WORLD RESOURCES INSTITUTE

NATURAL INFRASTRUCTURE FOR WATER

Identifying Opportunities to Reduce Environmental Degradation and Increase Water Security

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The World Resources Institute is a Global Environmental Think-Tank

NATURAL INFRASTRUCTURE FOR WATER

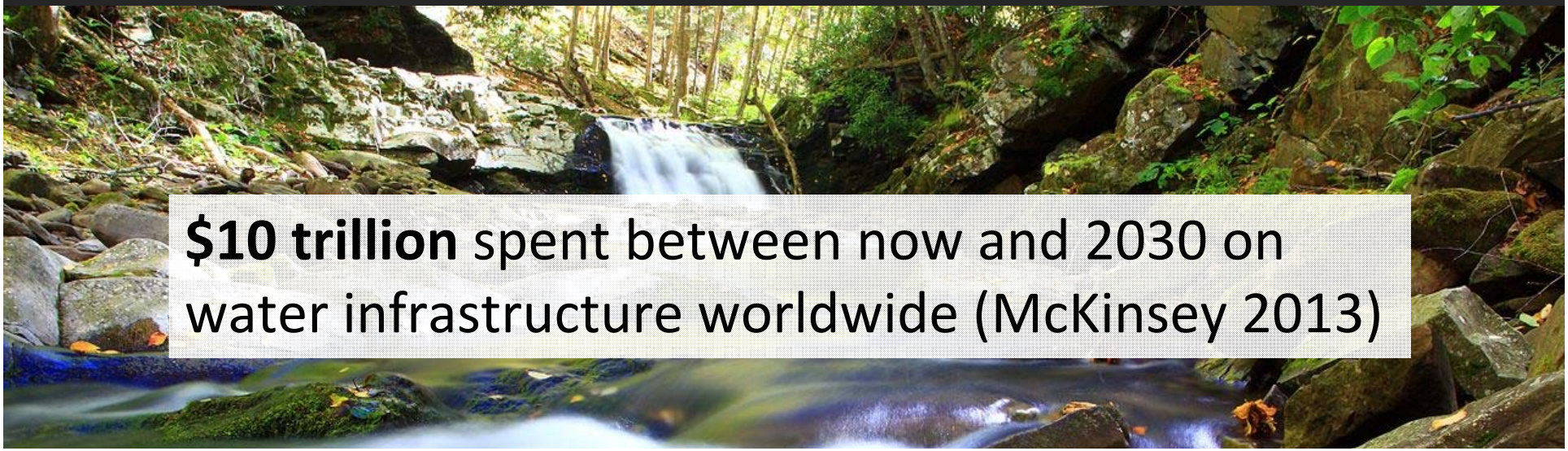
Forests
Wetlands
Floodplains

=

Clean Water &
Reduced
Flood Risk
@ lower cost

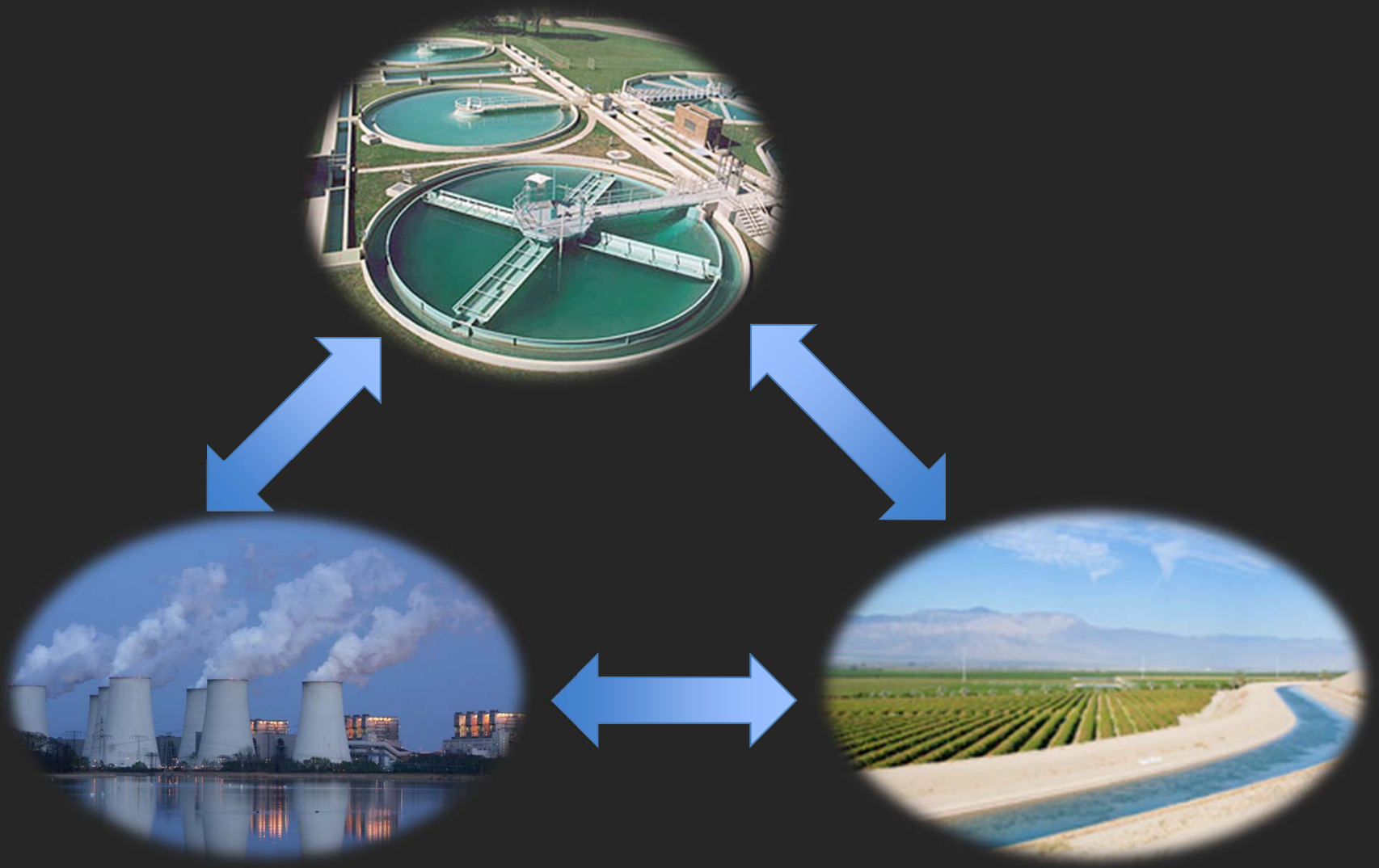
+

Sequestered Carbon
Habitat
Resilient Communities
Recreation
Clean Air
Rural Livelihoods



$10 trillion spent between now and 2030 on water infrastructure worldwide (McKinsey 2013)

NEXUS INFRASTRUCTURE IN THE NEXUS



BENEFITS OF NATURAL VERSUS GREY INFRASTRUCTURE

Grey infrastructure	Natural infrastructure
1. Costly • Expected $10 trillion in water infrastructure alone 2013-2030 • Limited lifespan	**Potentially cost-effective** • Reduces capital costs • Reduces O&M costs • Increases lifespan of built
2. Single purpose, single sector	**Multi-purpose, collaborative**
3. Difficult to adapt • Particularly in relation to climate change • Changed stakeholder preferences	**"Soft path" approach** • Can be reversed/removed • Natural adaptation capacity • No regrets

CHALLENGES TO SCALING NATURAL INFRASTRUCTURE INVESTMENTS

- Institutional inertia and knowledge gaps
- Lack of capacity to quantify the opportunity
- Long time horizons – not aligned with incentives
- Transaction costs – outside fence line
- Insufficient financing mechanisms

INCREASING INVESTMENTS IN NATURAL INFRASTRUCTURE: WRI'S APPROACH

COUNT IT:

- **Identify and map water and ecosystem risks and opportunities**
- **Overlay with nexus elements, assets and beneficiaries**

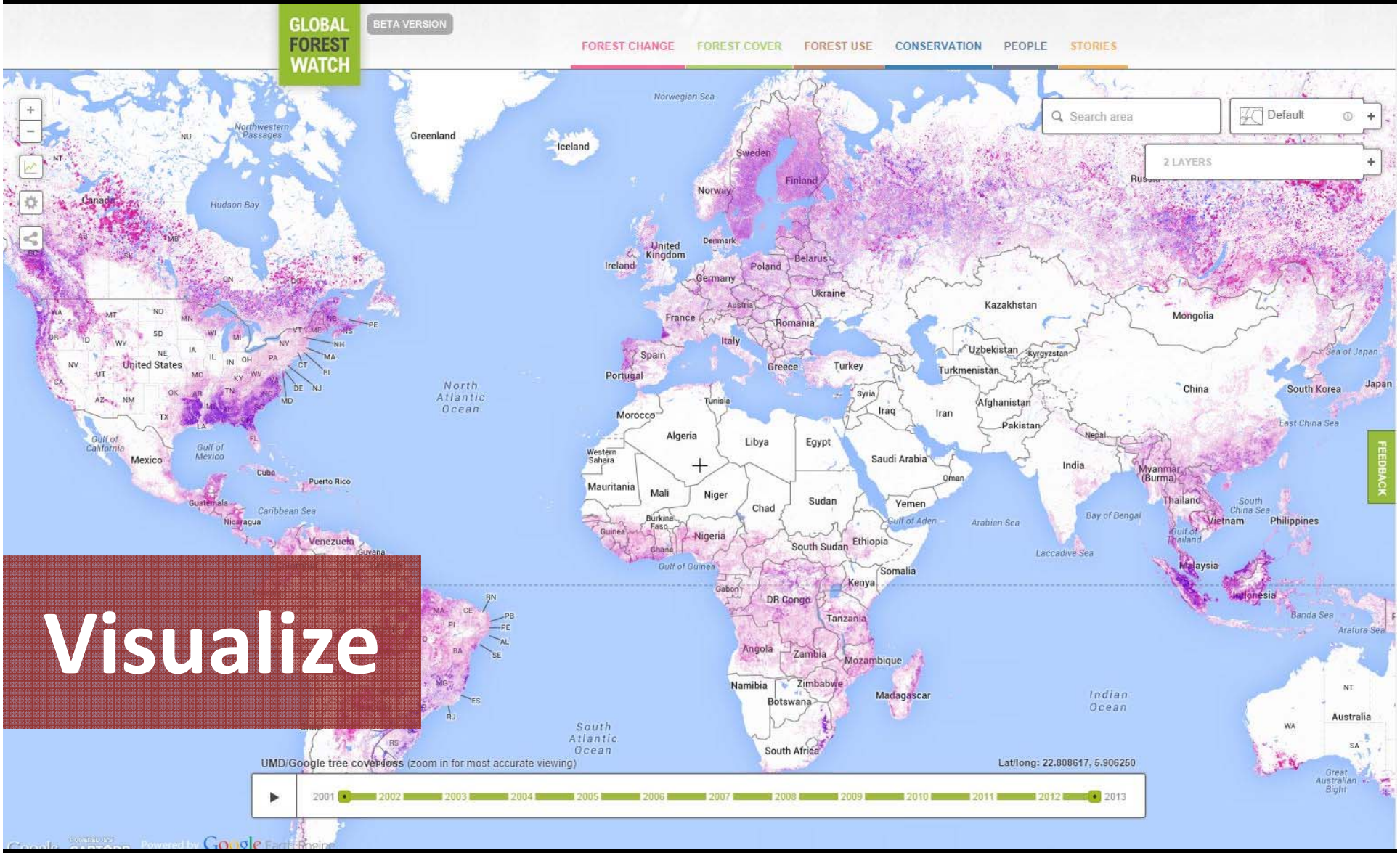
CHANGE IT:

- **Mobilize and equip champions (audience)**
- **Making the case**
- **Advance needed policies, incentives, and design elements**

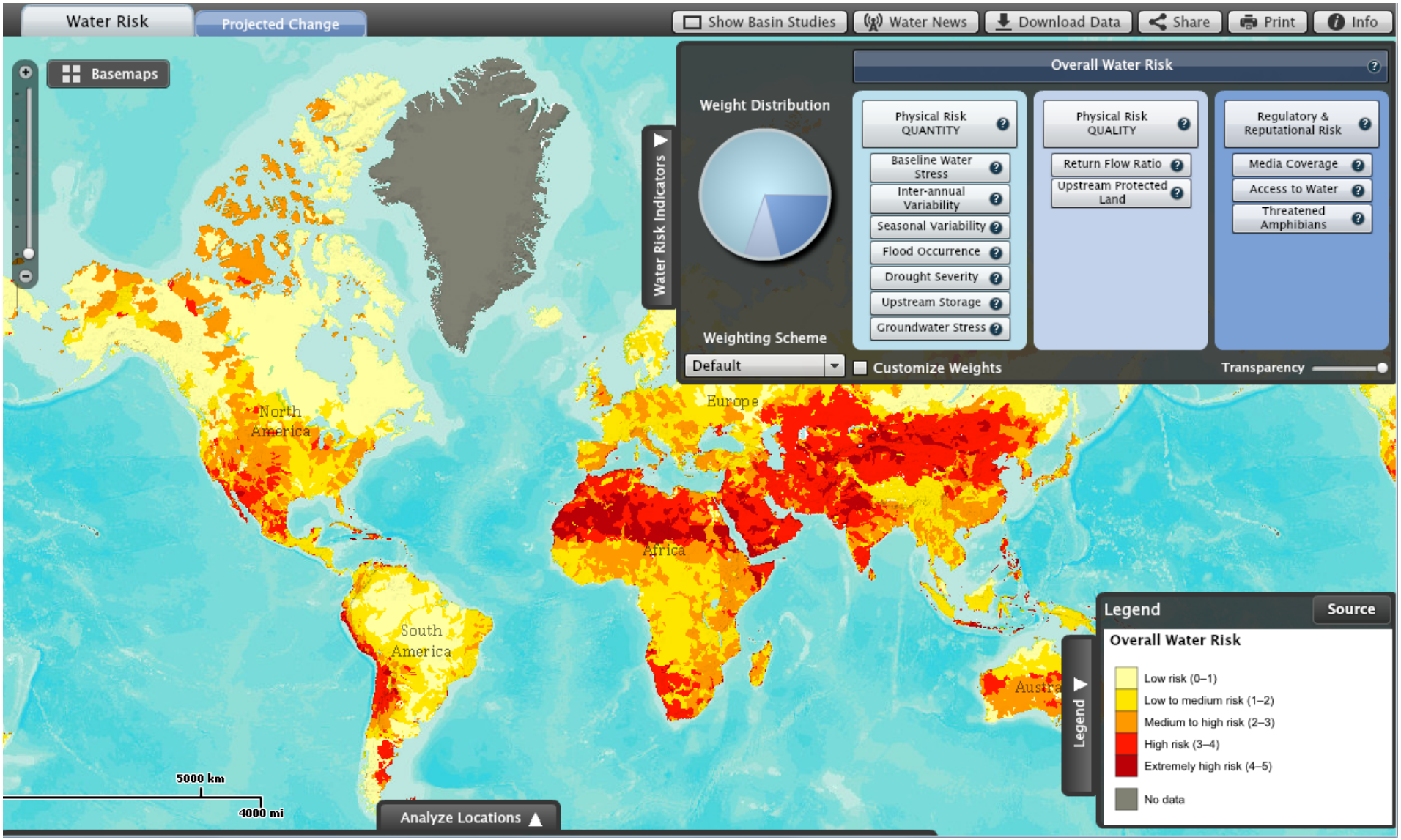
SCALE IT:

- **Governments, Municipalities, and Utilities**
- **Development Banks and Networks: IDB, WRI Country Offices, IWA**
- **Businesses: FEMSA, Shell, Aqueduct Alliance, WBCSD, others**

REAL TIME DEFORESTATION



GLOBAL WATER RISK MAPPING – 15,000 CATCHMENTS



AQUEDUCT

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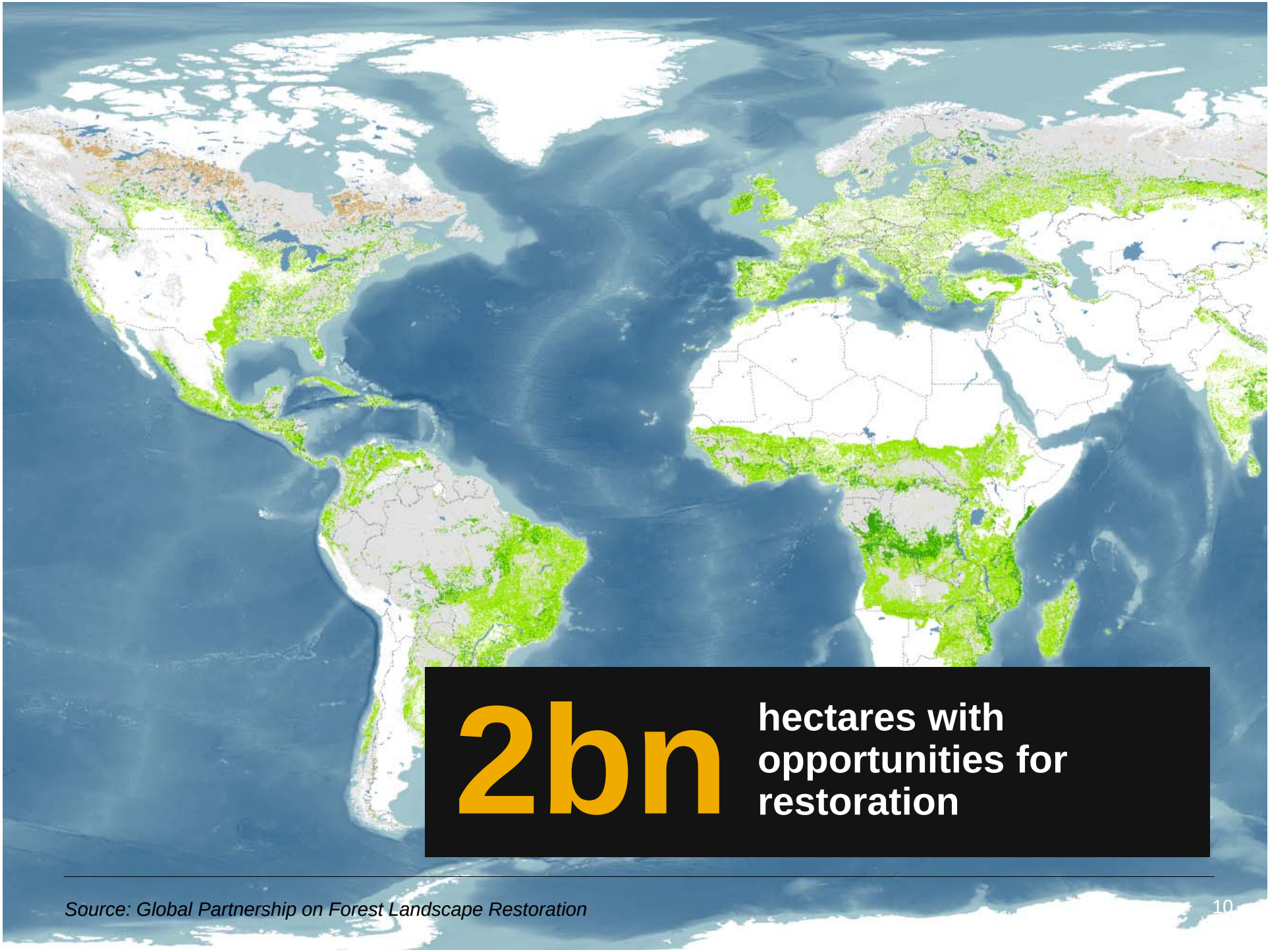


Source: Global Partnership on Forest Landscape Restoration

COUNT IT: IDENTIFYING AND MAPPING RISKS AND OPPORTUNITIES

DAR ES SALAAM: Watershed risk

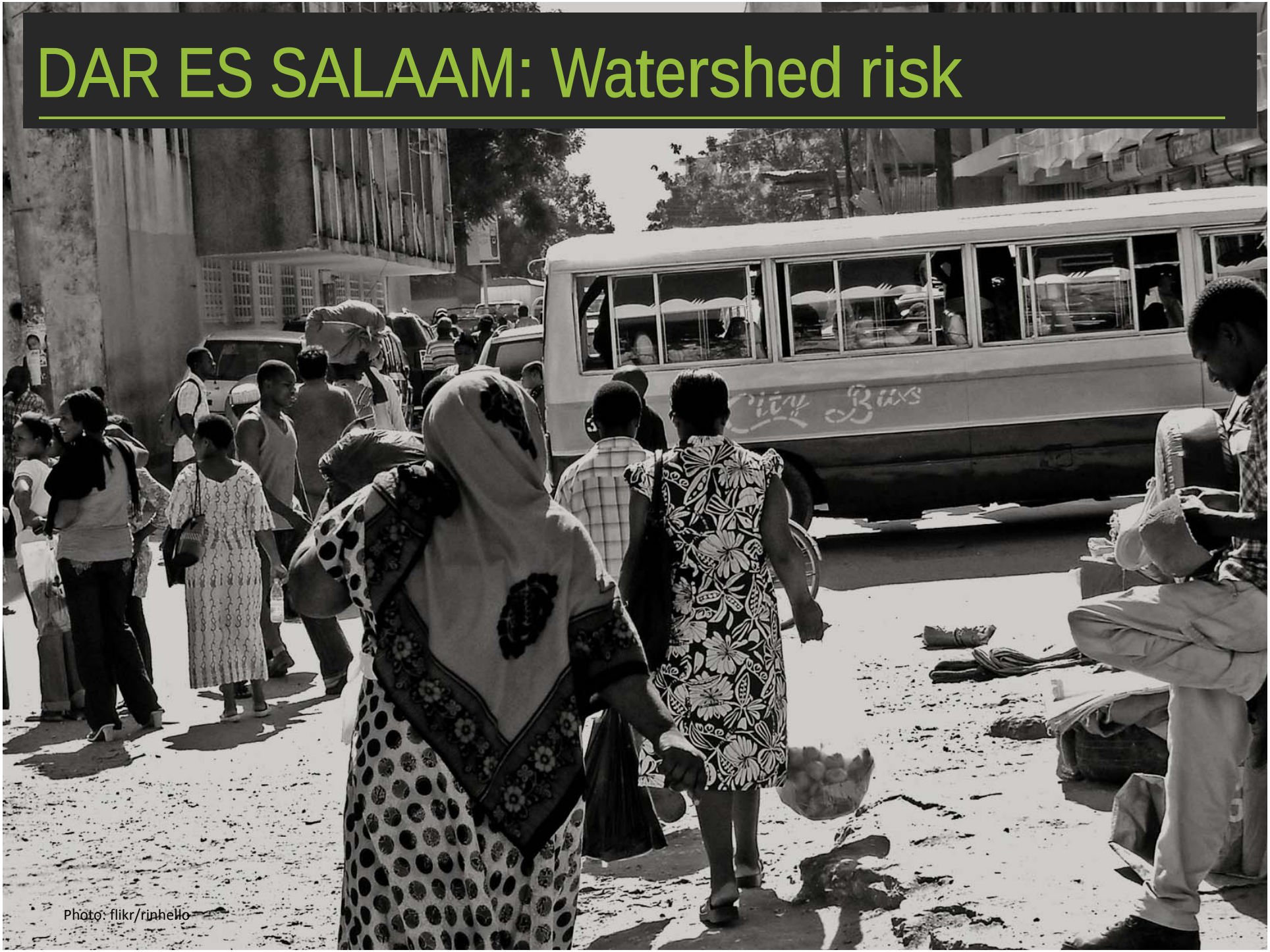
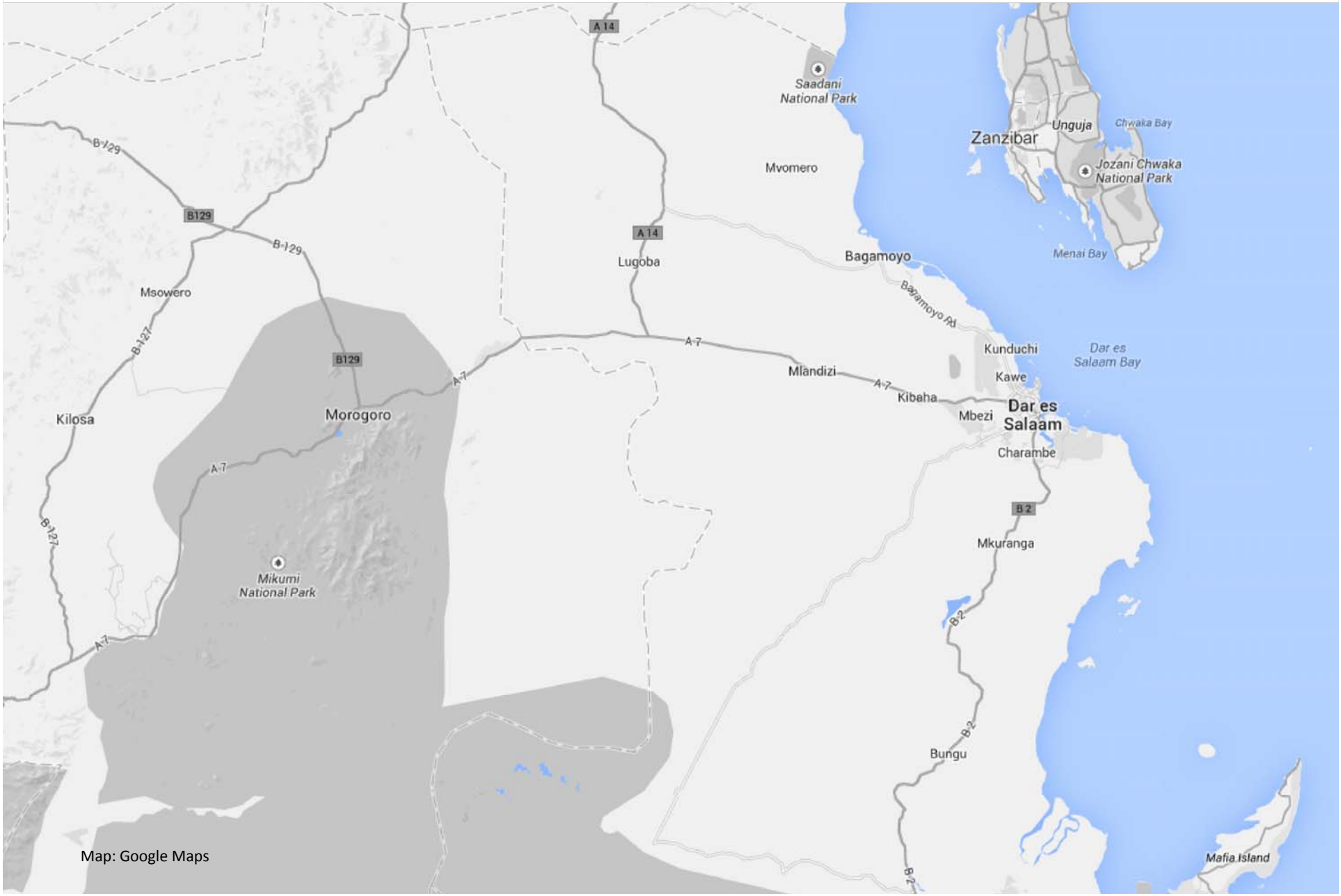
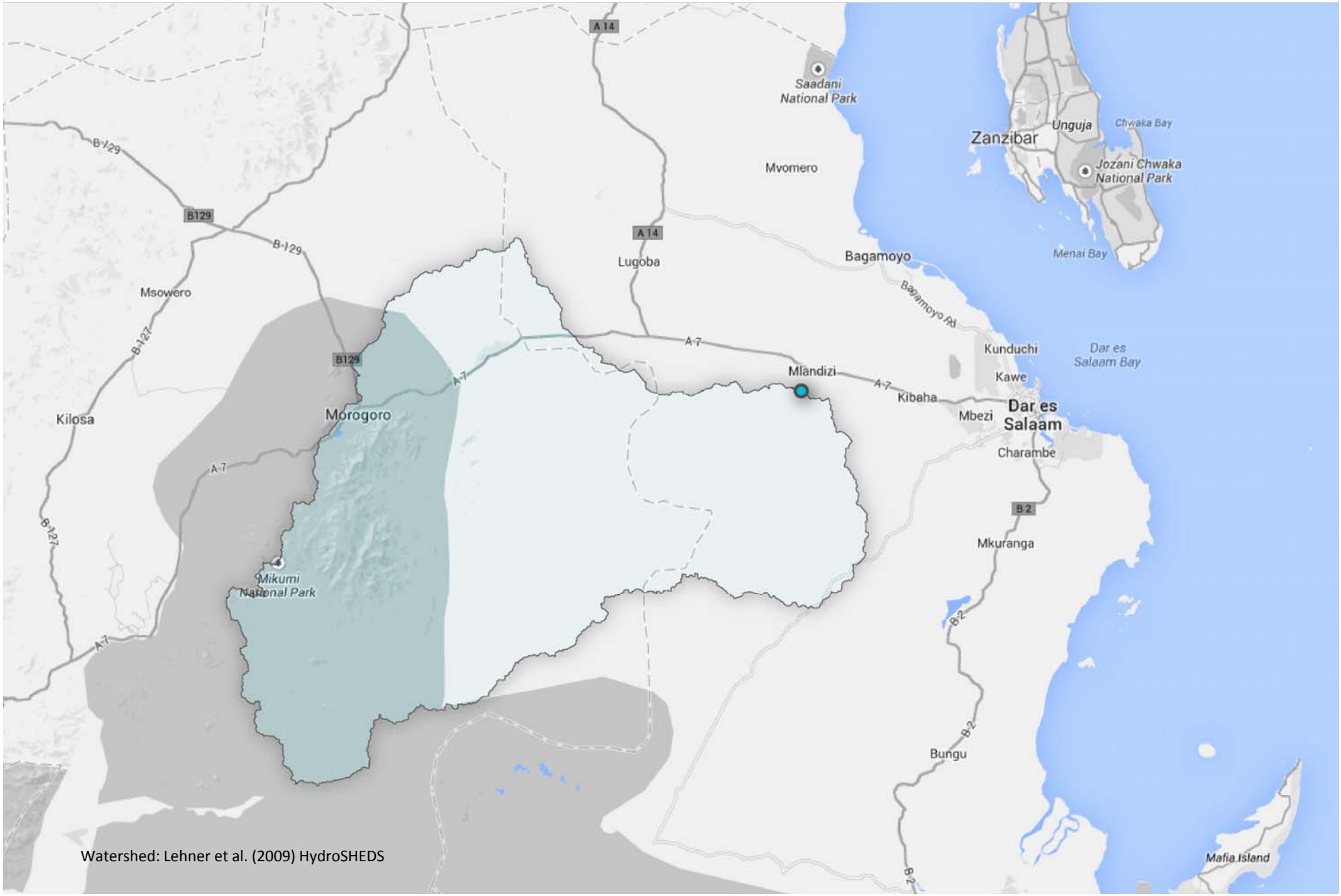


Photo: flikr/rinhello



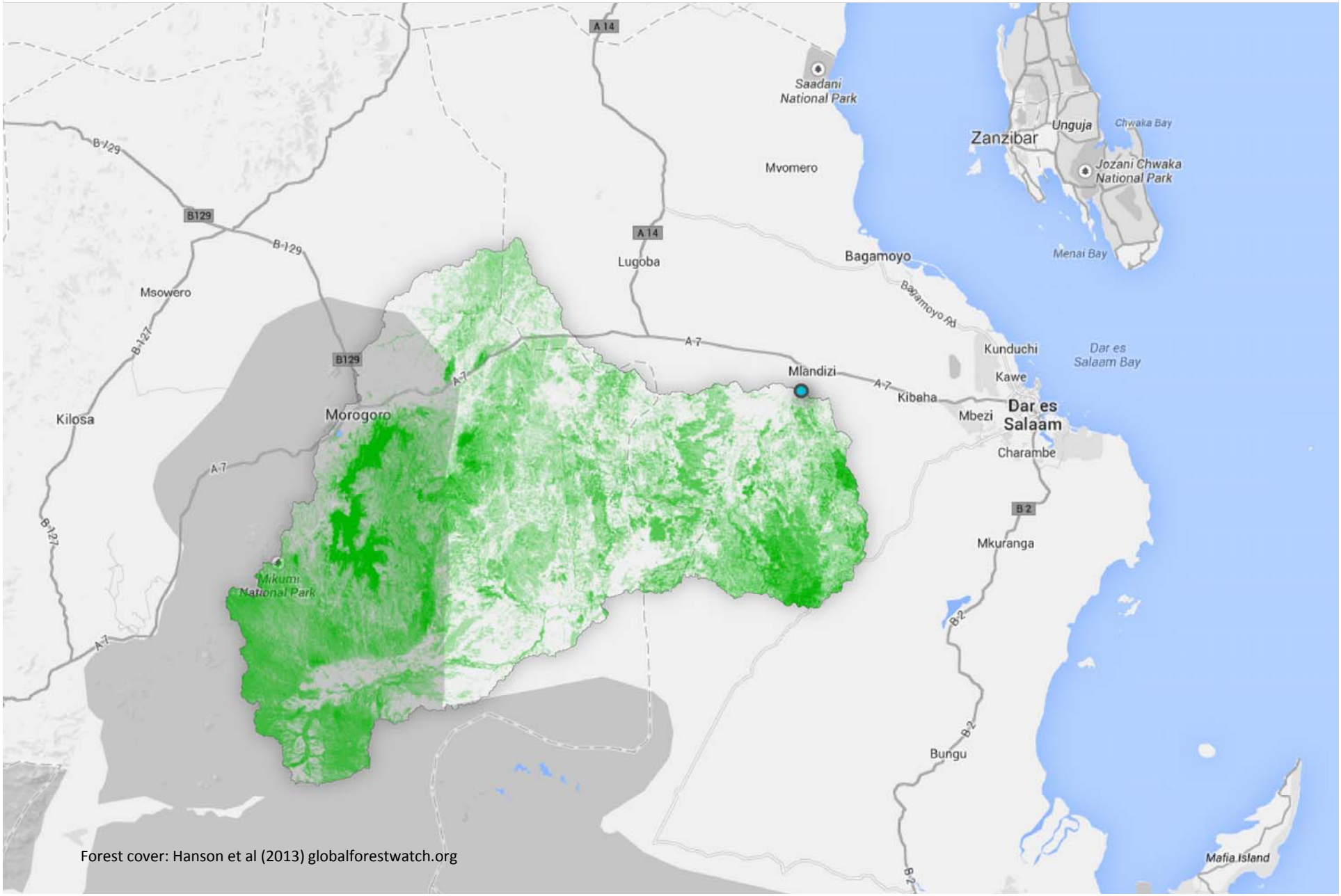
Map: Google Maps

DAR ES SALAAM'S WATERSHED (RIVU RIVER)



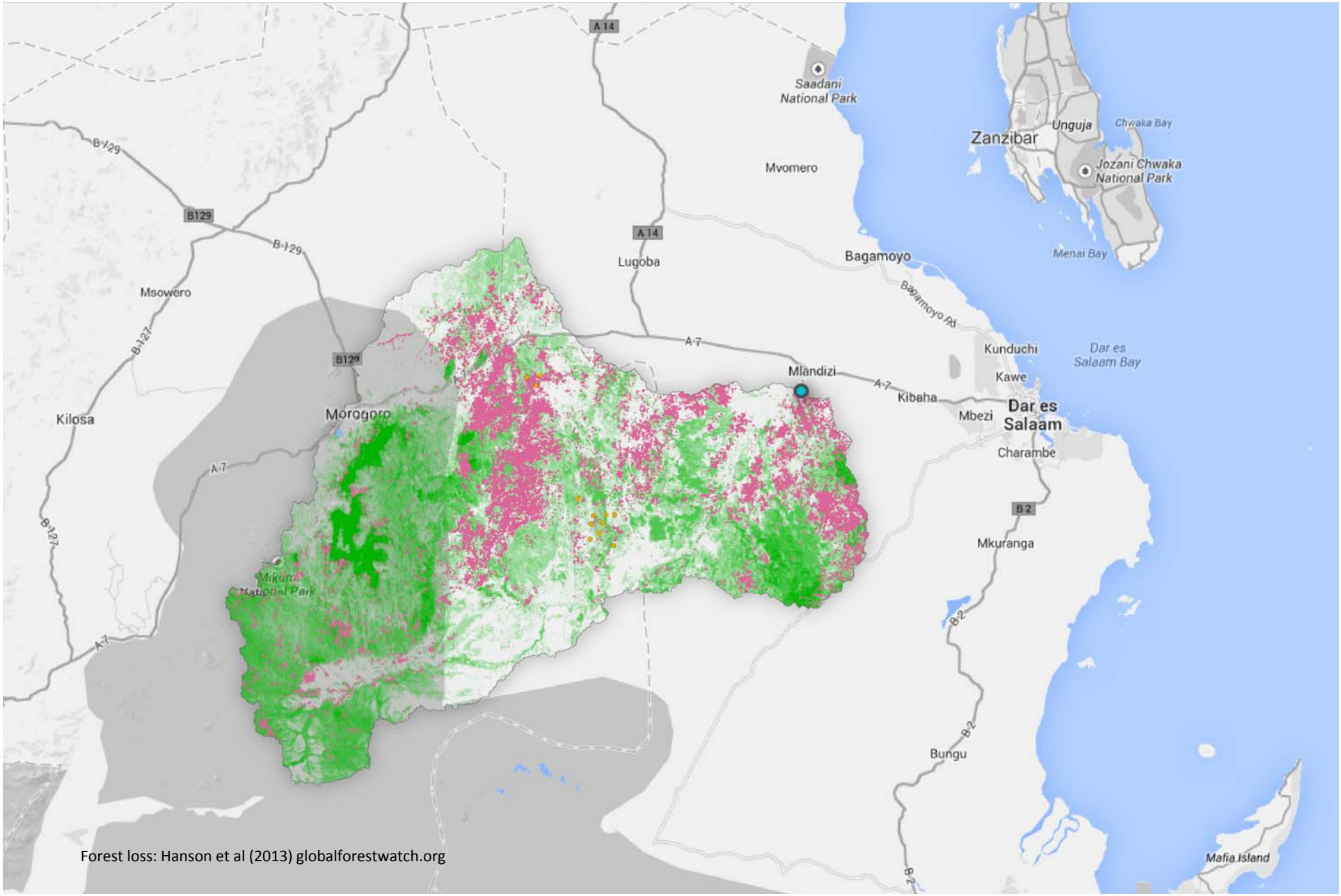
Watershed: Lehner et al. (2009) HydroSHEDS

DAR ES SALAAM'S WATERSHED FORESTS



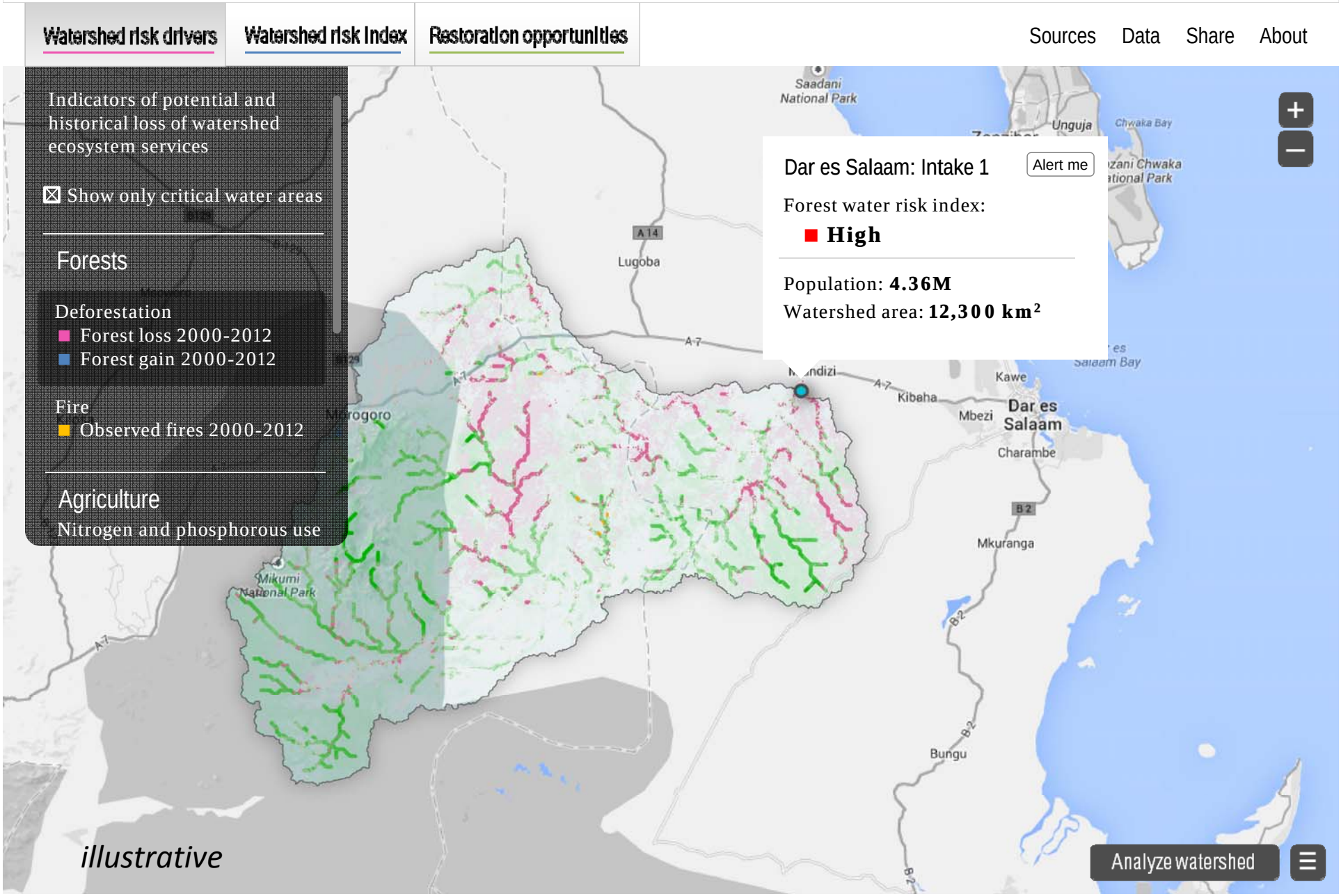
Forest cover: Hanson et al (2013) globalforestwatch.org

FOREST LOSS IN DAR ES SALAAM'S WATERSHED

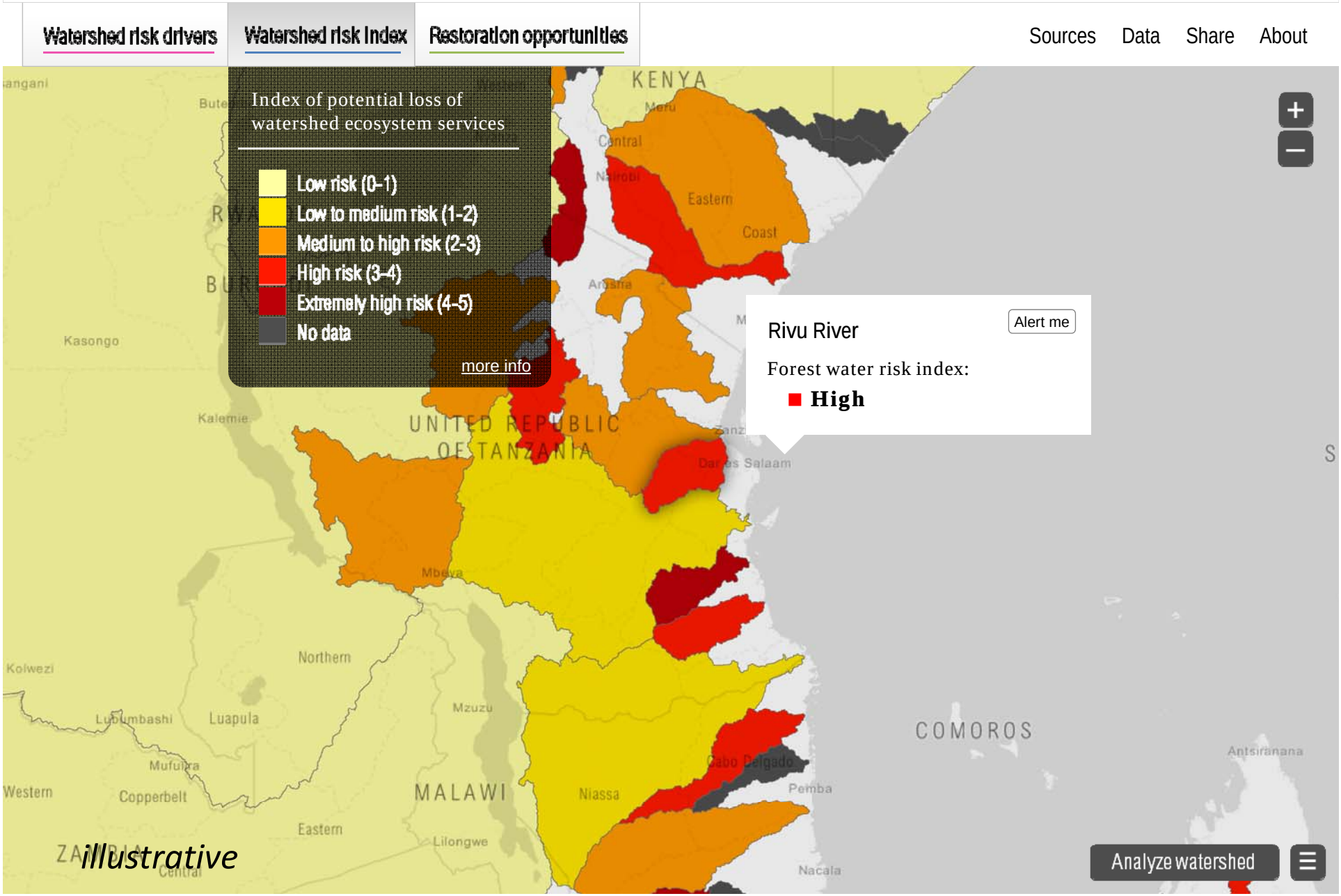


Forest loss: Hanson et al (2013) globalforestwatch.org

A TOOL FOR GLOBAL WATERSHED RISK ANALYSIS

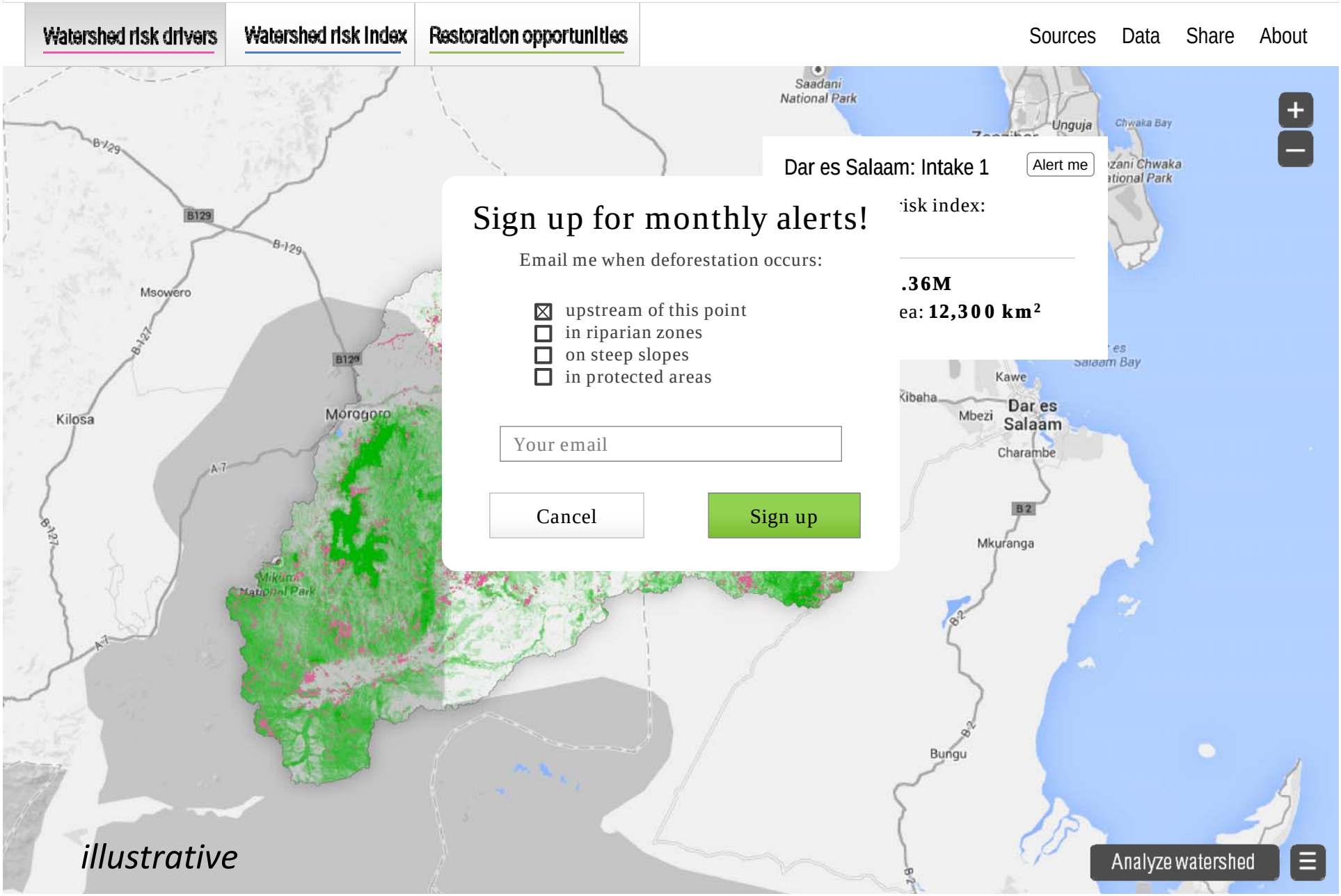


A TOOL FOR GLOBAL WATERSHED RISK ANALYSIS



illustrative

A TOOL FOR GLOBAL WATERSHED RISK ANALYSIS



CHANGE IT: MOBILIZE AND EQUIP CHAMPIONS

BUSINESS	POLICY MAKERS & DEVELOPMENT	MUNICIPALITIES & UTILITIES	CIVIL SOCIETY
Corporations, Corporate Consultants, Investors, Asset Managers	*Bilateral Development Banks, Policy Makers, NGOs, National/Regional Govs.*	*Municipalities, Water Treatment & Hydroelectric Plant Management*	*Academics, Reports, Community Based Non-Profits, General Public*

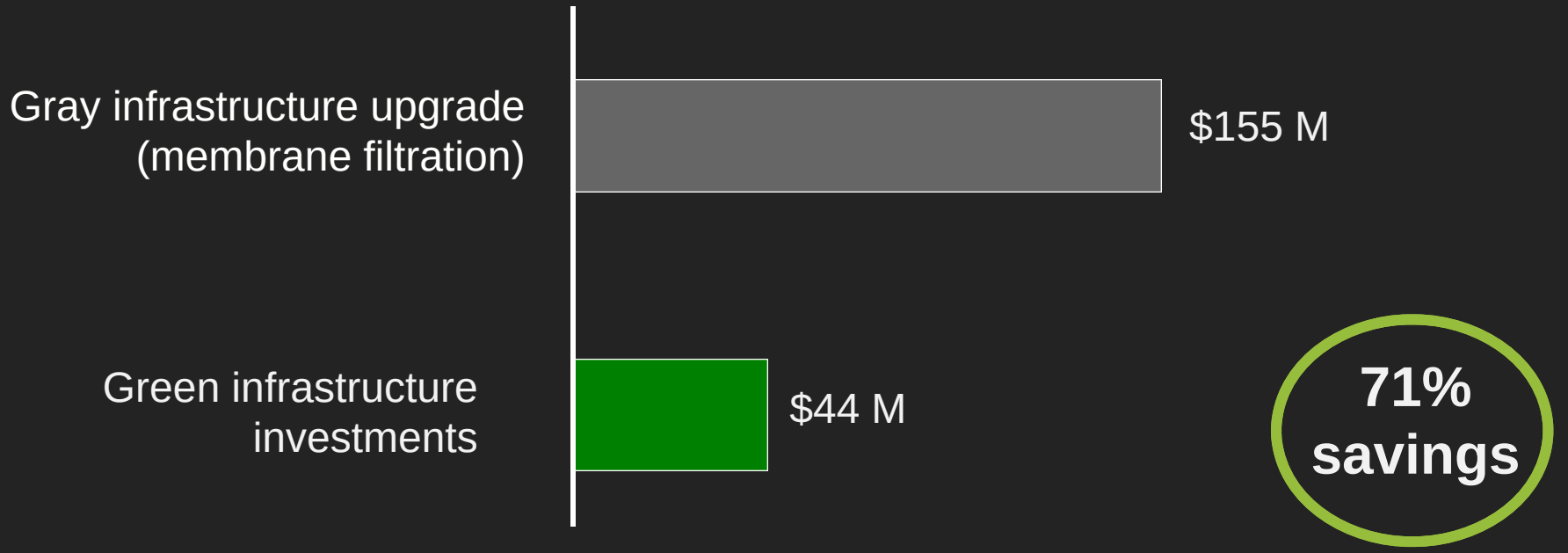
OPERATIONAL & SUPPLY CHAIN RISK	FOOD , WATER & ENERGY SECURITY	WATER & ENERGY SUPPLY	AWARENESS & LIVELYHOODS

ENVIRONMENTAL CONSERVATION & RESTORATION
PROMOTING SOCIO-ECONOMIC DEVELOPMENT

CHANGE IT: MAKING THE BUSINESS CASE

Present value of investment over 20 years, USD millions

Most optimistic scenario **(Portland, Maine; USA)**

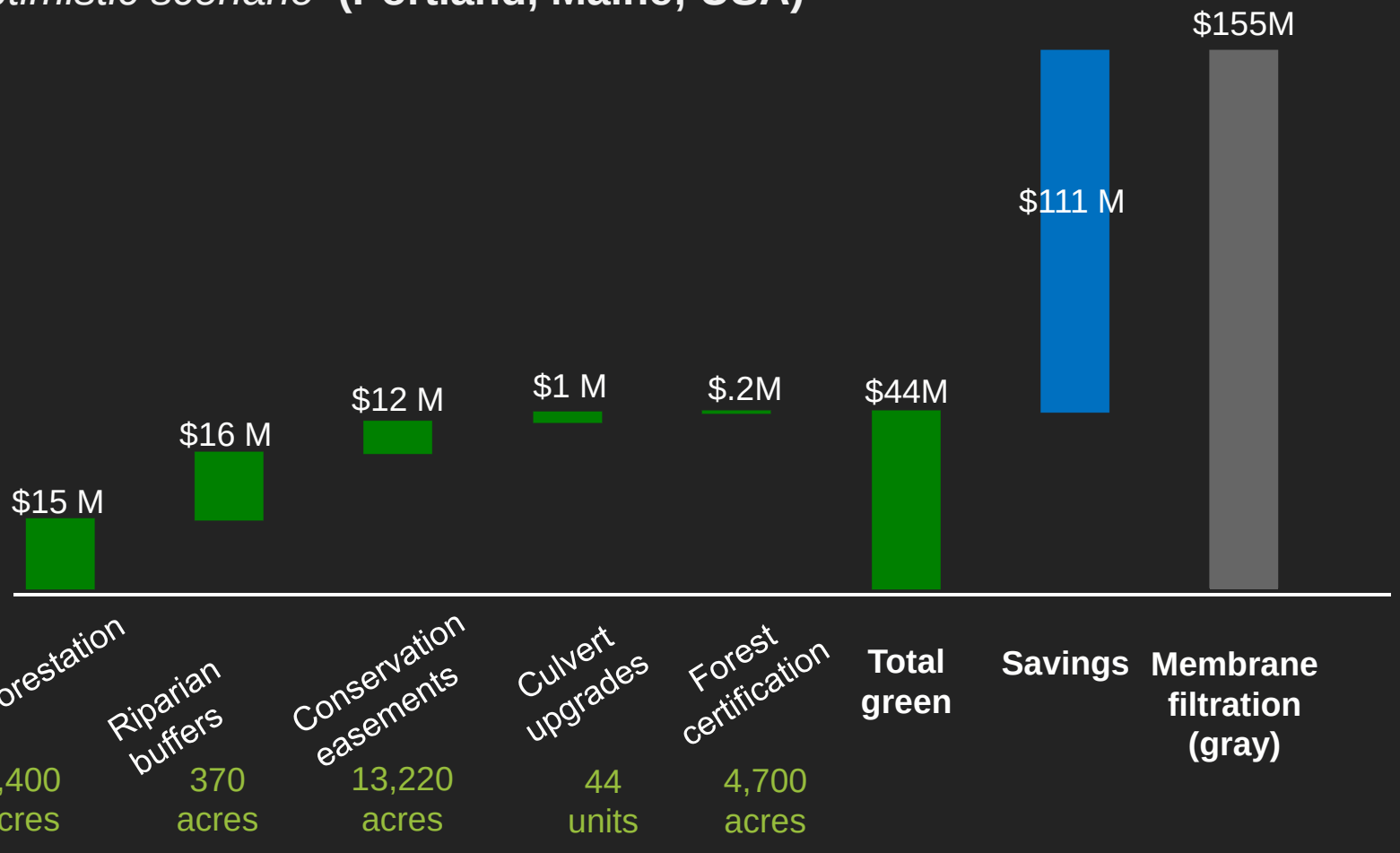


Source: Talberth, J. et al. 2012. Insights from the Field: Forests for Water. Washington, DC: World Resources Institute

CHANGE IT: DETAILED FINANCIALS

Present value of investment over 20 years, USD millions

Most optimistic scenario **(Portland, Maine; USA)**



Source: Talberth, J. et al. 2012. *Insights from the Field: Forests for Water.* Washington, DC: World Resources Institute

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CHANGE IT: ENABLING CONDITIONS

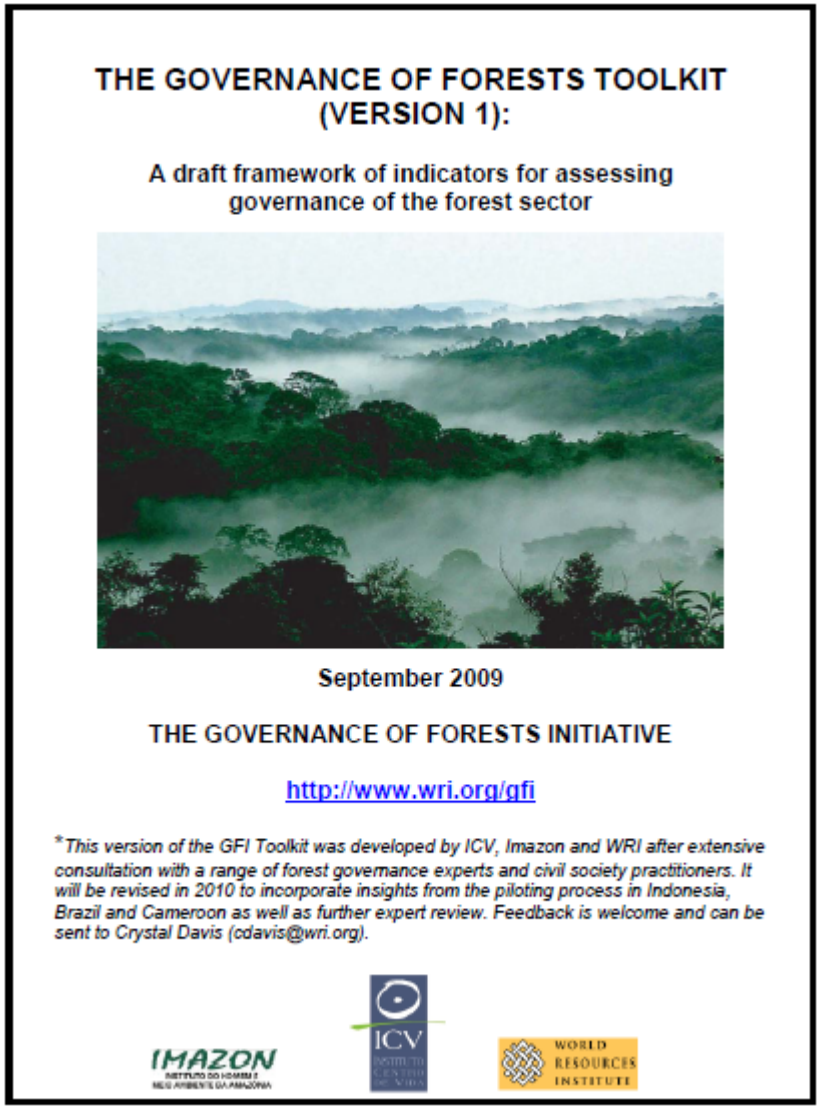
FEATURE	SUCCESS FACTOR	BRAZIL	COSTA RICA	CHINA
Ecological conditions	Suitable soil, water, climate, fire conditions	√	√	√
	No harmful plants, animals			√
	Native seeds, seedlings, source populations	√		√
Market conditions	Declining demand for degraded lands			
	Value chain for products from reforested areas	√	√	√
Policy conditions	Secure land and natural resource tenure		√	√
	Aligned, streamlined policies	√	√	√
	Natural forest-clearing restrictions exist	√	√	√
	Forest-clearing restrictions are enforced	√	√	√
Social conditions	Locals empowered in decision-making	√	√	
	Locals can benefit	√	√	√
Institutional conditions	Clearly defined roles, responsibilities	√	√	√
	Effective institutional coordination	√	√	√

CHANGE IT: FINANCING MECHANISMS

FINANCE MECHANISM	TYPICAL REVENUE ALLOCATION			TYPICAL USER OF FINANCE MECHANISM	POTENTIAL SCALE OF INVESTMENT
	LAND ACQUISITION	EASEMENTS	LAND MANAGEMENT ACTIVITIES		
Direct Investment by Governments and Utilities					
Rates	X	X	X	Utility	Med
Municipal bonds (revenue-backed)	X	X		Utility	High
Municipal bonds (general obligation)	X	X	X	Government	High
Rates surcharges	X	X	X	Utility	Med
Earmarked Proceeds	X	X	X	Government	Low-High
Development impact fees	X	X	X	Government	Low
Reverse auction	X	X	X	Government	Low
State revolving funds	X	X	X	Utility	Med
Farm bill programs			X	Government	Med
Water Infrastructure Finance and Innovation Authority	TBD	TBD	TBD	Utility	High
Private investment capital		X	X	Utility, Government	Low

CHANGE IT: GOVERNANCE

- **Promote Transparency**
- **Develop Indicators**
- **Create Accountability**
- **Mobilize Change**



THE GOVERNANCE OF FORESTS TOOLKIT
(VERSION 1):

A draft framework of indicators for assessing governance of the forest sector

September 2009

THE GOVERNANCE OF FORESTS INITIATIVE

http://www.wri.org/gfi

*This version of the GFI Toolkit was developed by ICV, Imazon and WRI after extensive consultation with a range of forest governance experts and civil society practitioners. It will be revised in 2010 to incorporate insights from the piloting process in Indonesia, Brazil and Cameroon as well as further expert review. Feedback is welcome and can be sent to Crystal Davis (cdavis@wri.org).

IMAZON

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NATURAL
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Investing in Forested Landscapes for
Source Water Protection in the United States
EDITED BY TODD GARTNER, JAMES MULLIGAN, ROWAN SCHMIDT, AND JOHN GUNN
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