Climate Change Adaptation

Research Group

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How to evaluate effective climate change adaptation in a permafrost environment

A pilot study using the Terrain Analysis in Nunavut (TAN) Project in Arviat, Canada

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Running for

PYRN

Permafrost Researchers Young Network

the PYRN Award

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International Permafrost Conference. Potsdam, Germany.

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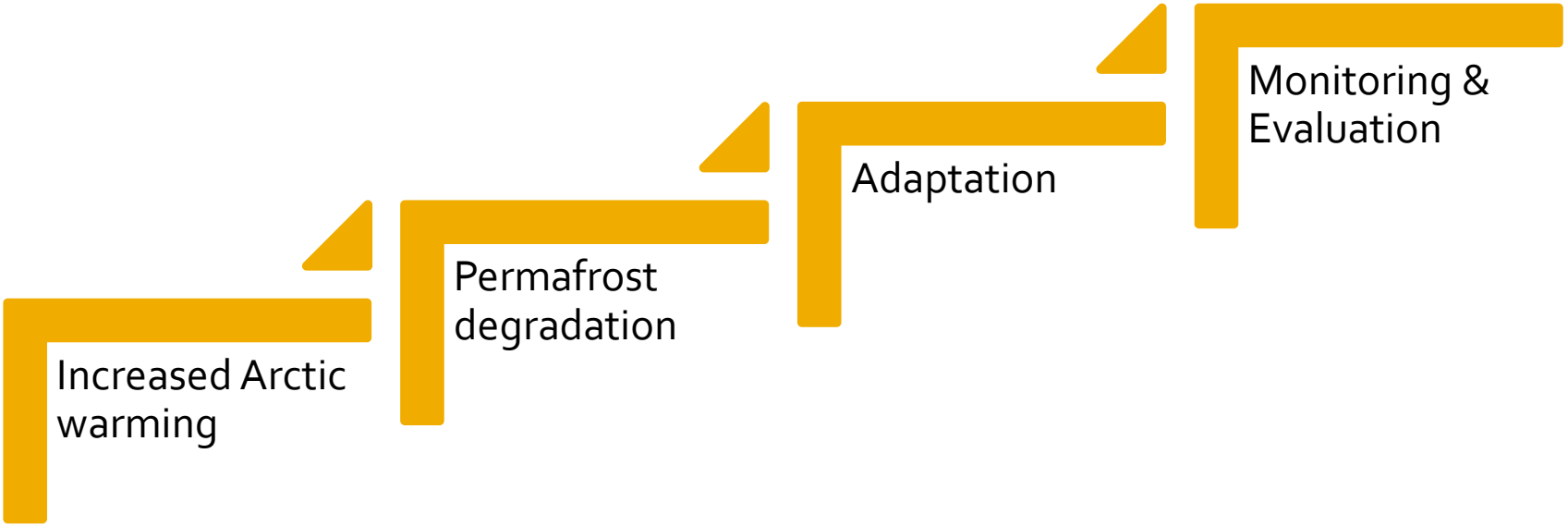
Context



Aim

Create an evaluation framework for climate change adaptation in a permafrost environment: A pilot study using the 'Terrain Analysis in Nunavut' project in Arviat, Canada.

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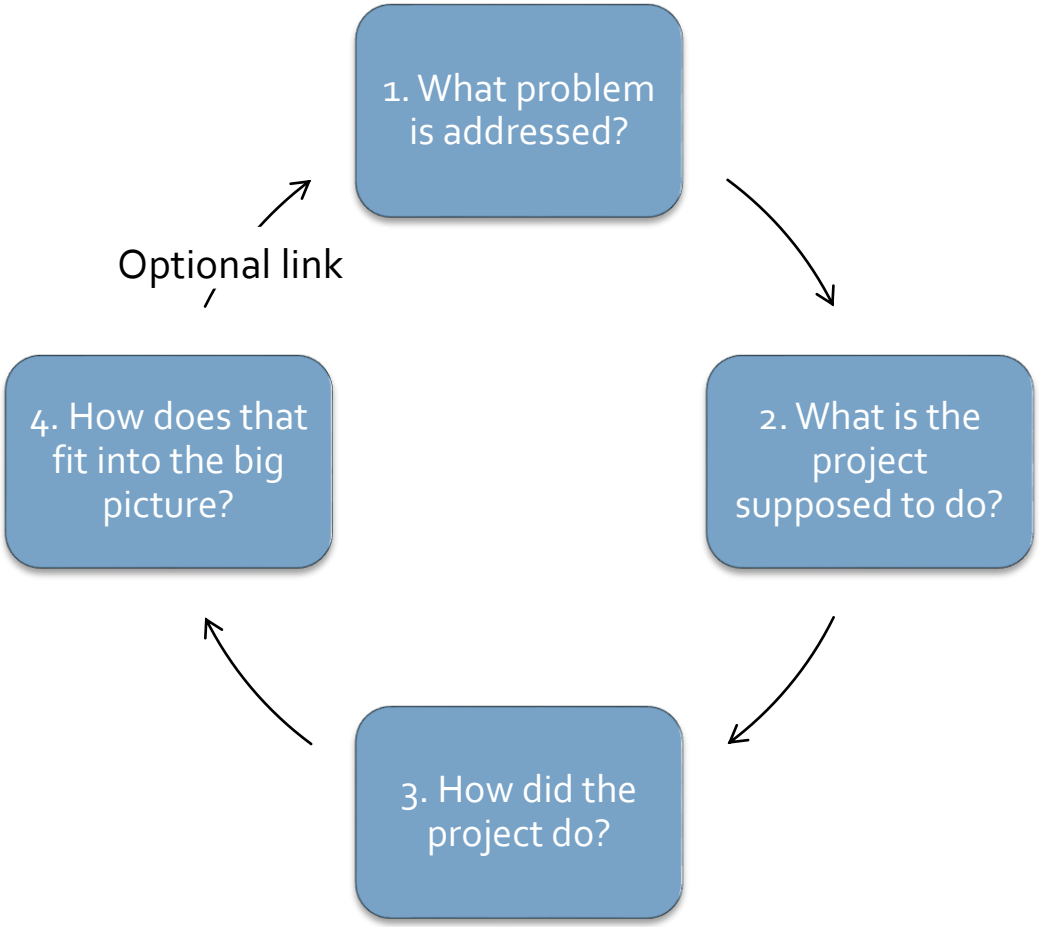
Method: A community based adaptation evaluation framework



Tools
1. Literature review
2. Logic model
3. Semi-structured interviews (N=19)
4. Adaptation Readiness Framework

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Method: What is being evaluated?

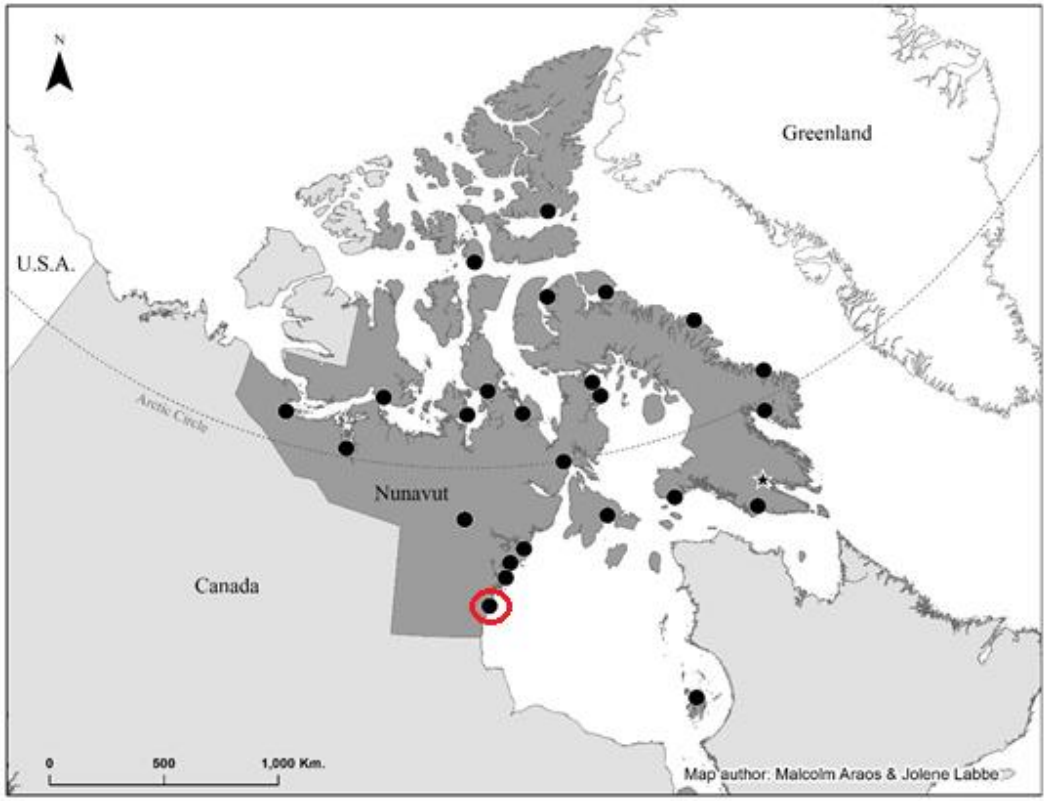
TERRAIN ANALYSIS IN NUNAVUT

- A 4 year project
- Lead by Government of Nunavut
- Across 7 communities

Aim: To identify ground which is susceptible to CC impacts using radar satellite data

For use by decision makers, in planning development [7]

ARVIAT, NUNAVUT



[7] Pan-Territorial Adaptation Partnership, n.d.; [8]Nunavut Bureau of Statistics, n.d; [9] Forbes et al., 2014

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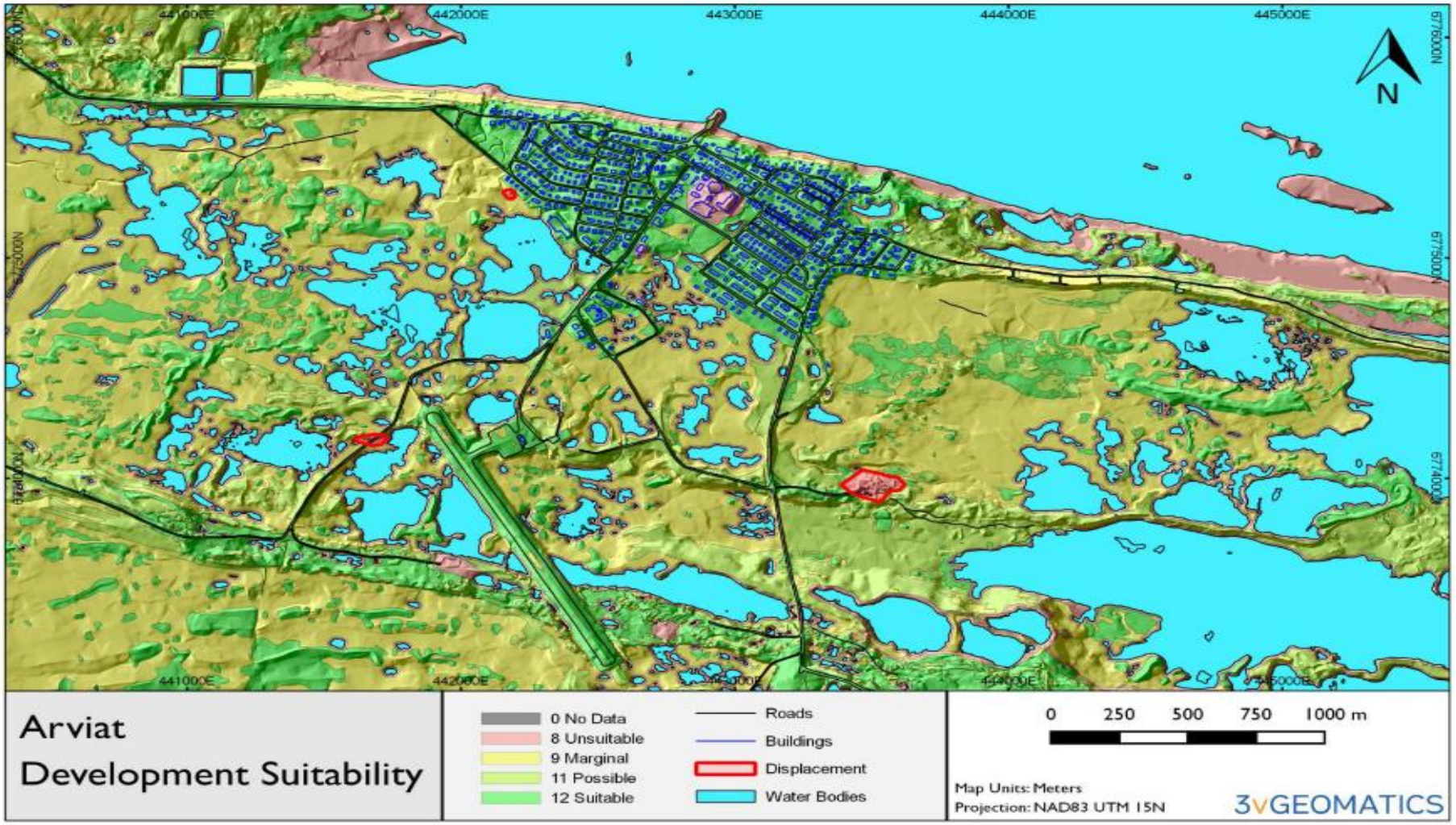
Method: What is being evaluated?



10. Pan-Territorial Adaptation Partnership, n.d.

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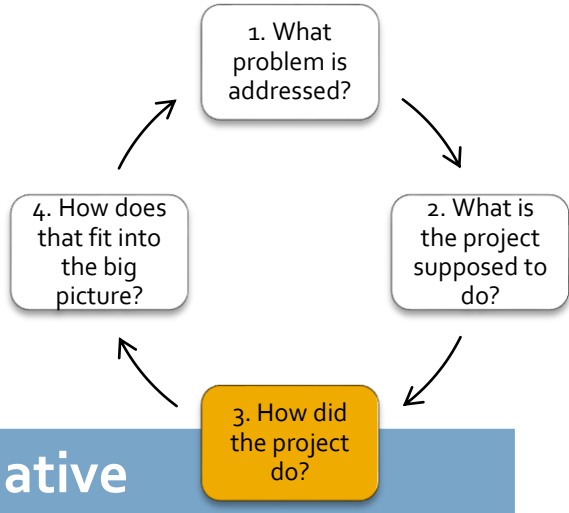
Results: Usable science



	Positive	Negative
Quality **Research is trusted and valued**	Appropriate techniques and in-situ validation	Contradicts Traditional knowledge
Timeliness **Research at the right timescale for decision-making**	Incorporated into community plan	Unsuitability criteria in developed areas
Pertinence **Research investigates factors under decision makers' influence**	Linked to local decision making needs & filled knowledge gap	Unclear understanding of ranking & limited access to maps

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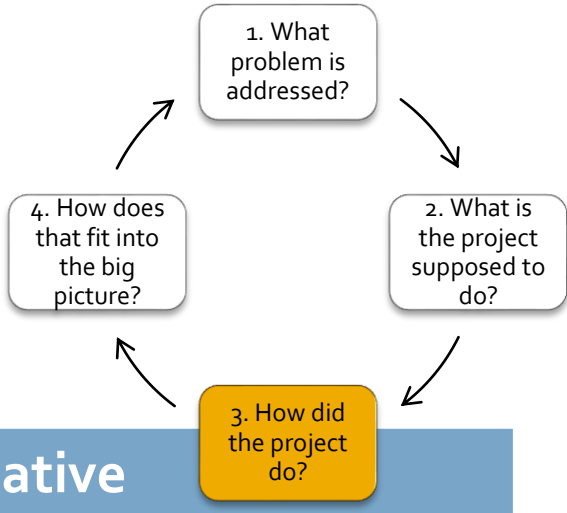
Results: Usable science



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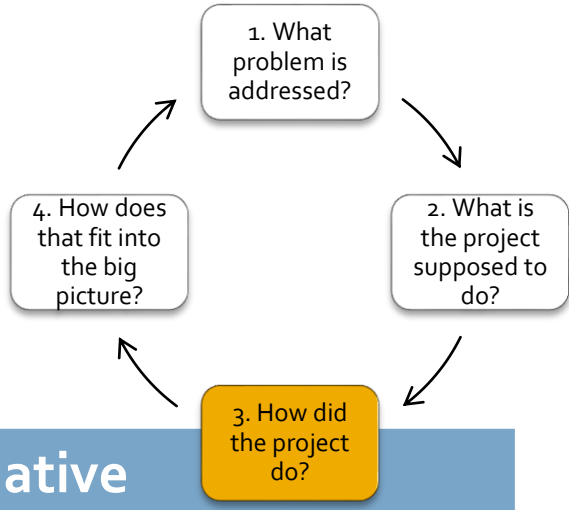

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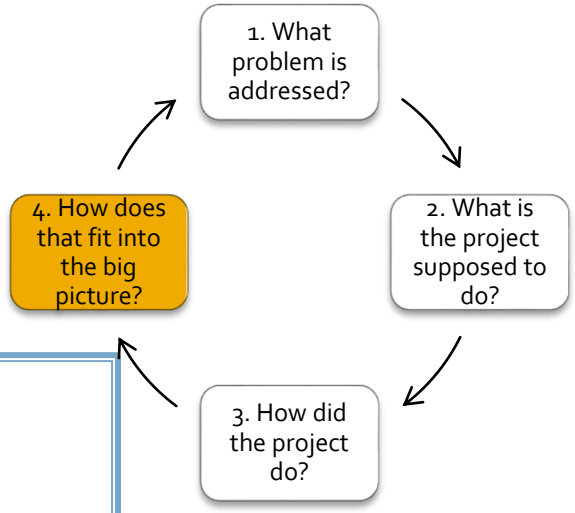
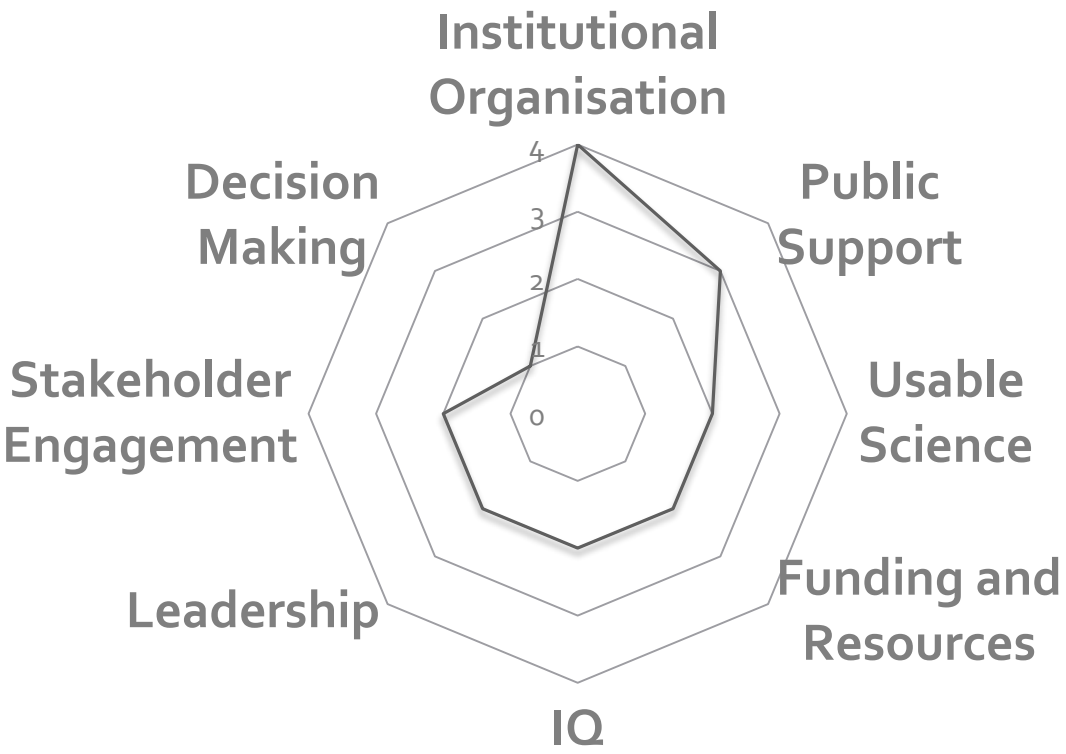
Results: Adaptation Readiness Framework[12]



The overarching factors critical for adaptation to occur[12]



12. Ford &King. 2015

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Conclusion: Using M&E to improve adaptation

Key lessons of this evaluation for hazard mapping projects

- Good science may not easily translate into good policy
- There are "quick wins" for improving usability of science (e.g. accessibility of data, technical guides)
- Big picture: There are some things which impact science usability which are out of our control.

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Appendix

A. Logic model for TAN project
B. Interview results
C. Readiness indicator: Institutional organisation
D. Readiness indicator: Public Support
E. Readiness indicator: Usable Science
F. Readiness indicator: Funding
G. Readiness indicator: Stakeholder Engagement
H. Readiness indicator: Leadership
I. Readiness indicator: IQ
J. Readiness indicator: Decision Making

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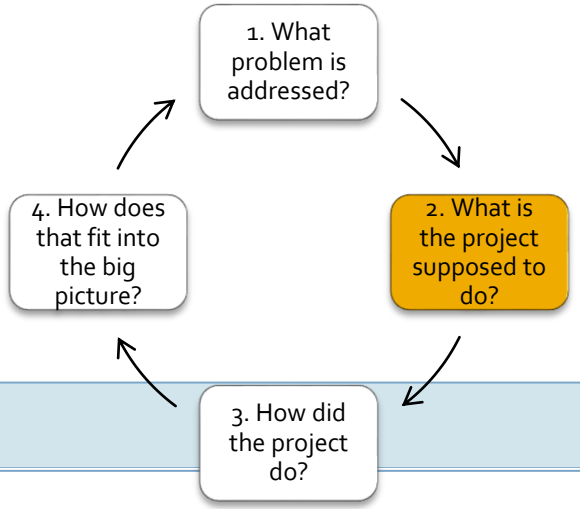
A. Logic model



Activities
The specific tasks to be undertaken

- Acquire RADARSAT-2 images
- Identify and monitor changes and field visits for validation

Outputs
The tangible products produced

- A map and report of suitability for future development

Outcomes
What the project is expected to achieve

- Transfer of knowledge to communities.
- Integrated into community development plans (20 year timeframe).

Impact
The macro-level objectives which the project contributes to

- Reduce the costs, damages and losses associated with the failure of foundations of buildings and infrastructure in Nunavut.

[11]Adapted from AUSAID, 2005.

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B. Interview results

Creator comments (+) (N=102)	User comments (+) (N=116)
Considered local context (n=16)	Increased knowledge sharing (n=22)
Aided in building relationships (n=16)	Local agreement with map (n=22)
Increased results dissemination (n=11)	Aids decision making (n=18)
Creator comments (-) (N=63)	**User comments (-) (N=80)**
Lack of communication between project stakeholders (n=17)	Local knowledge contradicts data (n=13)
Limited data access (n=6)	Limited data access (n=8)
Timeliness of information (n=5)	Unclear ranking system on maps (n=5)
Creator comments (REC)* (N=46)	**User comments (REC) (N=45)**
Include more oral/engaging activities (n=6)	Don't build near water (n=5)
*Only one recommendation included	Consider local quality of life (n=4)
	Clarification of ranking system on maps (n=4)

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C. Readiness indicators: Institutional organisation

Readiness factor	Indicator	Example	Rating
Institutional Organisation	Presence of boundary organisations working on climate change adaptation[12]	The bringing in of DoE-CCS to work with project leader and coordinate outreach.	Yes
	Stakeholders were involved in the decision making process[12]	Climate change engagement in Arviat brought together end-users with map creators to discuss results and next steps.	Yes

[12]Ford & King, 2015; [13]Ford et al., 2013

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D. Readiness indicators: Public support

Readiness factor	Indicator	Example	Rating
Public support	There is a public perception of the importance of climate change adaptation[12]	40-50 people attended the public event held, interviewees acknowledged changes happening in Arviat and discussed adaptation.	Yes
	Public understanding of climate change and impacts	Unpredictability of weather and changing migration patterns discussed by interviewees. Some misconceptions about the link between impacts and climate change.	Some what

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E. Readiness indicators: Usable science

Readiness factor	Indicator	Example	Rating
Usable science	Quality, timeliness and pertinence[13]	*Quality (score 2)*, literature review showed the project is using appropriate technology and in-situ data to validate results. *Timeliness (score 1)* CGS felt project outputs would be ready for incorporation in official community plan. Some felt it was too late for current development occurring in unsuitable zones. *Pertinence (score 1)*, the project provided new knowledge but the suitability categories were critiqued.	Somewhat
	Meaningful consultation with end-users	3vG consulted with CGS (end-user). However, the Hamlet weren't consulted during project creation and did not have significant input prior to community engagement.	Somewhat

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F. Readiness indicators: Funding

Readiness factor	Indicator	Example	Rating
Funding	Dedicated funding streams or budgets available within departments for climate change adaptation work[12]	Organisations interviewed currently found money for adaptation from other budgets (e.g. Halloween indoor activities held by Arviat). DoE-CCS budget is for admin and daily operations rather than funding of adaptation projects.	No
	Climate change adaptation funding is being accessed and utilised	CGS were able to access AANDC funds, Arviat Wellness centre also accessed funds from national level. Laval and Memorial's work was funded nationally through Arctic Net.	Yes

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G. Readiness indicators: Stakeholder engagement

Readiness factor	Indicator	Example	Rating
Stakeholder engagement	Relevant stakeholders have been engaged	Interviewees agreed that key stakeholders were present during the outreach.	Yes
	Stakeholders understood how this project would be utilised in their day to day role	'In Vivo' coding of "not my job" identified a lack of understanding about who was responsible for utilizing the project information.	No

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H. Readiness indicators: Leadership

Readiness factor	Indicator	Example	Rating
Leadership	Organisations or departments are mandated to include climate change in their work (own)	Most organisations did not have climate change policies. Exceptions to this were DoE-CCS, CGS (through CIP) and Nunavut Housing Corp (building standards).	Somewhat
	Statements of importance and need for adaptation by leaders[12]	CGS; felt it would be irresponsible to not include climate change. Hamlet felt there was too much uncertainty in impacts and Arviat currently had greater needs than adaptation (e.g. housing crisis)	Somewhat

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I. Readiness indicators: Inuit Qaujimajatuqangit (IQ)

Readiness factor	Indicator	Example	Rating
Inuit Qaujimajatuqangit (IQ)	IQ was collected during the project (own)	Discussions with elders occurred and local knowledge was sought out through field visits, Arctic Net work and community engagement	Yes
	IQ is integrated into project results (own)	No evidence of this happening currently. Interviewees discussed the difficulty in incorporating IQ	No

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J. Readiness indicators: Decision making

Readiness factor	Indicator	Example	Rating
Decision making	Access to key project information for decision makers	CGS and the Hamlet had access to maps but not all potential users had access to the map or knew where to find the information.	Somewhat
	Climate change adaptation is considered and accounted for in decisions made	Other priorities were given more consideration than climate change in development decisions	No