Cities and Flooding
Urban Flood Risk Management

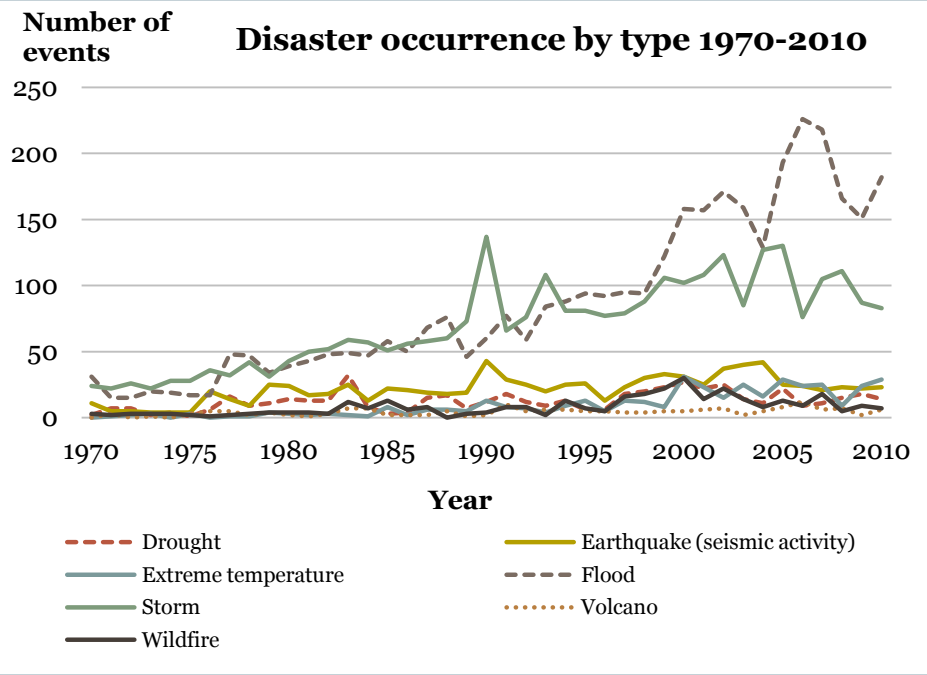
UNDERSTANDING RISK

Flood risks across spatial scales

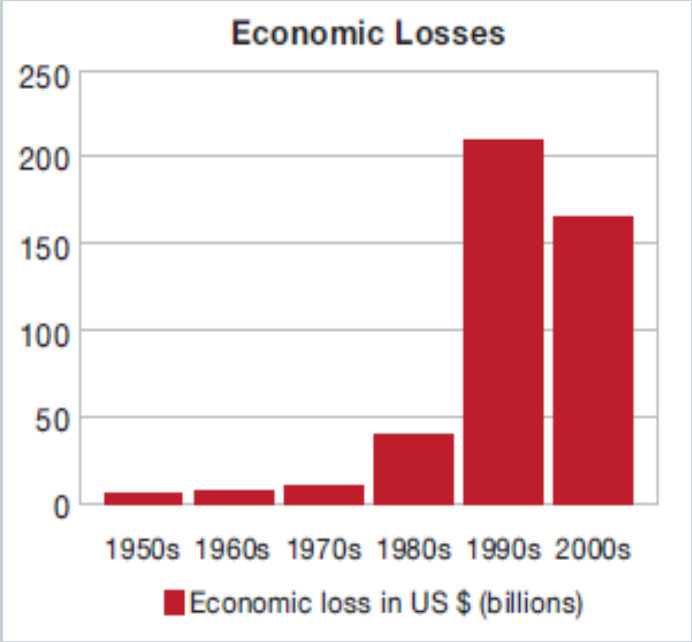
July 3rd 2012
Cape Town, South Africa

The occurrence of floods is the most frequent among all natural disasters globally

- In 2010 alone, **178 million people** were affected by floods. The total losses in exceptional years such as 1998 and 2010 exceeded **$40 billion**.



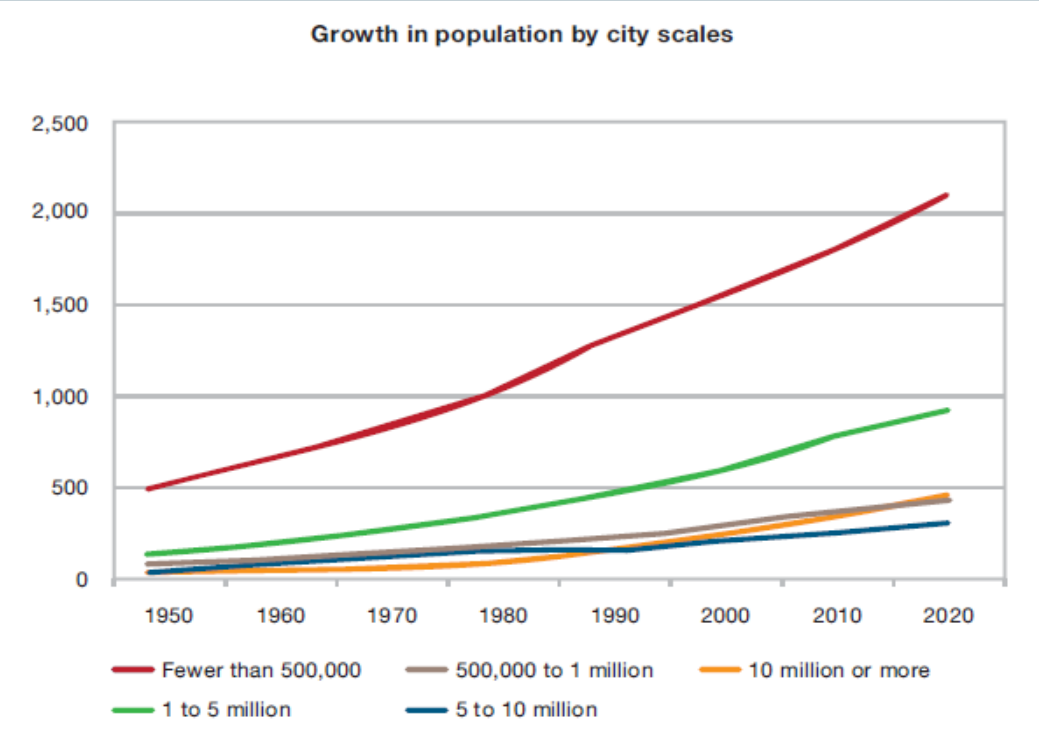
Number of reported disaster events. Source: based on EM-DAT/CRED



Direct monetary impacts resulting from flood events. Source: based on EM-DAT/CRED

Rapid and unplanned urbanization puts more people and assets in harm's way

- **Urbanization** is the defining feature of the world's demographic growth.



Who is at risk?

- Small and medium size towns and cities – by 2030, majority of population will live in towns and cities with population of less than 1 million
- Urban poor
- Socially disadvantaged communities

Growth in population by city scales. Source: based on Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2008 Revision and World Urbanization Prospects: The 2009 Revision.

Integrated Urban Flood Risk Management

- ***Forward-looking*** *approach, which aims to avoid the mistakes of the past.*
- ***Risk-based****, recognizing residual risk and uncertainty need to part of investments.*
- *A strategy based on implementing "the right balance" of* ***structural and non-structural measures****.*
- *As part of urban and land use planning, which is* ***participatory****, works across sectors and jurisdictions.*

http://www.gfdrr.org/urbanfloods

Getting the balance right

Keep the water away from the people

Hard engineered

- Flood conveyance
- Flood storage
- Urban drainage systems
- Ground water management
- Flood resilient building design
- Flood defenses

Eco-system management

- Utilizing wetlands
- Creating environmental buffers

Keeping the people away from the water

Increased preparedness

- Awareness campaigns
- Urban management

Flood avoidance

- Land use planning
- Resettlement

Emergency planning & management

- Early warning systems and evacuation
- Critical infrastructure

Speeding up recovery

- Building back safer
- Risk insurance

Make Land-use Planning an Instrument for Risk Reduction

German Flood Control Act 2005

Guiding principle	Corresponding Legislation
More space for rivers	Flood protection defined as issue of *spatial planning*
Retain floods in remote areas	States are *obliged* to designate more areas as flood plains
Control urban development– reduce damage potential	Planning new housing areas in flood plains is for the first time *prohibited* by law

Extensive improvements to flood zoning and mapping are occurring in accordance with this Act, as well as the **European Water Directive.** Importantly, public consultation is built into the process.

Examples: Integrated Flood Risk management approach as part of World Bank projects in EAP

Vietnam

- Local Resilience Plans for Can Tho
- Integrated Flood Management in Ho Chi Minh City

Mekong Basin

- Hydromet and Early Warning Systems (GFDRR, WMO)

Philippines

- Metro Manila Flood Management Master Plan (AusAID, JICA, GFDRR)

Indonesia

- InaSAFE (BNPB, GFDRR Labs, AusAID/AIFDR)
- Jakarta Urgent Flood Mitigation Project

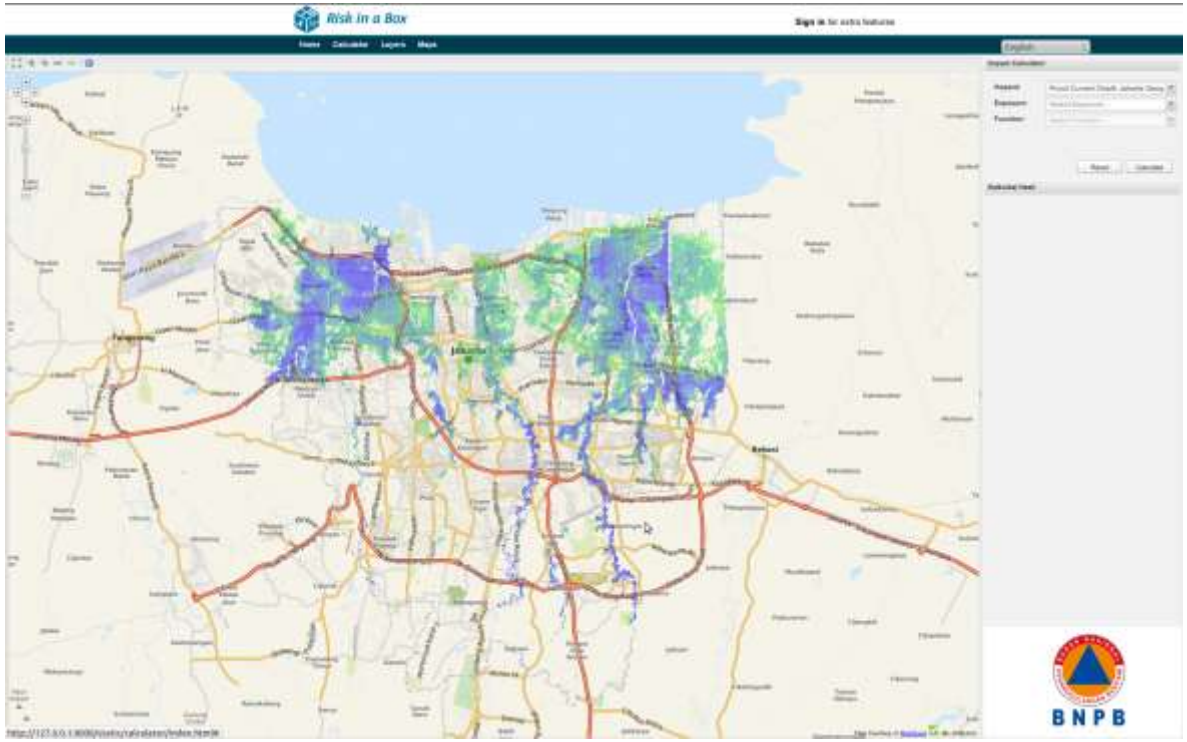
Pacific

- Kiribati Adaptation Program - Phase III Project (KAP III)
- Pacific Catastrophe Risk Assessment and Financing Initiative (SOPAC, WB, ADB, GFDRR and JICA)

Example: Indonesia – creating tools for understanding risk

AUSTRALIA–INDONESIA FACILITY FOR DISASTER REDUCTION

- **Jakarta suffers from recurrent flooding,** with especially devastating flood events in January 1996, February 2002 and February 2007.

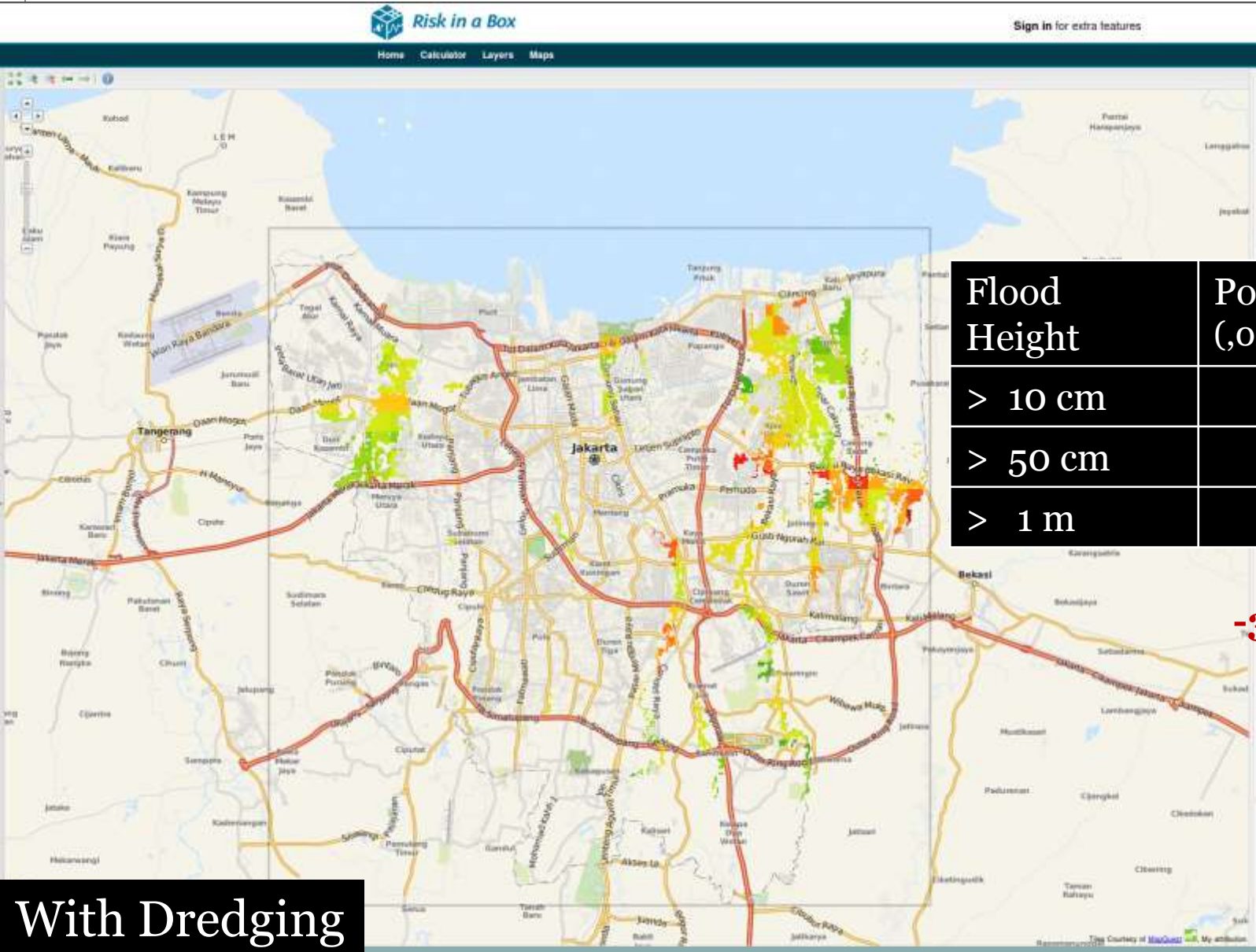


2007 floods

- Inundated **36% of** Jakarta
- Affected over **2.6 million** people;
- Losses **US$ 900 million**
- Over 70 people died
- Disease affected over 200,000 people

- **GFDRR (Labs), AusAID (AIFDR), national DM agency (BNPB) –** developed a prototype decision support tool "**InaSAFE.**"

Demonstrating relative impact of an infrastructure investment



Flood Height	Population (,000)
> 10 cm	1,900
> 50 cm	1,320
> 1 m	790

-33% affected

BNPB

With Dredging

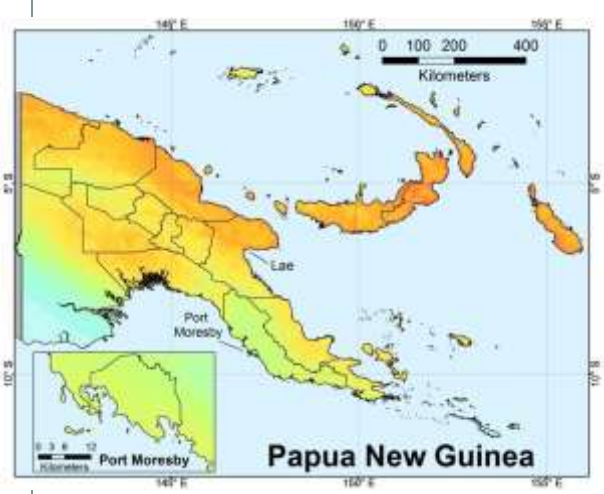
Example: Indonesia – creating tools for understanding risk

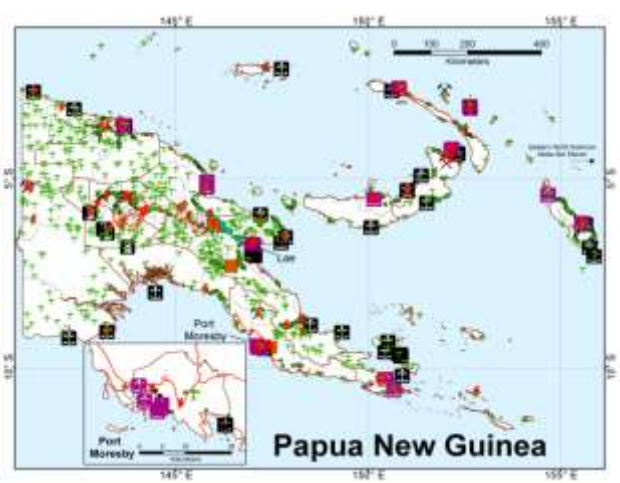
- Full agency ownership from the beginning of the process.
- This prototype **was used in the 2011 /2012 Jakarta contingency emergency planning.**
- Demand for further development including software advancement, testing, and user training.
- Continuous dialogue with other institutions.

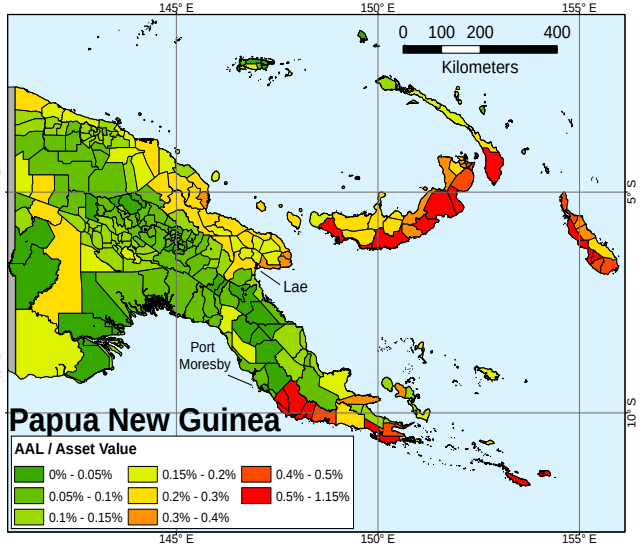
- **Dialogue on risk-based urban flood risk management, in line with WB Open Data for Resilience Initiative (OpenDRI)**
- **Facilitated discussion on flood risk mitigation, including the signing of a Urban Flood Mitigation Project ($139.64) million , additional (US$49.71 million) from central and provincial gvts**
- **Leveraging and complimenting efforts of partners**
- **Spurred cross-country interest in risk-based approach**

Example: Pacific – creating robust risk information for CCA and DRM

- Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI), led by SOPAC, WB, ADB, supported by GFDRR and JICA. It provides **15 Pacific Islands** with disaster risk assessment information & tools to help them better understand, model, and assess their exposure to natural disasters.





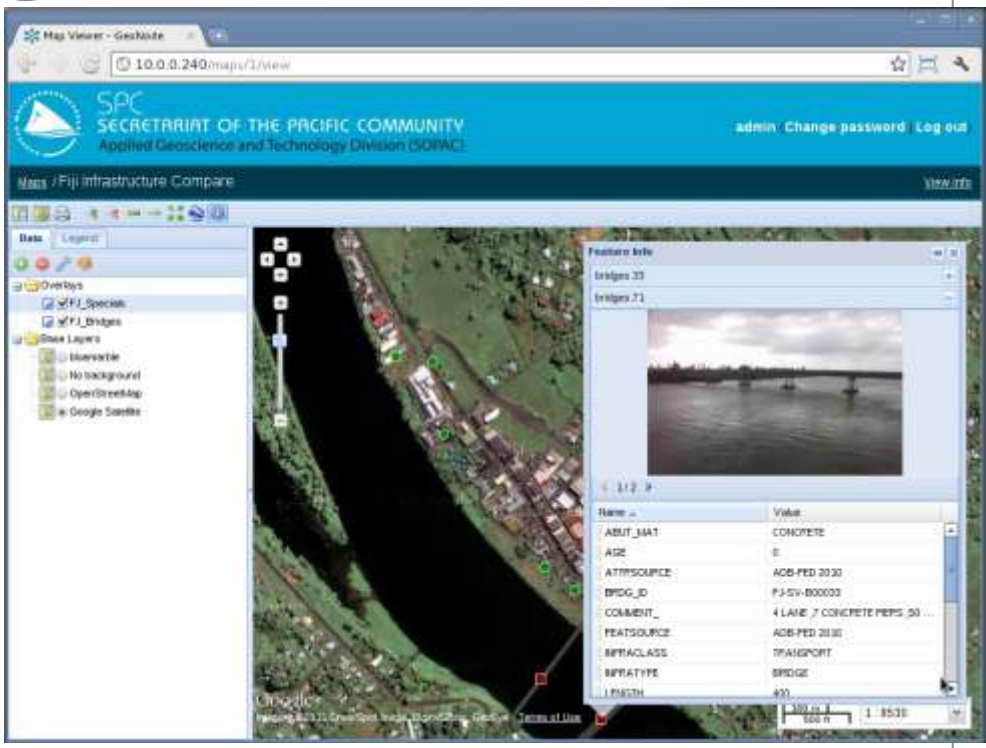


Hazard **Exposure/Vulnerability** **Risk**

Pacific Catastrophe Risk Assessment and Risk Financing in association with SPC/SOPAC and the ADB

Sharing Risk Information

- Ownership of regional agency
- Exposure, hazard and risk maps are shared across region for clients, WB, and other organization
- In line with WB OpenDRI
- **Facilitates dialogue on hydromet services**
- **Enhances integration of CCA and DRM agendas**
- **The data forms basis for projects in core DRM areas: disaster risk financing; flood mitigation investments, urban land & infrastructure planning; rapid post-disaster damage and loss estimation**



GeoNode

Collaborate, communicate, explore.
Make the most of your geospatial data.

Challenges and the way forward

- **INSTRUMENTS**: What instruments do we need to support our clients to mainstream integrated flood risk management ? (Data, metrics, analytical work etc.)
- **INVESTMENTS**: What concrete actions can we take to implement on ground the right balance between structural and non-structural measures?
- **INCENTIVES**: Institutionally why is this not happening, even for events that we know that are bound to take place? (Small, regular flood events)

Questions

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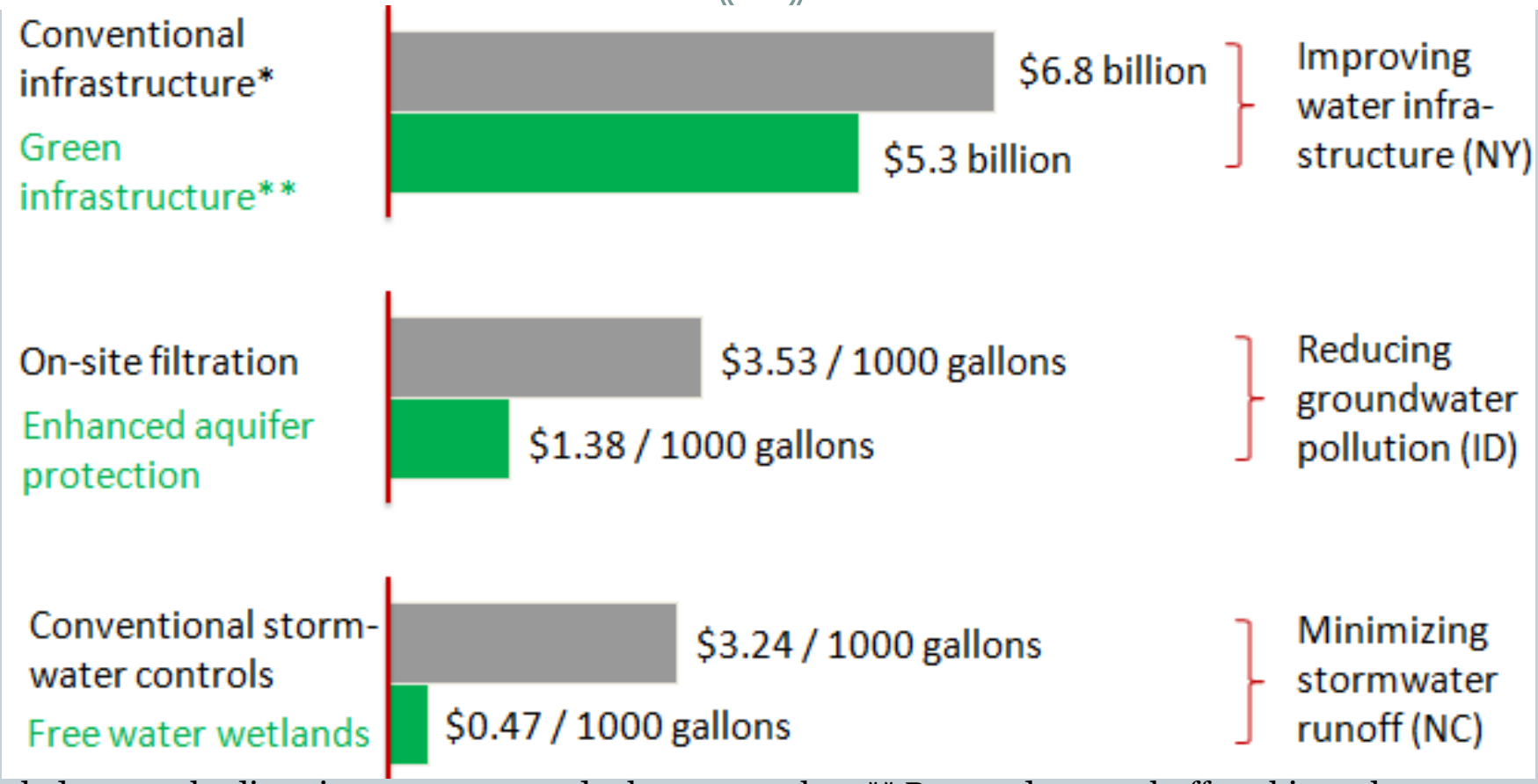
Disaster Risk Management

East Asia and the Pacific

The World Bank

Comparing the costs of gray and green infrastructure



•Includes tunnels, diversion structures, and other approaches. ** Restored stream buffers, bioswales, green roofs, and other approaches. Source: PlaNYC 2011, BBC Research 2001, ACOE 2003

Source: Talberth, John and Craig Hanson. Green vs. Gray Infrastructure: When Nature Is Better than Concrete. WRI Insights [online] insights.wri.org, June 19th 2012. Washington, D.C.: World Resources Institute.