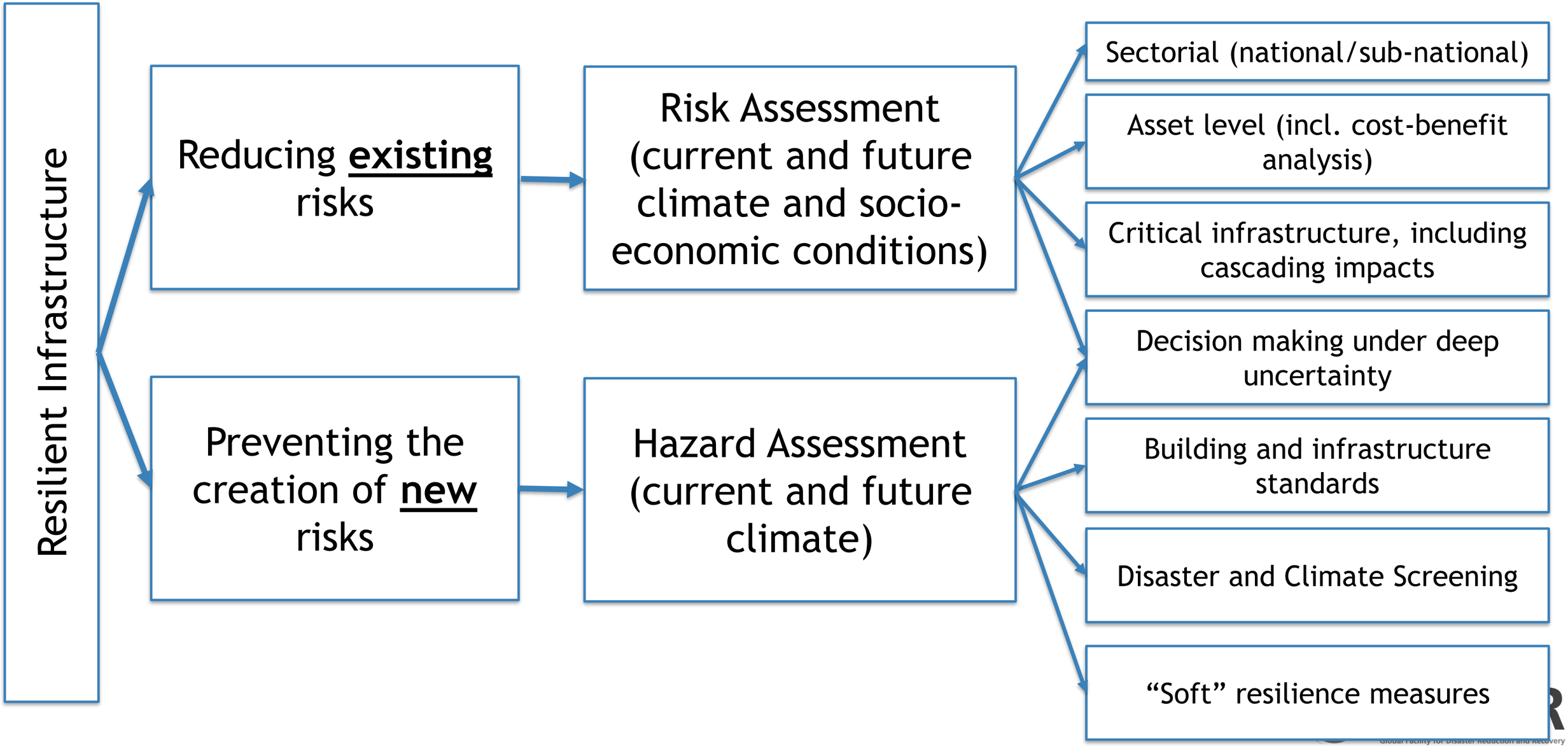
Resilient Infrastructure: *underpinned by robust and usable risk information*

Alanna Simpson PhD
Innovation Lab
World Bank Group

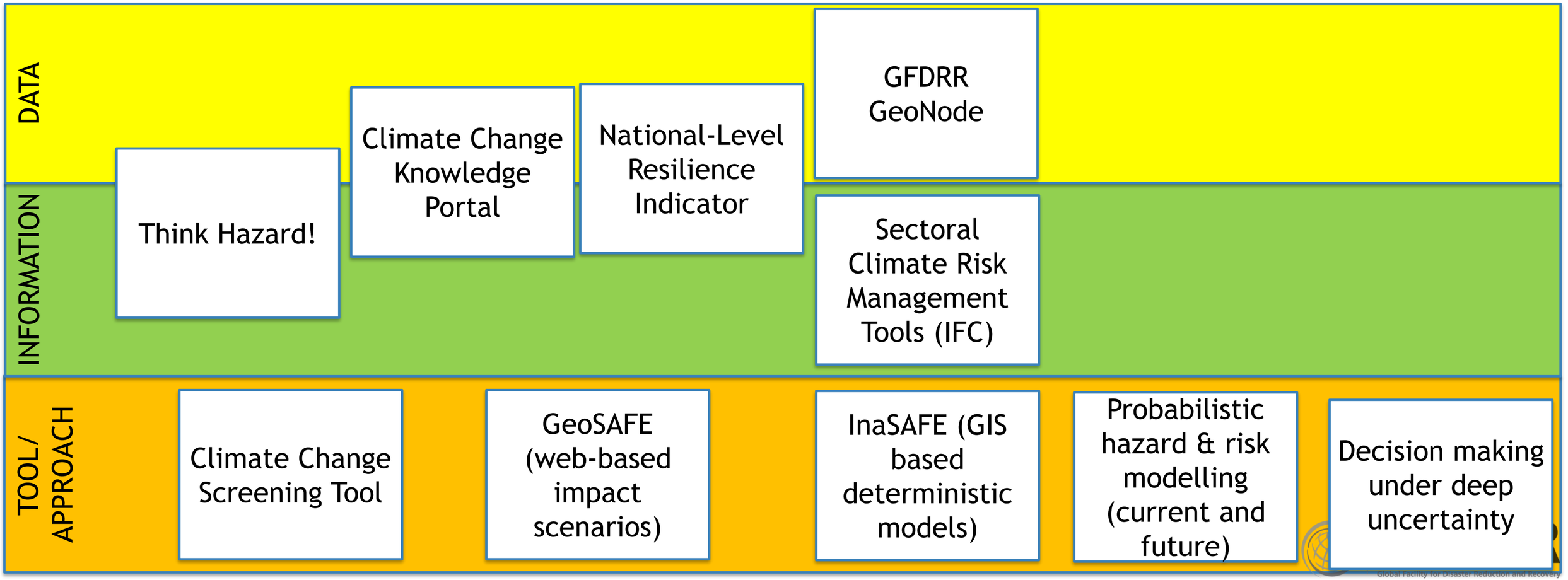
GFDRR
Global Facility for Disaster Reduction and Recovery

Risk Information = Evidence Based Decision Making



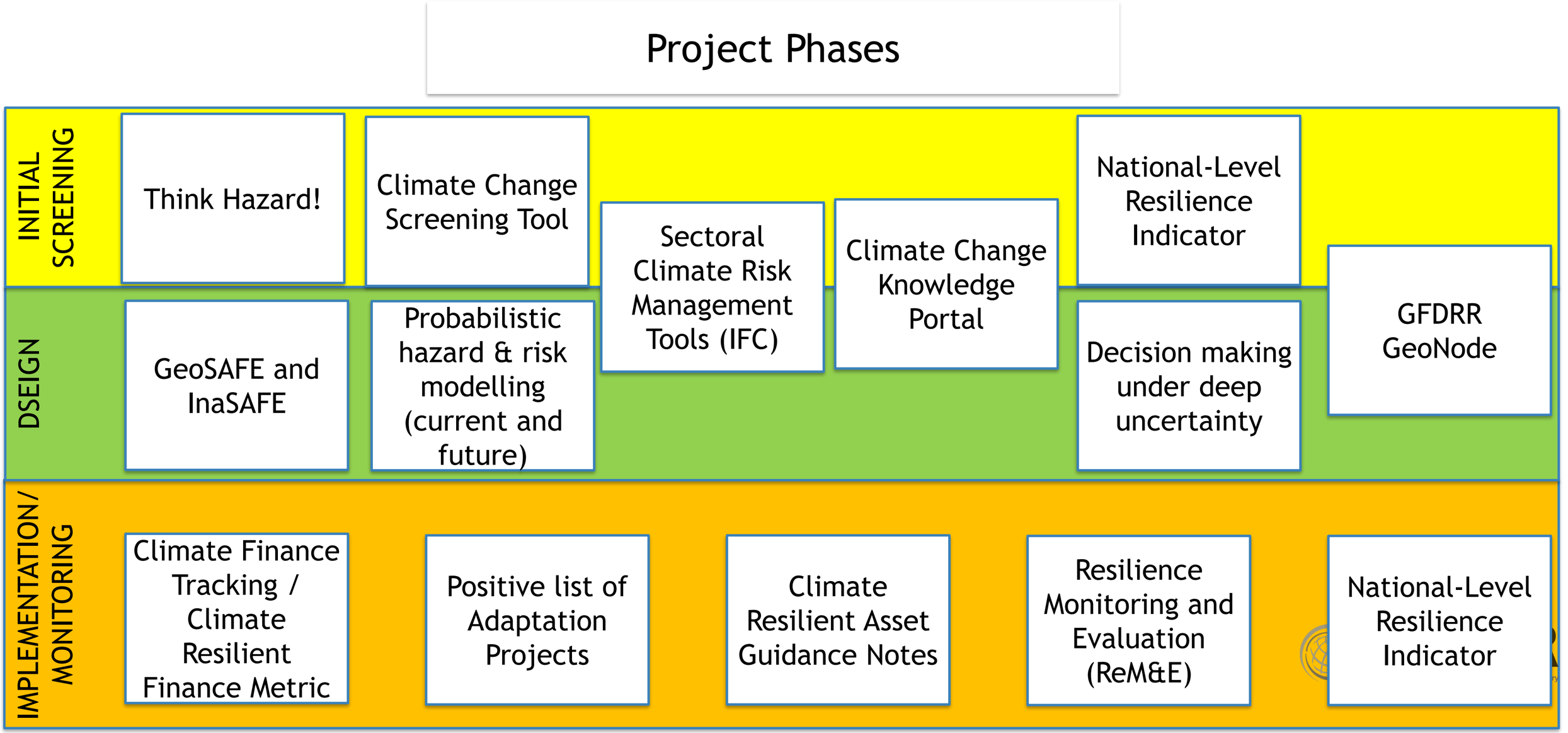
Risk Information = Evidence Based Decision Making

Available Data, Tools and Information



Increased complexity / resource requirements

Risk Information = Evidence Based Decision Making



INITIAL PROJECT SCREENING

THE WORLD BANK GROUP

Climate Change Knowledge Portal

For Development Practitioners and Policy Makers

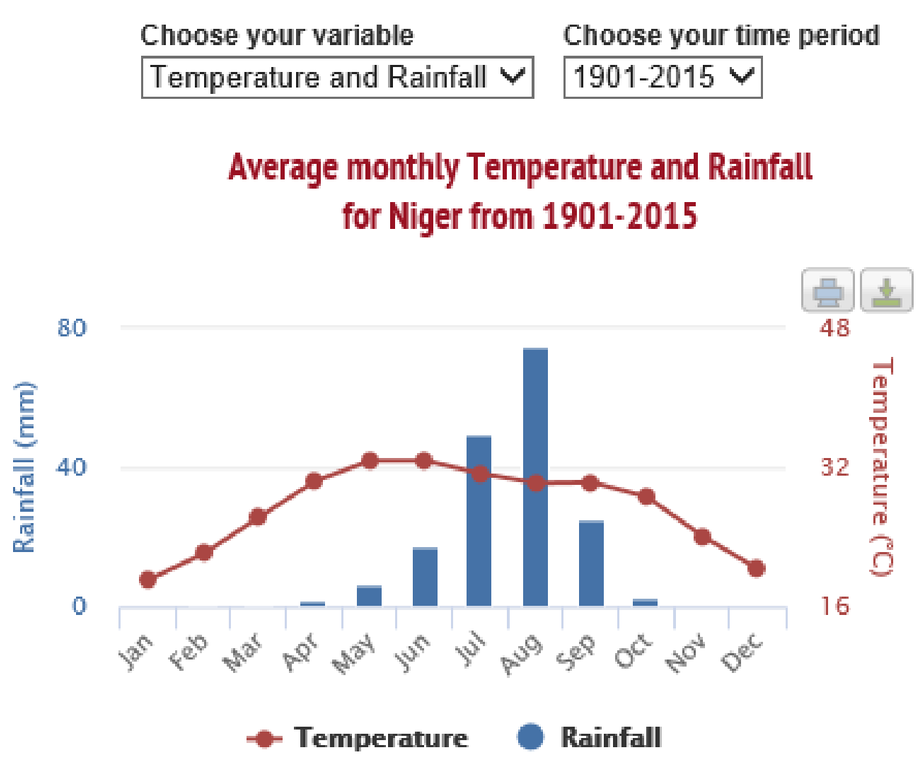
You Are Here: Home > Global Map >Africa > Niger

CLIMATE | IMPACTS | VULNERABILITIES | COUNTRY ADAPTATION PROFILE

HISTORICAL | FUTURE GCM | FUTURE DOWNSCALED | COMPARISONS | HISTORICAL VARIABILITY TOOL

Choose your variable: Temperature and Rainfall

Choose your time period: 1901-2015



It is important to evaluate how climate has varied and changed in the past. The monthly mean historical rainfall and temperature data can be mapped to show the baseline climate and seasonality by month, for specific above shows mean historical monthly period 1901-2015. The dataset was p University of East Anglia (UEA).

Contact: Ana Bucher

http://sdwebx.worldbank.org/climateportal/index.cfm

Climate & Disaster Risk Screening Tools

- Home
- About the Tools
- Start Screening
- Training
- Support and Resources
- Frequently Asked Questions
- Help Desk
- Climate Change News

Enabling Resilient Growth

Climate change and disasters pose a growing threat to development progress. We have tools to help you screen for climate and disaster risks at early stages of project design and planning processes. Read More »

SCREENING TOOLS

Recognize the Risks

Use the tools below to work toward a resilient future. Identify risks to national plans and project investments.

- Select the Right Tool
- Browse the Tools and Sample Reports
- Meeting Climate Change Commitments

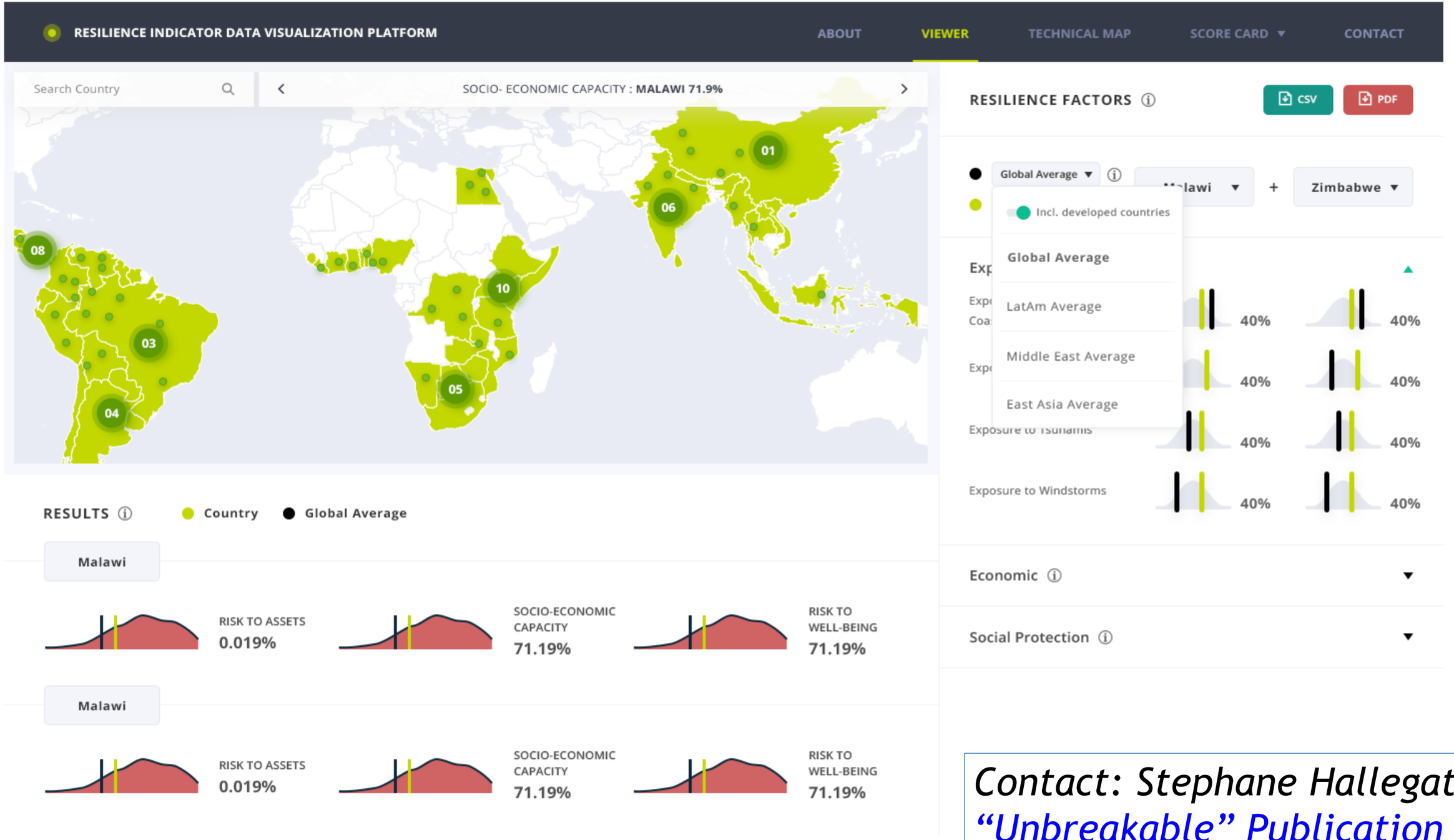
Agriculture

Coastal Flood Protection

Energy

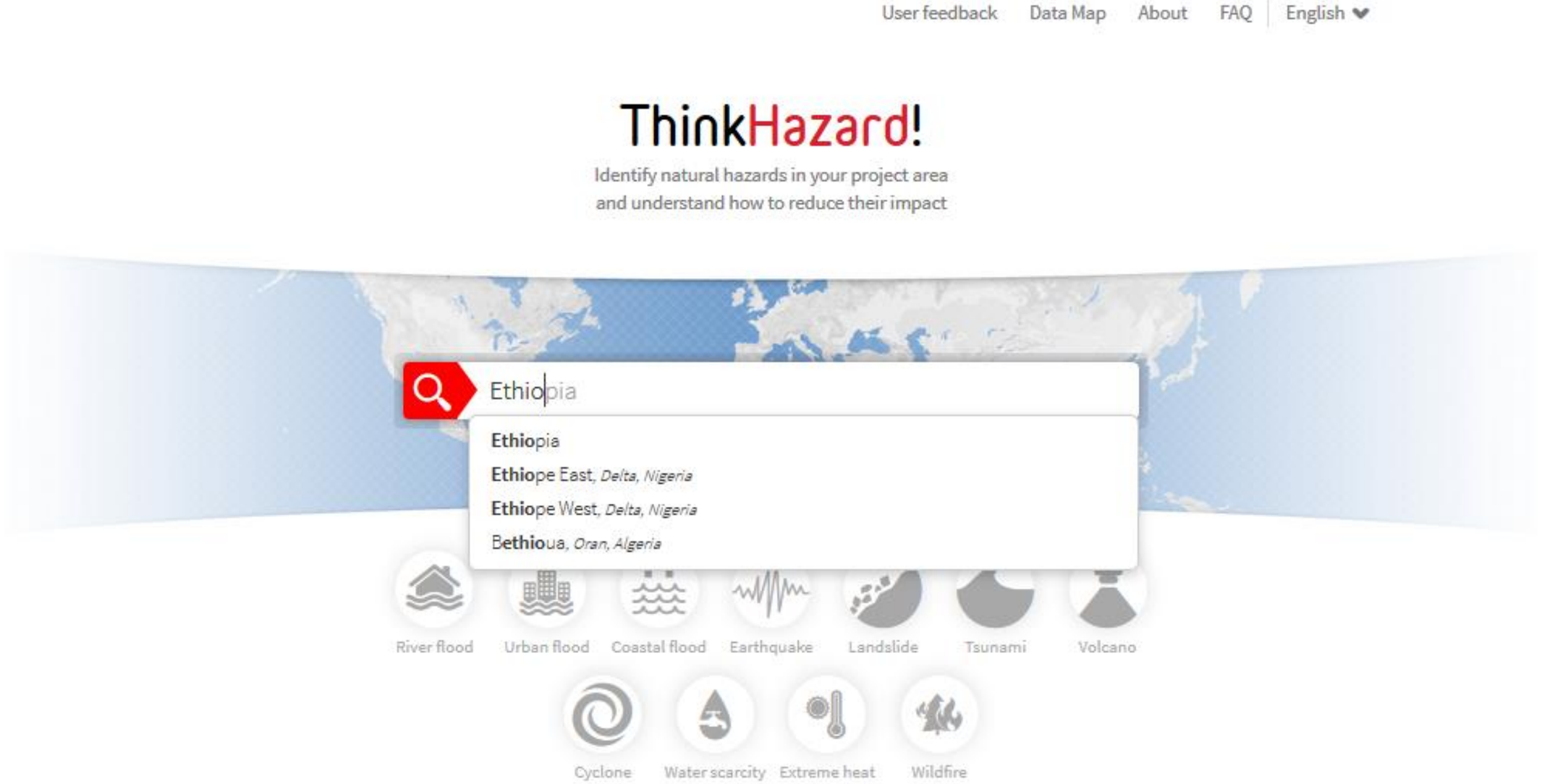
Health

Website:
https://climatescreeningtools.worldbank.org/



Contact: Stephane Hallegatte

[“Unbreakable” Publication]



Contact: Alanna Simpson
www.thinkhazard.org

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ThinkHazard! Enter location (e.g. Indonesia or Bali) About FAQ

Thailand Download PDF

Thailand

Overview | River flood | Earthquake | Water scarcity | Cyclone | Coastal flood | Tsunami | Volcano | Landslide

HAZARD LEVEL

River flood	High
Cyclone	High
Landslide	High
Earthquake	Medium
Water scarcity	Medium
Coastal flood	Very low
Volcano	Very low
Tsunami	No data available

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Thailand Download PDF

Thailand

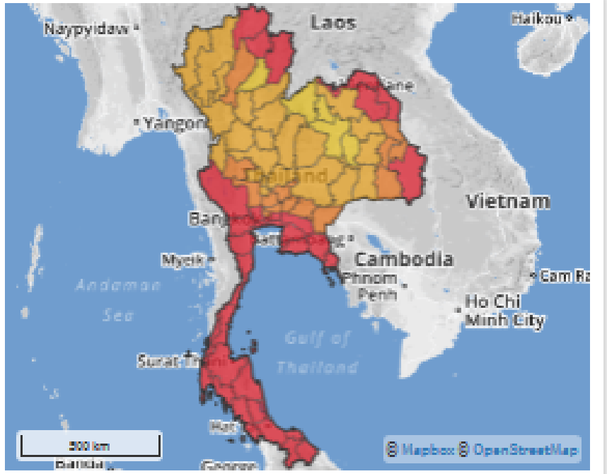
Overview | River flood | Earthquake | Water scarcity | Cyclone | Coastal flood | Tsunami | Volcano | Landslide

Cyclone

*Hazard level: **High***

In the area you have selected (Thailand) cyclone (also known as hurricane or typhoon) hazard is classified as high according to the information that is currently available. This means that there is more than a 20% chance of potentially-damaging wind speeds in your project area in the next 10 years. Based on this information, the impact of cyclones must be considered in all phases of the project, in particular during design and construction. Project planning decisions, project design, and construction methods should take into account the level of cyclone hazard. Note that damages can not only occur due to wind but also cyclone induced heavy rainfall and subsequent flooding as well as coastal floods in coastal areas. Further detailed information should be obtained to adequately account for the level of hazard.

Climate change impact: Global average tropical cyclone wind speed and rainfall is likely to increase in the future, and the global average frequency of tropical cyclones is likely to decrease or remain unchanged. It is possible that the frequency of the most intense tropical cyclones will increase substantially in some ocean regions (IPCC, 2013). The present hazard level in areas currently affected by tropical cyclones may increase in the long-term. Projects located in such areas should be robust to future increases in cyclone hazard.



Cyclone hazard level

Thailand

High | Low | Medium | Very low

DATA SOURCES

Impact Forecasting , UNISDR

Recommendations

- INSURANCE: For cyclone wind risks that cannot be mitigated, consider insurance products specifically aimed at alleviating the financial costs associated with wind risk. More information

- INTERACTING HAZARDS: Project planning, design, and construction practices should account for strong wind from potential cyclones in your project area. More information

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River flood

*Hazard level: **High***

In the area you have selected (Thailand) river flood hazard is classified as **high** according to the information that is currently available to this tool. This means that potentially damaging and life-threatening river floods are expected to occur at least once in the next 10 years. **Project planning decisions, project design, and construction methods must take into account the level of river flood hazard.** Surface flood hazard in urban and rural areas is not included in this hazard classification, and may also be possible in this location. The following is a list of recommendations that could be followed in different phases of the project to help reduce the risk to your project. Please note that these recommendations are generic and not project-specific.

Climate change impacts: Medium confidence in more frequent and intense heavy precipitation days and an increase in the number of extreme rainfall events. The present hazard level may increase in the future due to the effects of climate change. It would be prudent to design projects in this area to be robust to river flood hazard in the long-term.

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River flood

*Hazard level: **High***

In the area you have selected (Thailand) river flood hazard is classified as **high** according to the information that is currently available to this tool. This means that potentially damaging and life-threatening river floods are expected to occur at least once in the next 10 years. **Project planning decisions, project design, and construction methods must take into account the level of river flood hazard.** Surface flood hazard in urban and rural areas is not included in this hazard classification, and may also be possible in this location. The following is a list of recommendations that could be followed in different phases of the project to help reduce the risk to your project. Please note that these recommendations are generic and not project-specific.

Climate change impacts: Medium confidence in more frequent and intense heavy precipitation days and an increase in the number of extreme rainfall events. The present hazard level may increase in the future due to the effects of climate change. It would be prudent to design projects in this area to be robust to river flood hazard in the long-term.

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Recommendations

- Location assessment: The high-level information available in this tool may indicate the presence of river flood hazard in your project area. Before committing significant resources to this issue, a study of the surrounding landscape can help you to assess whether more detailed assessment and/or intervention should be considered. More information

- Obtain pre-existing flood hazard information: The high-level information available in this tool may indicate the presence of flood hazard in your project area. However, because flood hazard can change dramatically over short distances, the exact geographical location of your project should be checked against pre-existing flood hazard information. More information

- Professional guidance: Consultation with professionals will provide a more detailed understanding of the risk posed to your asset by flooding. The level of guidance required will depend upon the level of hazard present, the vulnerability of the asset and local legislation that might apply. More information

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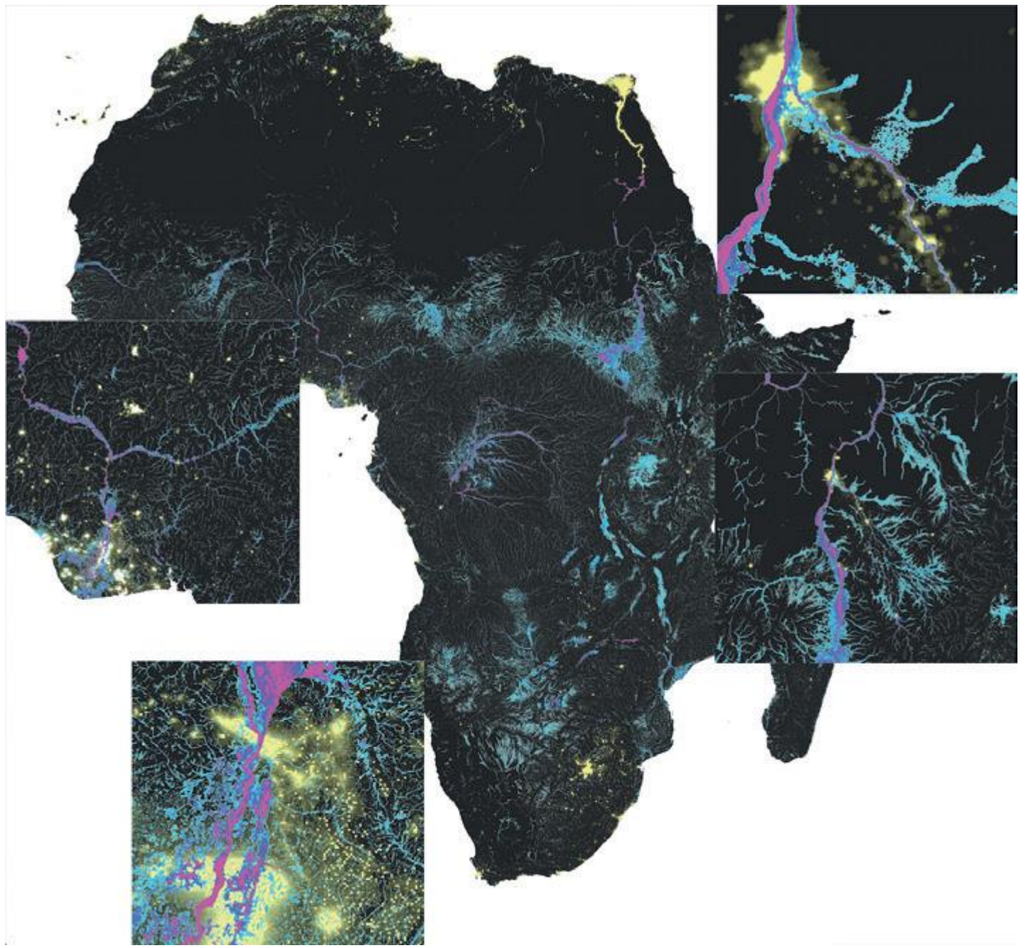
Think Hazard! – *version 2 (release July 1)*

- Spanish and French language. API.
- Enhanced visualization of “aggregate” levels, and improved method for riverine flood
- Inclusion of urban flood, air quality, wildfire and extreme heat
- Higher resolution and more recent riverine flood, cyclone & earthquake data
- National level contact details for each peril



PROJECT DESIGN

GFDRR InnovationLab

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InnovationLab GeoNode

Open data to further your understanding of disaster risk

http://45.55.174.20

Contact: Vivien Deparday

Hazard datasets

We maintain a curation of hazard datasets at the global and country level. Tools like ThinkHazard! use these datasets in the backend.

Earthquake
212 datasets

Drought
11 datasets

River Flood
78 datasets

Tsunami
4 datasets

Coastal Flood
71 datasets

Strong Wind
42 datasets

Volcanic
1 datasets

Landslide
6 datasets

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Search :

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KEYWORDS

DATE

REGIONS

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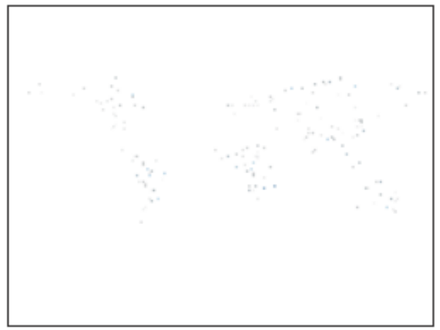
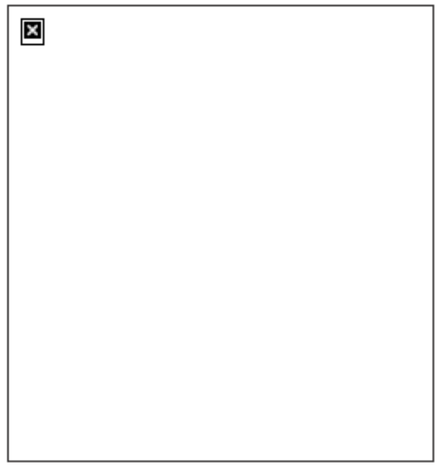


FL-GLOBAL-GLOFRIS-50

Geoscientific Information by GLOFRIS

Fluvial flood inundation layers for Indonesia, from an adapted version of the GLOFRIS global flood model. Flood inundation maps were provided for 8 return periods between 5yr and 1000yr. The unit of the data is inundation depth in meters. The data resolution is 30 arc seconds (approximately 1km at the equator). The data are provided in GeoTIFF raster file format '.tif', with the geographic projection EPSG:4326 - WGS84. For further information on GLOFRIS: Ward, P.J., Jongman, B., Sperna Weiland, F., Bouwman, A., Van Beek, R., Bierkens, M.F.P., Ligtvoet, W., Winsemius, H.C., 2013. Assessing flood risk at the global scale: model setup, results, and sensitivity. Environmental Research Letters, 8, 044019, doi:10.1088/1748-9326/8/4/044019. Winsemius, H.C., Van Beek, R., Jongman, B., Ward, P.J., Bouwman, A., 2013. A framework for global river flood risk assessments. Hydrology and Earth System Sciences, 17, 1871-1892, doi:10.5194/hess-17-1871-2013.

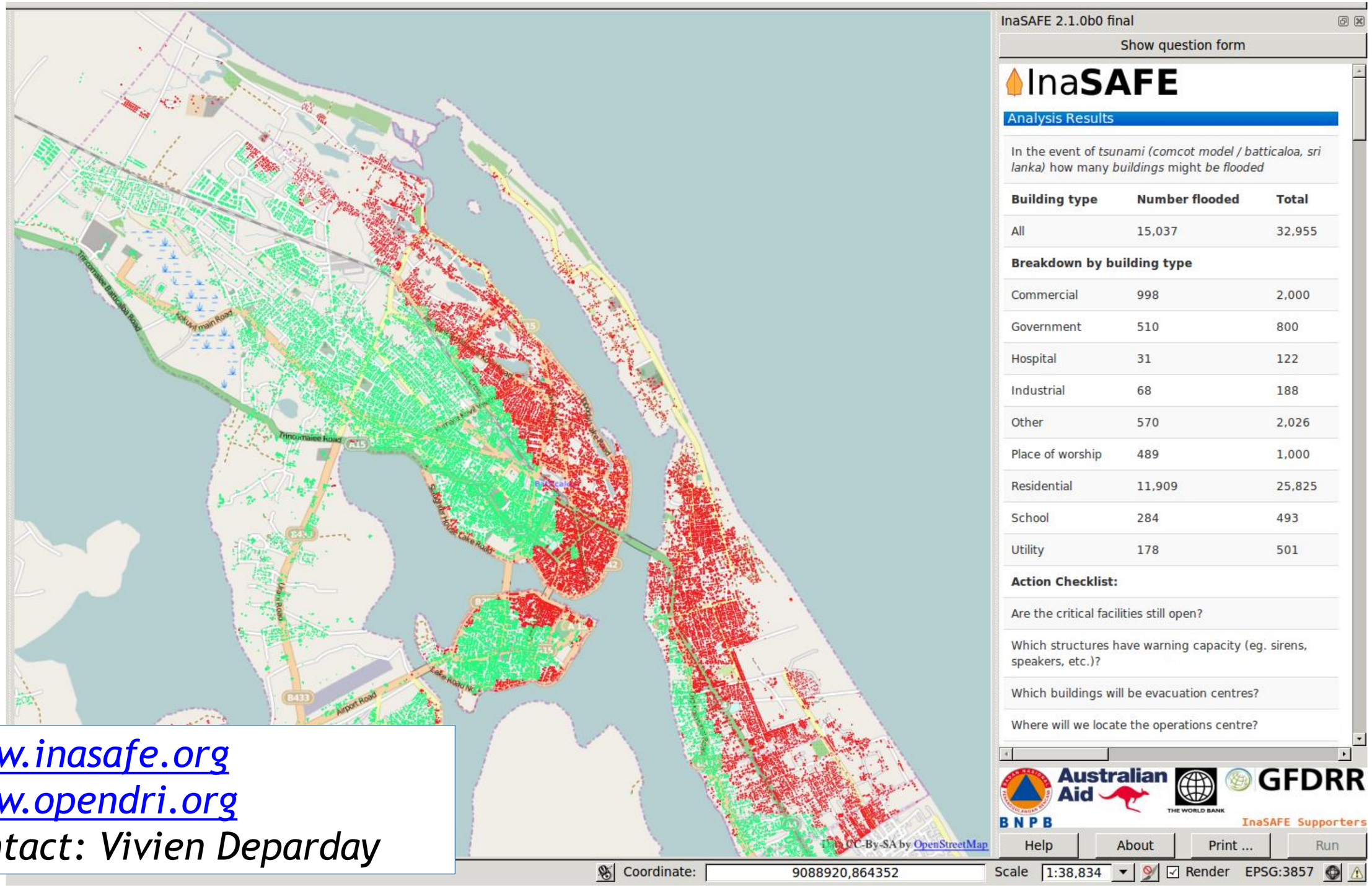
| 426 | 0 | 0 Create a Map



FL-GLOBAL-GLOFRIS-25

Geoscientific Information by GLOFRIS

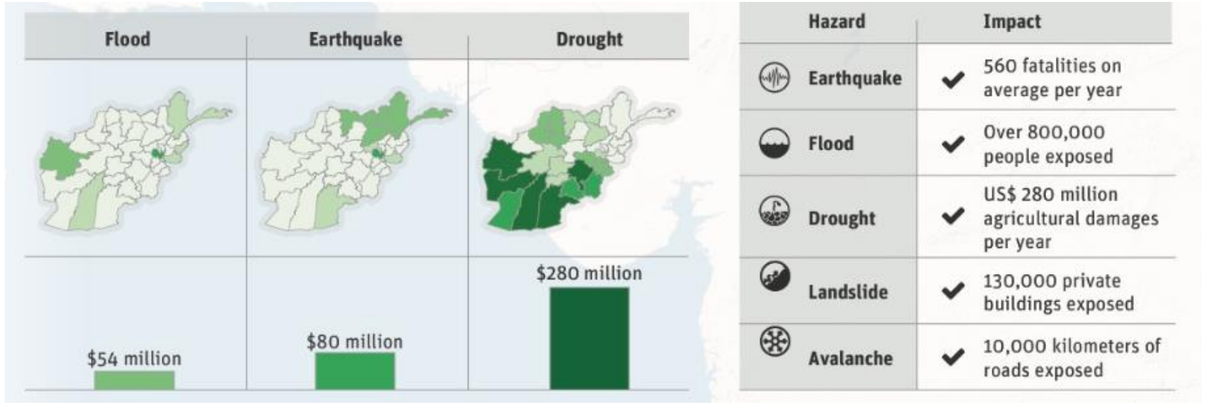
Fluvial flood inundation layers for Indonesia, from an adapted version of the GLOFRIS global flood model. Flood inundation maps were provided for 8 return periods between 5yr and 1000yr. The unit of the data is inundation depth in meters. The data resolution is 30 arc seconds (approximately 1km at the equator). The data are provided in GeoTIFF raster file format '.tif', with the geographic projection EPSG:4326 - WGS84. For further information on GLOFRIS: Ward, P.J., Jongman, B., Sperna Weiland, F., Bouwman, A., Van Beek, R., Bierkens, M.F.P., Ligtvoet, W., Winsemius, H.C., 2013. Assessing flood risk at the global scale: model setup, results, and sensitivity. Environmental Research Letters, 8, 044019, doi:10.1088/1748-9326/8/4/044019. Winsemius, H.C., Van Beek, R., Jongman, B., Ward, P.J., Bouwman, A., 2013. A framework for global river flood risk assessments. Hydrology and Earth System Sciences, 17, 1871-1892, doi:10.5194/hess-17-1871-2013.

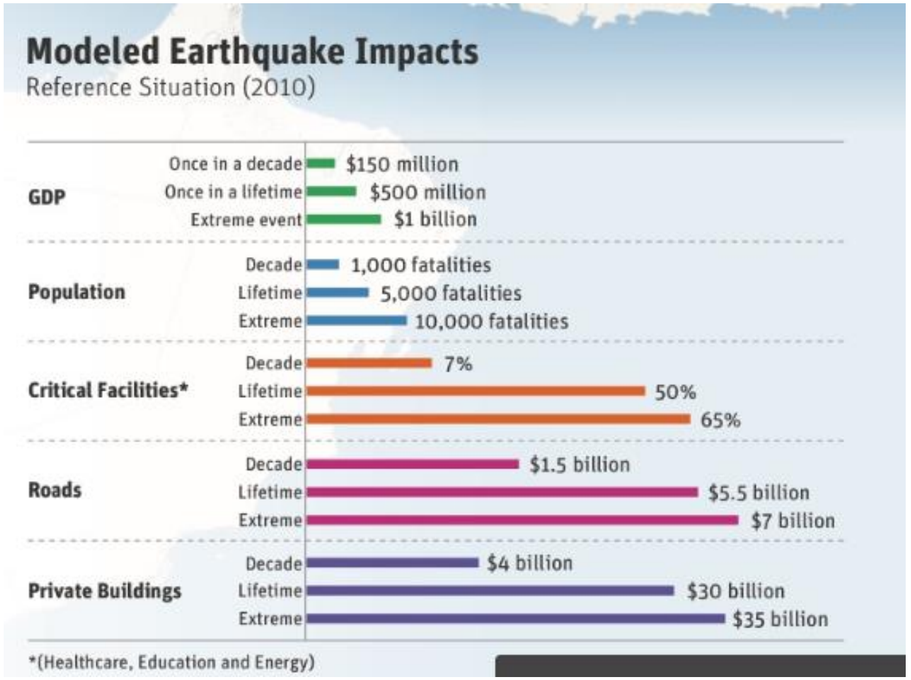


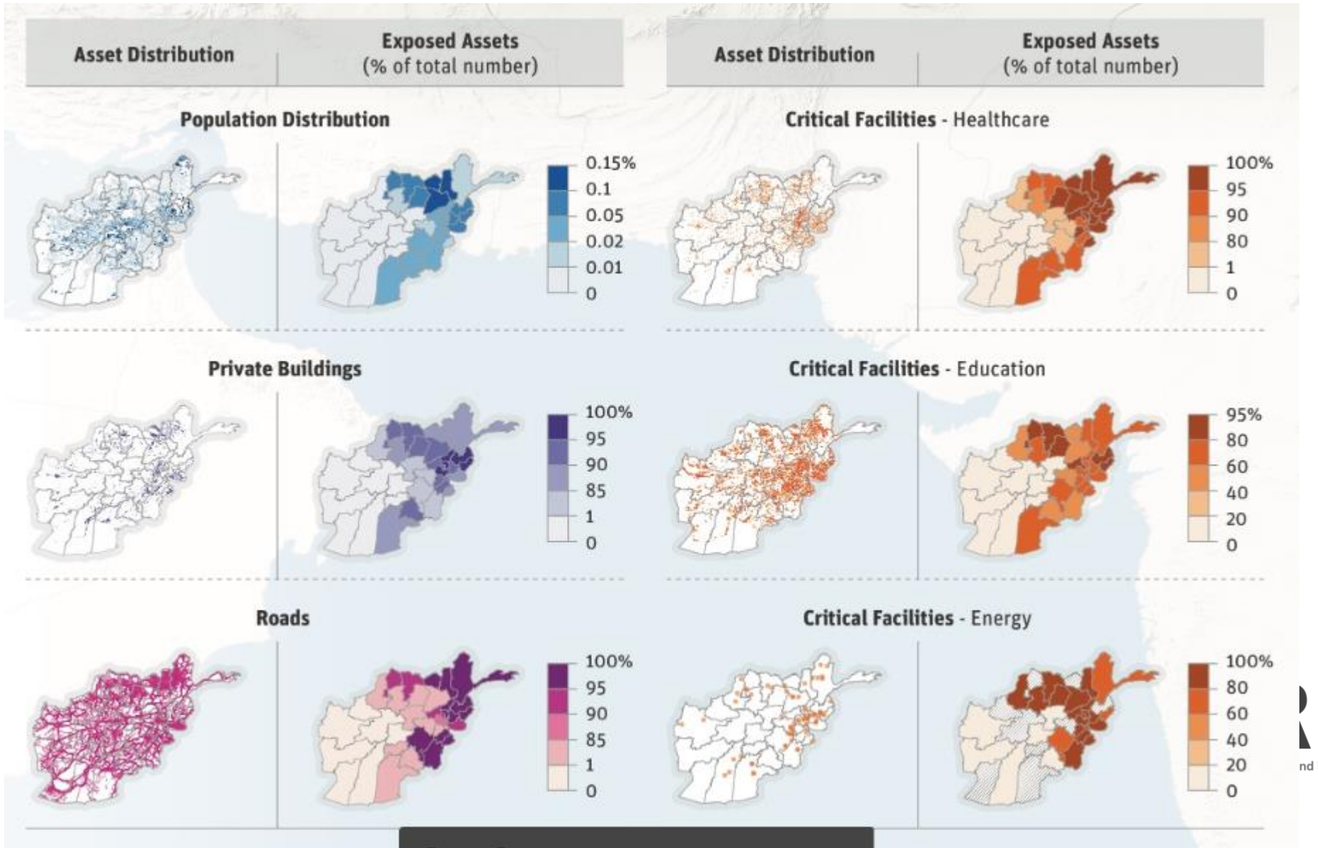
www.inasafe.org
www.opendri.org
Contact: Vivien Deparday

Probabilistic Risk Assessment [Afghanistan Risk Profile]

- *Aim: Provide estimates of potential costs and benefits of a set of possible risk reduction measures, and mainstream disaster risk into project design and implementation.*
- *Current and future climate*
- *Drought, flood, avalanche and earthquake*







What is at risk and where?

[Afghanistan Risk Profile]

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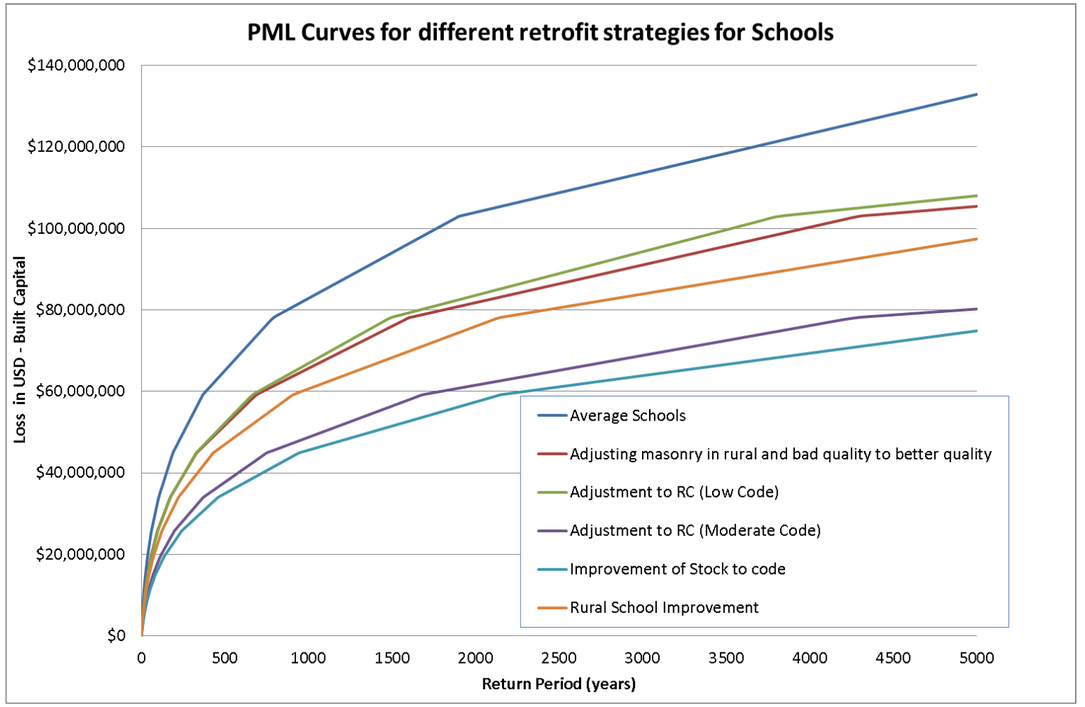


Table 3.33 : CBA calculations for Kabul and Panj Amur case studies (details in appendix B)

Economic growth rate	7,0%			Benefits
Description	**Cash Flow**	**IRR**	**Investment**	**1**
	0	0,0%		0
	0	0,0%		0
Agriculture area Kunduz (20 years)	9.140	13,5%	(3.200)	301
Puli Khumri (20 years)	8.152	29,0%	(990)	223
Fayzabad (20 years)	3.918	22,0%	(694)	113
Fayzabad (20 years) +	3.275	12,1%	(1.337)	113
Kabul Flood wall	21.043	138,4%	(398)	523
Puli Khumri (20 years) +	8.059	26,9%	(1.083)	223
	0	0,0%		0
Kabul Flood proofing (1/20)	9.639	12,2%	(3.890)	330
Kabul Flood proofing (1/50 + 20 years)	9.268	10,3%	(4.712)	341
	0	0,0%		0
Kabul Flood proofing (1/20 + 20 years)	9.640	12,2%	(3.889)	330
Kabul Flood proofing (1/50 + 50 years)	133.914	10,3%	(4.712)	341
Kabul Flood proofing (1/100 + 100 years)	4.439.744	9,6%	(5.273)	359

Contact: Alanna Simpson
Brenden Jongman
www.disasterrisk.af.geonode.org
Risk Profile

Asset Level Analysis

[HydroPower - Urban water supply]

- Roadmaps (guidelines) under development to build resilience to climate change into:
  - Urban water supply and sanitation systems
  - Hydropower
- Focused on development specialists and investors
- Action orientated advice on the design and maintenance of hydropower and water supply investments
- Highlights the importance of decision making under uncertainty when climate models lack consensus on trends related to rainfall and heat.

Contact: Laura Bonzanigo

Decision Making under Uncertainty

Decision Making Under Uncertainty Runs the Analysis Backwards

“Predict Then Act”

What will the future be? → What is the best near-term decision? → How sensitive is our decision to our predictions?

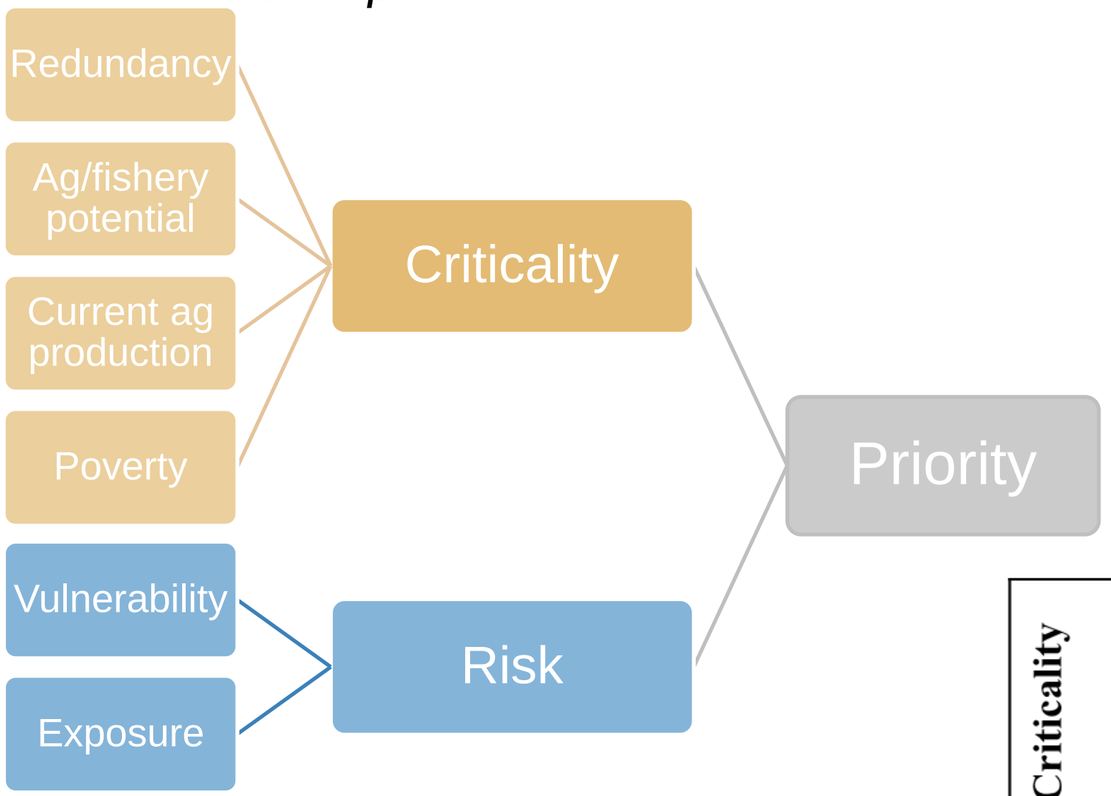
Decision Making Under Uncertainty (DMU)

What are the available strategies? → Identify vulnerabilities of these strategies → Develop strategy adaptations to reduce vulnerabilities

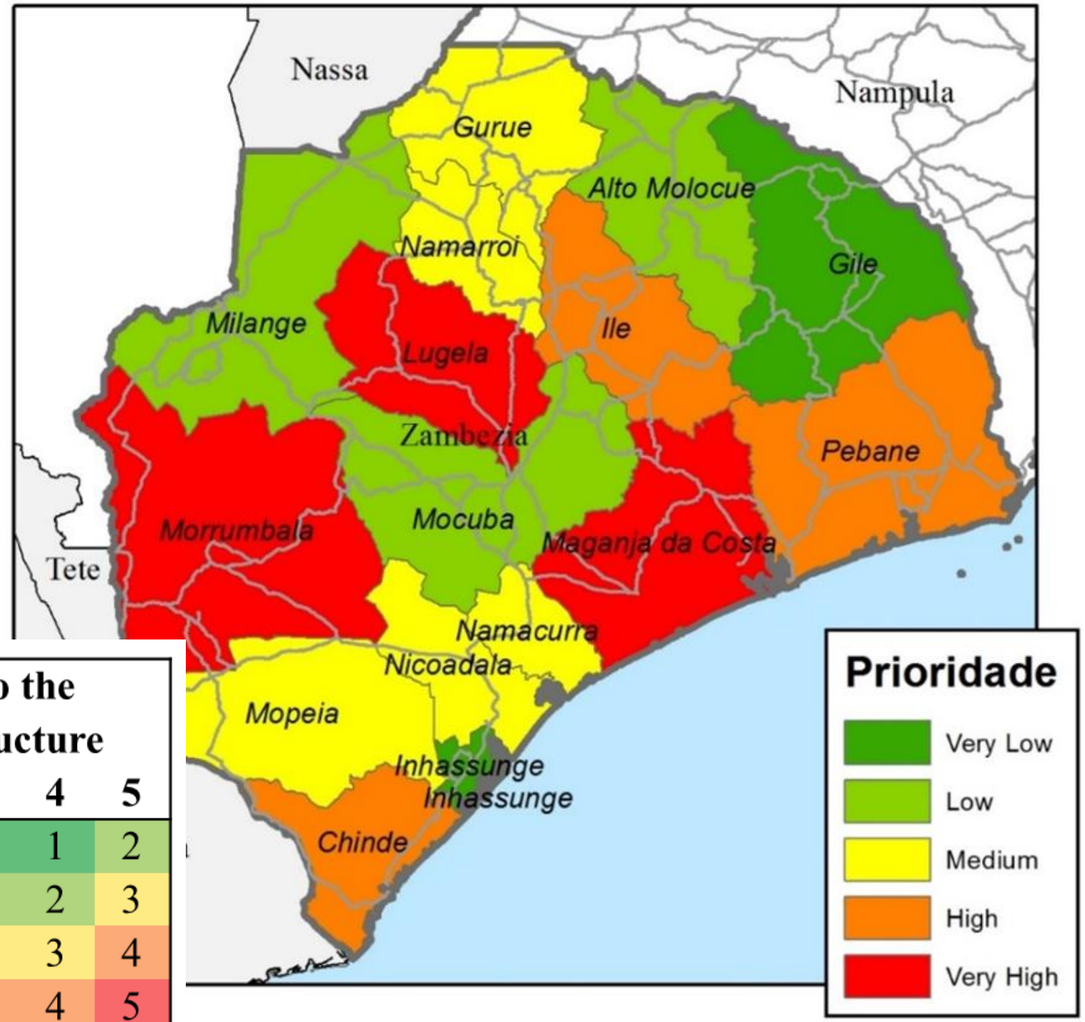
Prioritizing Interventions

[Roads, Mozambique]

- *Aim: Improve rural accessibility and agricultural production through resilient road access*
- *Assessment enables the prioritization of districts for transportation investment*
- *Flood maps considered low, medium, high climate scenarios over 10 return periods*

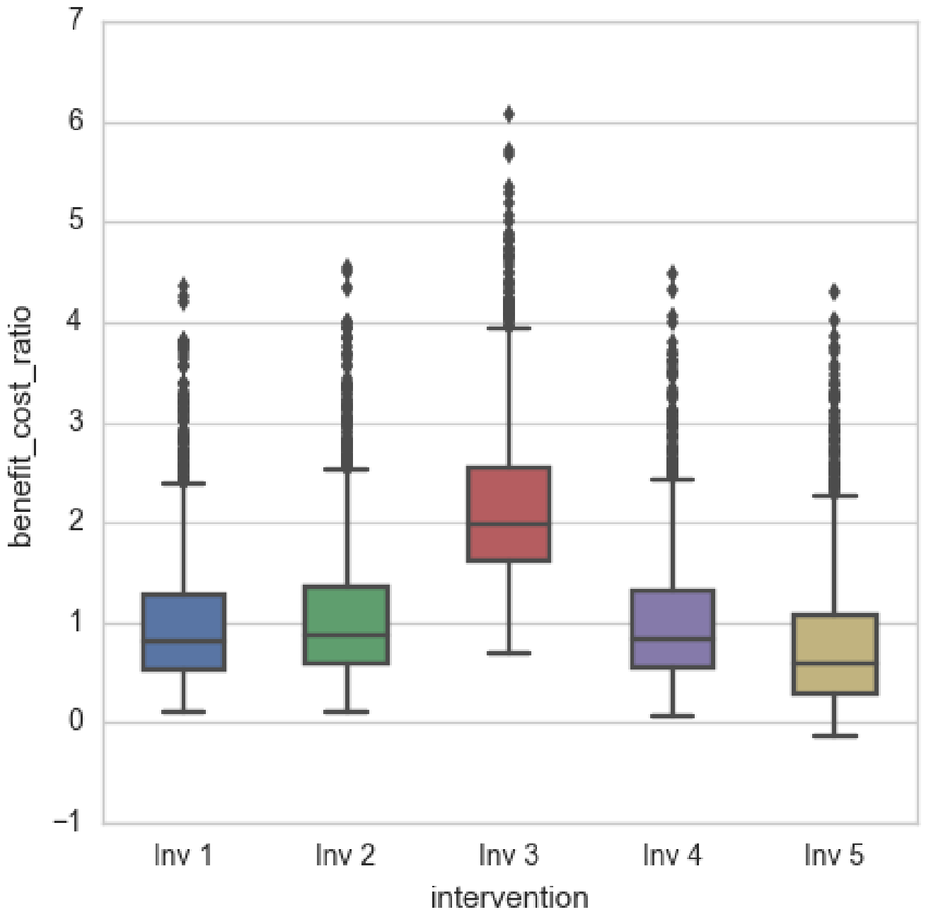


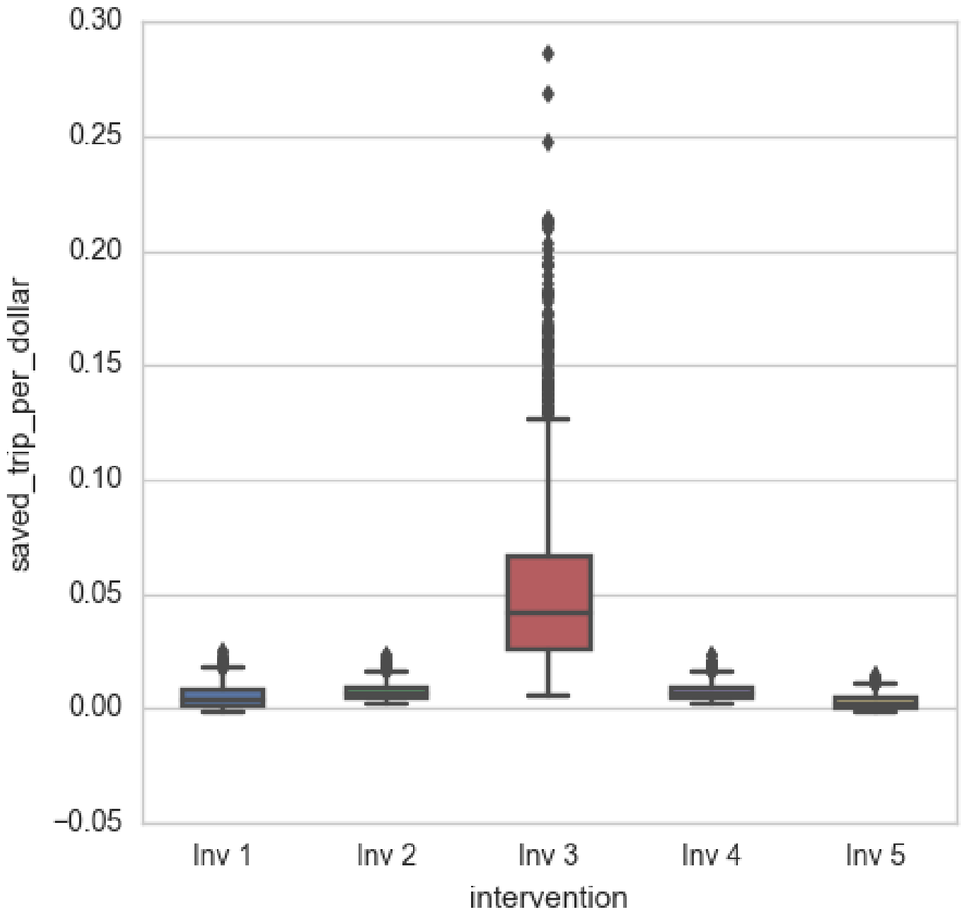
Criticality	Risk to the infrastructure 1	2	3	4	5
1	1	1	1	1	2
2	1	2	2	2	3
3	2	2	3	3	4
4	3	3	4	4	5
5	3	4	4	5	5



Prioritizing Interventions

[Roads, Mozambique]





Investment 3 (bridges and culverts) is the best option in 98% of scenarios and has a BCR >1 in 95%.

It has the highest saved trips/dollar ratio.

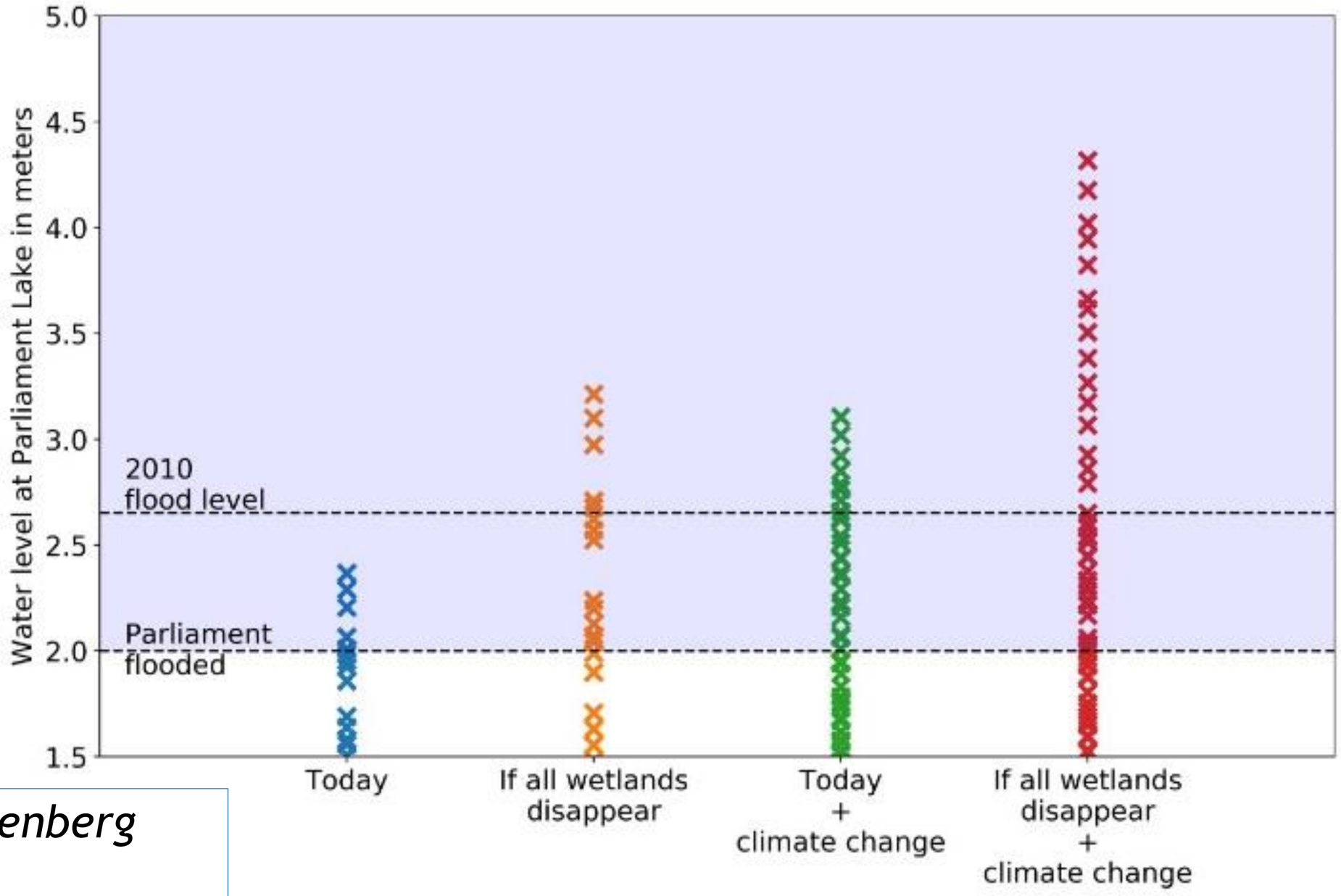
Contact: Julie Rozenberg
Stephane Hallegatte

To develop or not to develop in Colombo

Let's focus o
infrastructur
so that we
can build
hotels in the
wetlands!

Let's protect the
wetland to reduc
flood risks

To develop or not to develop in Colombo



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