



Natural Resources
Canada

Ressources naturelles
Canada

From Hazard Research to Risk Reduction Action: An Evolution at the Geological Survey of Canada

Malaika Ulmi, Public Safety Geoscience Program Manager

Canada

Geological Survey of Canada

Mission: Provide authoritative geoscience knowledge to inform the stewardship of Canada's onshore and offshore lands, to sustain responsible resource development for future generations and to ***keep Canada safe from natural hazards and related risks.***



Natural Resources
Canada

Ressources naturelles
Canada

Canada

Geohazard Research Evolution

- Initially, research on earthquakes, terrestrial and marine landslides, tsunami sources, volcanoes and space weather were consolidated within the GSC
- Research focussed on geological and geophysical processes



Natural Resources
Canada

Ressources naturelles
Canada

Canada

“Gather terrestrial, marine and space weather information required to conduct hazard assessments.

Define the magnitude, frequency and extent of hazards.

Develop testable hypotheses to account for the processes and conditions that generate hazards.”



Natural Resources
Canada

Ressources naturelles
Canada

Canada

Some Outcomes and Highlights

- Discovered subduction zone off Canada's west coast
- Discovery of episodic tremor and slip in subduction zone process
- Development and update of seismic hazard model to underpin seismic provisions of building code
- National landslide susceptibility map
- Tsunami assessment for Canada
- Recognition of submarine landslide deposits in areas of development for marine and coastal infrastructure



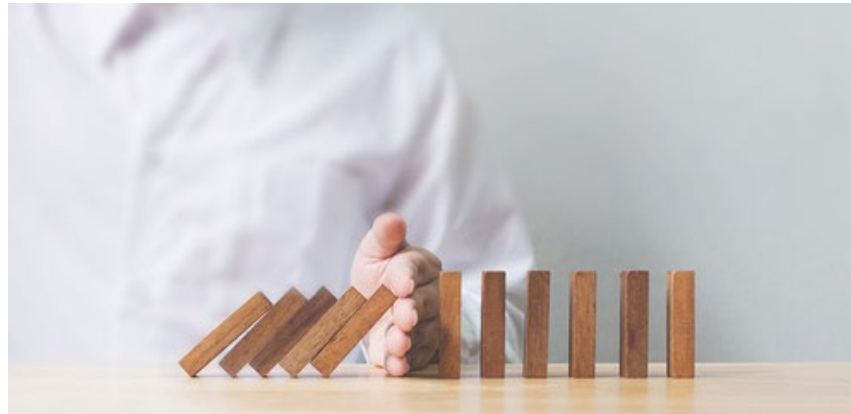
Natural Resources
Canada

Ressources naturelles
Canada

Canada

But...

- There was a gap in uptake of knowledge of hazards into emergency management, planning and other disaster risk reduction actions.



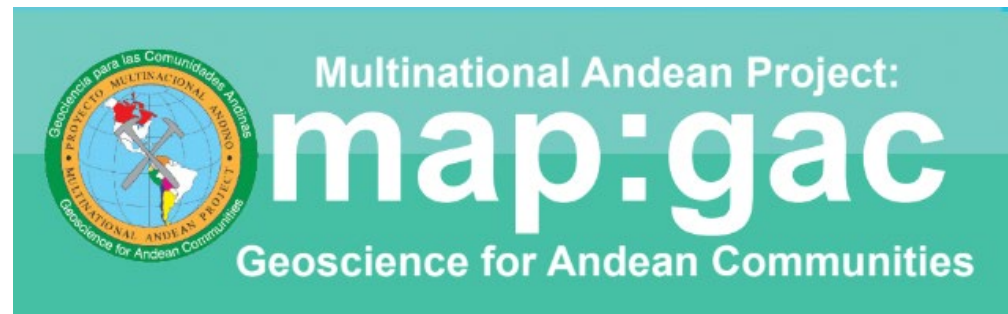
Natural Resources
Canada

Ressources naturelles
Canada

Canada

Meanwhile...

- The GSC was collaborating through a regional international project in South America to better connect the geological survey organizations with civil defense and land use planning.

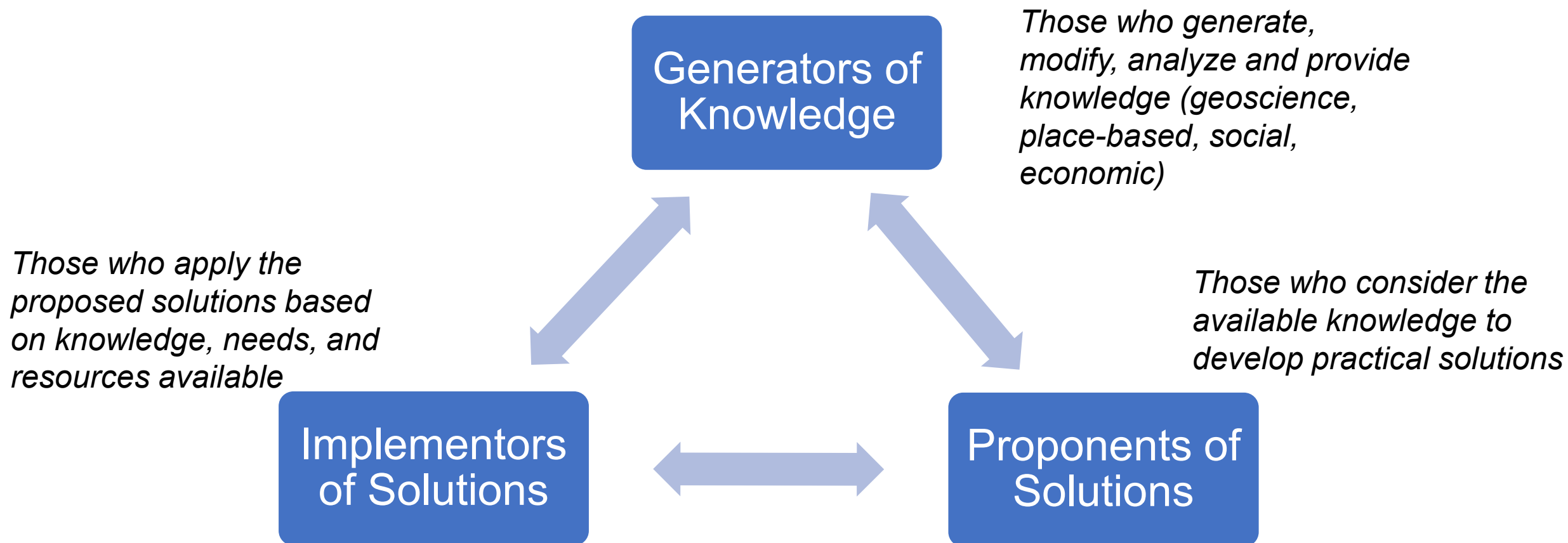


Natural Resources
Canada

Ressources naturelles
Canada

Canada

Transformative Communication



Natural Resources
Canada

Ressources naturelles
Canada

Canada

And...

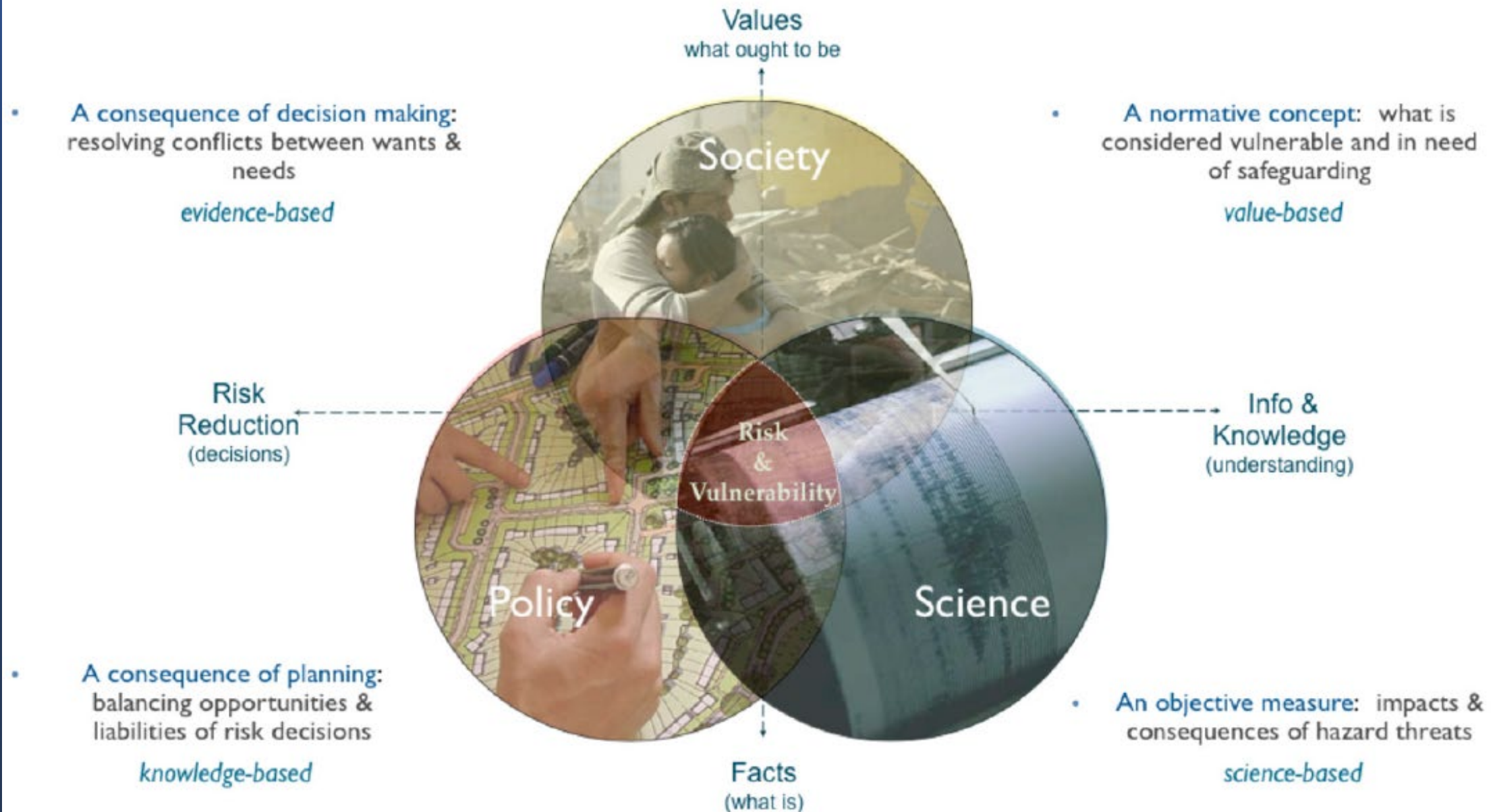
- The GSC was initiating case study-based research to determine and demonstrate how and where geoscience fits in risk reduction decision making at the municipal level for emergency management and planning.
- Worked with municipalities and regions
- Adapted Hazus for Canada
- External funding provided opportunity



Natural Resources
Canada

Ressources naturelles
Canada

Canada



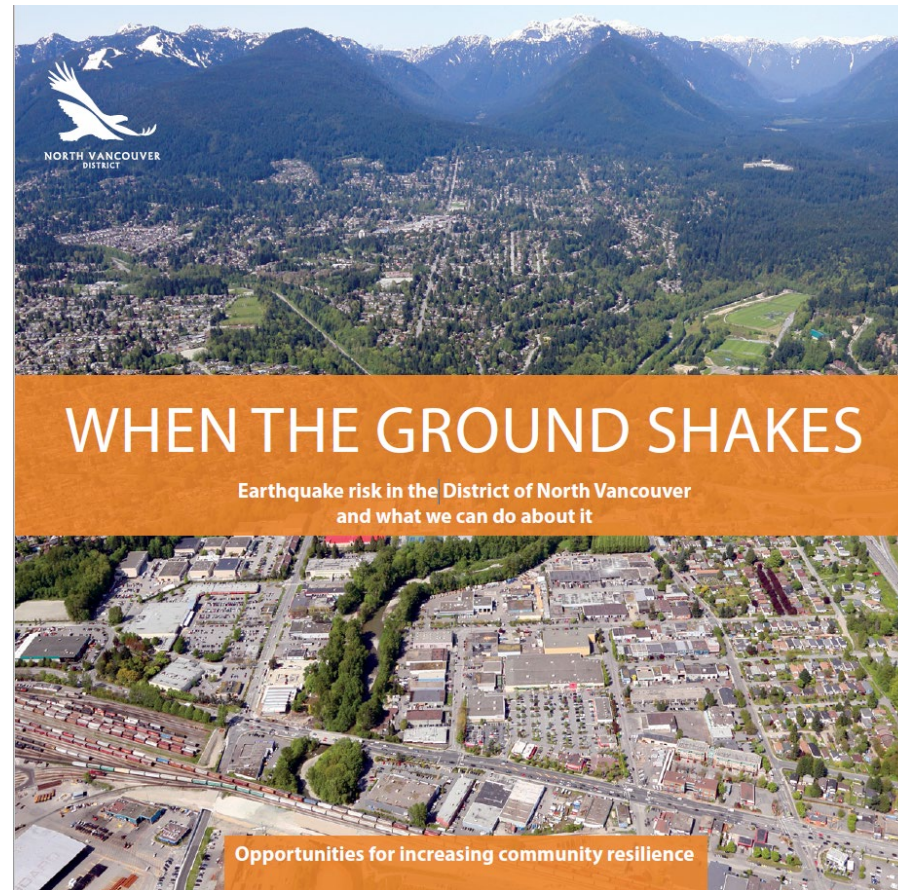


Natural Resources
Canada

Ressources naturelles
Canada

Canada

Knowledge to Action



Analytic Methods and Tools to Assess:

- Damage potential and likely consequences of natural hazard threats.
- Underlying causal structures and driving forces of vulnerability in human-natural systems.
- The capability of these systems to mitigate and/or adapt to changing conditions of vulnerability and risk over time.
- Deliberative methods and tools to assist in:
 - Articulating the goals and intended outcomes of the planning process.
 - Characterizing thresholds of tolerable risk that will be used to evaluate the strengths and weaknesses of mitigation alternatives.

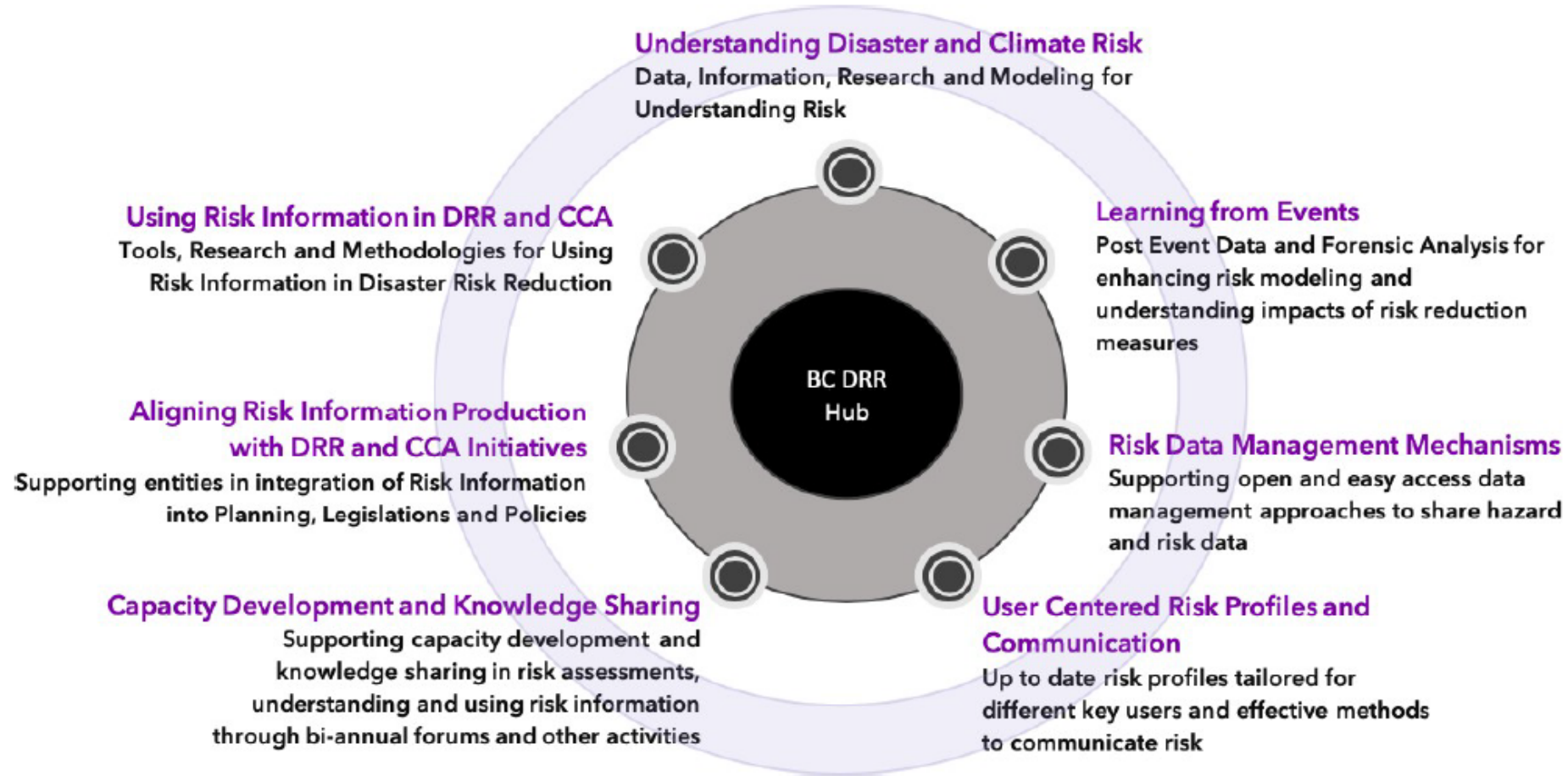


Natural Resources
Canada

Ressources naturelles
Canada

Canada

Creating space for DRR



Natural Resources
Canada

Ressources naturelles
Canada

Canada

What is needed?

- Improved understanding of risk
- Business case – cost/benefit analysis for risk reduction measures
- Indicators of risk to support decision making
- Coordination among emergency management, planning, scientists, and data holders



-




Earthquake risk information for emergency management and planning in Canada.

Tools to help Canadians build resiliency to seismic risk through planning and emergency management.

QUICK LINKS

- [Explore Earthquake Scenarios](#)
- [Consider Probabilistic Earthquake Risks](#)
- [Learn More](#)
- [Download Data](#)



 Natural Resources Canada Ressources naturelles Canada

Challenges

- Participative processes create big resource demands
- Constantly changing hazard and risk environment (work is never done)
- Each domain requires a different set of indicators and resolution for decision making
- Consistent data foundation for exposure and vulnerability models across hazards
- Matching the speed of policy making with scientific knowledge and research
- Positioning geological hazard and risk work in the DRR and CC adaptation policy frameworks



Thank you

Email: malaika.ulmi@nrcan-rncan.gc.ca



Natural Resources
Canada

Ressources naturelles
Canada

Canada

Canada

© His Majesty the King in Right of Canada, as represented by the Minister of Natural Resources, 2022



Natural Resources
Canada

Ressources naturelles
Canada

Canada