Evidence of learning for climate change adaptation:

An assessment of environmental and natural resource partnerships

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1. Background

- Climate change demands a balancing act of long-term adaptation versus short-term needs, which is especially challenging in Northern contexts.
- This systematic review seeks to examine the role learning plays in adaptation for climate change and how collaboration facilitates that learning (specifically for forestry and renewable resource partnerships).
- This review is part of a five-year SSHRC-funded project called "Climate Learning and Adaptation for Northern Development (C-LAND)".

2. Methods

- A systematic review of English, peer-reviewed literature from the years 2009 - 2018 in the databases: 1) EBSCO Academic Search Premier; 2) Science Direct; 3) Web of Science.

> **SEARCH STRING**
>
> Climate **AND** Governance **AND** (adapt **OR** adaptation **OR** adaptive) **AND** Learning **AND** Partnership **AND** ("environmental resource" **OR** "natural resource")

- Papers were excluded using an iterative approach and the following inclusion/exclusion criteria:
- Initial body of literature: *n = 985*
  - Cut 1: Excluded papers lacking a learning framework [*n = 173*]
  - Cut 2: Excluded less relevant sectors (non-renewable resources, parks/protected areas, tourism, agriculture, health) [*n= 166*]
  - Cut 3: Excluded papers lacking a partnership/collaboration component
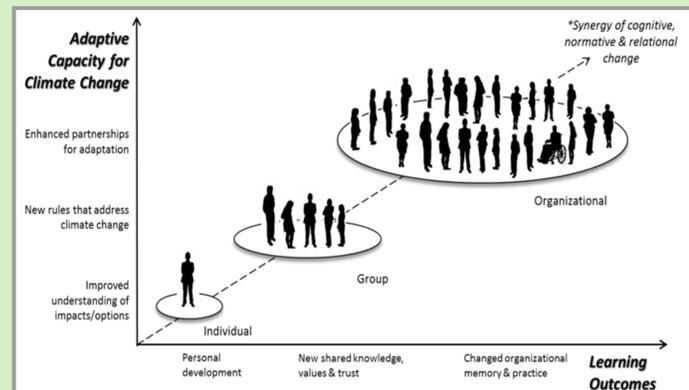- Final body of literature: *n = 93*

Figure 1: Multi-scale adaptive capacity and learning outcomes

- This project conceptualizes learning on multiple levels: individual, group, and organizational (Haug et al. 2011; Baird et al. 2014; Nilsson and Gerger Swartling 2009; Bullock et al. 2012; Gerger Swartling et al. 2015).
- Different learning processes and outcomes occur at different levels and overlap can occur between these levels.
- The 93 papers were reviewed for various criteria including: identity of participants, learning level, learning theory, study methods, definitions of learning and adaptive capacity, learning processes and outcomes, sector, and region.
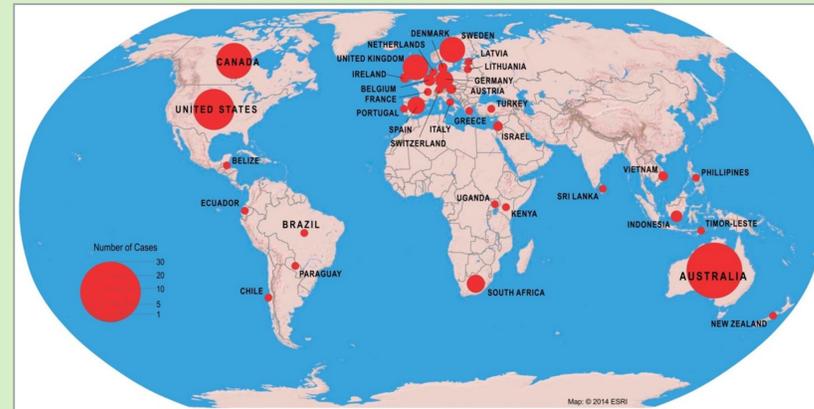
3. Findings

Figure 2: Location of research by country/region

- 28 papers based in Australia, followed by the United States (13), Canada (12), Sweden (7), and the UK (7).
- Regionally, Europe (39) is where most research was located.
- This could be because the search was conducted in English, and/or because this field of study has had a Western and Euro-Centric focus.
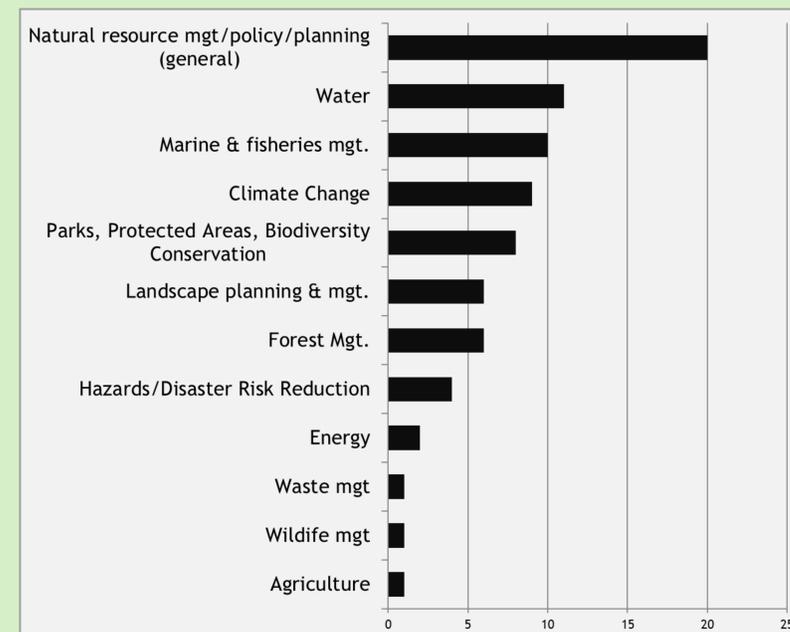- Few papers were located in Northern regions (the C-LAND project is situated in a Northern context).

Figure 3: Research output by sector

- Predominately papers focused on NRM, policy, and planning (adaptive co-management and community-based management).
- Shortage of papers on forestry and energy, which is a gap that the C-LAND project hopes to fill.
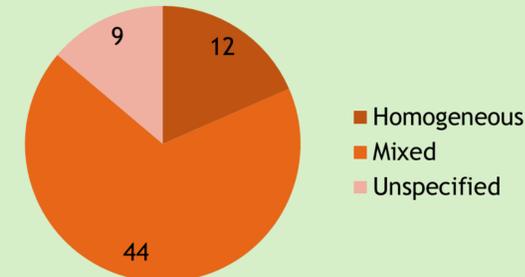

Figure 4: Diversity of participant groups

- The individuals learning in these papers come from a diverse range of participant groups (community members, government, business/industry, scientists, etc.).
- More papers had study participants from mixed backgrounds than from homogeneous backgrounds.
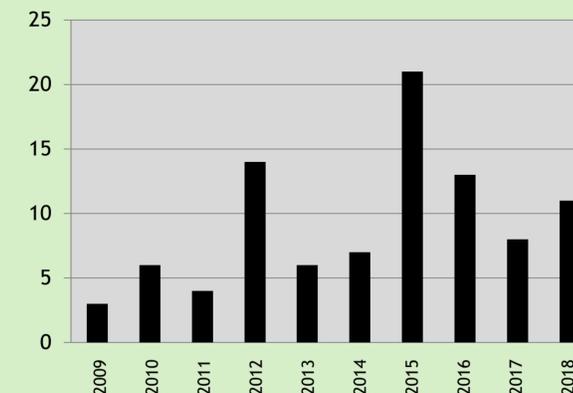

Figure 5: Research output by year

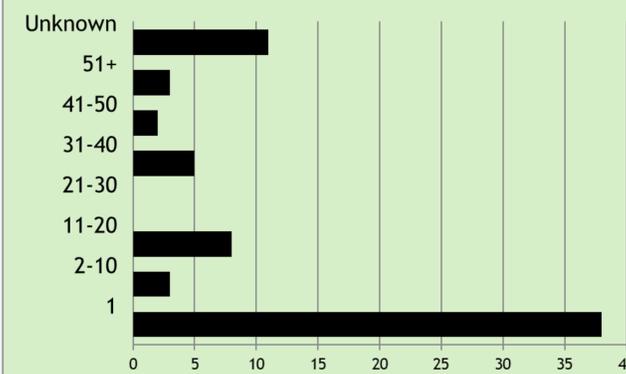- Steady increase in research output over the past decade.

Figure 6: Number of participants learning together per study

- Majority of papers looked at learning on an individual scale.
- Roughly equal number of "small groups" and "large groups".

Figure 7: Methods

- Researchers engaged predominately in interviews.
- Mixed methods second most common approach (e.g. hosting a workshop and then interviewing participants about what they learned).
- Interviews provide insights into the outcomes of learning, while workshops demonstrate the learning process itself.
- Interviews provide information on individual learning, while workshops can show group or organizational learning.

4. Conclusions

- Large variations in research design and reporting make method and case comparisons difficult.
- Few studies from northern Canada indicates potential opportunity.
- Eurocentric / Western learning & adaptive capacity research should be strongly informed by northern & Indigenous learning approaches & knowledge.
- Next steps: 1) Synthesize individual/collective learning processes and outcomes and links to adaptive capacity building in collaborative settings. 2) Conduct empirical research with renewable resource partnerships across Canada.

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