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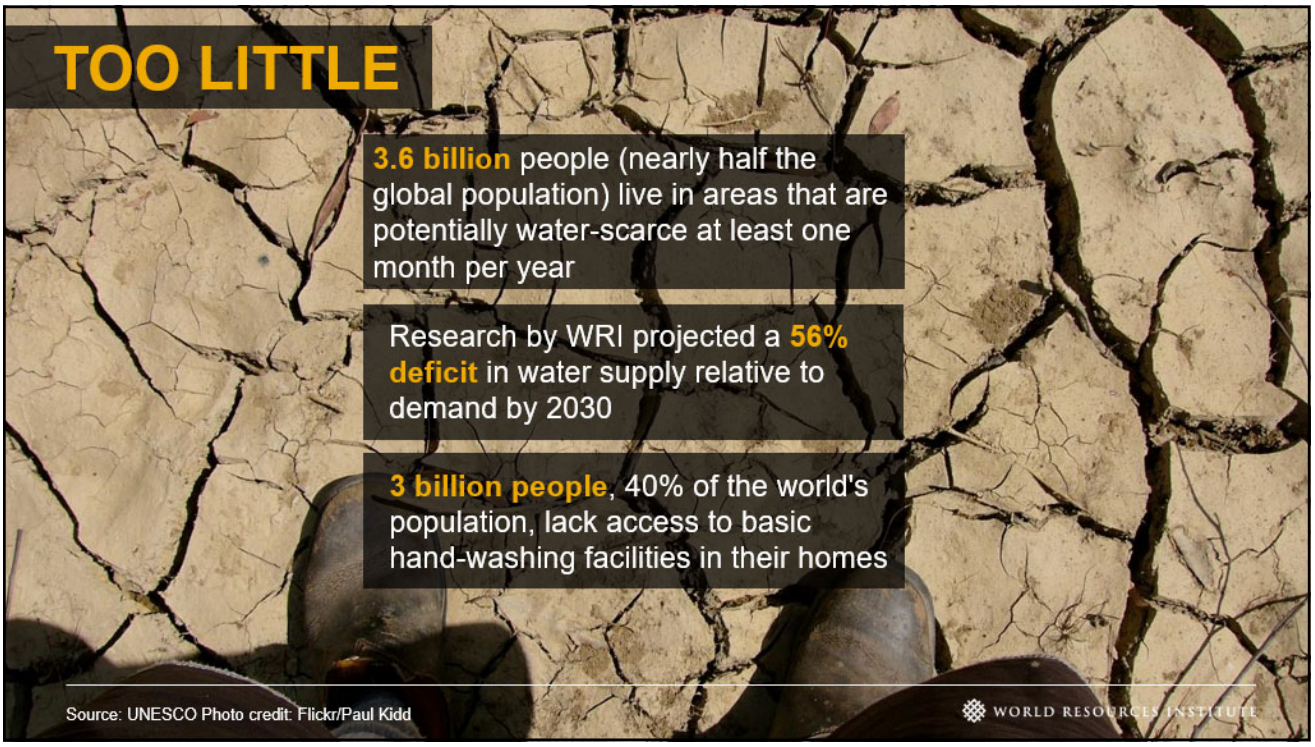
TOO LITTLE
3.6 billion people (nearly half the global population) live in areas that are potentially water-scarce at least one month per year
Research by WRI projected a 56% deficit in water supply relative to demand by 2030
3 billion people, 40% of the world's population, lack access to basic hand-washing facilities in their homes
Source: UNESCO Photo credit: Flickr/Paul Kidd
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TOO MUCH
WRI's Aqueduct Floods finds that the number of people affected by floods will double worldwide by 2030
The amount of urban property damaged by riverine floods will increase threefold by 2030
Urban property damaged by coastal storm surge and sea level rise will increase tenfold by 2030
Photo: Flickr/Sudipto Das
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AQUEDUCT

The Aqueduct™ tools enable users to measure, map, and mitigate water risks around the world. Aqueduct's data is used to evaluate water risks, set targets, inform smart water policies, and assess the costs and benefits of water management strategies. Beyond the tools, the Aqueduct team works one-on-one with companies, governments, and research partners to help advance best practices in water resources management and enable sustainable growth in a water-constrained world.

WRI'S THEORY OF CHANGE

COUNT IT → CHANGE IT → SCALE IT

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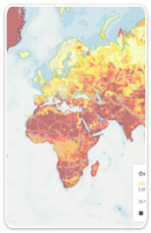
THE AQUEDUCT PROJECT

Mapping and measuring global water risks



Aqueduct Water Risk Atlas

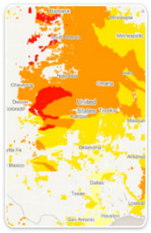
Map and analyze current and future water risks across locations.

Launch Tool

Aqueduct Country Rankings

Understand and compare national and sub-national water risks.

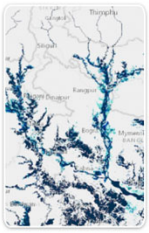
Launch Tool



Aqueduct Food

Understand and identify current and future water risks to agriculture and food security.

Launch Tool



Aqueduct Floods

Identify coastal and riverine flood risks, and analyze the costs and benefits of investing in flood protection.

Launch Tool

Aqueduct website: https://www.wri.org/aqueduct/

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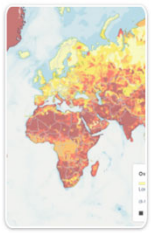
THE AQUEDUCT PROJECT

Mapping and measuring global water risks



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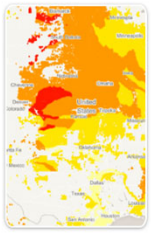

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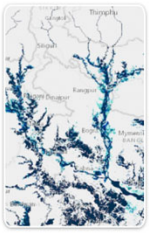

Aqueduct Floods

Identify coastal and riverine flood risks, and analyze the costs and benefits of investing in flood protection.

Launch Tool

Aqueduct website: https://www.wri.org/aqueduct/

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AQUEDUCT FLOODS PARTNERS

Government of the Netherlands

Deltares

IVM Institute for Environmental Studies VU

Universiteit Utrecht

PBL Netherlands Environmental Assessment Agency

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AQUEDUCT FLOODS – KEY OFFERS

1. **Hazard** – global riverine and coastal inundation maps by return period, for now and the future
2. **Risk** – flood risks in urban damage, affected GDP and population by country, by state, and by river basin
3. **Cost-benefit analysis** – evaluating the costs and benefits of dykes for riverine flood protection at a strategic level *[returning early 2022]*

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AQUEDUCT FLOODS FEATURES

- **Riverine** and **coastal** flood risk
  - Current and future
  - climate change & socioeconomic growth
  - sea level rise & subsidence
- Existing flood protection levels per state
- Costs & benefits of adapting to riverine flood risk

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AQUEDUCT FLOODS DEMO

Analyst at a development bank

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PAKISTAN FLOODING IN THE NEWS

Pakistan floods 'hit 14m people'

BBC NEWS

6 August 2010

New Devastating Pakistan Floods

The Atlantic

ALAN TAYLOR | SEPTEMBER 20, 2011 | 36 PHOTOS | IN FOCUS

More than 130 dead as avalanches and floods hit Pakistan and Afghanistan

The Guardian

Agence France-Presse

Tue 14 Jan 2020 20.38 EST

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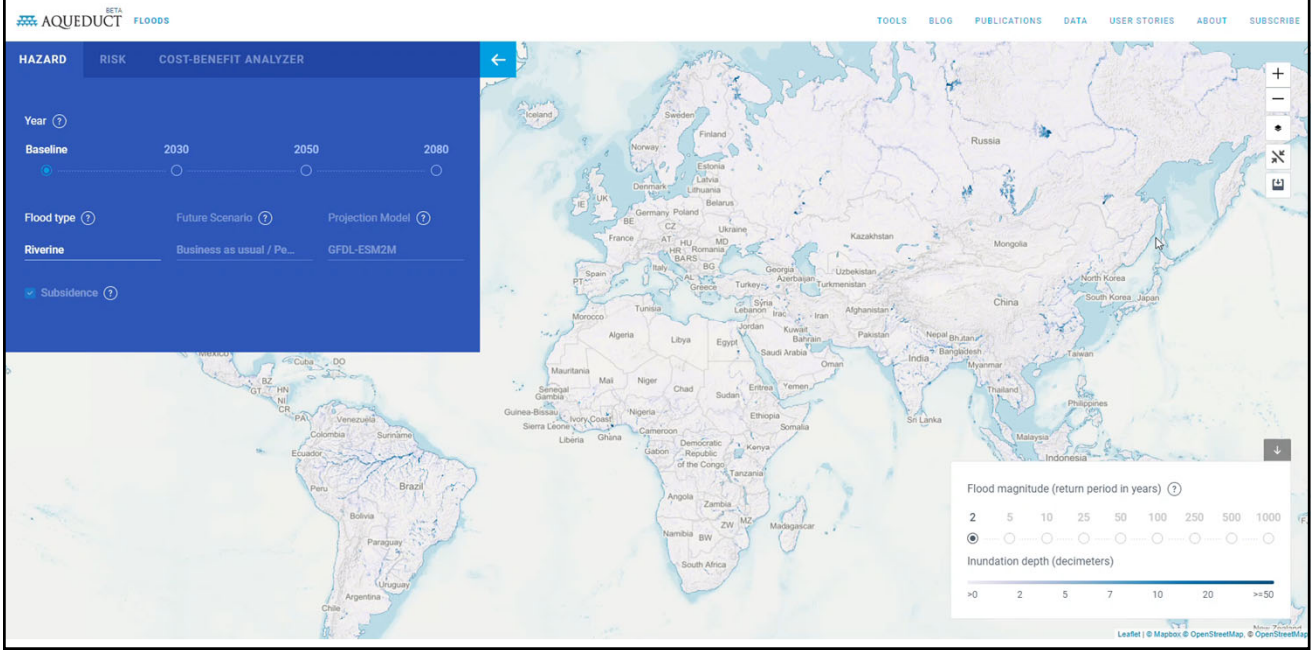
AQUEDUCT FLOODS: HAZARD



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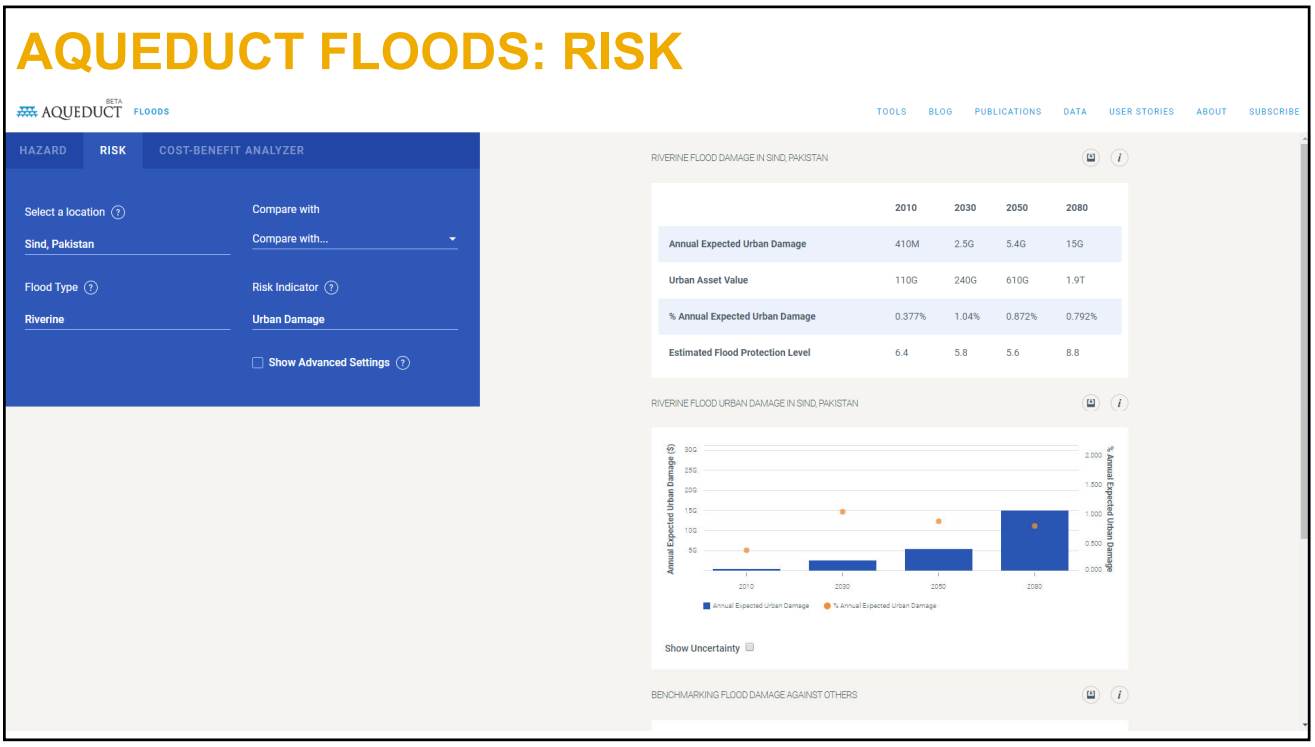
AQUEDUCT FLOODS: RISK



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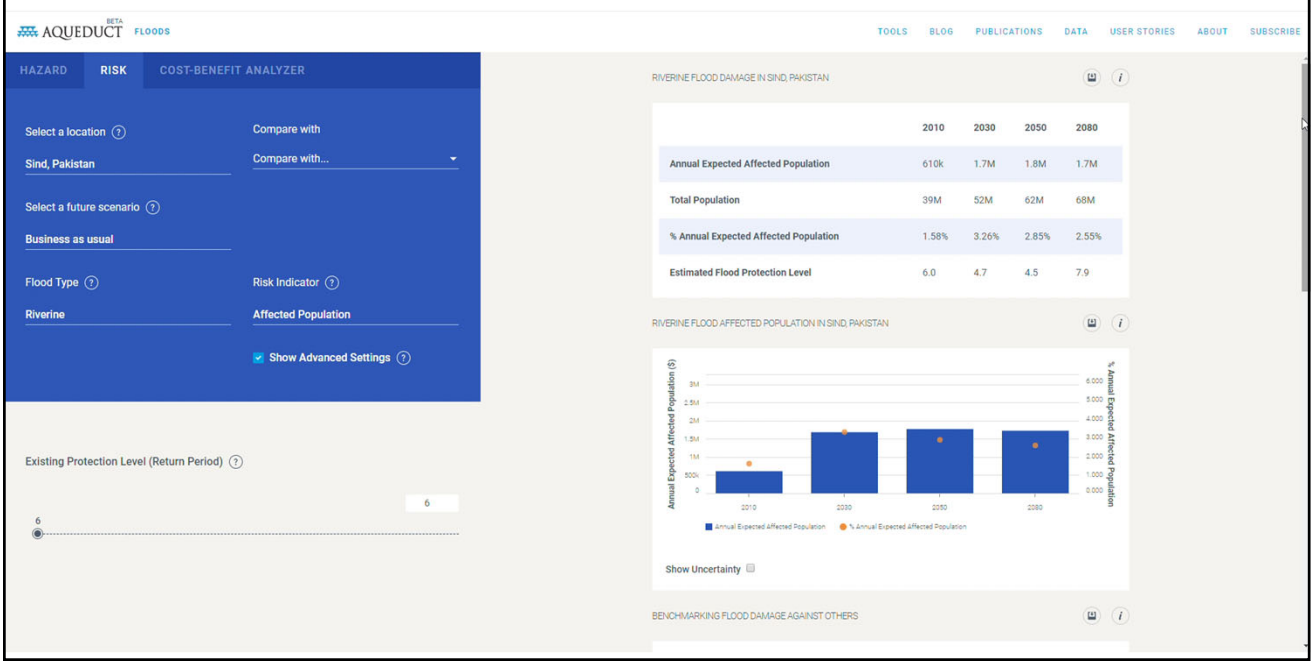
AQUEDUCT FLOODS: RISK



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AQUEDUCT FLOODS: RISK

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AQUEDUCT FLOODS LEVEE BENEFIT CALCULATION

Benefits

=

economic risk ($) **with no** adaptation

-

economic risk ($) **with** adaptation

Slide credit: Philip Ward, IVM

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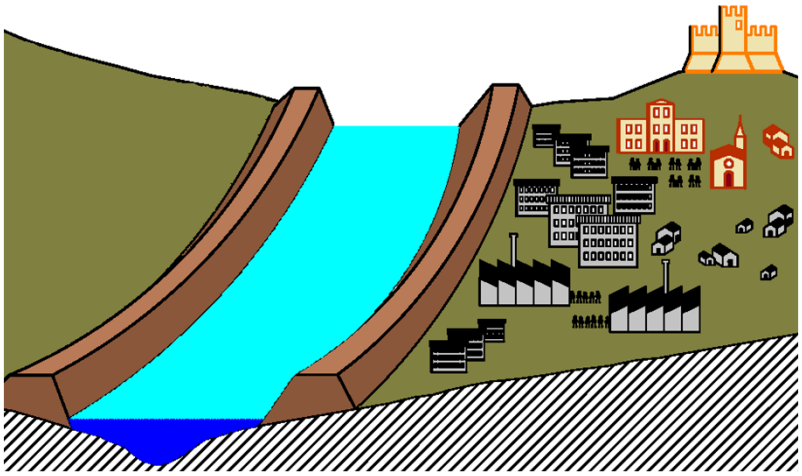
AQUEDUCT FLOODS LEVEE COST CALCULATION



Construction Costs
=
required levee height
x
required levee lengths
x
unit costs

+ maintenance costs!

See:
- Di Baldassarre et al., 2018

See:
- Ward et al., 2013
- Winsemius et al., 2013

Slide credit: Philip Ward, IVM

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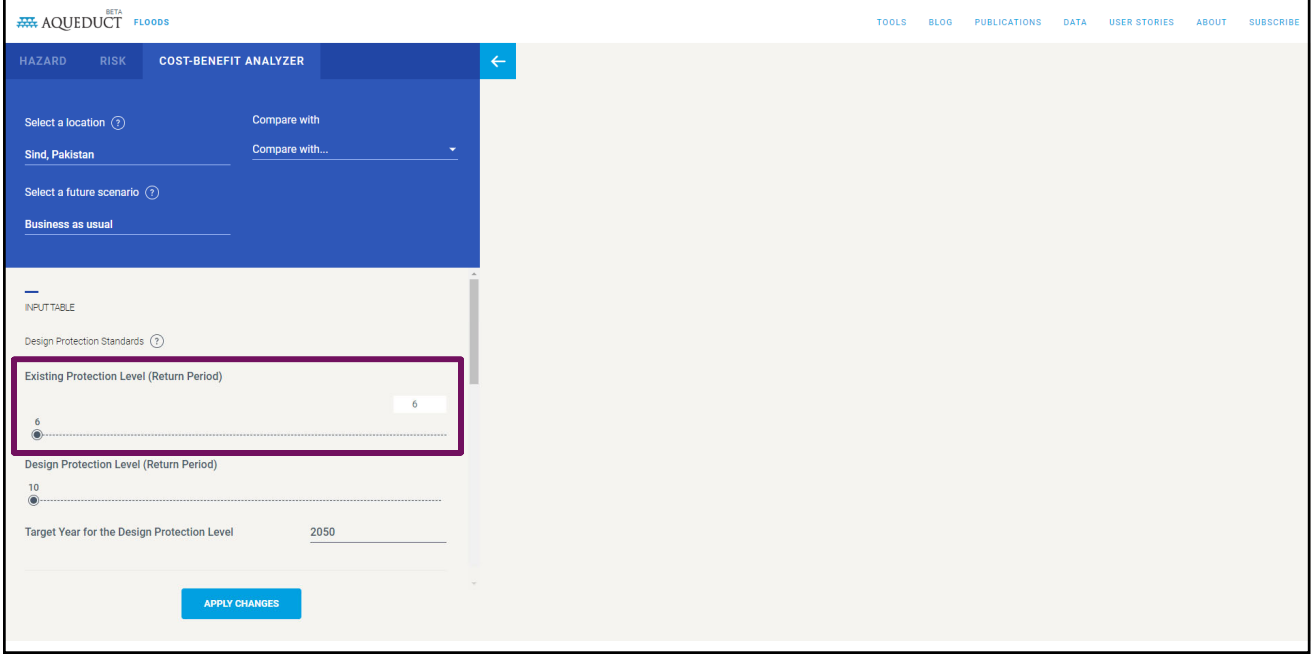
AQUEDUCT FLOODS: COST-BENEFIT ANALYZER



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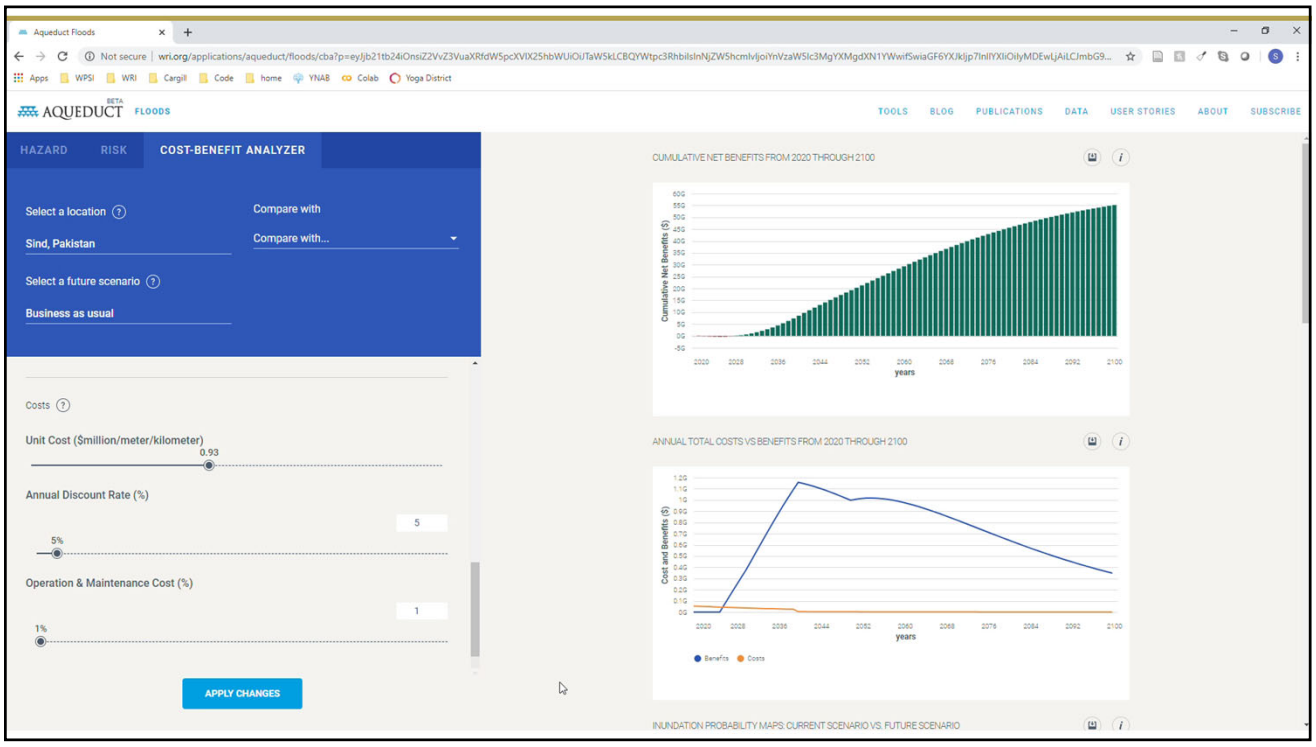

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AQUEDUCT FLOODS DEMO

Analyst at a development bank

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CITATIONS

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- Erkens et al., 2015. Proceedings of the IAHS, doi:10.5194/piahs-372-189-2015
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- Winsemius et al., 2016. Nature Climate Change, doi:10.1038/nclimate2893

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APPENDIX

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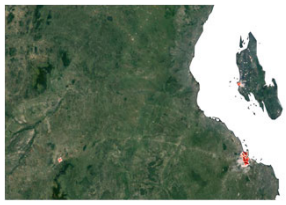
AQUEDUCT FLOODS RISK CALCULATION

STEP 1:

HAZARD

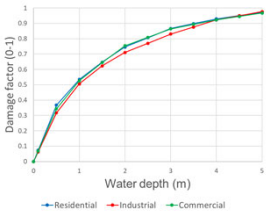
100 year flood depth

EXPOSURE



Population density

VULNERABILITY



Flood depth-damage function

Impacts per return period

$ / affected people / affected GDP

See:
- Ward et al., 2013
- Winsemius et al., 2013

Slide credit: Philip Ward, IVM

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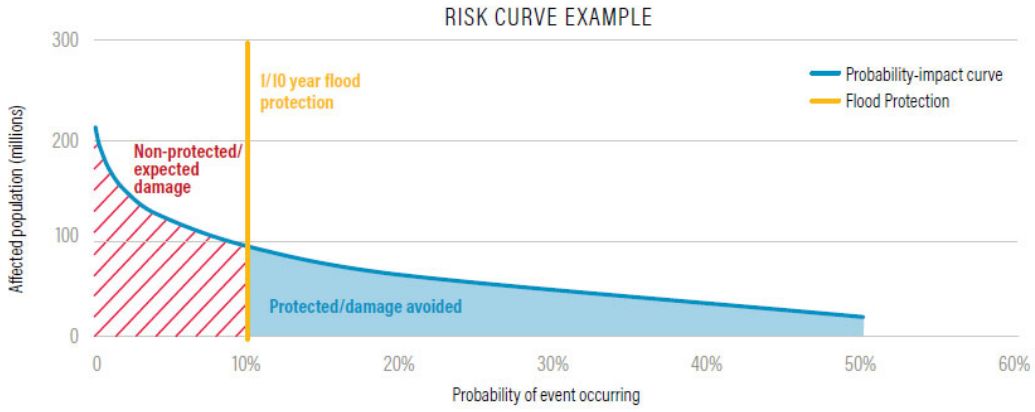
AQUEDUCT FLOODS RISK CALCULATION

STEP 2: Expected Annual Impacts
(e.g. EAD)



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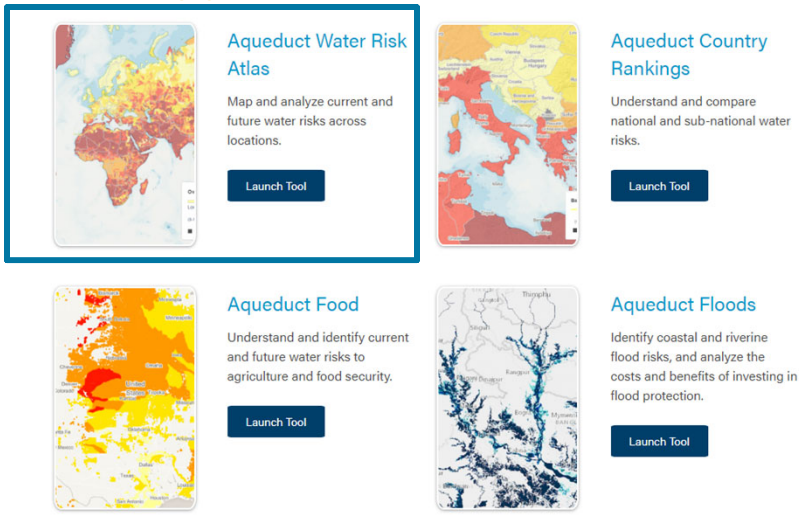
Mapping and measuring global water risks



Aqueduct website: https://www.wri.org/aqueduct/

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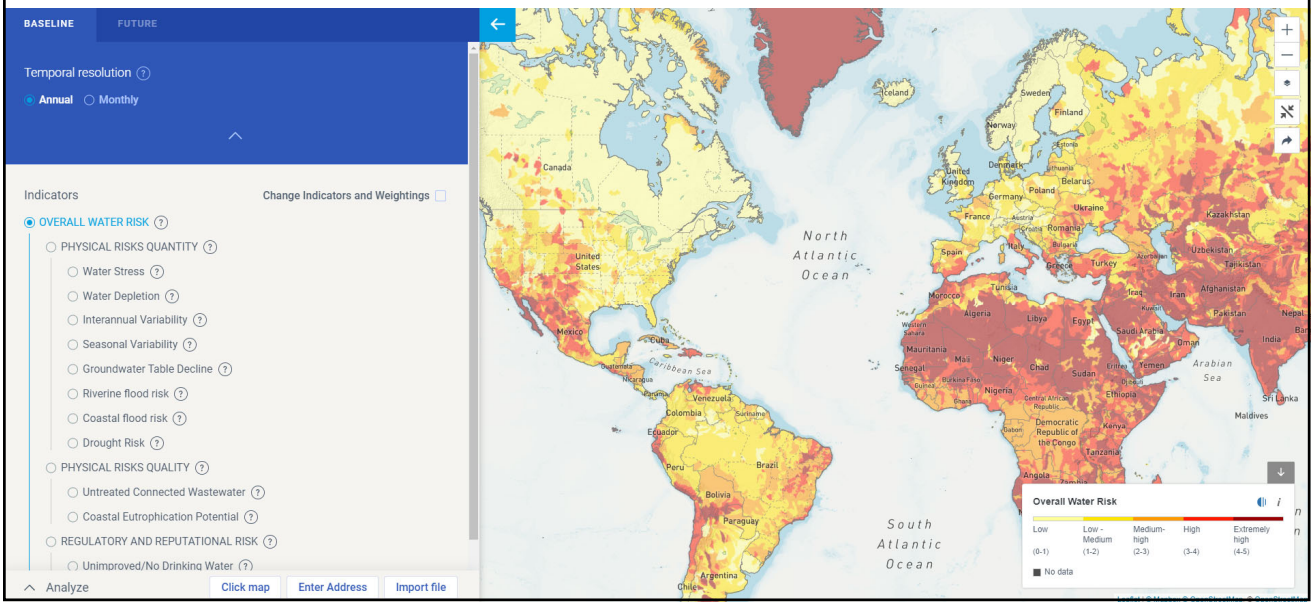
AQUEDUCT WATER RISK ATLAS 3.0



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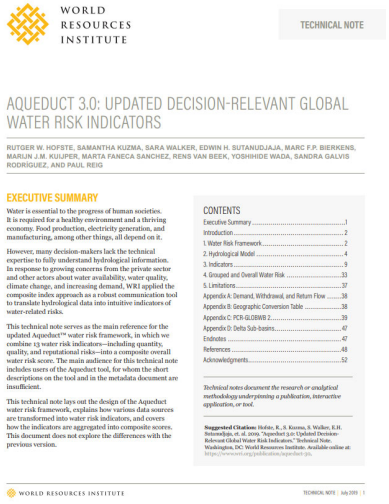
DATA & METHODOLOGY



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TECHNICAL NOTE

AQUEDUCT 3.0: UPDATED DECISION-RELEVANT GLOBAL WATER RISK INDICATORS

RUTGER W. HOFSTE, SAMANTHA KUZMA, SARA WALKER, EDWIN H. SUTANUDJAJA, MARC F.P. BIERKENS, MARLIN J.M. KUILPER, MARTA FANECA SANCHEZ, RENS VAN BEEK, YOSHIHIDE WADA, SANDRA GALVIS RODRÍGUEZ, AND PAUL REIG

EXECUTIVE SUMMARY

Water is essential to the progress of human societies. It is required for a healthy environment and a thriving economy. Food production, electricity generation, and manufacturing, among other things, all depend on it.

However, many decision-makers lack the technical expertise to fully understand hydrological information. In response to growing concerns from the private sector and other actors about water availability, water quality, climate change, and increasing demand, WRI applied the composite index approach as a robust communication tool to translate hydrological data into intuitive indicators of water-related risks.

This technical note serves as the main reference for the updated Aqueduct™ water risk framework, in which we combine 13 water risk indicators—including quantity, quality, and reputational risks—into a composite overall water risk score. The main audience for this technical note includes users of the Aqueduct tool, for whom the short descriptions on the tool and in the metadata document are insufficient.

This technical note lays out the design of the Aqueduct water risk framework, explains how various data sources are transformed into water risk indicators, and covers how the indicators are aggregated into composite scores. This document does not explore the differences with the previous version.

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Technical notes document the research or analytical methodology underpinning a publication, interactive application, or tool.

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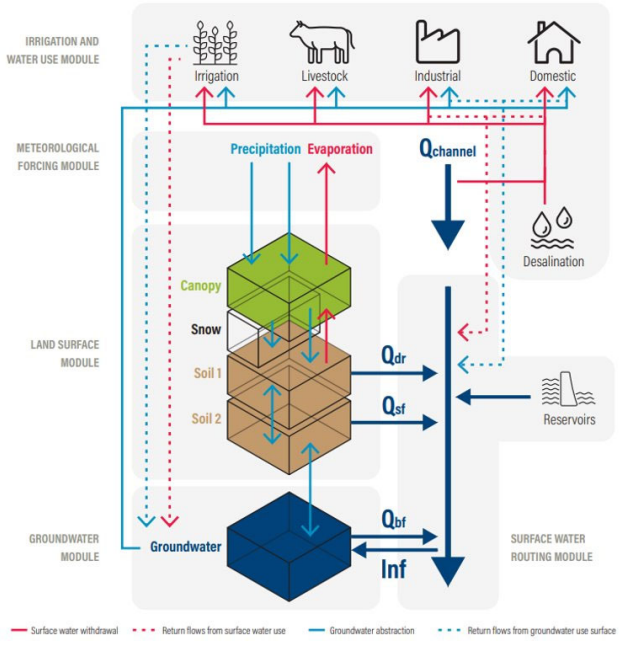

Aqueduct 3.0 Technical Methodology

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FRAMEWORK

Overall Water Risk

Physical Risk QUANTITY	Physical Risk QUALITY	Regulatory & Reputational Risk
• Baseline Water Stress • Baseline Water Depletion • Inter-annual Variability • Seasonal Variability • Groundwater Table Decline • Riverine Flood Risk • Coastal Flood Risk • Drought Risk	• Untreated Connected Wastewater • Coastal Eutrophication Potential	• Unimproved/No Drinking Water • Unimproved/No Sanitation • Peak RepRisk Country ESG Risk Index

Aqueduct 3.0 Technical Methodology

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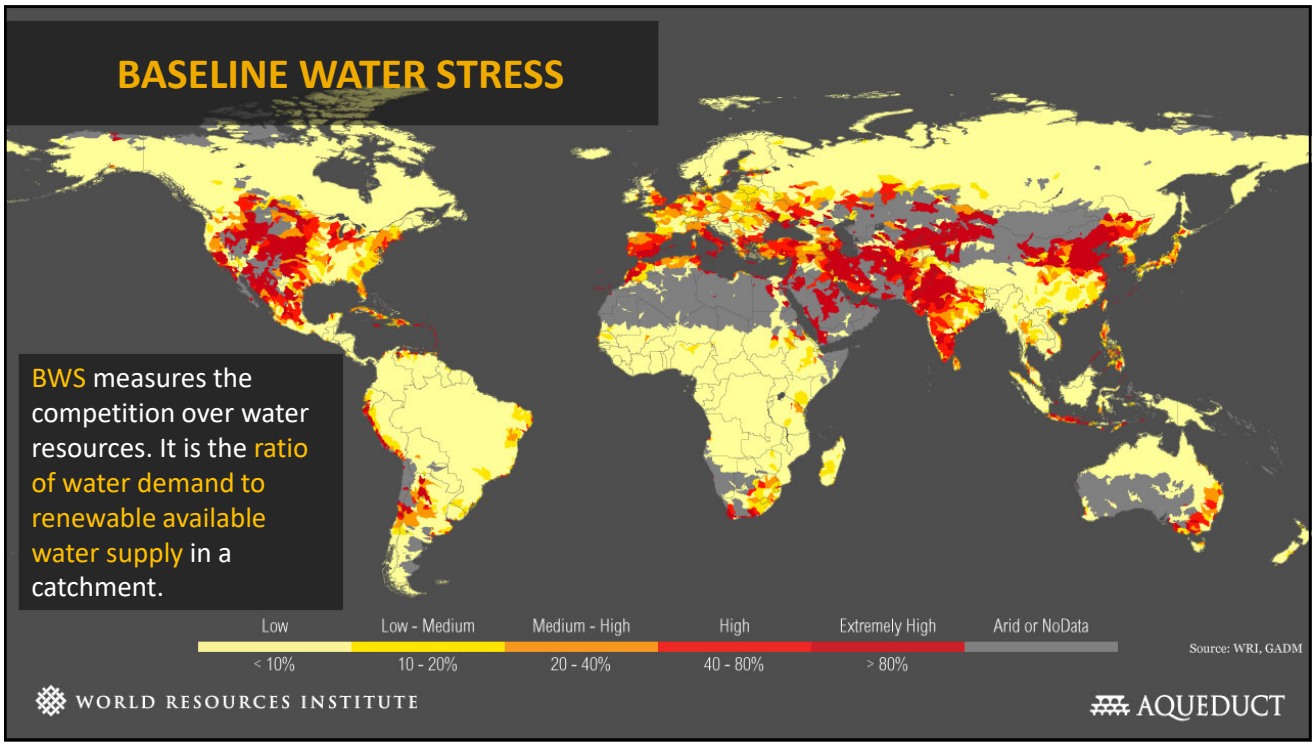

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