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ADAPTING ROAD INFRASTRUCTURE TO CLIMATE CHANGE: INNOVATIVE APPROACHES AND TOOLS

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ADAPTING ROAD INFRASTRUCTURE TO CLIMATE CHANGE: INNOVATIVE APPROACHES AND TOOLS

The framework



Extreme climate events have major direct impacts on transport infrastructure



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What is at stake?

- Transport infrastructure is usually very vulnerable to climate events significantly stronger than their design level
- While we have to design engineering structures with life spans of one hundred years or more, this is precisely the period during which climate change is expected to be especially strong



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What is at stake?

- Despite persistent scientific uncertainties, the cost of “inaction” clearly demonstrates the essential need to act now and in a relevant manner
- In addition, transport infrastructure operators note an increase in social intolerance to hazards (whether of climatic or other nature) over the years

➔ New approaches and tools to assess the vulnerability to climate change are required



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What can we do?

- As budgets are not limitless, it is impossible to build an infrastructure capable of withstanding all climatic hazards
- The only reasonable way to reconcile these constraints is to express the problems in terms of risk, and to address them by means of an analytical process involving all stakeholders

➔ This process expands from upstream institutional approach to real-time risk management



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1) Assessing Transport Sector Preparedness to Climate Change

- Improve knowledge and develop decision-making tools
- Inventory critical points within the transportation network regarding climate risks
- Change construction standards, especially concerning hydraulic works
- Implement risk analysis and cost-benefit analysis in the decision-making process of major investments



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1) Assessing Transport Sector Preparedness to Climate Change

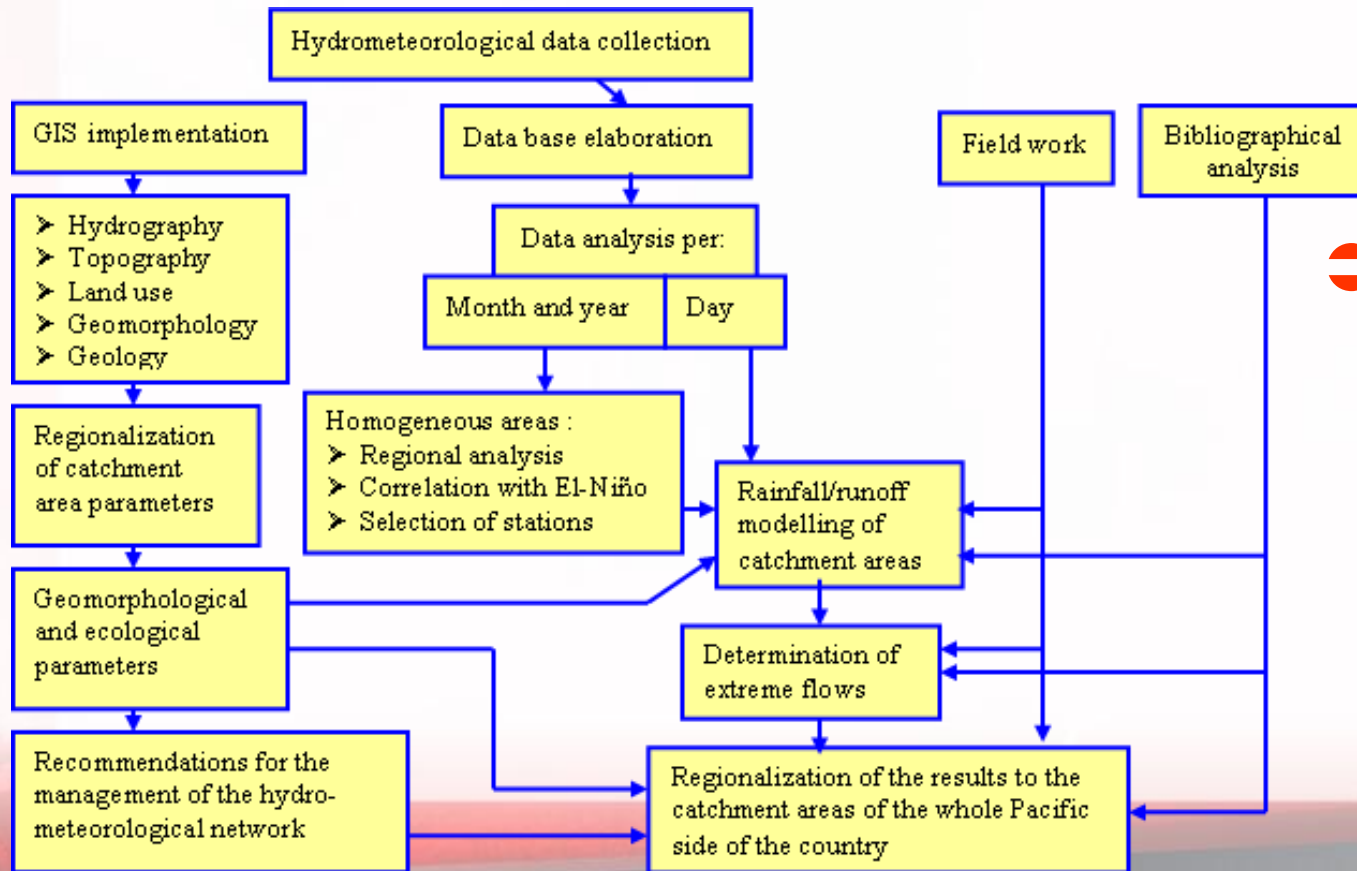
- Anticipate and manage extreme events with specific tools
- Define and schedule programs to rebuild or retrofit key infrastructure likely to be affected by climate change
- Strengthen the institutional framework

➔ **Pilot study on adaptation to climate change in the Moroccan transport sector**



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2) Assessing Hydro-meteorological Issues when Designing Transport Infrastructure

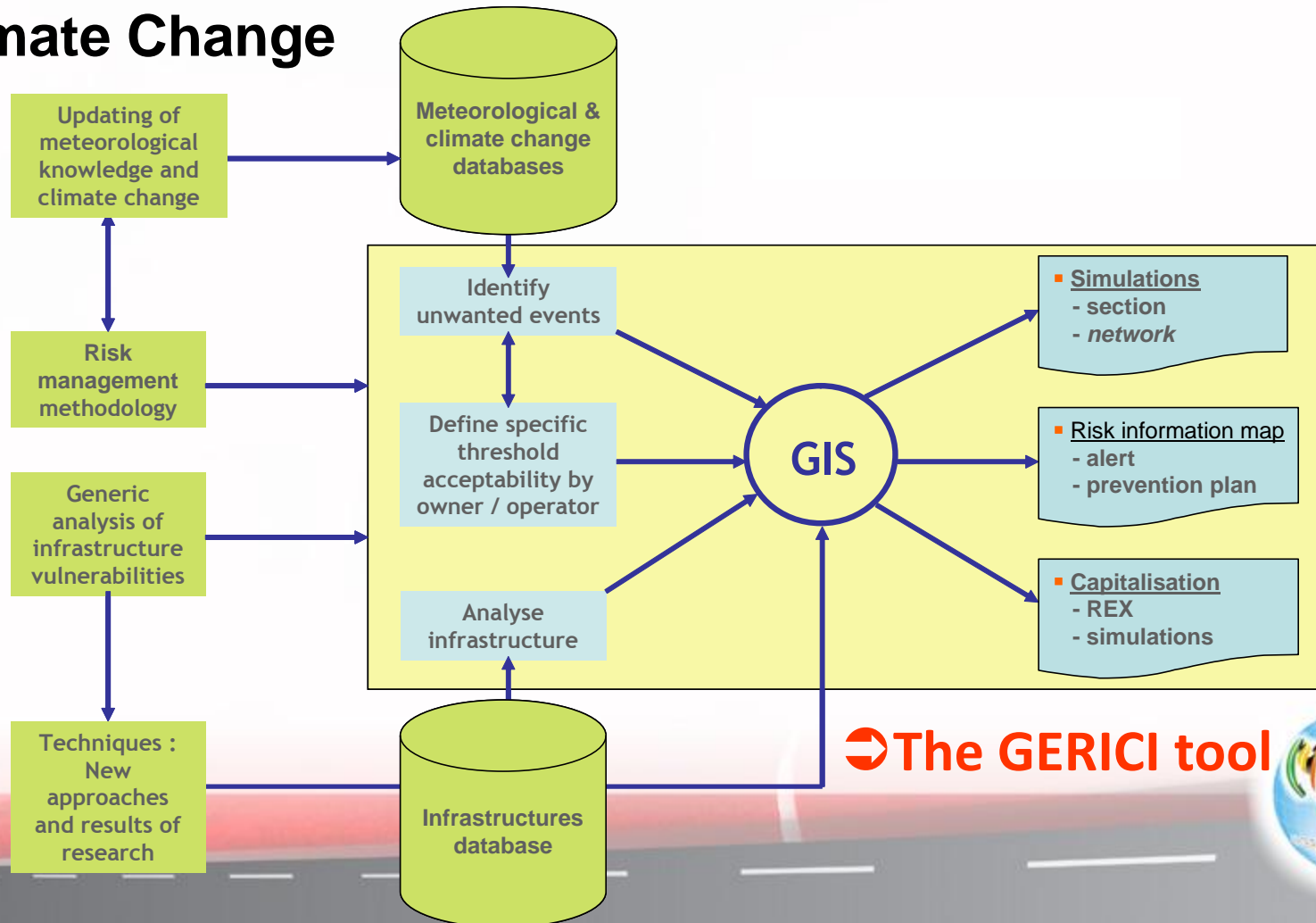


➔ Case study on the evaluation of the El-Niño phenomenon on the coastal road network in Peru



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3) Identifying Transport Infrastructure Vulnerabilities to Climate Change



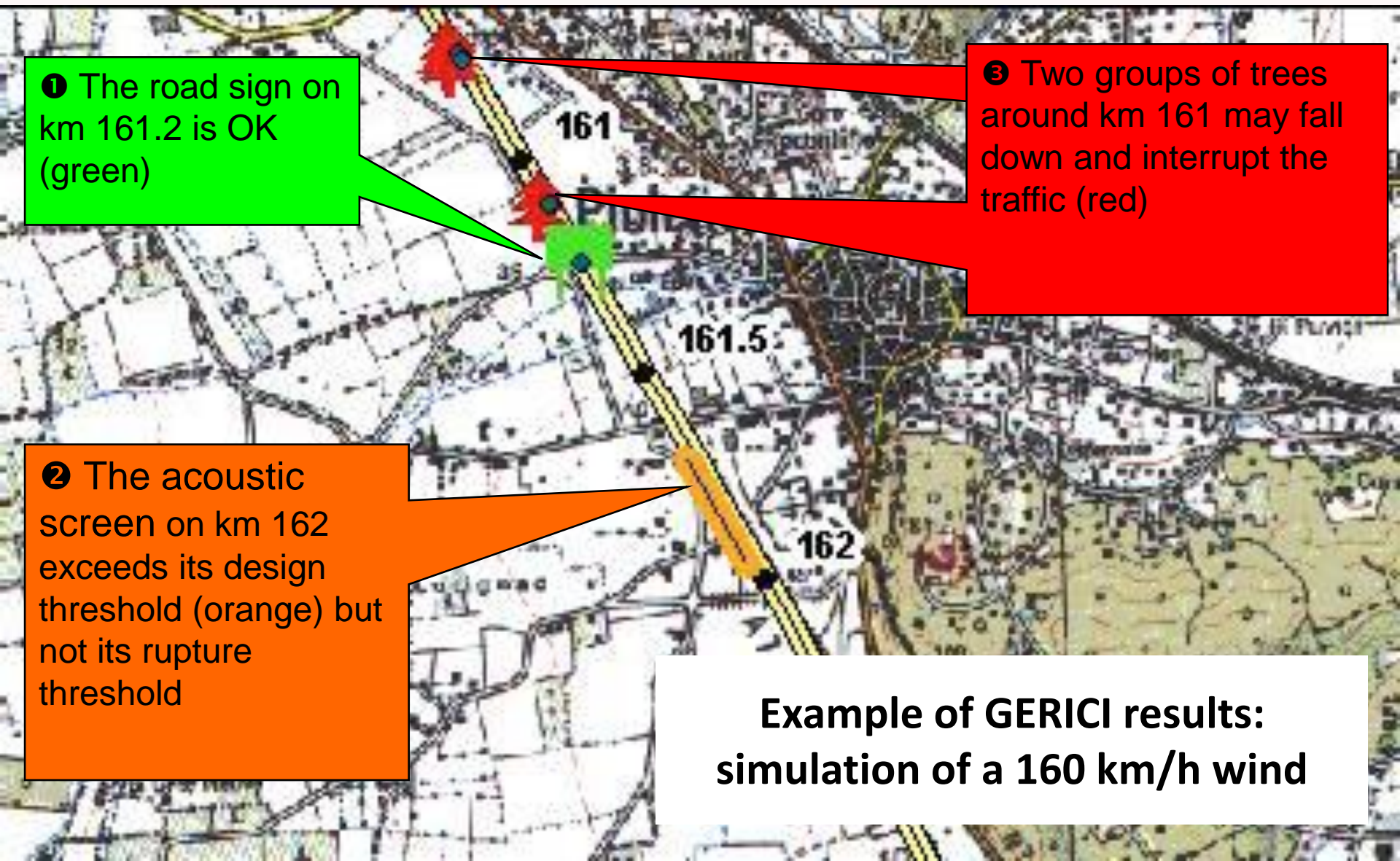
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❶ The road sign on km 161.2 is OK (green)

❸ Two groups of trees around km 161 may fall down and interrupt the traffic (red)

❷ The acoustic screen on km 162 exceeds its design threshold (orange) but not its rupture threshold

Example of GERICI results:
simulation of a 160 km/h wind



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4) Forecasting and Managing Extreme Climate Events in Real Time



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5) Alerting Infrastructure Owners, Operators and Users

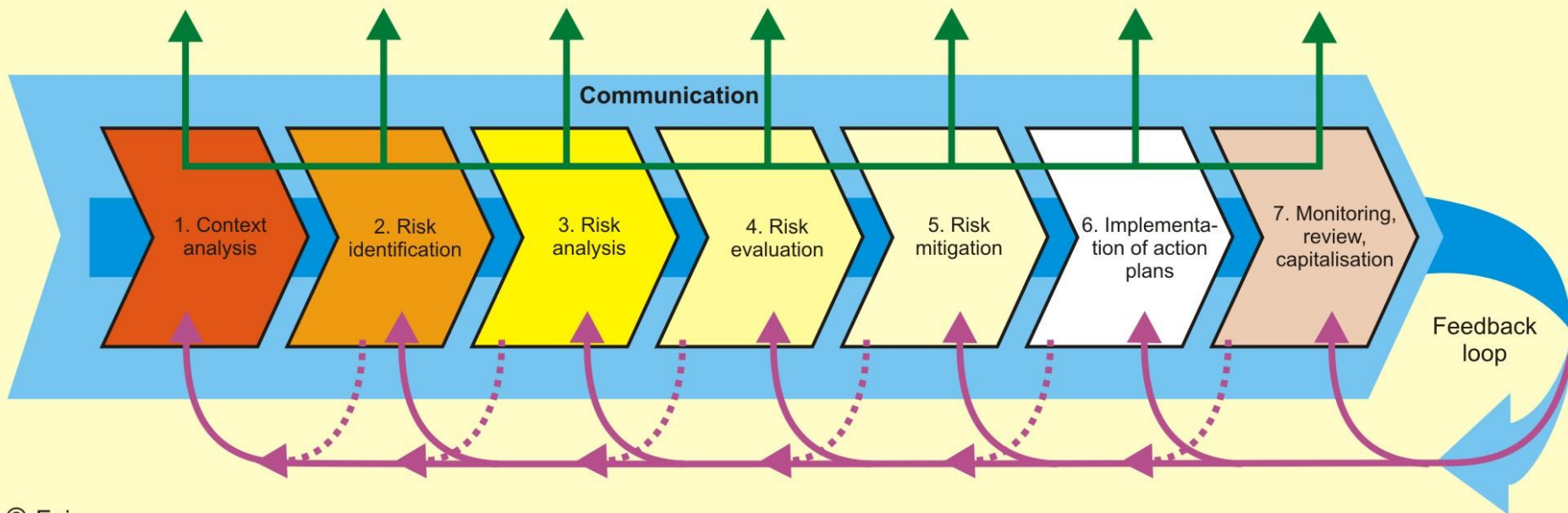
- Transmission of information on the hydro-meteorological conditions of the catchment area with data provision in real time through the internet
- Securing information transmission during exceptional meteorological events with private digital radio networks
- Transmission of alerts on pagers to the members of the crisis units
- Outsourced mass call system to alert the population in the catchment area exposed to the risks

➔ **The TRACE system**



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6) Managing Climate Change Risks for Transport Infrastructure and Networks



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➔ The RIMAROCC method



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Thank you for your attention ...

