

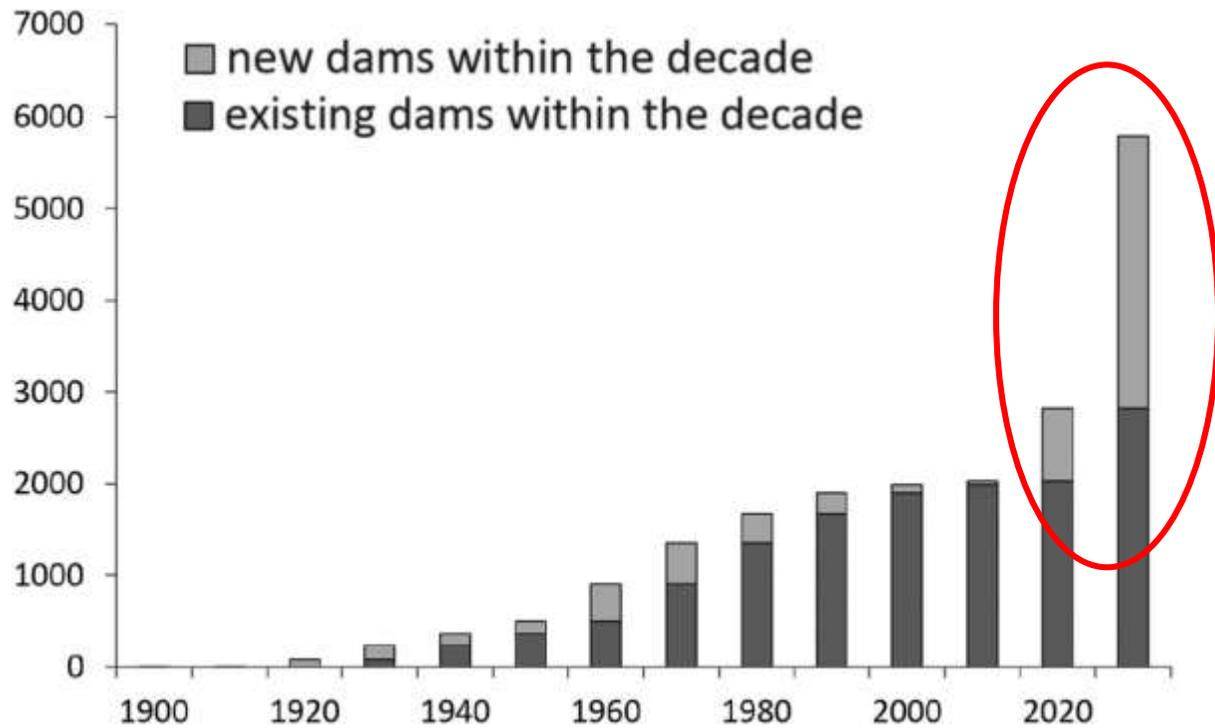
Lies, Dam Lies, and Statistics?

Global Trends and Observations on Large Dams

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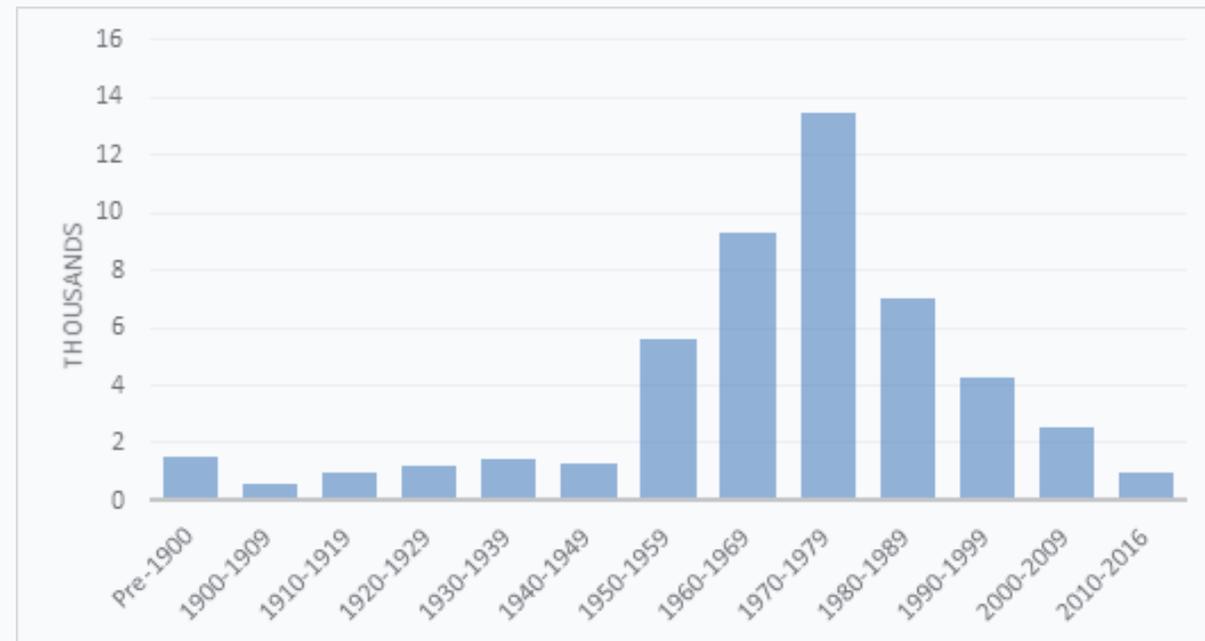


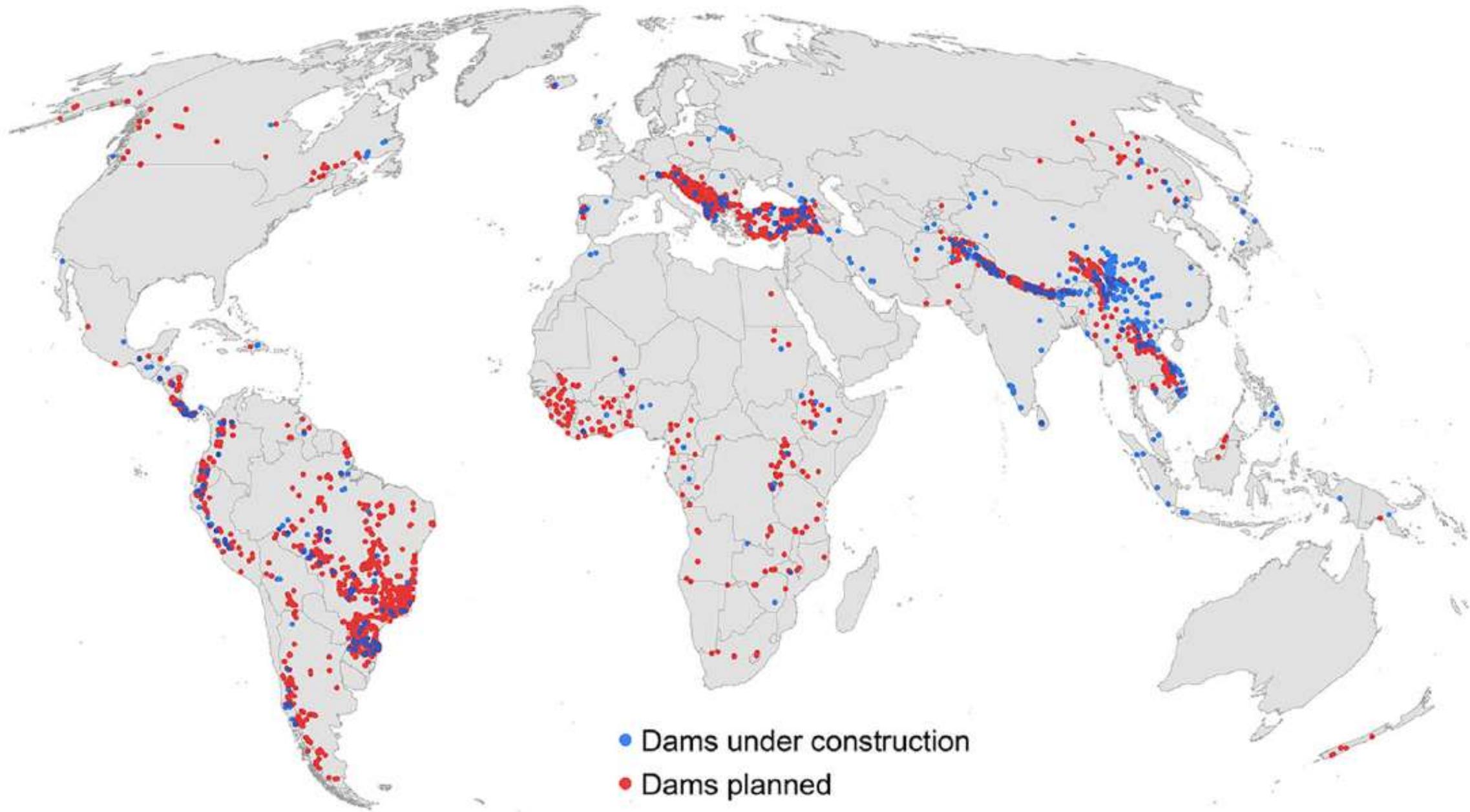
- Around 60,000 large dams and 800,000 dams in total
- At least 3,700 major dams, each with a capacity of more than 1 MW, are either planned or under construction, primarily in countries with emerging economies.

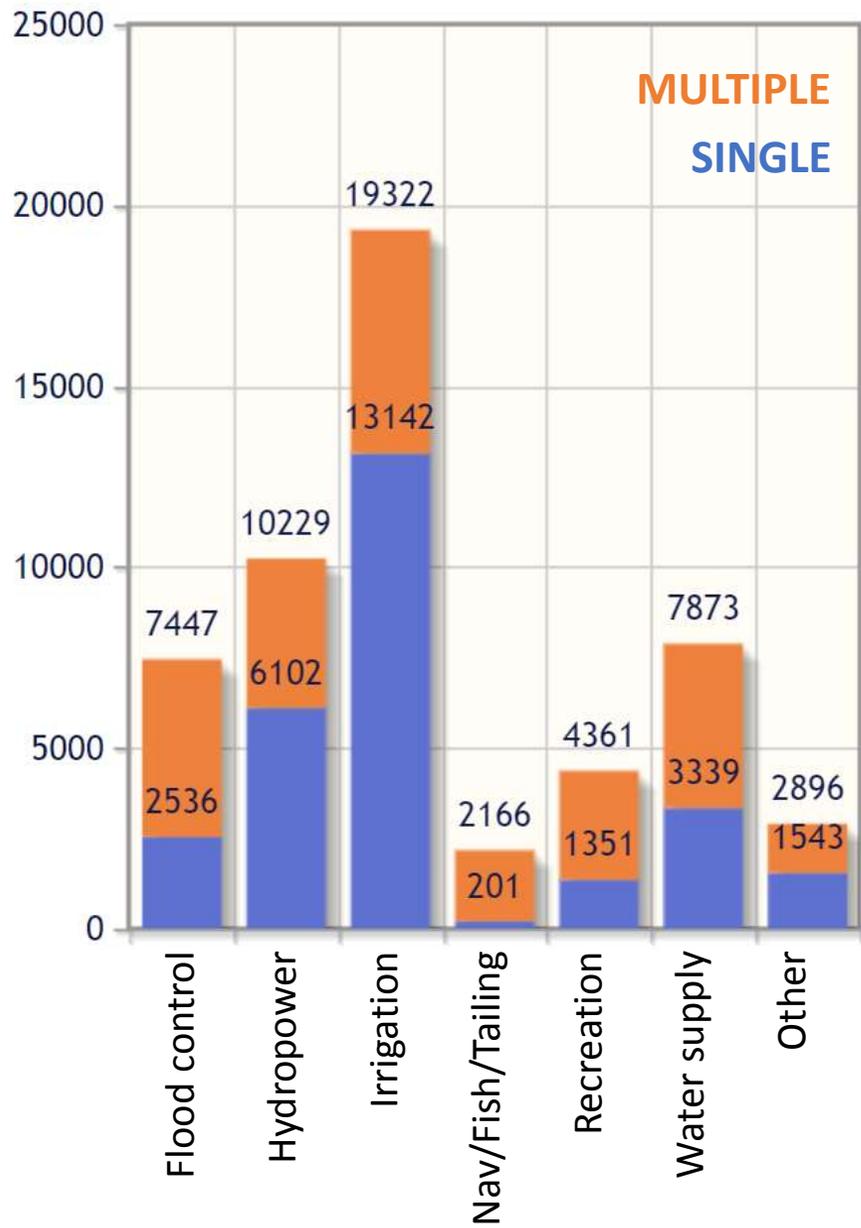
Lehner B et al (2011) High resolution mapping of the world's reservoirs and dams for sustainable river-flow management. *Front Ecol Environ* 9:494–502

- Looking just at commissioning of new dams, highlights the “boom: in the 1960/70, and the subsequent reduction.

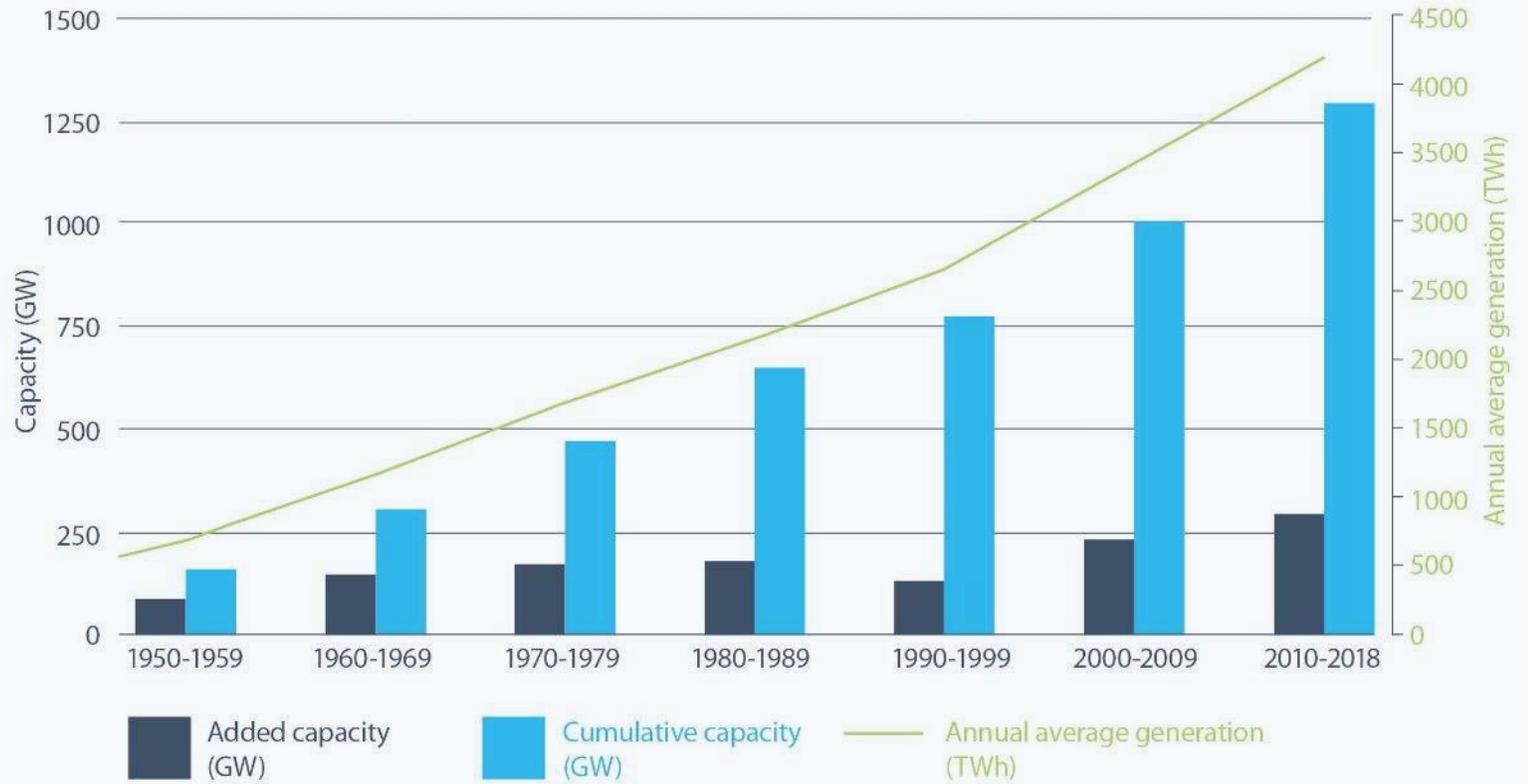
World Bank analysis of 60,000 dams in ICOLD database



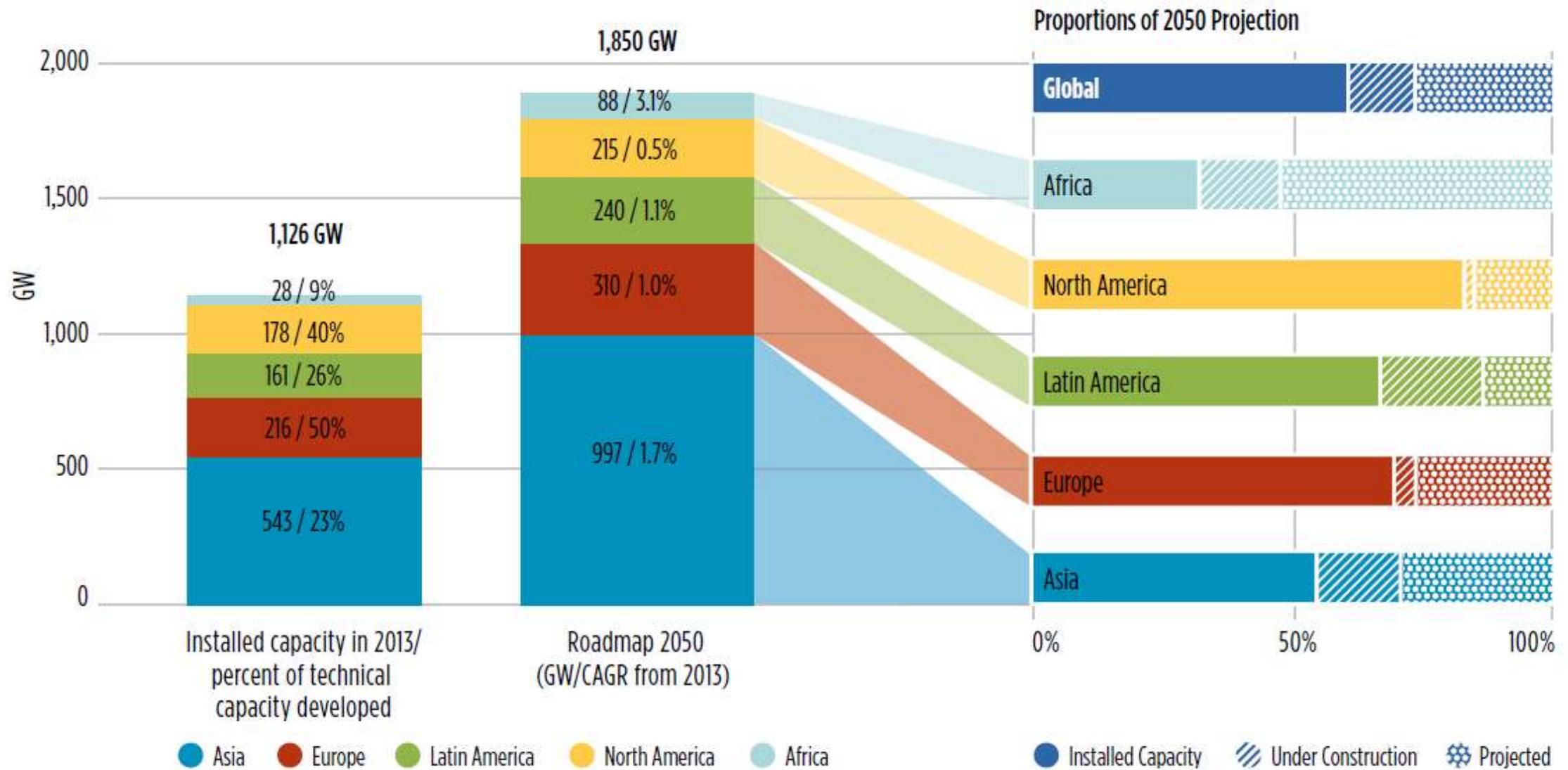


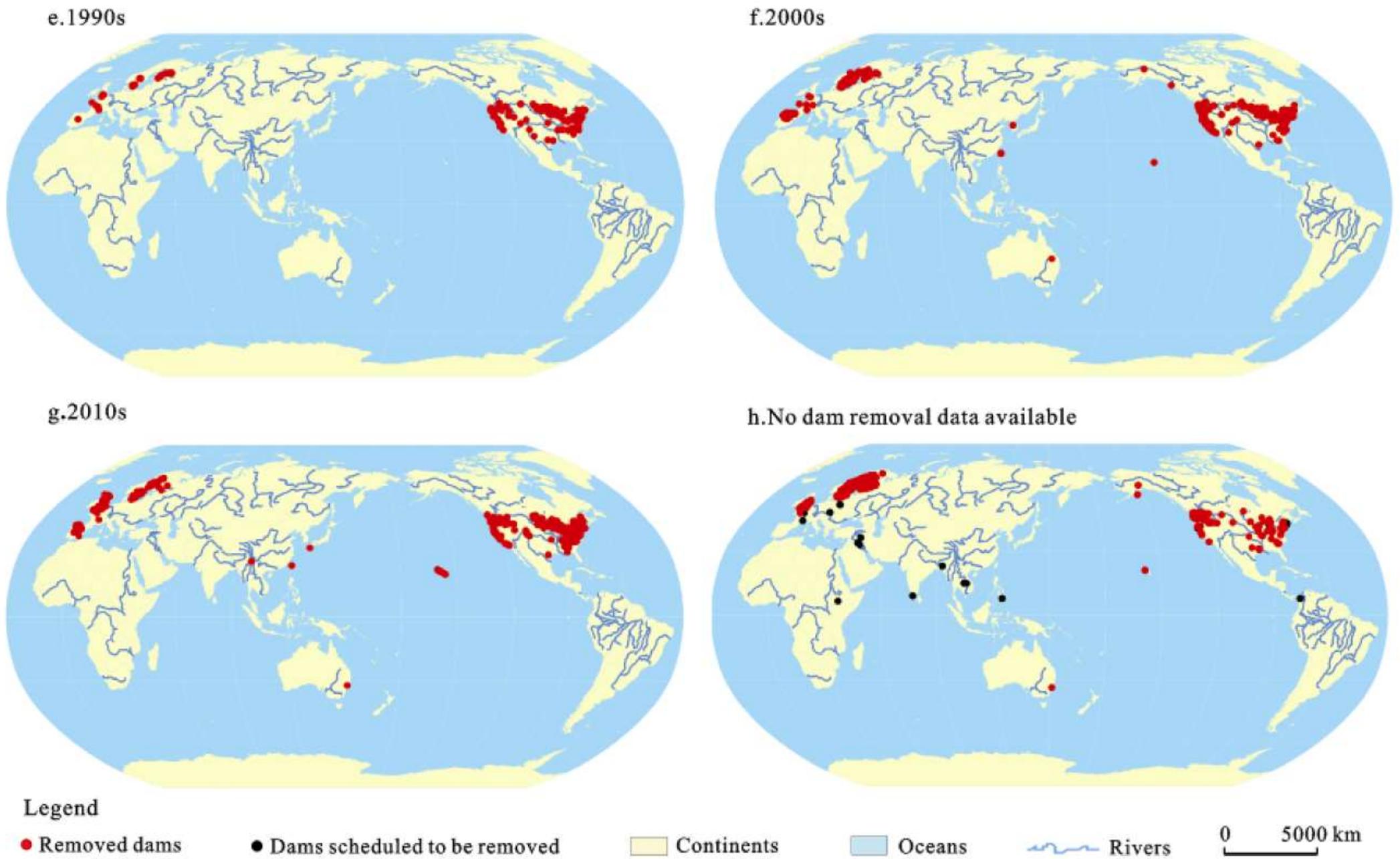


ICOLD data (<https://www.icold-cigb.org/>)

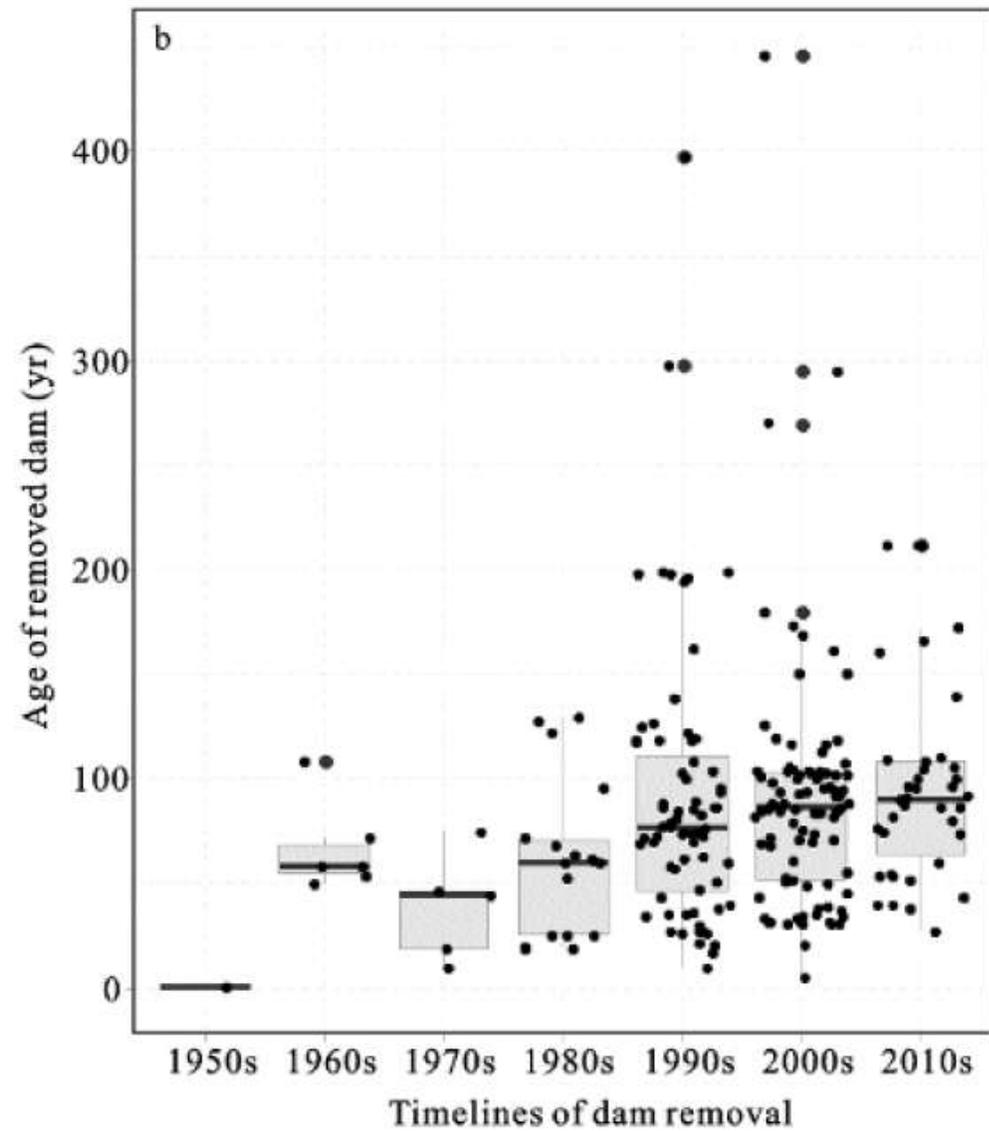
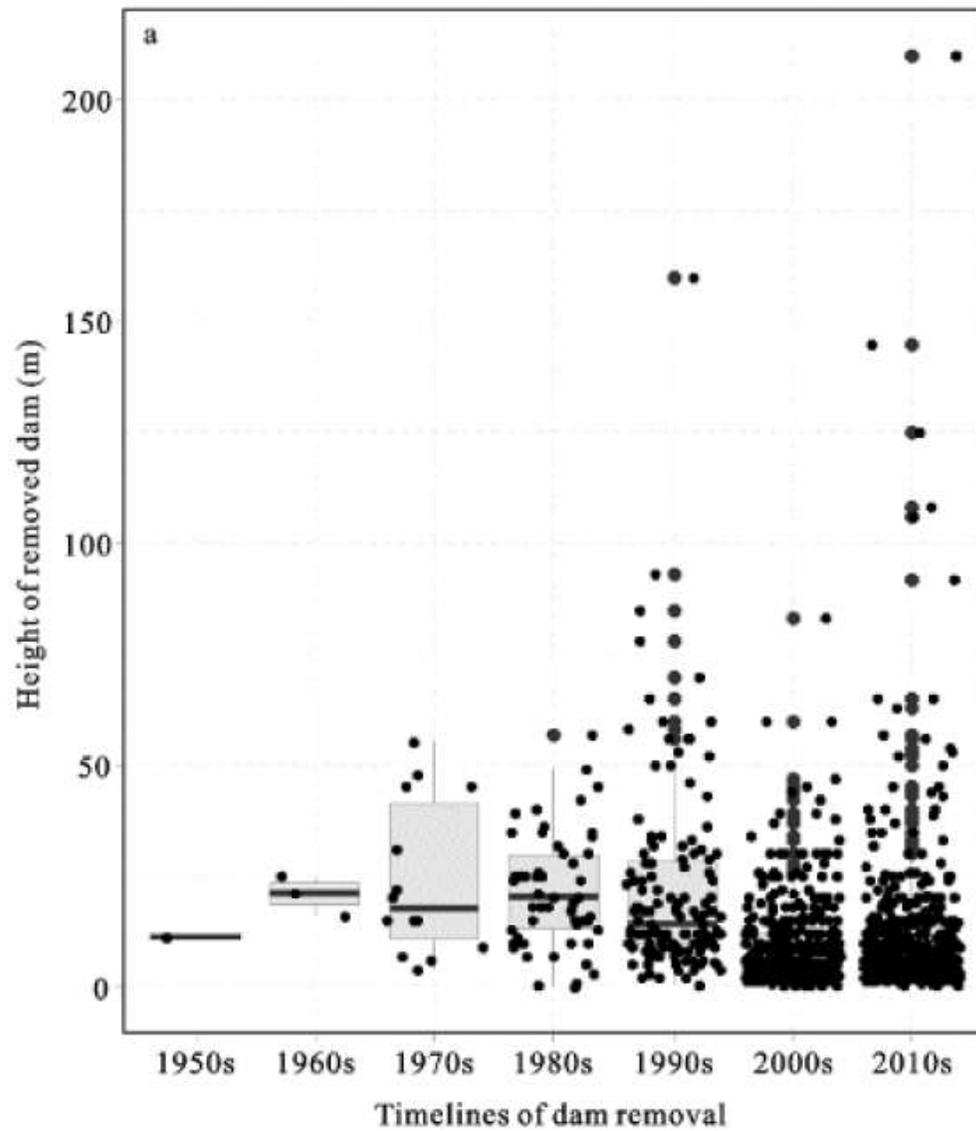


IHA (2019) Hydropower Status Report: trends and insights.



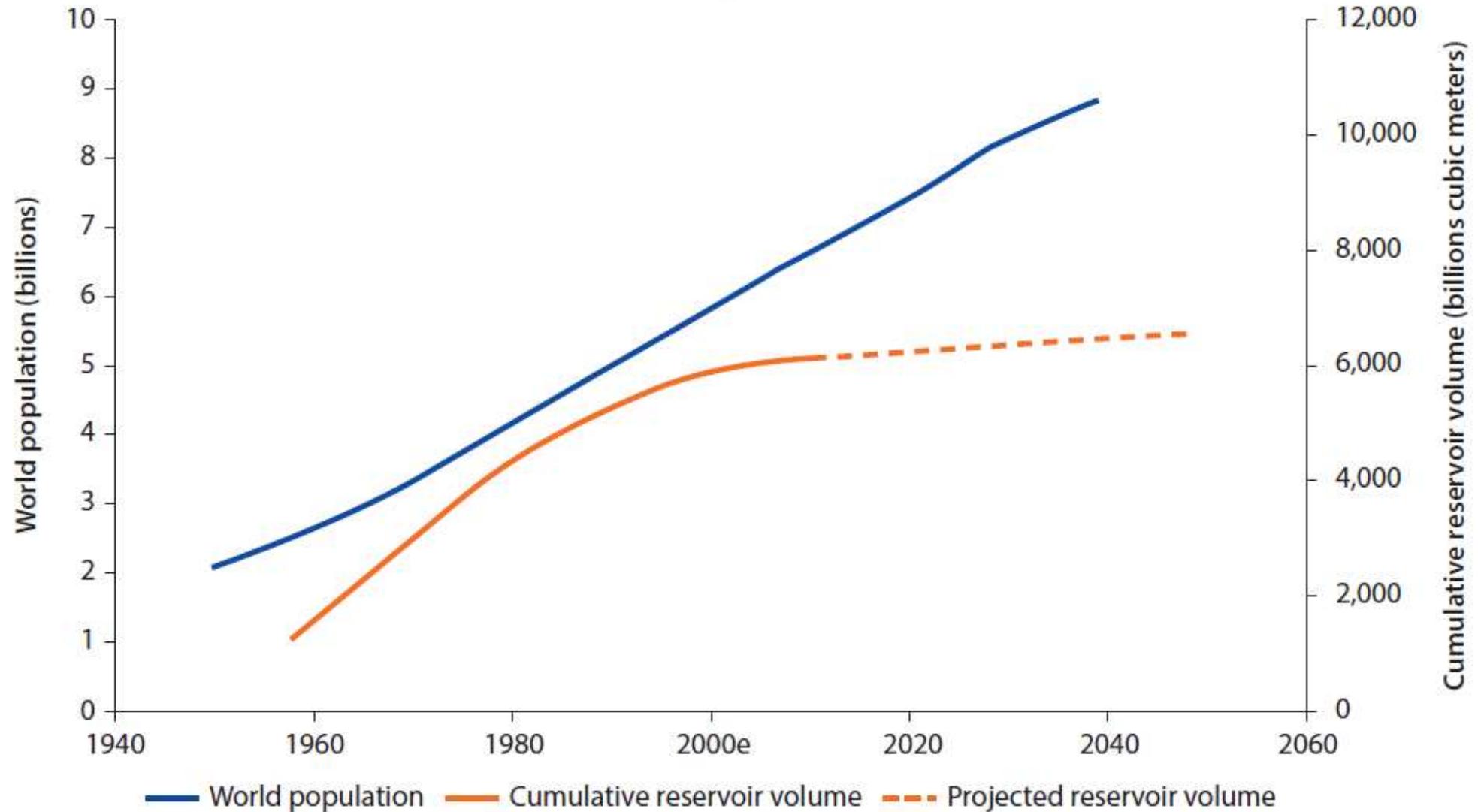


Global geographic distribution of the removal of 3917 dams... Ding L et al (2019) Global Trends in Dam Removal and Related Research: A Systematic Review Based on Associated Datasets and Bibliometric Analysis. Chin. Geogra. Sci.

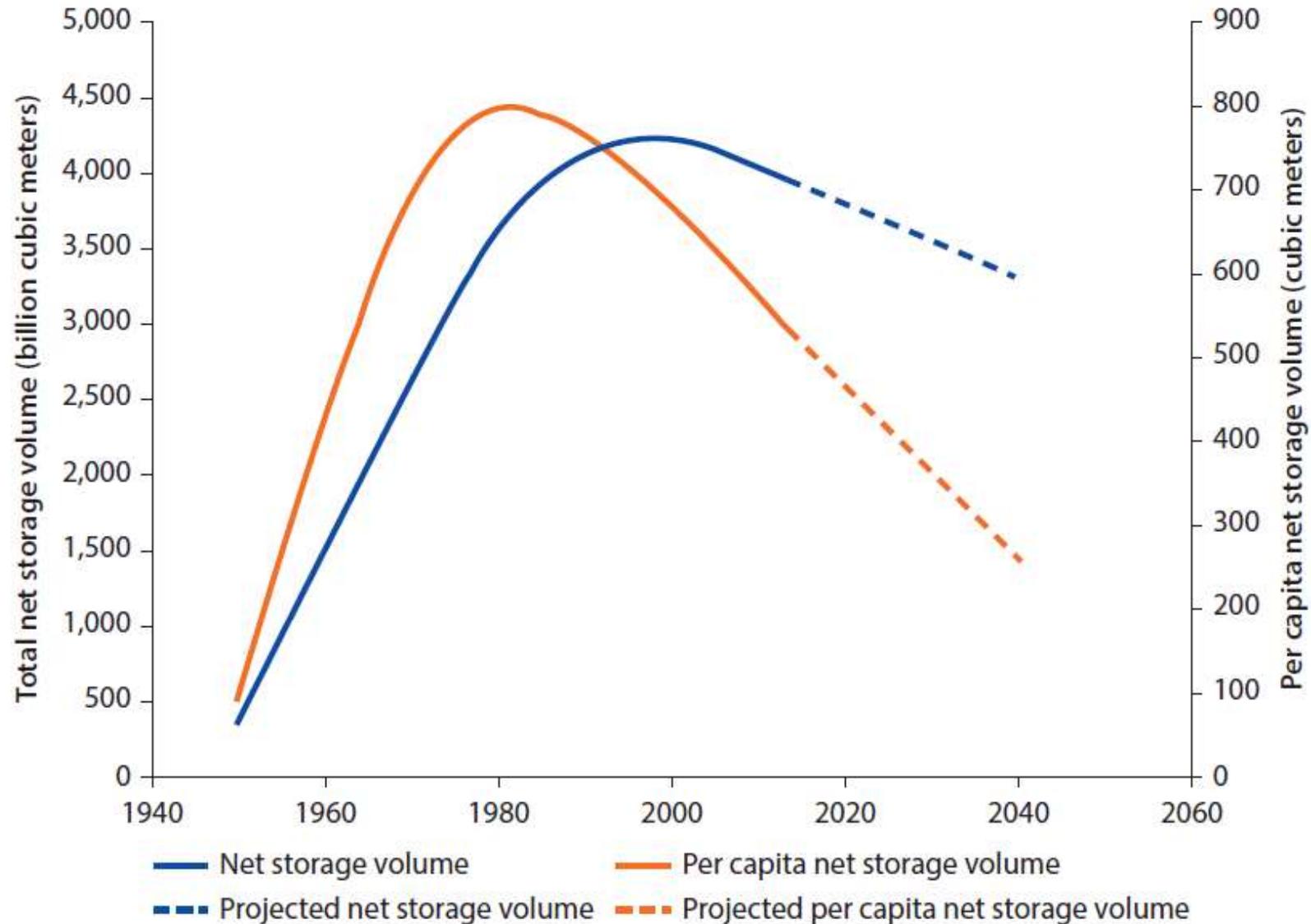


heights of removed dams and the ages of removed dams... [Ding L et al \(2019\)](#) Global Trends in Dam Removal and Related Research: A Systematic Review Based on Associated Datasets and Bibliometric Analysis. Chin. Geogra. Sci.

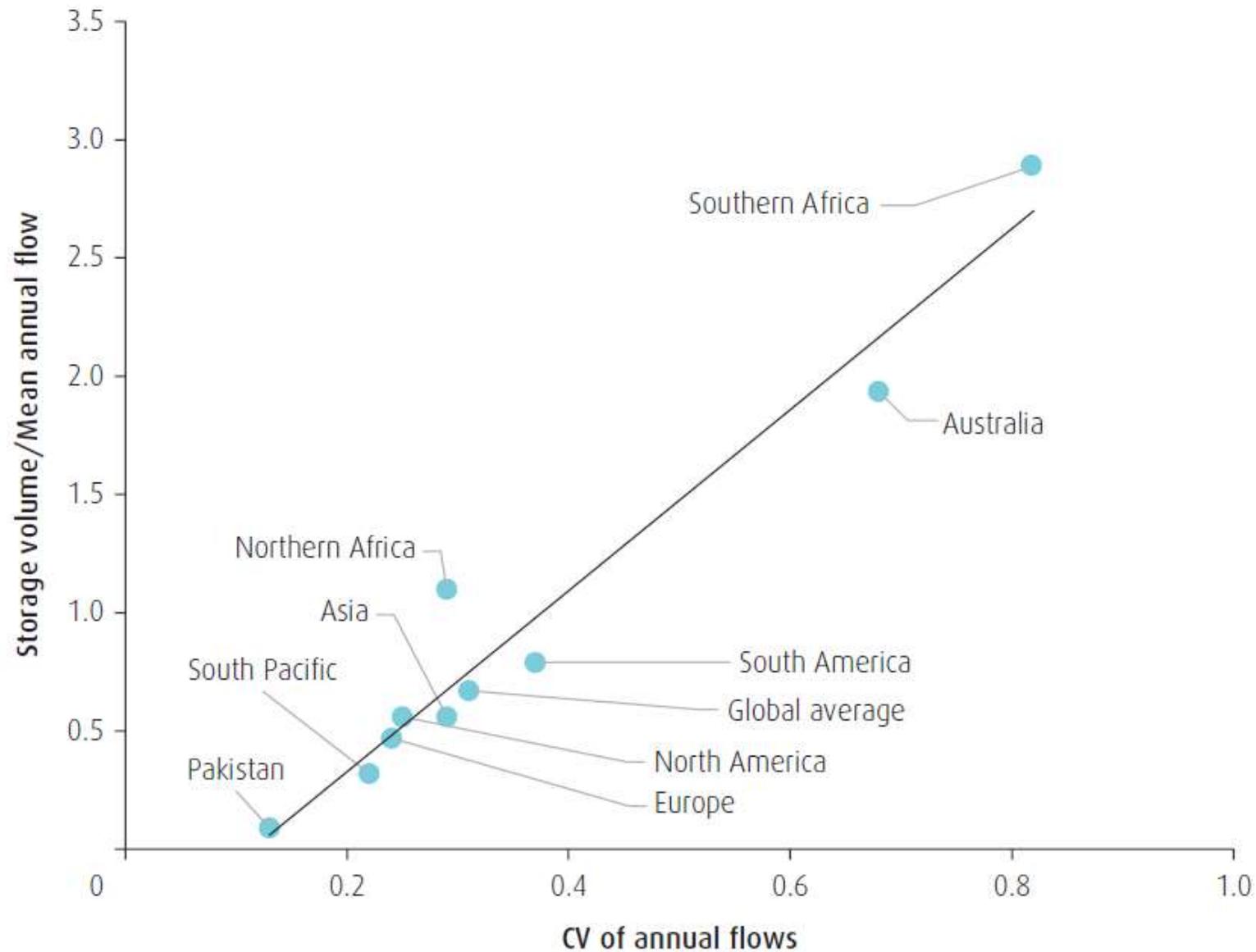
Total storage volume



Net storage volume – result of sedimentation



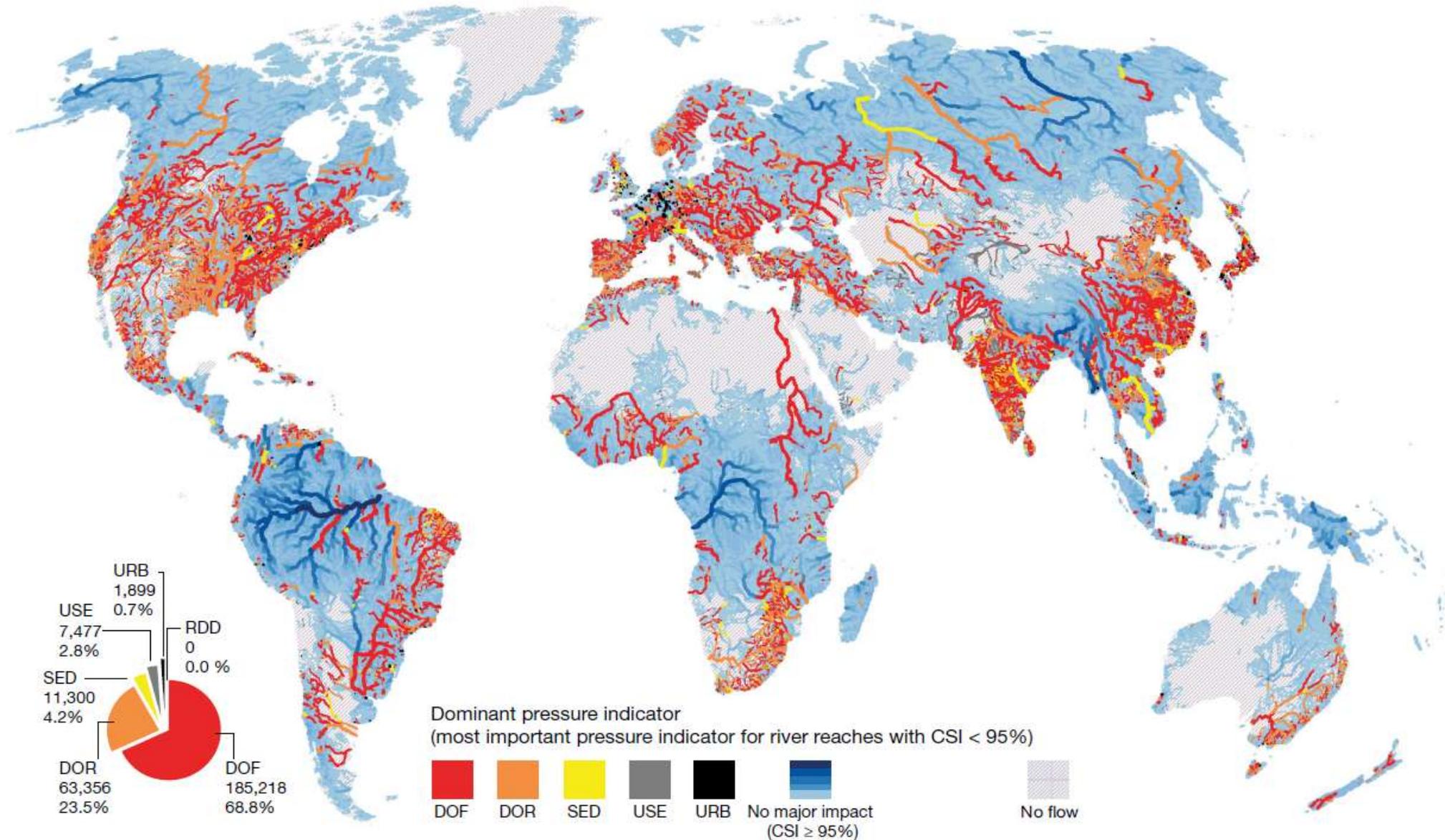
Storage – managing supply variability



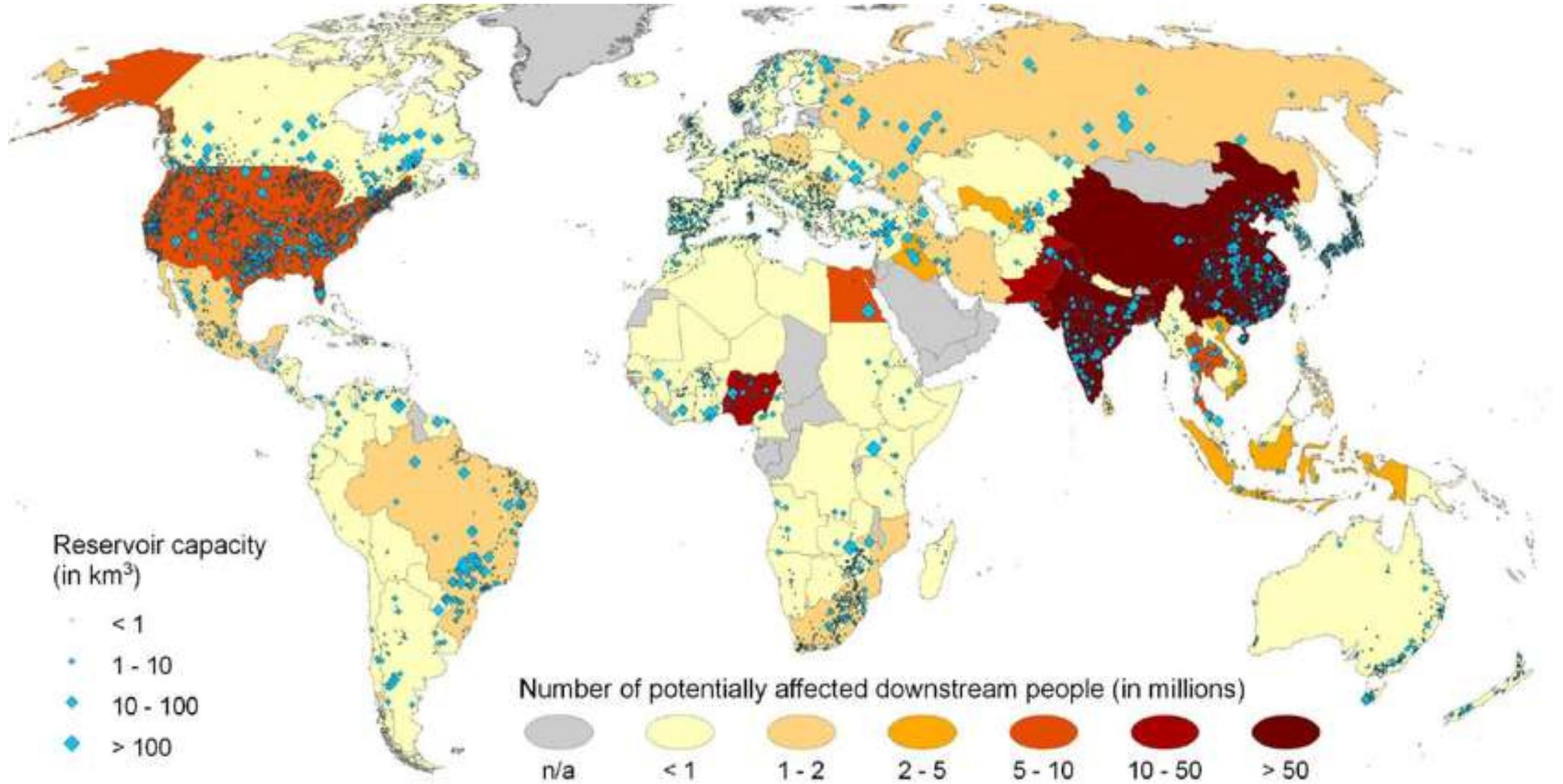
World Commission on Dams

- Proposed by WB in 1995. Conducted from 1998-2000.
- Assessed development effectiveness of large dams and developed best practice guidelines for large dam construction / management, based on review of evidence and stakeholder consultation.
- Produced 2 reports. 2nd contained "internationally acceptable criteria and standards", and 26 guidelines for future dam projects, with strong focus on social and environmental justice.
- Reception was mixed. CSOs generally welcomed advice. WB, China, India, and industry reactions ranged from lukewarm to hostile.
- But WCD emerges from recent literature as a remarkable institution: bold, creative, and radical; and often credited with exposing the political nature of dam construction.

Global Environmental Impacts

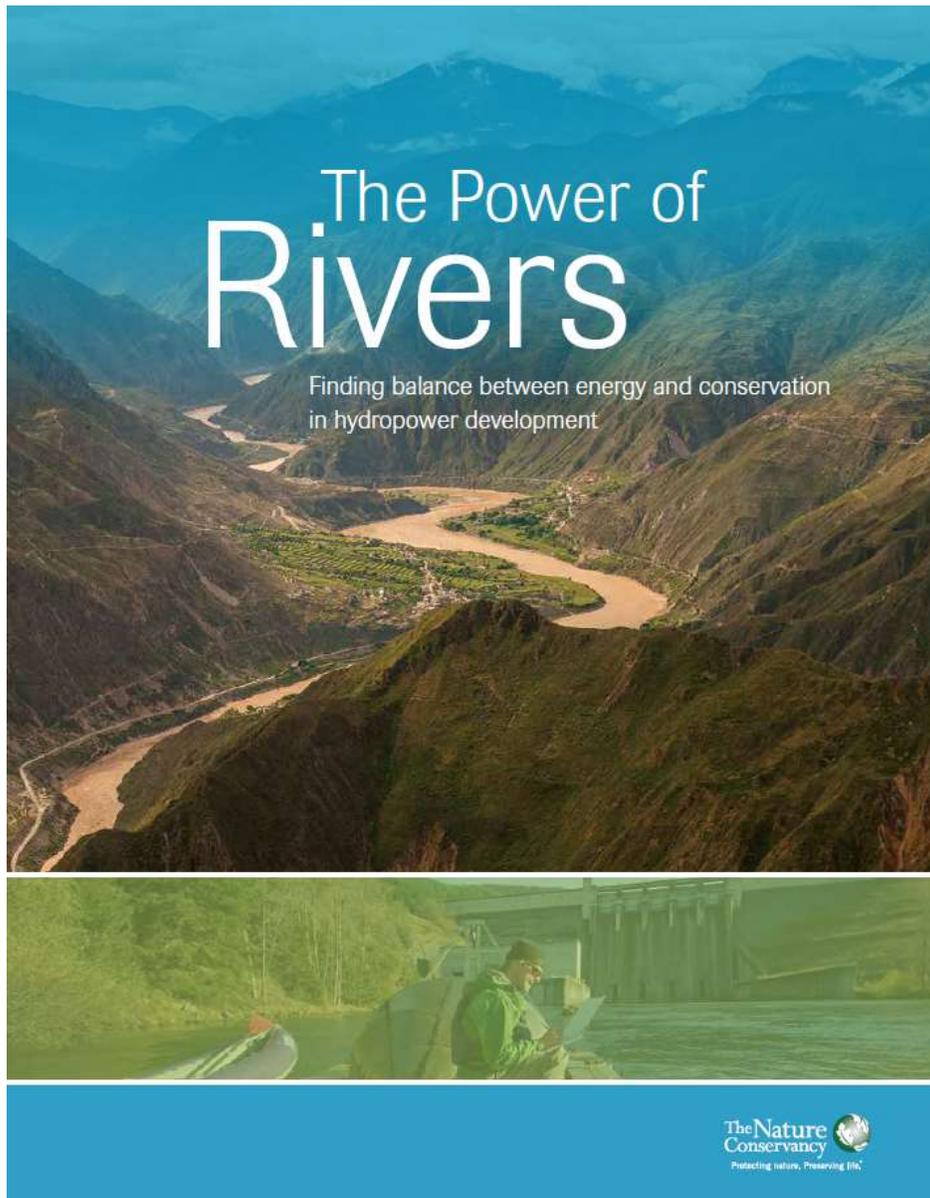


Global Social Impacts



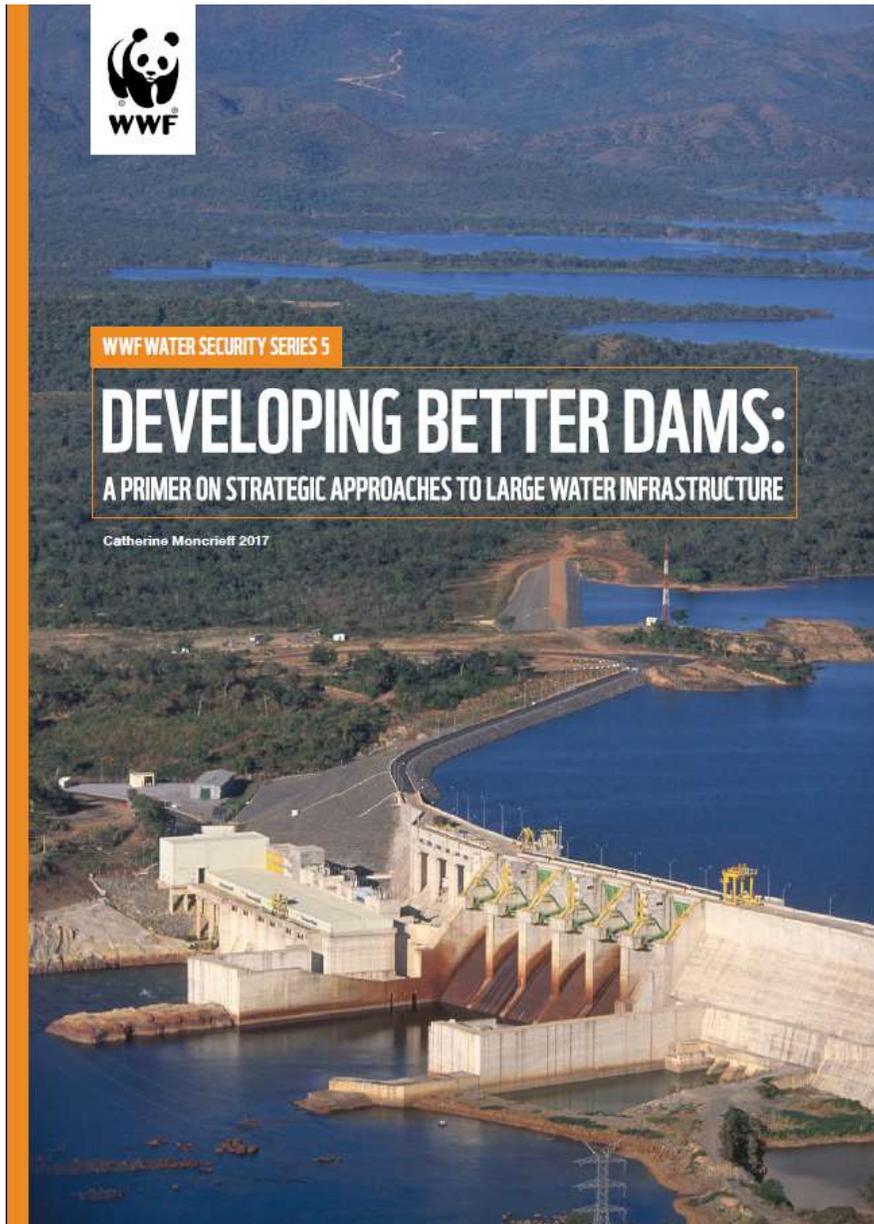
During 20 years since WCD

- Debate has continued and perhaps intensified rather than abated.
- Dam construction slowed in the decade after WCD but now anticipated to rapidly increase. Partly driven by increasing CC concerns assoc with fossil fuels.
- Bank adopted a "high risks/high rewards" strategy and mantra shifted from "doing dams right" (engineering focus) to "doing the right dams" (planning and impact mitigation focus).
- But globally, many new dams are not being planned using WCD approach and thus controversies around negative social and env impacts of dams continue. And evidence of impacts is growing.
- Also however, in the developed world, a rapid increase in dam removal: partly age, partly safety, partly redundancy, partly social and env impacts.
- Significant post WCD literature. See:
 - *Water Alternatives (2010) Special Issue: WCD+10: Revisiting the Large Dam Controversy*
 - *Schultz & Adams (2019) Debating dams: The World Commission on Dams 20 years on. WIRES Water.*



TNC (2015)

- Risks:
 - HEP dams planned and under construction will **impact 300,000 km of rivers**
 - Impacts will occur in river basins with the greatest freshwater fish harvests. ~70% of affected river length in ecoregions with greatest fish diversity
- HEP by Design
 - **Avoid** the most damaging sites; focus on sites with lower impacts
 - **Minimize** impacts and **restore** key processes through better design and operation
 - **Offset** impacts that can't be avoided, minimized, or restored – compensation schemes and mgt of nearby rivers
 - Increase in overall investment costs ~15% - total global cost ~US\$3 B/yr between 2015 and 2040.



- Dams aren't always an optimal development solution
- System-scale planning delivers greater benefits to society.
- In a rapidly changing world, dams must be adaptable (*Decision Making Under Deep Uncertainty*).
- E-flows and river connectivity should be prioritized to safeguard aquatic biodiversity and ecosystem services.
- Planning most effective with meaningful participation of all stakeholders
- Governance reform often required for dams to effectively balance societal interests
- Reducing adverse environmental and social impacts also requires meaningful impact assessments at the project scale.
- Several tools exist for assessing and reducing the environmental, social and financial risks of dam projects.
- System-scale analysis of existing dams can optimize benefits, reduce impacts and facilitate responses to climate change, societal needs and economic development imperatives.
- Removal should be considered where obsolete or inefficient dams are preventing the restoration of ecosystems and/or having negative impacts on communities.

WWF (2015)



GOOD PRACTICE HANDBOOK

Environmental Flows for Hydropower Projects

Guidance for the Private Sector in Emerging Markets



- Eflows for Hydropower Projects: Guidance for the Private Sector in Emerging Markets
- Decision approach to selecting eflow methods
- Guidance on WB social and environmental safeguards – old and new
- Guidance different eflow and other assessment methods
- Eflows in an **impact mitigation hierarchy**
- Implementation & adaptive management

WBG (2019)