Policy guidelines
- Capacity building and knowledge transfer
- Sediment management study, Pulangi IV reservoir

GLOBAL STUDY IN SEDIMENT MANAGEMENT in Reservoirs and Run-Of-The-River Projects

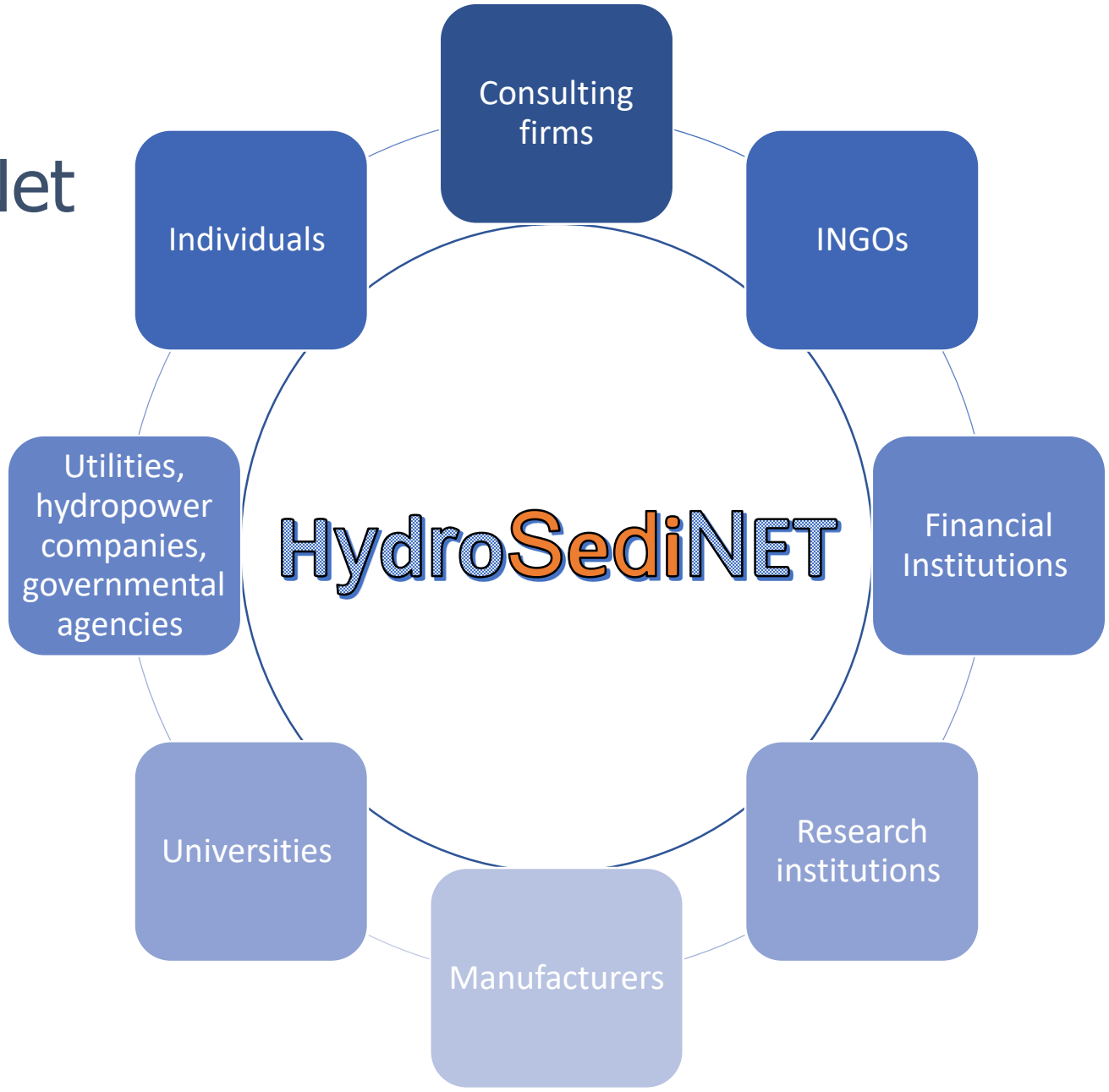
- **Activity 1**
  - Case studies
    - Reservoir case studies
    - River basin case studies
    - E-book on sediment management
- **Activity 2**
  - Design guidelines and technical toolkit
    - Design guidelines
    - RESCON2 improvement and finalization
    - Development of numerical model for sediment management
- **Activity 3**
  - Recommenda-tions for policy guidelines
    - Compilation of recommendations for policy guidelines (Country 1)
    - Compilation of recommendations for policy guidelines (Country 2)
- **Activity 4**
  - Capacity building and knowledge transfer
    - Workshops, seminars, conferences and webinars
    - Integration into UNESCO's Worlds Large River Initiative (WLRI)
    - Establishmentof international sediment management network (HydroSedi NET)
- **Activity 5**
  - Case study (Pulangi IV reservoir, Philipines)
    - 1. Sediment monitoring
    - 1. Reservoir and river modeling
    - 1. Sediment management alternatives analysis

Global Sediment Management Study

Team

Global Sediment Management Study

HydroSediNet



DIRECTIONS IN DEVELOPMENT
Energy and Mining

Extending the Life of Reservoirs

Sustainable Sediment Management for Dams and Run-of-River Hydropower

George W. Annandale, Gregory L. Morris, and Pravin Karki

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RESCON 2
User Manual

Reservoir Conservation Model RESCON 2 Beta

Economic and Engineering Evaluation of Alternative Sediment Management Strategies

Nikolaos P. Efthymiou, Sebastian Palt, George W. Annandale, Pravin Karki

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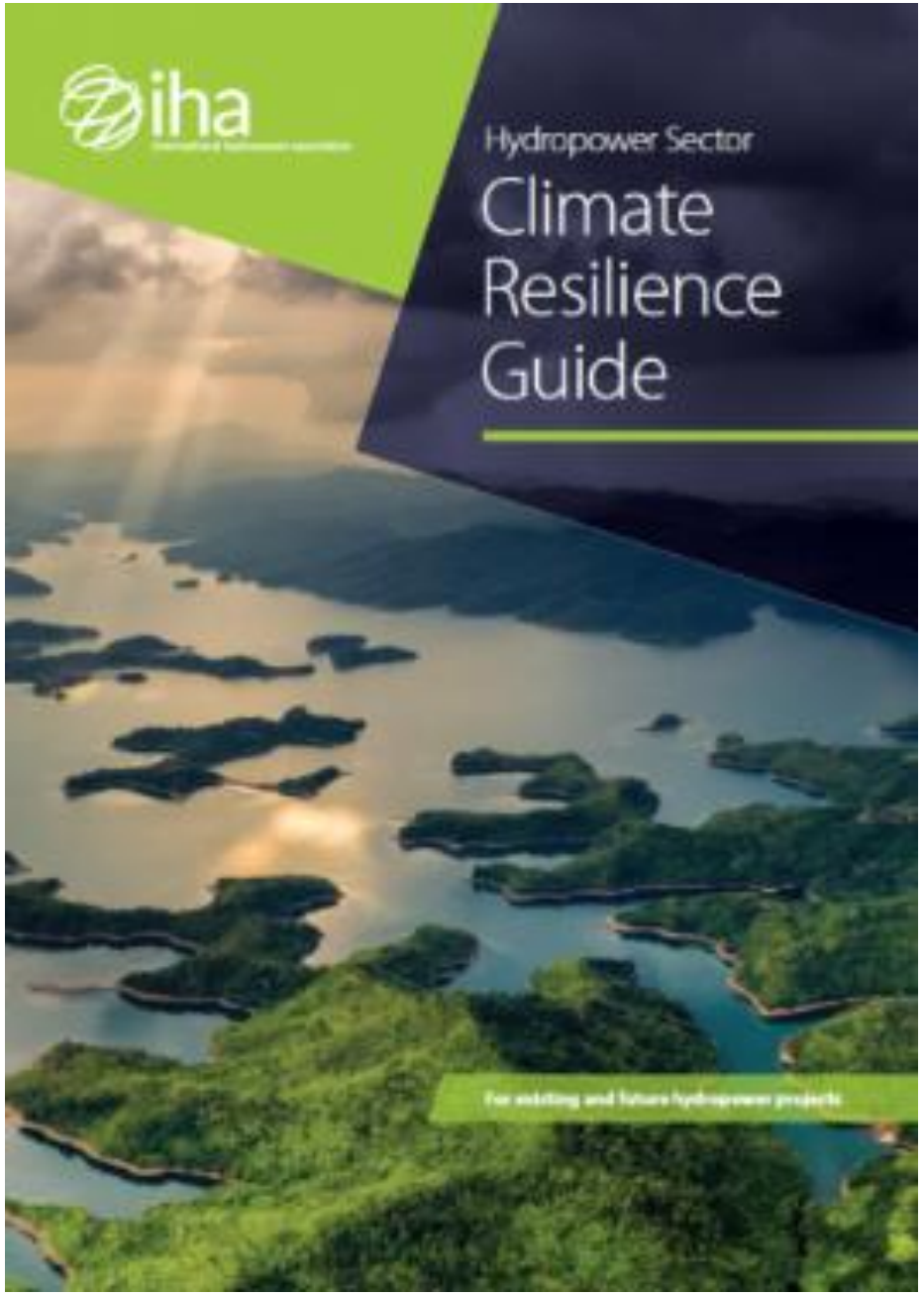

The Hydropower Sector Climate Resilience Guide offers a methodology for identifying, assessing and managing climate risks to enhance the resilience of hydropower projects.

iha international hydropower association

https://www.hydropower.org/sediment-management

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