World Bank Group Report Launch:
Financial Protection of Critical Infrastructure Services

Data and Analytics to Design Risk Financing Programs for Critical Infrastructure Services

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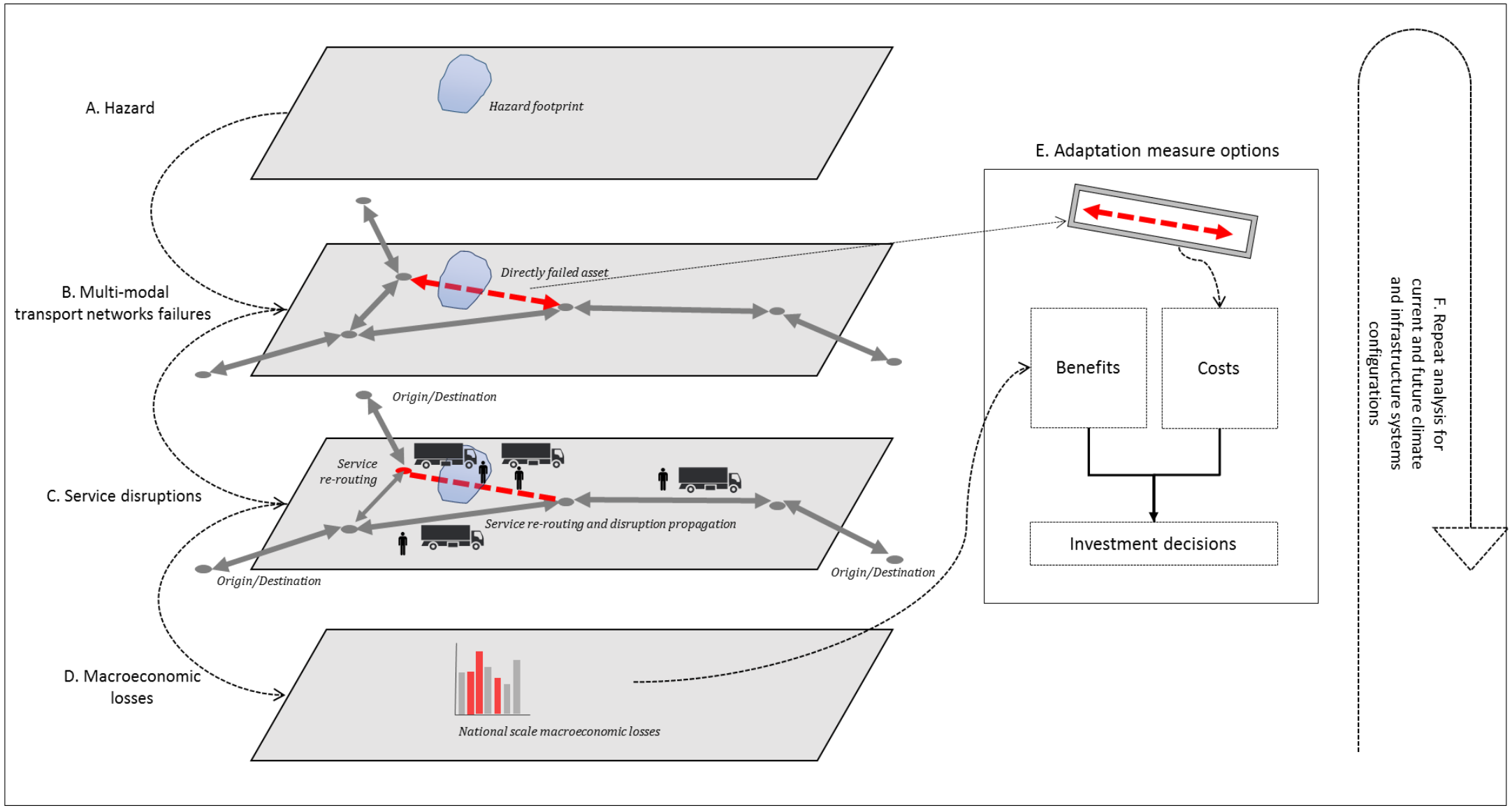
Risk analytics to inform decision making

Geospatial analysis of risks to infrastructure systems informs:

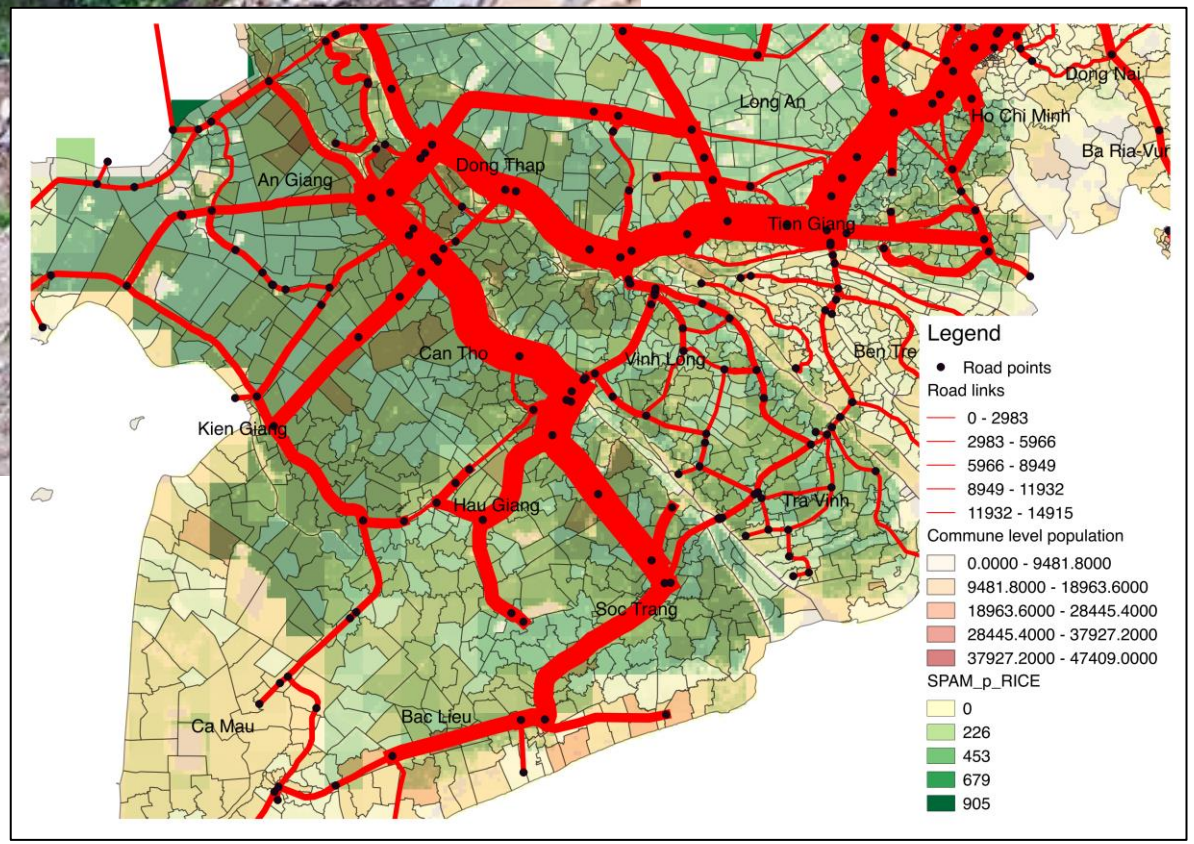
- Targeting and pricing of disaster risk financing and insurance:
  - Indemnity insurance
  - Parametric insurance
  - O&M finance
- Prioritisation of adaptation investments
- Climate risk reporting for infrastructure investments
- Macro-prudential regulation

Infrastructure risk analysis calculations

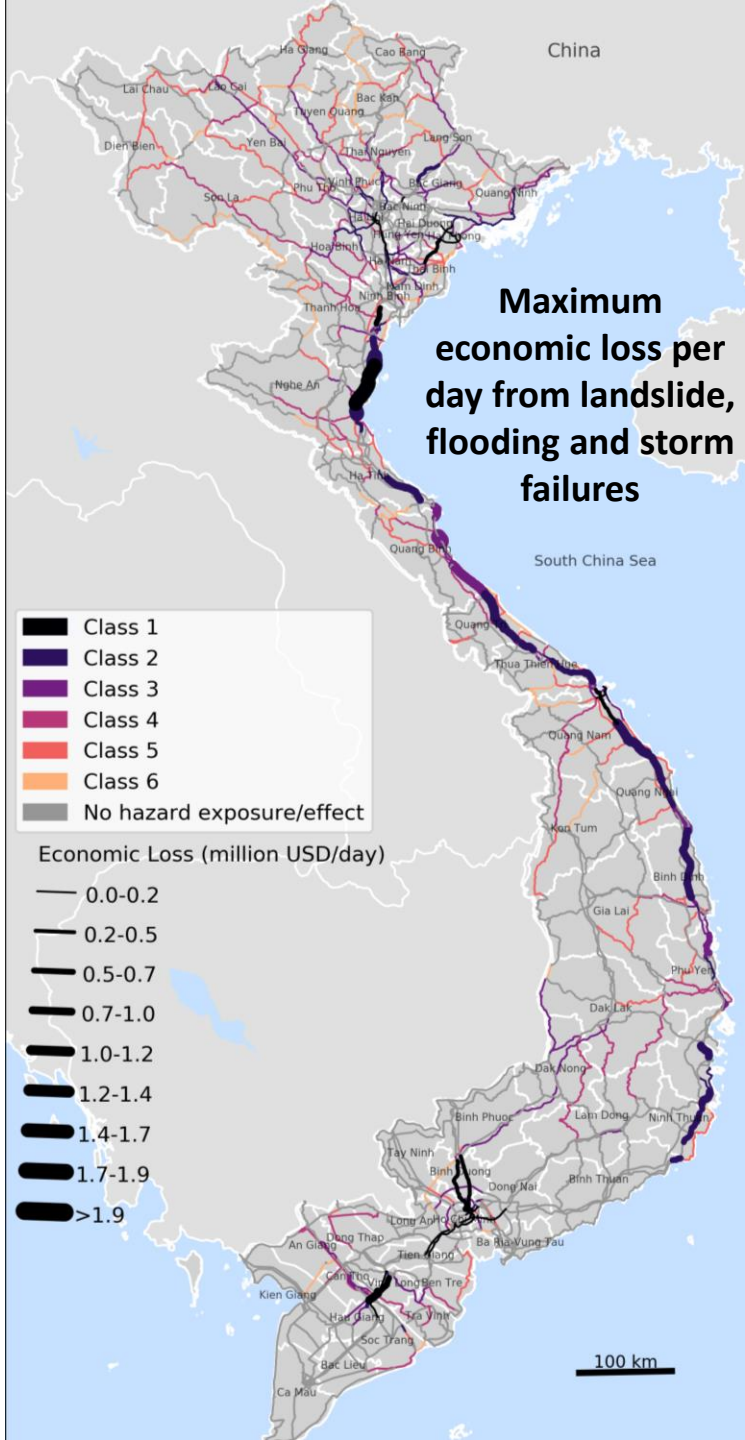


Application in Vietnam

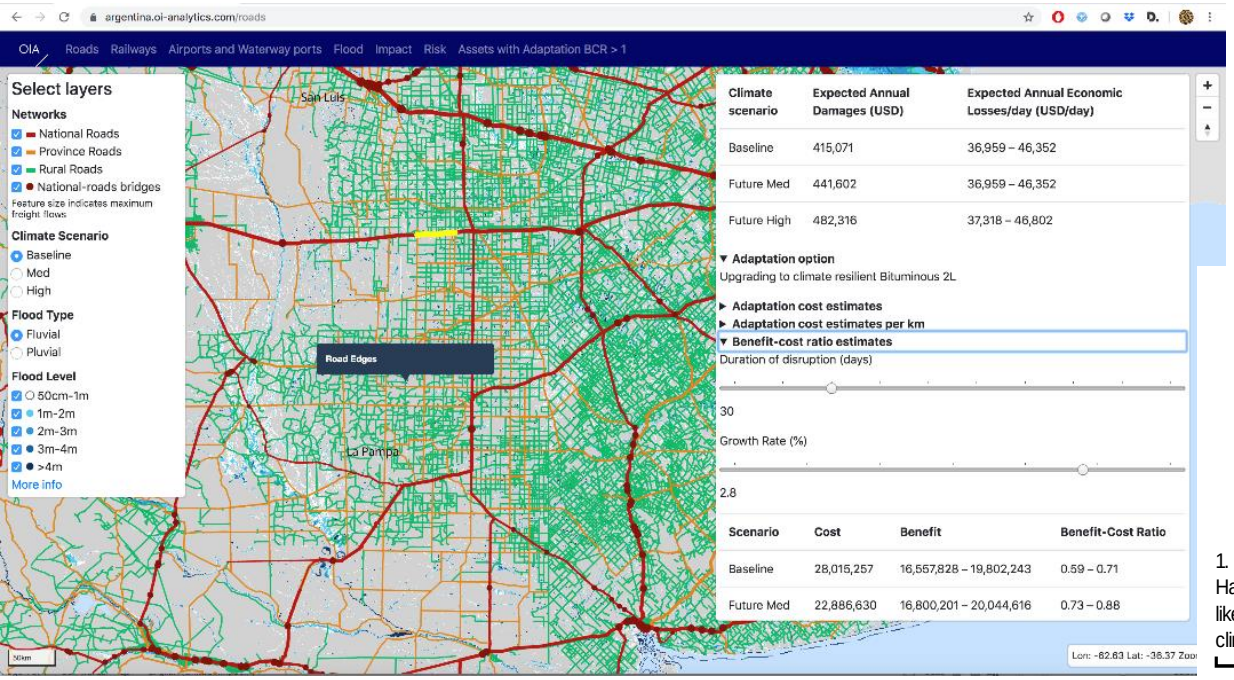
Landslide at National highway 4h in Lai Chau – June 2014



Most important routes for agriculture

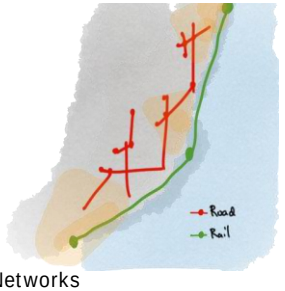


Decision support tools



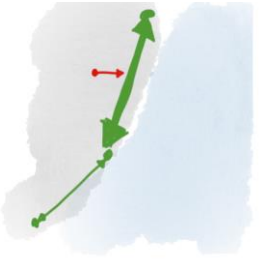
1. Hazard

Hazard maps with intensity and likelihood, under current and future climate scenarios.



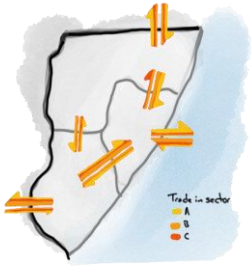
2. Networks

Energy, transport, water systems linked to population and economic activity.



3. Services

Network models of service provision give knock-on effects and indirect impacts of individual asset failure.



4. Socio-economics

Population and firm locations provide demand for infrastructure services. Regional supply-use tables.

5. Fragility ⊗ Exposure = Vulnerability

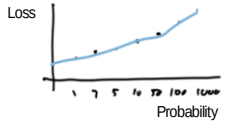
Networks exposed to hazards of varying intensity may lead to direct damages and service disruption.

6. Δ Service Provision = Criticality

Calculate impact of the failure of any single asset on overall service provision in the networked system.

7. Macroeconomic

Calculate wider impacts on the macro-economy through input-output modelling.



8. Probability × Impact = Risk

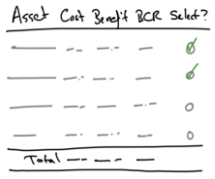
Calculate risk of direct damage and risk of indirect losses due to service disruption.

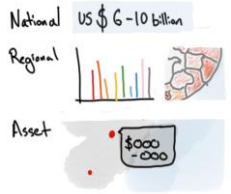
9. Adaption options

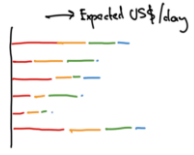
Introduce changes to the network or response to hazard events.

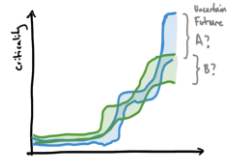
Calculate expected benefits as avoiding potential losses.

Summarise and prioritise options.

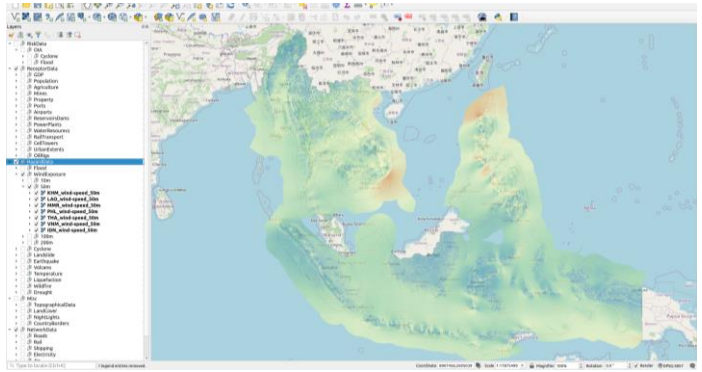


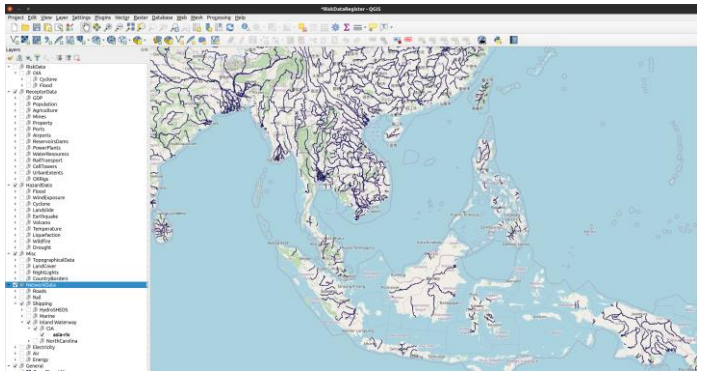


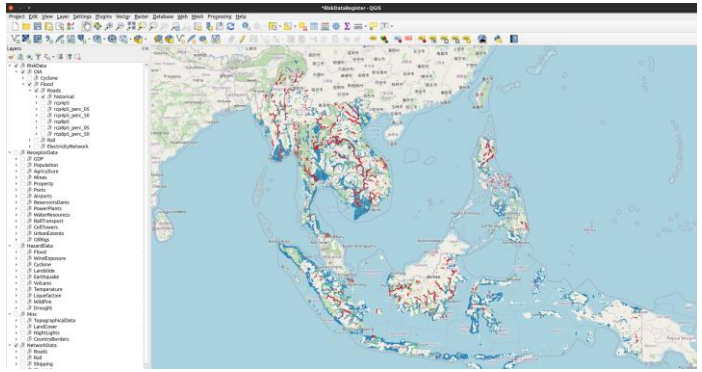


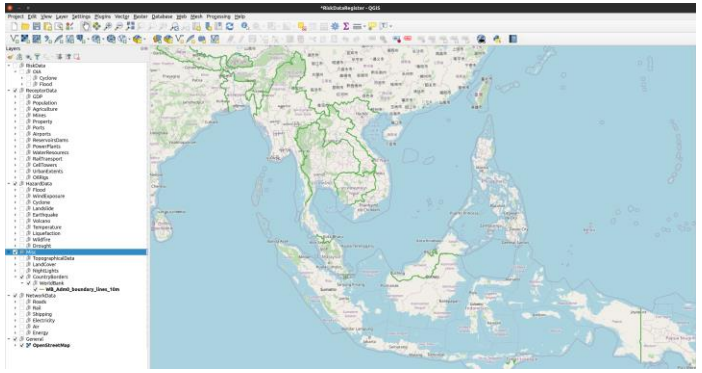


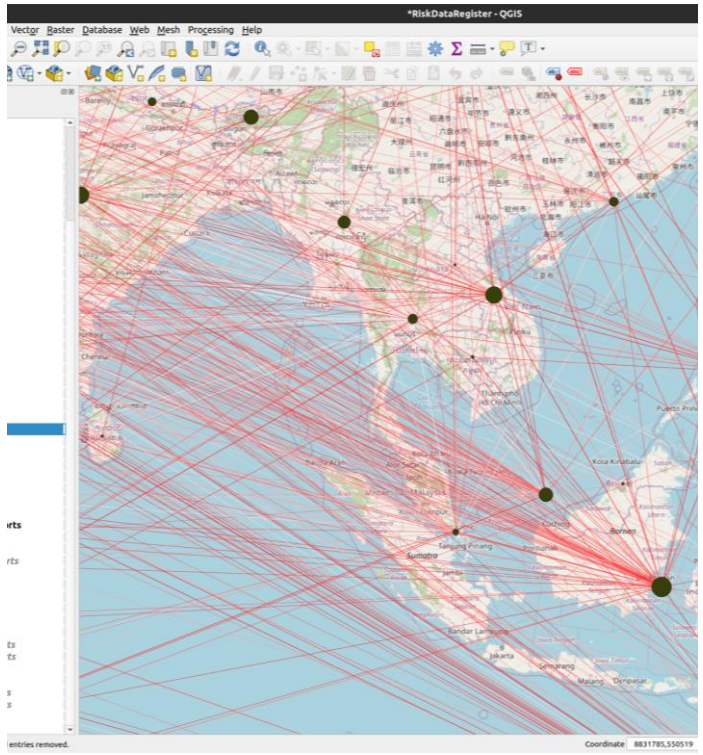
Analytics for Financial Risk Management of Critical Infrastructure in South East Asia











- Demonstrate ***how criticality analyses and vulnerability assessments for critical infrastructure systems can be used to inform financial risk management by governments***, including potential financial products, and present a prototype analytical platform for SE Asian countries
- Apply a criticality framework to a financial risk assessment of critical infrastructure systems to assess ***whether and how the analysis can be scaled*** both geographically and intensity of work.

Conclusion

Challenges and Opportunities for Analytics for Financial Risk Management of Critical Infrastructure

Challenges:

- Asset data: condition, design standards, recovery capacity
- Business interruption, supply chains and economic impacts
- Costs and benefits of maintenance and upgrade

Opportunities:

- Growing demand for quantification of infrastructure risks for a variety of purposes
- Earth Observation and crowd source datasets
- Multi-purpose open source risk analysis software and tools