Belmont Forum Arctic Collaborative Research Action

The Challenge:

The US, Canada, and Norway have agreed to lead the development of a future Belmont Collaborative Research Action focusing on two areas of international scientific interest: Arctic Observing Systems and Arctic Sustainability Science.

The Belmont Forum requires that any Collaborative Research Action meet the goals of the Belmont Challenge:

To deliver knowledge needed for action to avoid and adapt to detrimental environmental change including extreme hazardous events.

Belmont further requires consideration of **human and natural systems** in each proposal, and a **minimum of three nations** involved in each project.

The Collaborative Research Action does not require all partners to fund all sciences. National annexes provide each partner agency the opportunity to spell out specific interests in the call and whether participation would be monetary or in-kind (personnel, access to facilities/labs/computer resources).

In Vancouver, initial information was gathered from agencies to refine the scope of interest in observing and sustainability science.

The aim was to rectify the two themes with national interests – thereby leveraging existing or planned activities – and meet the requirements of the Belmont Challenge.

The Input:

Submissions were received from a handful of agencies, and some discussion was offered during the workshop itself.

Agency interests included (in no order):

Impacts of changing Arctic climate (in the atmosphere and ocean) on global climate (MEXT, CNRS)
Assessment of the Arctic hydrologic cycle (CNR)
Impacts on permafrost and infrastructure to the region (MEXT, CNRS)
Prediction of sea-ice and navigation for the Arctic sea routes (MEXT)
Changing cryosphere and the carbon cycle for improving process understanding and long-term predictive capability (CNRS, CNR)
Evolution of emission, transport, transformation, and deposition of pollutants in the Arctic (CNRS, Norway, CNR)
Role of short-lived forcers at lower latitudes on Arctic climate (CNR)

Observing, understanding, and predicting the effects of climate change and increasing human activity on Arctic biodiversity and ecosystems (CNRS, CNR)
Environmental and physical feedback mechanisms and couplings over varying timescales and their contribution to systematic change (CNRS, CNR, India)
Role of the low/mid/upper atmosphere coupling in climate change (CNR)
Evolving vertical structure of the Arctic atmosphere and ocean (CNR)
Changing surface heat budget and influence of aerosols on albedo, clouds, and precipitation (India)
Determination and prioritization of amplification mechanisms in Arctic climate (CNR)
Quantification of anthropogenic forcing on Arctic change and downscaling of this effect to the local and regional scale (CNR)
Engineering design and testing of integrated systems for hydrosphere-atmosphere and hydrosphere-cryosphere measurements (CNR)
Technological improvements for ship-based measurements of atmospheric and oceanographic variables (CNR)
Development of renewable energy systems (CNR)
Demographic and economic longitudinal data to understand social change in the Arctic and its relationship in coupled human-natural systems (NSF)
Monitoring subsistence resources and the effect of both climate change and globalization on these key resources to human well being and cultural survival (NSF)
Research on the social dimensions of large scale technological systems and science infrastructure in the Arctic (NSF)
Research on how changes in the environment change the accessibility of natural resources to extractive industries and how these changes affect are affected by legal regimes, economic interests, population distributions, cultural values, etc (NSF)
Studies of the effects of ice-free periods on international boundaries, territorial claims, economic systems, and our collective definition of the Arctic (NSF)
Research on cultural concepts of climate change, both indigenous and western, including how language and discourse inform understanding (NSF)

Possible key words for the solicitation included:
• network evaluation, optimization, and feasibility studies
• system interactions, feedbacks, amplification, predictability, and impacts
• engineering and communication for an observing network – "wired/human sensor network"
• governance and sovereignty
• behavior, values, changing demography of Arctic residents
• natural resource management and environmental stewardship
• policy advice
• global connectivity

Networking activities or symposia were suggested as a possible first step to introduce international investigators capable of submitting multi-national proposals to a Belmont Arctic call.

How these might be grouped:

Using the past Belmont calls as examples (http://igfagcr.org/index.php/coastal-vulnerability-call), we may choose to group these themes into broad categories. Coastal used "characterization", "prediction", and "management strategies" to encompass their scientific interests. We could do the same.

The US and France recently held a joint call on Arctic Sustainability which could serve as a different model: http://www.nsf.gov/pubs/2012/nsf12553/nsf12553.htm . Science was directed around themes, and within those themes varying levels of discovery, management, and prediction could be proposed.

What is still needed:

We have heard from a few agencies, but not all that were present. So that we can define the "universe" of the call, it is important to hear from all interested agencies. There are three key pieces of information to share:

- scientific interests (leveraging existing or new programs)
- interest in a round one call (which could be capacity building, pilot projects, or a range of science)
- what kind of support you would envision (new money, supplements to already funded projects, in-kind support, etc)

Much of the input received has been from the natural science funders. We are actively reaching out to social science funding agencies as well to include their research priorities in the scope to meet the Belmont Challenge and balance the call.

With this in hand, I can draft an example call for group comment. This draft can be taken to other funding agencies within your country or region. Individual countries can have multiple funding partners within a given annex. One example of a national annex with different agency partners can be found here: http://igfagcr.org/images/pdf/uk_national_annex_uk_updated_18-06-2012.pdf .