Framing Infrastructure Climate Risk Assessment For Enhanced Climate Services and National Adaptation Planning – The Costa Rica Example

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On behalf of:

Federal Ministry
for the Environment, Nature Conservation,
Building and Nuclear Safety

of the Federal Republic of Germany

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Enhancing Climate Services for Infrastructure Investments

CSI Global Project

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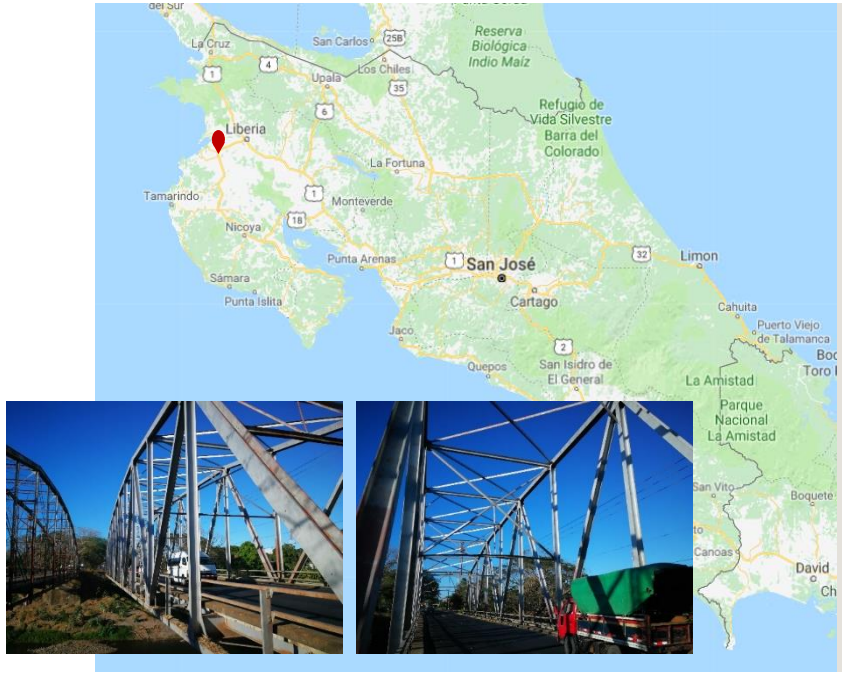
CLIMATE RISK ASSESSMENT PILOT – GUARDIA BRIDGE – COSTA RICA

Infrastructure sector: Bridges



Name: Puente de Guardia
River: Río Tempisque
Province/Location: Guanacaste, on Ruta 21 between Liberia & Filadelfia

Strategic value for the region

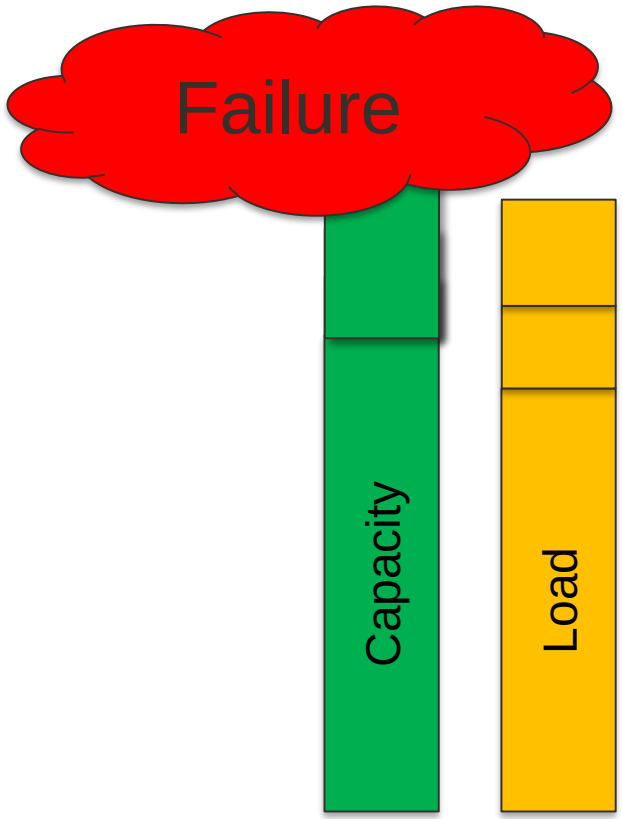
- 11,000 vehicles use the bridge every day, within 200 km the only possibility of crossing the river
- Important route for tourism to connect Liberia and the international airport Daniel Oduber with Guanacaste's pacific coast and the Nicoya Peninsula
- Transport route for local sugar factories which need to cross Tempisque that separates their harvest sites and production facilities

Past climatic events

Torrential rains regularly increase the water level of the Río Tempisque and lead to floods and inundations that damage the bridge structure

- An extreme flooding in October 2007 completely inundated the road surface of the bridge and made it impassable

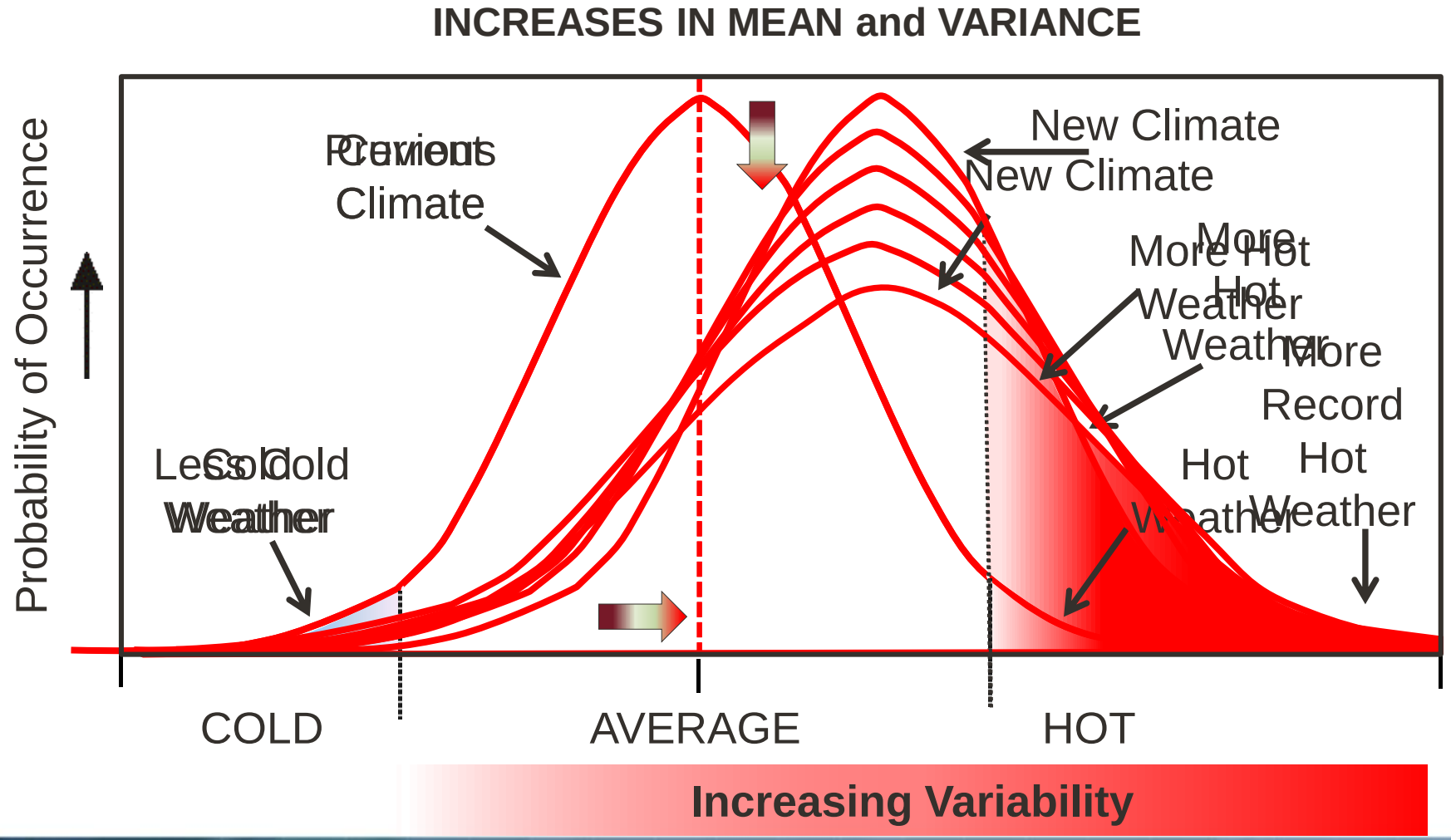
How do Small Changes Lead to Catastrophic Failure?



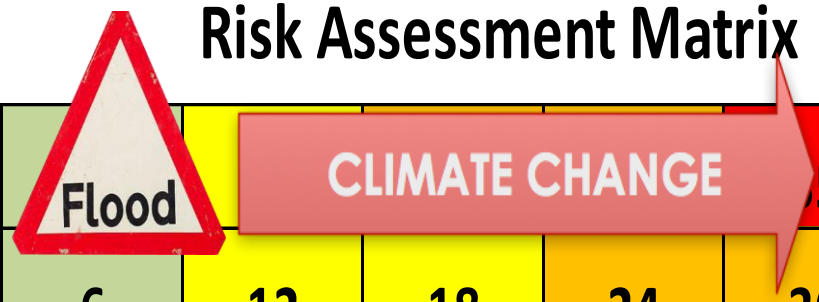
- Design Capacity
- Safety Factor
- Impact of age on structure
- Impact of unforeseen weathering

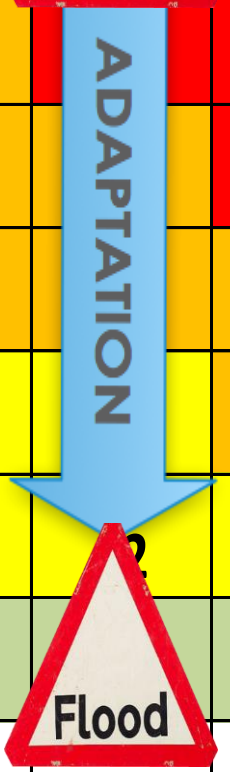
- Design Load
- Change of use over time
  - e.g. population growth
- Severe climate event

The probability of extreme changes in climate parameters



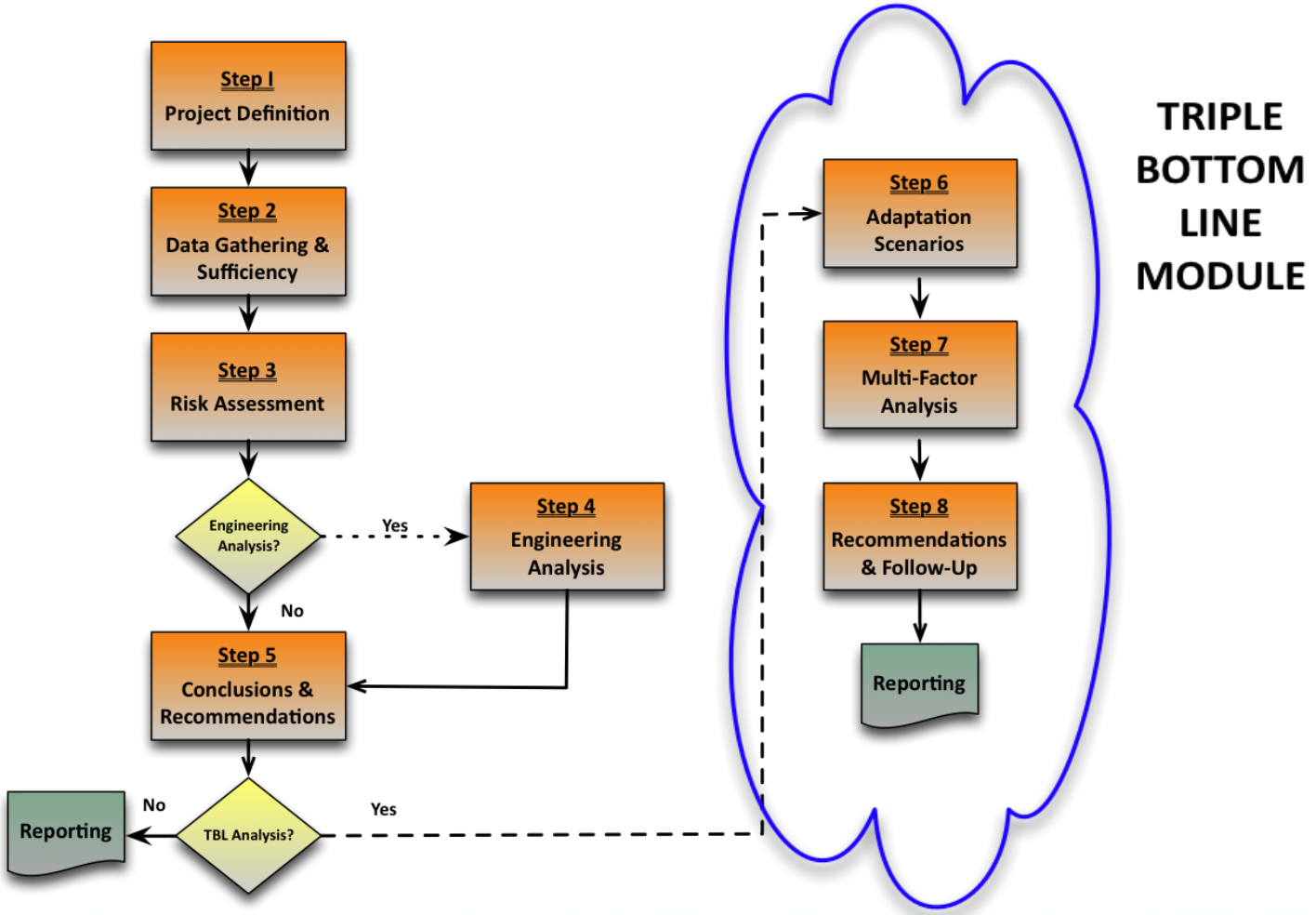
Risk Assessment Matrix





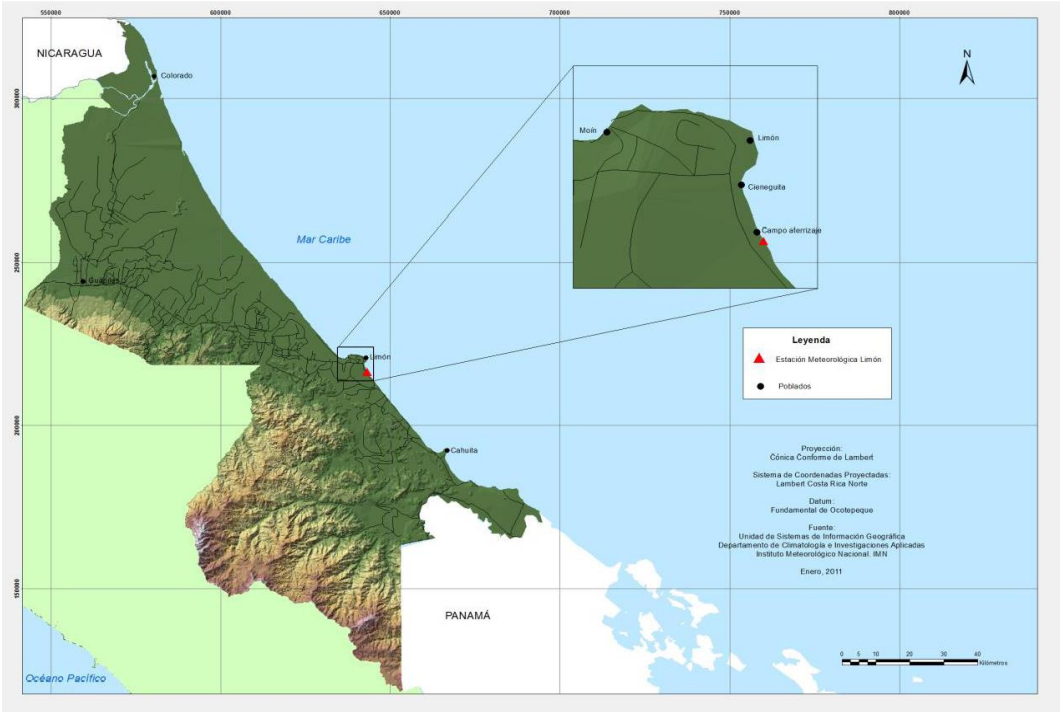
Consequence								
	7					5		49
	6	6	12	18	24	30		42
	5	5	10	15	20	25		35
	4	4	8	12	16	20		28
	3	3	6	9	12	15		21
	2	2	4	6	8	10	2	14
	1	1	2	3	4	5		7
		1	2	3	4	5	6	7
		Probability of Occurrence						

PIEVC: 5 Key Steps + Optional TBL Module



Costa Rica Limon Infrastructure Case Study
April 2010 to March 2011

- The City of Limon sewage system was selected by Costa Rica as the representative and priority infrastructure
- Limon is located on the Caribbean Sea side of Costa Rica
  - Capital city and main hub of the Limon province
  - Total Metro population =105,000



Costa Rica Participating Organizations

CFIA (Colegio de Ingenieros y de Arquitectos de Costa Rica

AyA (Instituto Costarricense de Acueductos y Alcantarillados

IMN (Instituto Meteorologico Nacional)

Good Practices to Understand and Minimize Climate Risks to Infrastructure

- Gain **climate understanding**
- Understanding **new vulnerabilities**
- **Prioritize the risks** (Urgent to Least Urgent)
- **Minimize the risks** (Engage Risk Reduction Programs)

Combining these Key Activities provides key elements of an ***Infrastructure Climate Risk Assessment*** and ***Mitigation Plan***

Integrate Infrastructure Risk Mitigation Plan into National Adaptation Plan

Thank you!

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