

# ADAPTIVE, MULTI-LEVEL LEARNING IN FLOOD RISK MANAGEMENT

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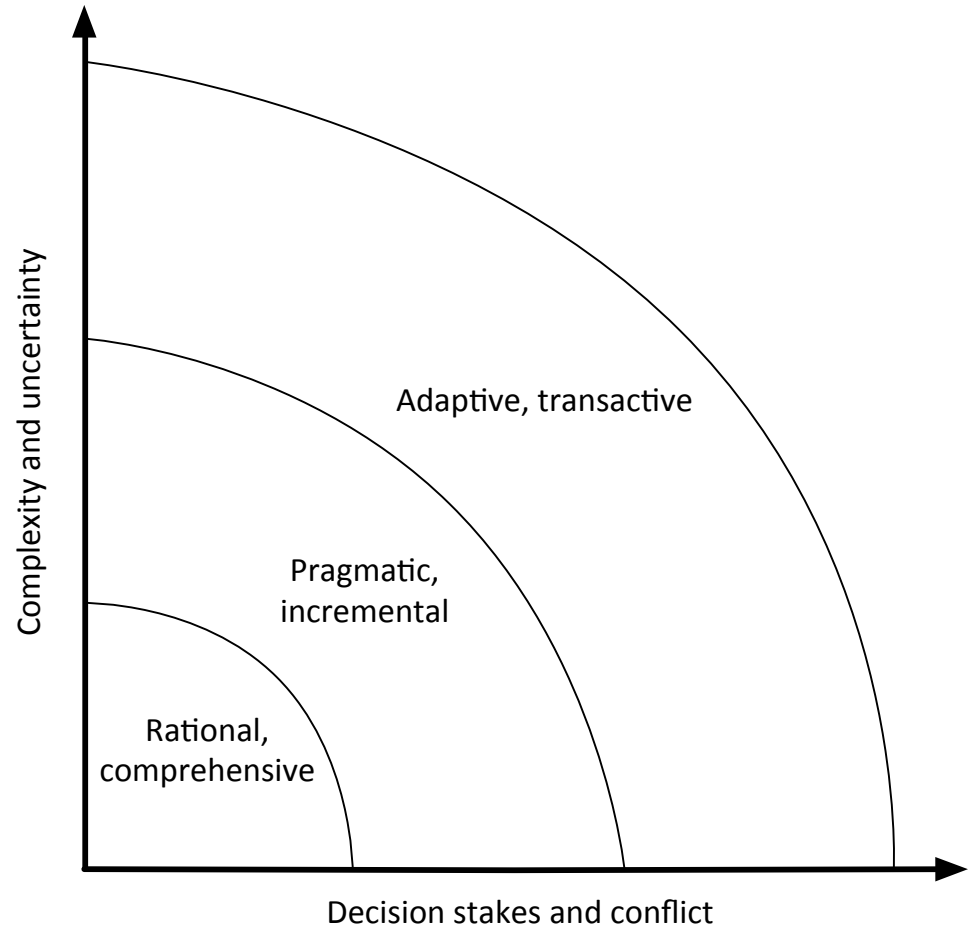
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# Outline

- Background
- Conceptual framework
- Purpose
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  - Context, Involvement, Learning
- Discussion
- Conclusion

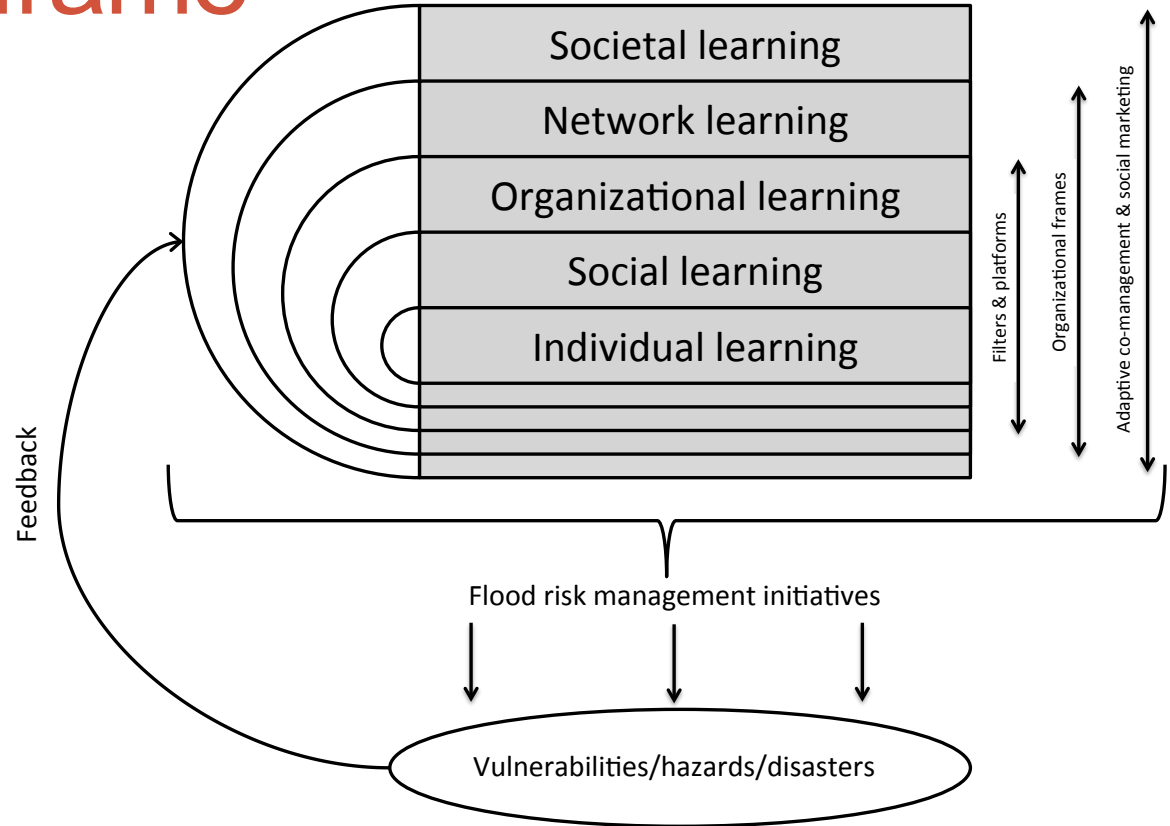
# Background

- Flood risk management and complexity, uncertainty and conflict (after Funtowicz & Ravetz 1993)

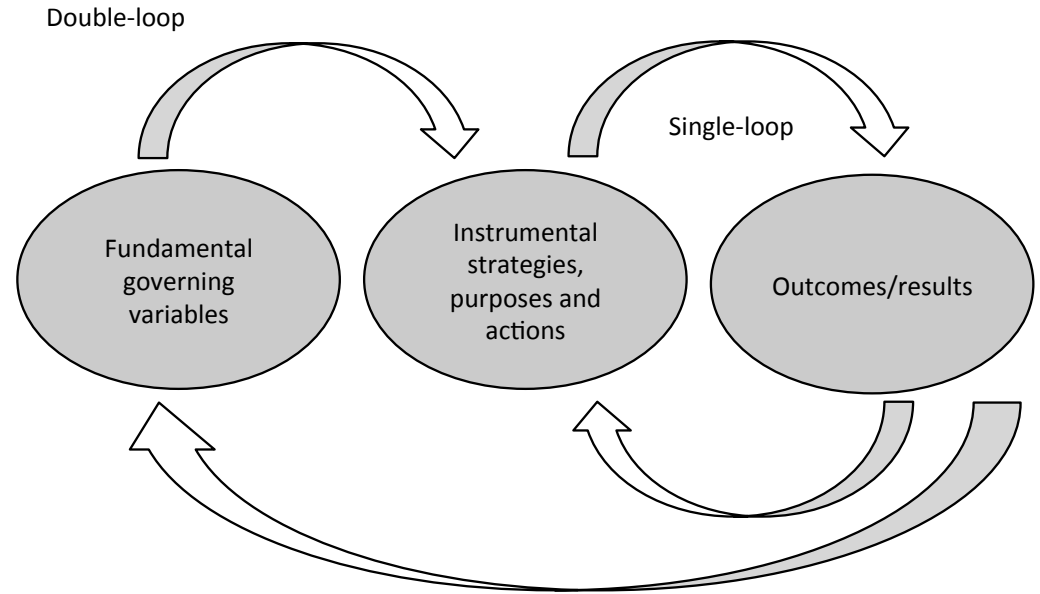


# Conceptual frame

- Adaptive multi-level learning (Diduck 2010)



- Theory of action and organizational learning (Argyris and Schön 1978, Argyris 1990)
- People and groups learn from experience and create and act on organizational memory



# Purpose

- Examine the implications of organizational learning through stakeholder involvement in flood risk management

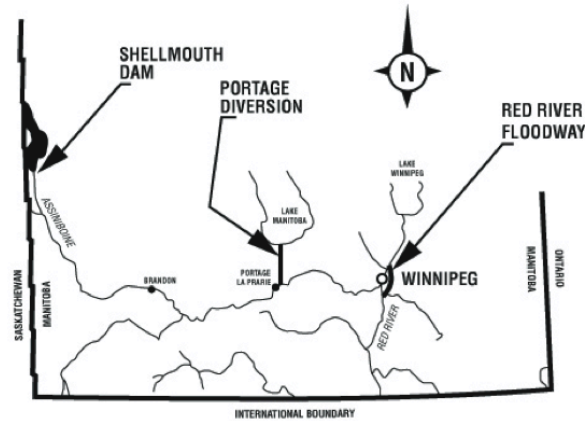
# Methods

- Integrative literature review (Torraco 2005)
- Qualitative, retrospective case study of a community-based organization (CBO) (Thomas 2011)
- 8 semi-structured interviews with 5 of CBO's leaders
- A review of nearly 400 organizational records
- Thematic coding (Creswell 2014) using QSR NVivo

# Case study results: context



Red River Basin  
(Diduck et al. 2005)



Structures built after the  
1950 flood (MCEC 2005)



1997 flood level in  
Winnipeg but for the  
post-1950 structures



- CBO's baseline beliefs, goals and strategies
  - Believed that government actions to protect Winnipeg, although justified, worsened impacts outside the city
  - Wanted the government to acknowledge these impacts and provide compensation for them
  - Sought a comprehensive basin-wide management plan
  - Relied on administrative and political strategies
  - Organized its members, mustered evidence of its position, lobbied and made formal presentations to government

# Case study results: involvement

- Five flood management initiatives from 1997 to 2005
  1. Hearings into operation of the floodway during the 1997 flood
  2. A proposal to build a dike along a provincial road
  3. A review of the floodway rules of operation
  4. Pre-feasibility studies to enhance flood protection for Winnipeg
  5. Environmental assessment of a proposal to expand the floodway

# Case study results: learning

- Numerous manifestations in organizational memory of single-loop learning
  - Enhanced knowledge of, and trust in, other organizations with shared interests
  - Broader and deep technical knowledge of geography, hydrology, engineering, politics and law
  - Use of a wider array of tactics, including adversarial and legal avenues
- No evidence of double-loop learning

# Discussion

1. “Standard” public involvement processes (Diduck et al. 2015) offer good opportunities for single-loop organizational learning (Fitzpatrick 2006)
2. Would more participatory processes have facilitated double-loop outcomes for CBO?
3. Unclear because CBO forged its governing variables in staunch opposition to government actions

4. Also unclear if more participatory processes would have led to double-loop learning by government agencies
5. Government learning can be far-reaching if it involves institutional reform (societal learning) (Woodhill 2002)
6. Adaptive co-management (Armitage et al. 2009) serves social goals of sustainability (Gibson et al. 2013)

# Conclusions

1. The conceptual framework shows promise for analyzing learning and institutional change in flood risk management
2. However, the framework is highly abstract, and the case study is tentative and emphasizes just one level in the overall framework
3. Further research is needed to empirically test more of the framework's elements using various qualitative and quantitative methods

# References

- Argyris, C. (1990). *Overcoming Organizational Defenses: Facilitating Organizational Learning*. Wellesley MA: Allyn and Bacon.
- Argyris, C., & Schön, D. A. (1978). *Organizational Learning: A Theory of Action Perspective*. Reading MA: Addison-Wesley.
- Armitage, D., Plummer, R., Berkes, F., Arthur, R., Davidson-Hunt, I., Diduck, A. P., . . . Wollenberg, L. (2009). Adaptive co-management for social-ecological complexity. *Frontiers in Ecology and the Environment*, 7(2), 95-102.
- Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (4th ed.). Los Angeles: Sage.
- Diduck, A. P. (2010). The learning dimension of adaptive capacity: untangling the multi-level connections. In D. Armitage & R. Plummer (Eds.), *Adaptive Capacity: Building Environmental Governance in an Age of Uncertainty* (pp. 199-221). Heidelberg, Germany: Springer.
- Diduck, A. P., Moyer, J., & Briscoe, E. (2005). A social learning analysis of recent flood management initiatives in the Red River basin, Canada: systemic impediments to double-loop learning. In D. Shrubsole & N. Watson (Eds.), *Sustaining Our Futures: Reflections on Environment, Economy and Society* (pp. 127-164). Waterloo, ON: Department of Geography Publication Series No. 60, University of Waterloo.

- Diduck, A. P., Reed, M. G., & George, C. (2015). Participatory approaches to resource and environmental management. In B. Mitchell (Ed.), *Resource and Environmental Management in Canada: Addressing Conflict and Uncertainty* (5th ed., pp. 142-170). Toronto: Oxford University Press.
- Fitzpatrick, P. (2006). In it together: organizational learning through participation in environmental assessment. *Environmental Assessment Policy and Management*, 8(2), 157-182.
- Funtowicz, S., & Ravetz, J. (1993). Science for the post-normal age. *Futures*, 25(7), 739-757.
- Gibson, R. B., Hassan, S., & Tansey, J. (2013). *Sustainability Assessment: Criteria and Processes*. Oxford: Routledge.
- MCEC. (2005). *Red River Floodway Expansion: Report on Public Hearing (June 2005)*. Winnipeg, Manitoba: Manitoba Clean Environment Commission.
- Thomas, G. (2011). A typology for the case study in social science following a review of definition, discourse, and structure. *Qualitative Inquiry*, 17(6), 511-521.
- Torraco, R. J. (2005). Writing integrative literature reviews: guidelines and examples. *Human Resource Development Review*, 4(3), 356-367.
- Woodhill, J. (2002). Sustainability, social learning and the democratic imperative. In C. Leeuwis & R. Pyburn (Eds.), *Wheel-barrows Full of Frogs: Social Learning in Rural Resource Management* (pp. 317-331). Assen, The Netherlands: Koninklijke Van Gorcum.



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