

The Matrix: Getting Inside the Science-Policy Interface

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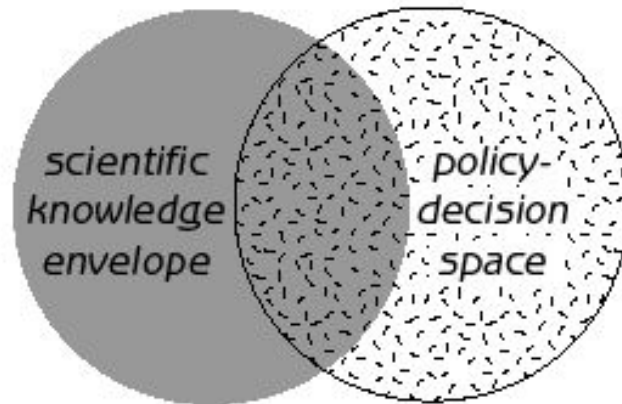
Part of a larger project on Integrating and Translating ArcticNet Science for Sustainable Communities and National and Global Policy and Decision-Making

Overall Objectives:

1. Assessment of the current and potential impact of ArcticNet (and broader Arctic) science (including local and Indigenous knowledge documentation) for informing policy development through a quantitative and qualitative analysis of the documents linking science outcomes to policy development and orientation. Particular attention will be paid to how the science and policy questions have been 'framed' by researchers, policy-makers, northerners and Indigenous organizations, media and other users science.
2. Identify information needs of northern decision makers and leaders to assist in the development of policies, strategies and approaches to Arctic regional, or national decision making on climate change issues.
3. Describe key Arctic climate related policy issues and current Arctic policies relevant to these issues to determine what gaps exist in current policies and in the available scientific information relevant to such policies.

Need to more effectively bridge the “science-policy gap” is well recognized.

Present View



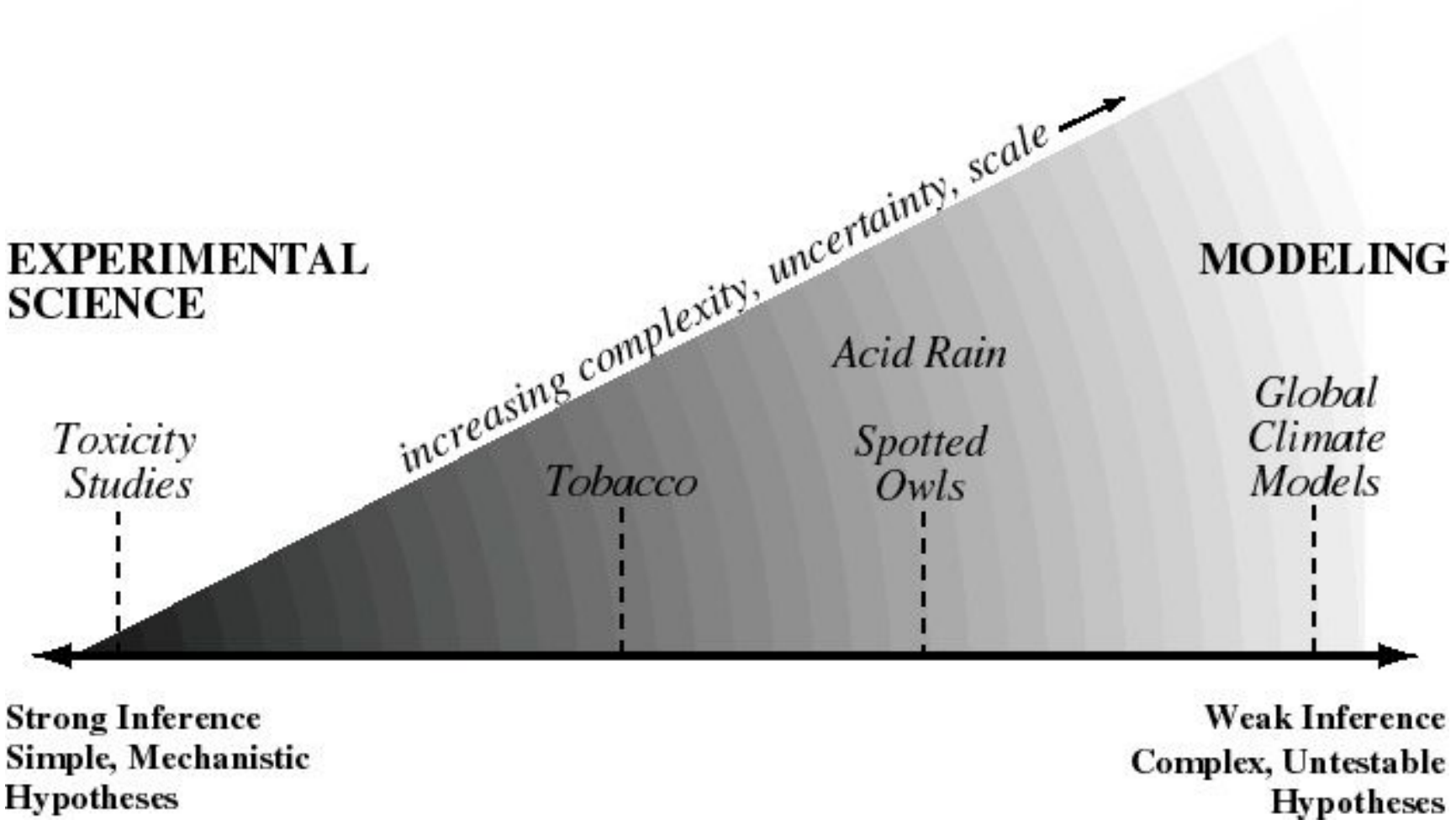
Proposed View



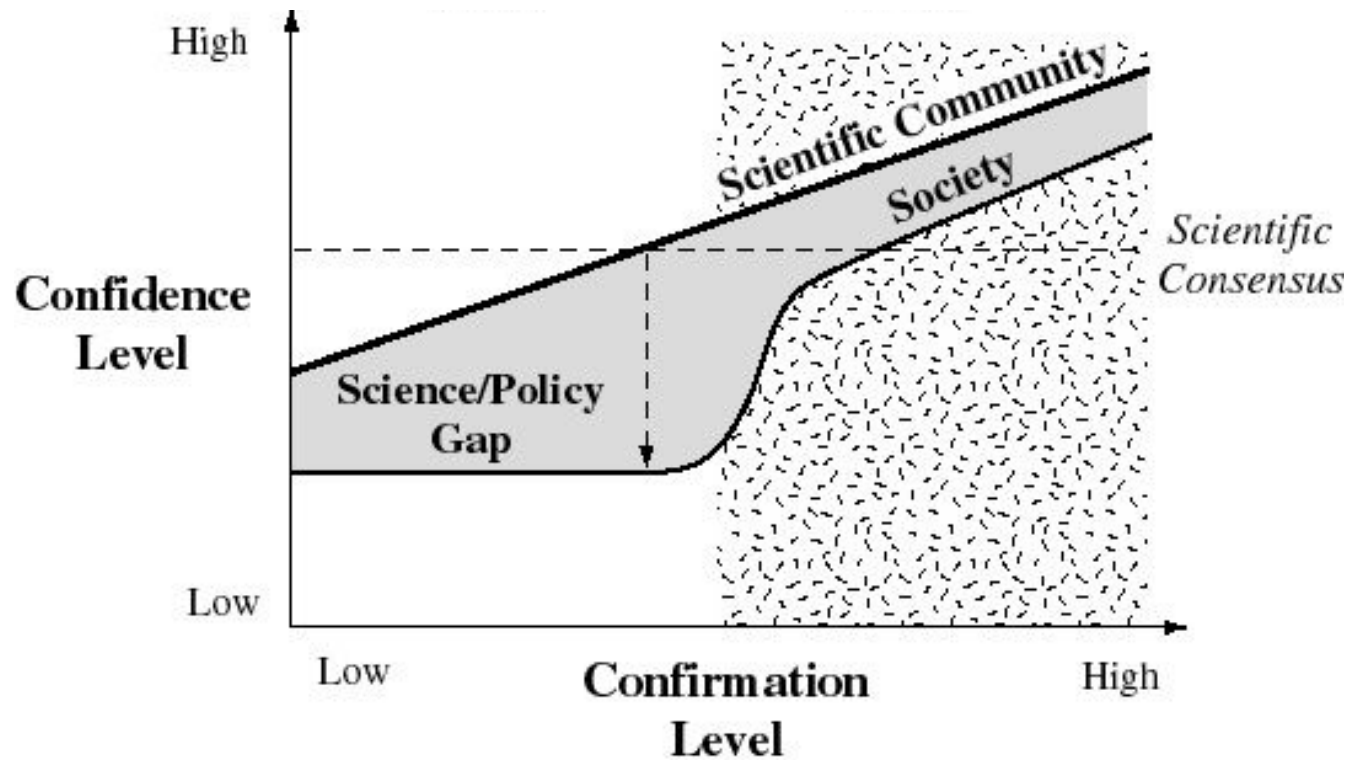
Need to bring researchers and policy-makers together early and often.

But what works best?

Examples of Scientific Uncertainty



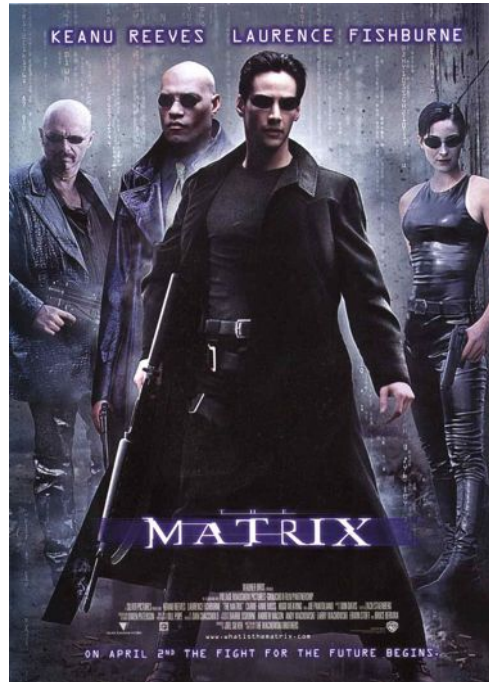
There is often a gap between the science community and society especially for some emerging issues.



Some characteristics of science and government agencies. The institutions of science and government are generally marked by very distinct behaviors and interests which contribute to some of the difficulties associated with transmitting and translating scientific information into policy and decisions (Manning 1988).

Science	Government
Probability accepted	Certainty desired
Inequality is a fact	Equality desired
Anticipatory	Time ends at next election
Flexibility	Rigidity
Problem oriented	Service oriented
Discovery oriented	Mission oriented
Failure and risk accepted	Failure and risk intolerable
Innovation prized	Innovation suspect
Replication essential for belief	Beliefs are situational
Clientele diffuse, diverse, or not present	Clientele specific, immediate, and insistent

A Matrix Approach



A Matrix Approach

$$\mathbf{A} = \begin{pmatrix} 2 & 1 \\ -4 & 3 \\ 2 & -2 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 0 & 2 \\ 1 & -3 \\ 3 & -2 \end{pmatrix}$$
$$\mathbf{A} + \mathbf{B} = \begin{pmatrix} 2+0 & 1+2 \\ -4+1 & 3+(-3) \\ 2+3 & -2+(-2) \end{pmatrix} = \begin{pmatrix} 2 & 3 \\ -3 & 0 \\ 5 & -4 \end{pmatrix}$$

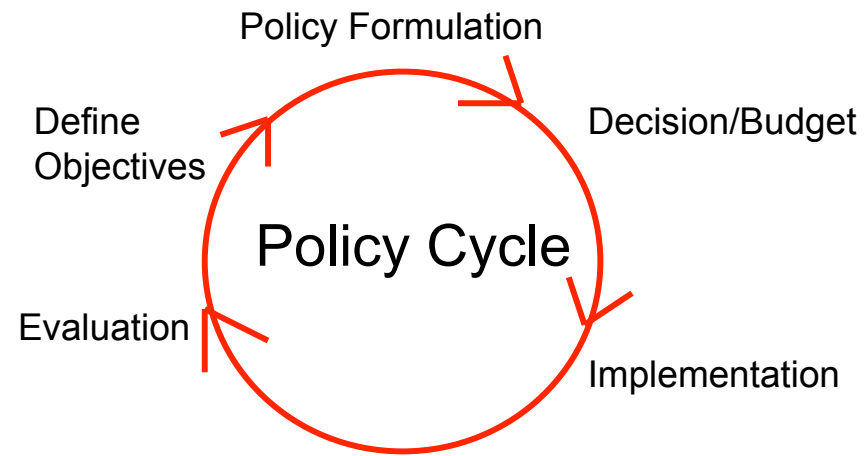
A matrix is a rectangular array of variables (functions, numbers, etc).

The dimensions of a matrix are the number of its rows and columns.

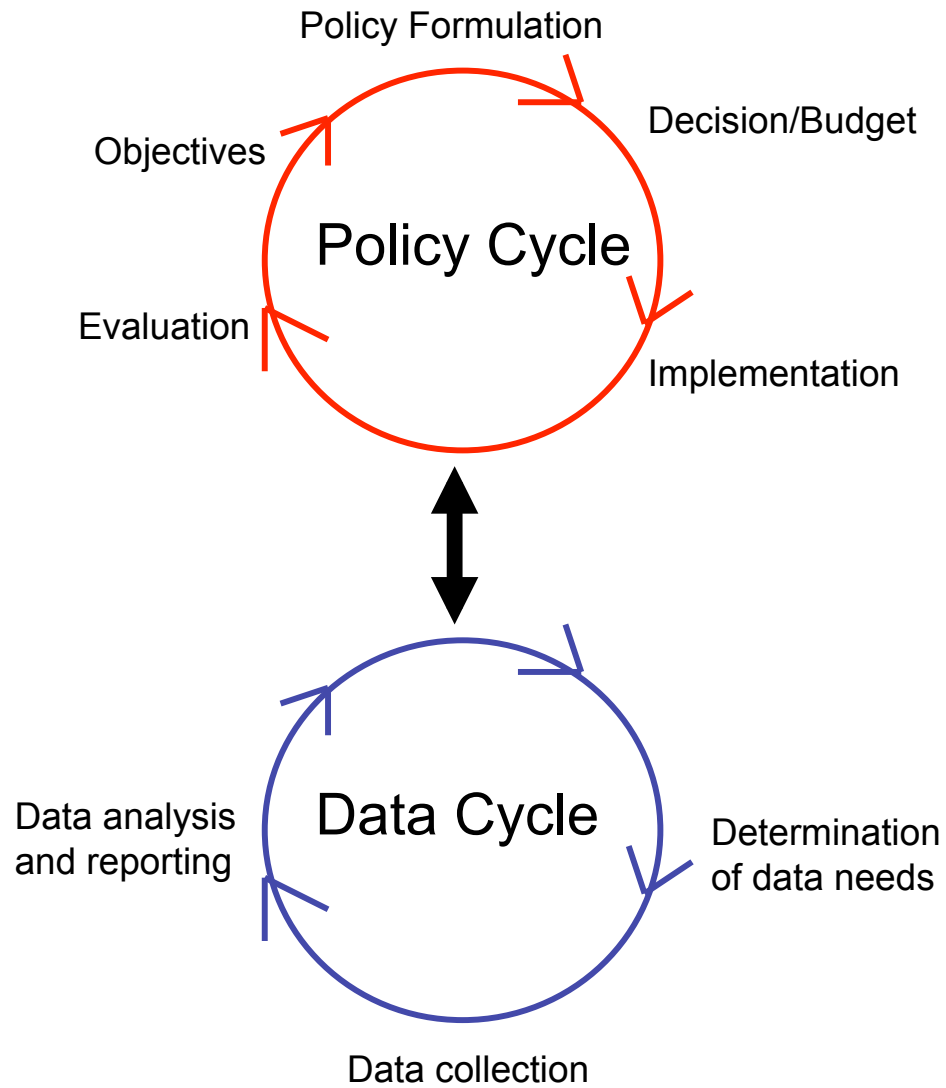
Usually, it necessary to compare matrices with similar dimensions.

For example $A + B$ is only defined if A and B are of the same dimension.

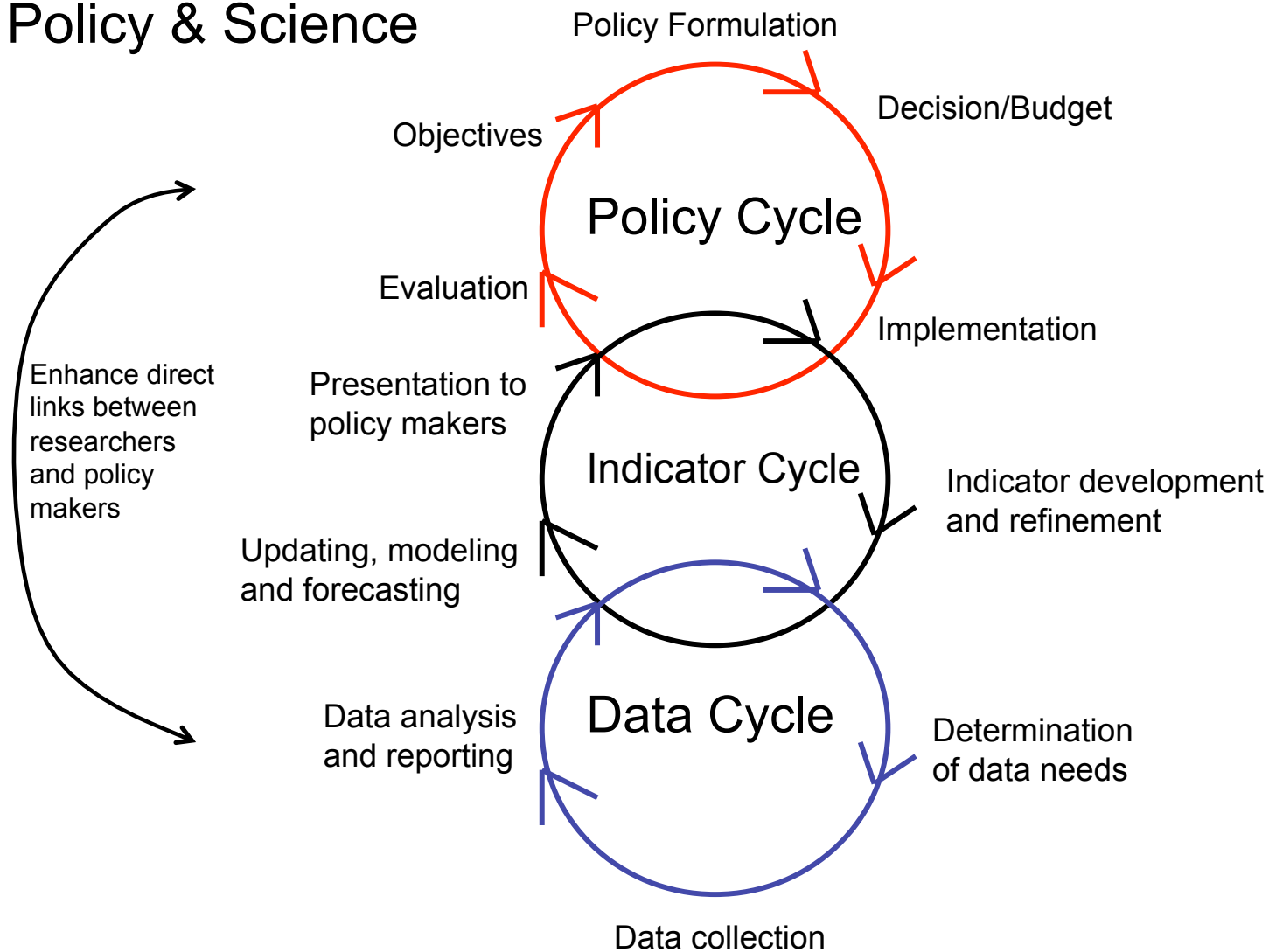
Simple Conceptual Model



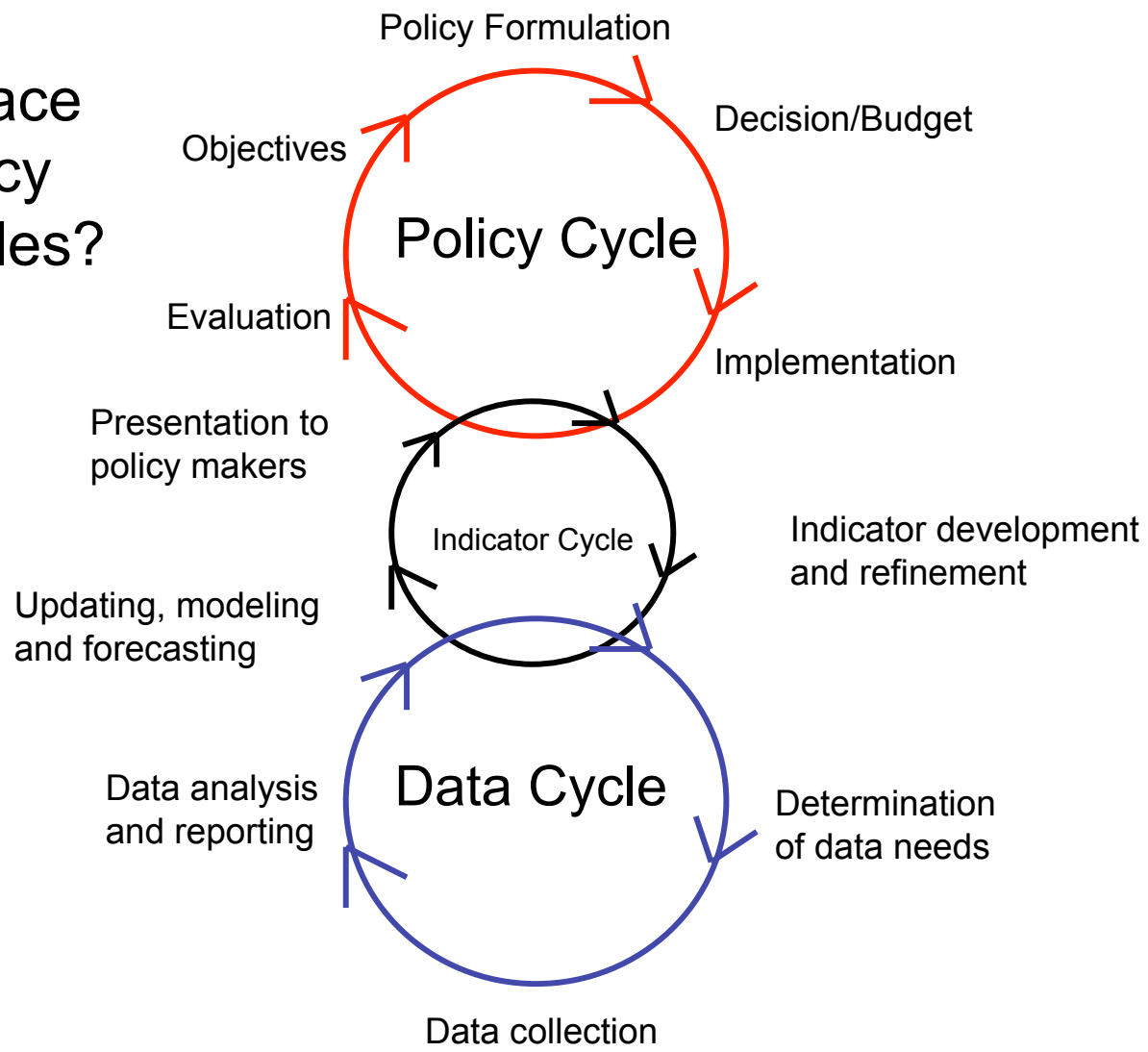
Gap or Interface?



Need to effectively link Policy & Science

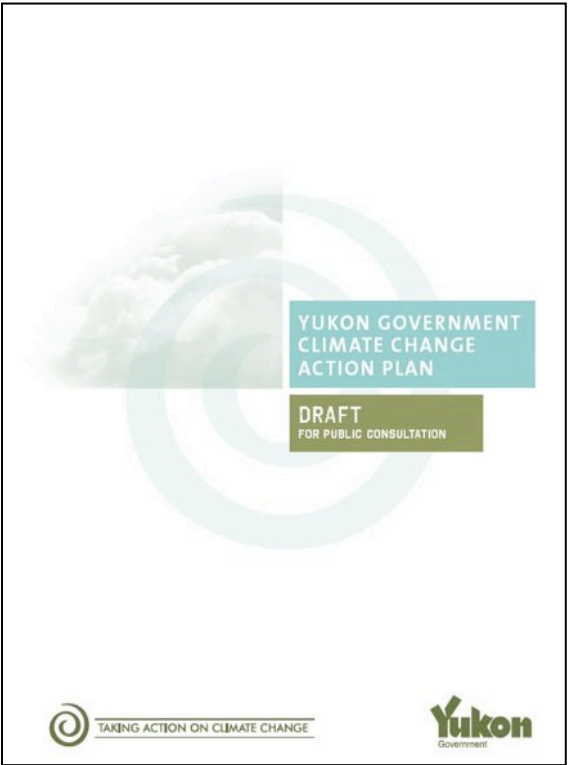
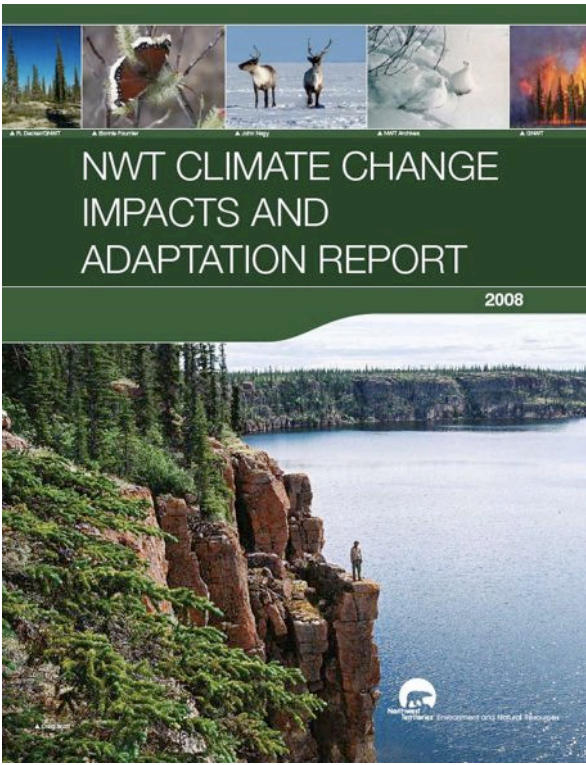
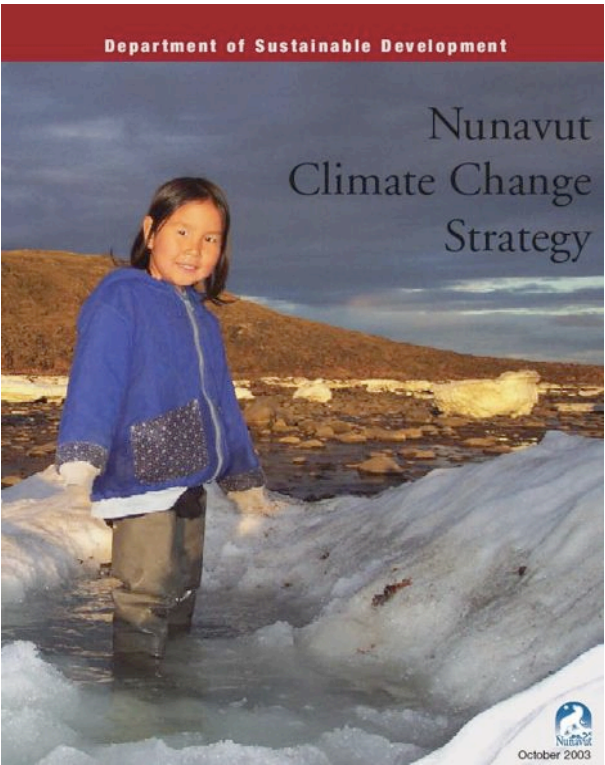


What is most effective type of interface between policy and data cycles?



Example

Climate Change Adaptation Strategies: post-hoc harmonization?



Other examples of policy and related documents that make use of research results:

Canada's Northern Strategy, Canada's Northern Foreign policy, and federal departmental positions on Arctic issues;

Territorial and provincial research and adaptation / planning agendas;

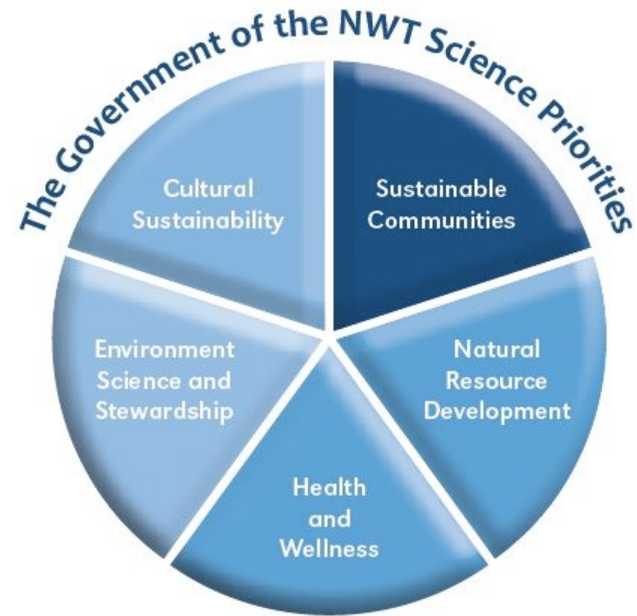
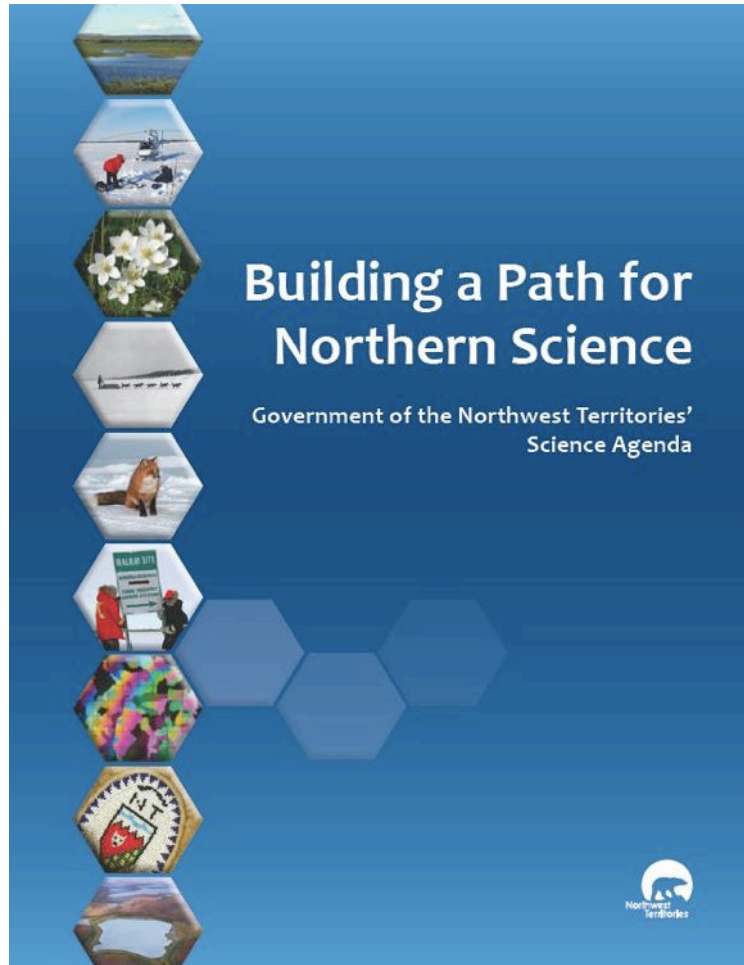
ITK and regional policy documents such as *Building Inuit Nunaat: The Inuit Action Plan*, ITK's proposal for a Northern Strategy, and *Identifying Canada's global science advantage in addressing the grand challenges facing the Canadian Arctic : An Inuit perspective* (May 2008);

ICC's *Utqiagvik Declaration* and ICC's Principles and Elements for a Comprehensive Arctic Policy;

ICARP II, Arctic Council Assessments, SAON, ACIA, IPCC recommendations and others.

Example

GNWT Science Agenda (2009): Policy-needs led process

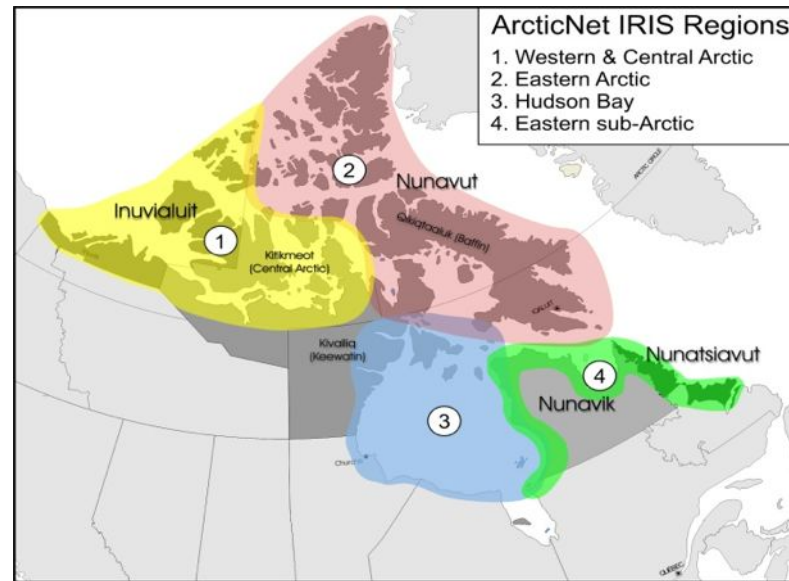


Cross-cutting themes:

- Technology integration and use
- Traditional knowledge integration
- Climate Change

Example

Integrated Regional Impacts Studies: Science-outcomes led process



Integrated Regional Impact Studies (IRISes) are dedicated to the consequences of change on the society and ecosystems in the coastal Canadian High Arctic, Eastern Arctic and Hudson Bay. An IRIS will summarize and combine knowledge and models of relevant aspects of the ecosystems of a region affected by change, with the objective of producing a prognosis of the magnitude and socio-economic costs of the impacts of change.

Process for Convergence of Perspectives?

Science 'structure'

Permafrost
Vegetation change
Caribou population dynamics
Hydrology
Carbon budget
etc

Northern government 'structure'

Resource extraction
Tourism
Hunting/outfitting
Fishing
Mining footprints
Energy
Community infrastructure
etc



What are the characteristics of a robust Science - Policy linkage?

