
What needs to be considered in developing an adaptation strategy?

Arctic Considerations

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Part One

Arctic Council Background Information

The Era of the Accessible Arctic

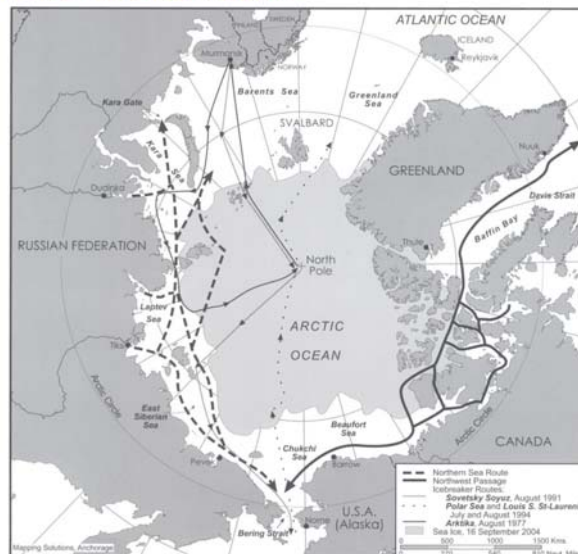
- ❑ **There has been significant political, economic and social change in the circumpolar North in the past several decades.**
 - ❑ **Indigenous peoples and governments are an integral part of the political & economic mainstream in some parts of the circumpolar North.**
 - ❑ **Industry is making or considering significant new investments in the circumpolar North.**
 - ❑ **Non-Arctic States appear to have a growing interest in the Arctic region.**
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Circumpolar Trends

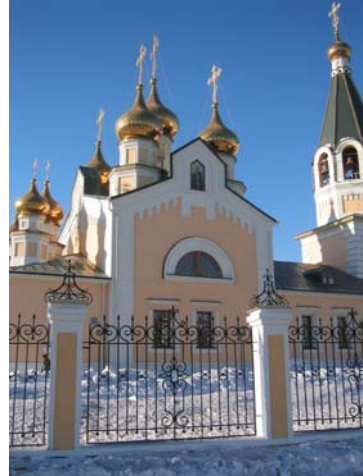
Significant local impacts from external and international issues

- Trans-boundary pollutants
- Increased demands for northern natural resources
- Increased scientific, commercial & military activity in Arctic
- Climate change

Arctic Ocean Marine Routes



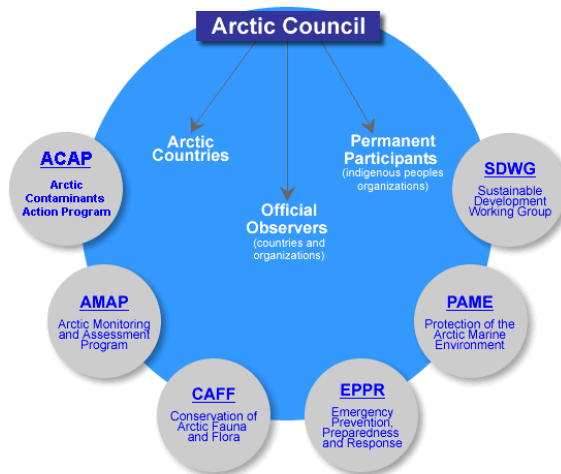
Circumpolar Cooperation



The Arctic Council

- An international network of scientists and policy makers
- “The Arctic Council is established as a high level forum to provide a means for promoting cooperation, coordination and interaction among the Arctic States, with the involvement of the Arctic indigenous communities and other Arctic inhabitants on common arctic issues*, in particular issues of sustainable development and environmental protection in the Arctic.” [AC Declaration, Sept.1996]

Arctic Council Organizational Structure & Working Groups



Source: <http://acap.4poyntzdesign.com/content.php?sec=1>

Arctic Council Member States

- Canada
- Denmark/Greenland/Faroe Islands
- Finland
- Iceland
- Norway
- Sweden
- Russian Federation
- United States of America

Permanent Participants

(International Indigenous Organizations)

- Aleut International Association (AIA)
- Arctic Athabaskan Council (AAC)
- Gwich'in Council International (GCI)
- Inuit Circumpolar Conference (ICC)
- Saami Council
- Russian Association of Indigenous Peoples of the North (RAIPON)

Observers

Observer States

- France
- Germany
- The Netherlands
- Poland
- United Kingdom
- Spain
- China
- Italy

International Governmental Organizations

- Conference of Parliamentarians of the Arctic Region
- International Federation of Red Cross & Red Crescent Societies
- International Union for the Conservation of Nature (IUCN)
- Nordic Council of Ministers
- Northern Forum
- North Atlantic Marine Mammal Commission (NAMMCO)
- United Nations Economic Commission for Europe (UNECE)
- United Nations Environment Program (UNEP)

Non-governmental organizations

- Advisory Committee on Protection of the Seas (ACOPS)
- Association of World Reindeer Herders
- Circumpolar Conservation Union
- International Arctic Science Committee (IASC)
- International Arctic Social Sciences Association (IASSA),
- International Union for Circumpolar Health (IUCH)
- Worldwide Fund for Nature (WWF)
- United Nations Development Programme (UNDP)
- International Work Group for Indigenous Affairs (IWGIA)
- University of the Arctic

Arctic Council Working Groups

- ACAP (Arctic Contaminants Action Program)
- AMAP (Arctic Monitoring & Assessment Program)
- CAFF (Conservation of Arctic Flora & Fauna)
- EPPR (Emergency Prevention, Preparedness & Response)
- PAME (Protection of Arctic Marine Environment)
- SDWG (Sustainable Development Working Group)

- ACIA (Arctic Climate Impact Assessment)*

* Not a permanent Arctic Council working group

Arctic Council Websites

- Arctic Council: <http://www.arctic-council.org>
- ACAP: <http://acap.arctic-council.org>
- AMAP: <http://www.amap.no>
- CAFF: <http://www.caff.is>
- EPPR: <http://epr.arctic-council.org>
- PAME: <http://www.pame.is>
- SDWG: <http://portal.sdwg.org>
- ACIA: <http://www.acia.uaf.edu>

Some Relevant Arctic Council Activities

- Adaptation to Arctic Climate Change
- AHDR (Arctic Human Development Report)
- SLiCA (Survey of Arctic Living Conditions)
- AMSP (Arctic Marine Strategic Plan)
- Arctic Shipping Assessment
- Arctic Oil and Gas Assessment
- CAFF Biodiversity Framework
- Arctic Social Indicators
- Arctic Human Health Initiative



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Thematic Areas discussed by SDWG

- Follow-on to the AHDR
- Arctic Information & Communication Technologies
- Management of Natural Resources
- Arctic Human Health
- Adaptation to Climate Change



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SDWG Projects & Activities 2006-2008

Project/Activity	Lead
Adaptation to Climate Change in the Arctic	Norway
Arctic Human Health Initiative	USA
Arctic Infrastructure: Aviation	USA
International Circumpolar Surveillance: Prevention and Control of Emerging Infectious Diseases in the Arctic	USA
Survey of Living Conditions in the Arctic	Denmark Greenland Faroe Islands
Telemedicine	USA



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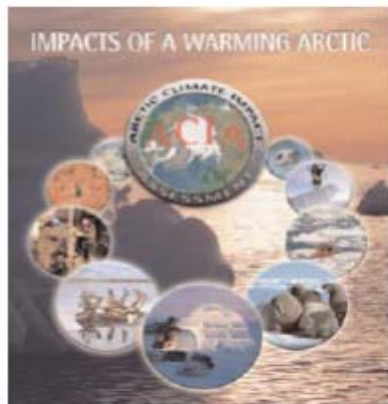
SDWG Projects & Activities 2006-2008

Project/Activity	Lead
Arctic Action (ICT)	Sweden
Arctic Energy Summit	USA
Arctic ICT Assessment	USA, Finland
Arctic Indigenous Languages Symposium	Canada
Arctic Social Indicators	Iceland
ArcticStat	Canada
Research & Action Plan for Human Health Risk Reduction in the Arctic	Russia
Sustainable Development of Indigenous Peoples of Russian North	RAIPON/Russia

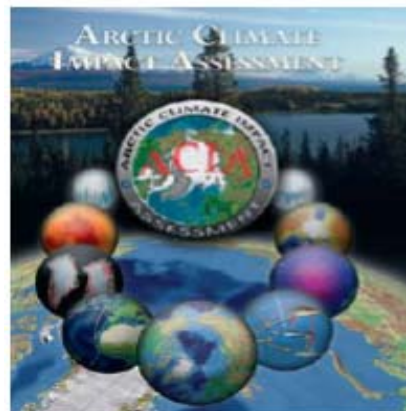
Part Two

Arctic Climate Impact Assessment

Climate Change Reports: 2004-2005



ACIA Overview Report



ACIA Science Report

ACIA overview

- ACIA is a starting point for Arctic actions in adaptation
- ACIA did not assess vulnerability or adaptation needs in the circumpolar Arctic
- ACIA highlighted the climate trends and projected their impacts on natural ecosystems and on society throughout the Arctic
- ACIA provides basic information on changes that require planning of adaptation measures
- ACIA identified four sub-regions in the Arctic with significant sub-regional variations in climate
- ACIA highlighted selected impacts of climate change in each of these sub-regions.
- Regional variations in climate change will call for local adaptation
- adaptive capacity of some arctic populations and ecosystems will be challenged
- ACIA notes that many other stresses simultaneously affecting life in the Arctic.
- Other stresses are important to take into account while assessing adaptation needs

ACIA's 10 Key Findings

- **The Arctic climate is now warming rapidly & much larger changes are projected.**
- **Arctic warming & its consequences have worldwide implications.**

ACIA's 10 Key Findings

- **Arctic vegetation zones are projected to shift, bringing wide-ranging impacts.**
 - **Animal species' diversity, ranges & distribution will change.**
 - **Many coastal communities & facilities face increasing exposure to storms.**
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ACIA's 10 Key Findings

- **Reduced sea ice is very likely to increase marine transport & access to resources.**
 - **Thawing ground will disruption transportation, building & other infrastructure.**
 - **Indigenous communities are facing major economic & cultural impacts.**
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ACIA's 10 Key Findings

- **Elevated ultraviolet radiation levels will affect people, plants & animals.**
- **Multiple influences interact to cause the impacts to people & ecosystems.**

Some Potential Climate Change Impacts

Local & National

- Migration and feeding patterns of wildlife
- Harvesting and traditional economies
- Coastal communities: rising sea levels & coastal erosion
- New health issues: pest-borne infectious diseases

International

- Impacts on land & sea infrastructure
- New shipping lanes in Arctic waters
- Pressures to develop non-renewable resources
- Pressures for fresh water exports
- Sovereignty & security

ACIA: Adaptation

The ACIA notes:

“Depending on the frequency, duration, and suddenness in the onset of a stress, and on the resilience of a system, either coping or adaptive responses or both will come into play. With a progression of change in climatic conditions, coping mechanisms may at some point be overwhelmed, and by necessity supplanted by adaptive responses.”

[ACIA 2005, p 955.]

Part Three

Adaptation

Overview: Adaptation & the Circumpolar North

- Climate change will have fundamental impacts on northern peoples, ecosystems and economies.
- Northern peoples are already seeing the impacts of climate change detailed in the Arctic Council's Arctic Climate Impact Assessment.
- Climate change is becoming a key driver of environmental, social, economic and cultural change in the Arctic.
- Municipal, industrial and transportation infrastructure is already being impacted by climate change and the costs of replacing, renewing and expanding it need to be better understood.
- new infrastructure investments will likely be necessary as an ice-reduced Arctic Ocean increases the region's accessibility
- There will be a need for assessing "on the ground" impacts of climate change.
- Capacity to measure and predict such impacts will necessarily remain imperfect, as will our ability to determine their relative significance in relation to the myriad other factors (often grouped under the heading "globalization") driving change
- Public policy to reduce vulnerability is at an early stage.
- A vulnerability-based approach to climate change adaptation must rely significantly on past and current experience in guiding the development of resilience to potentially more challenging future conditions.

Adaptation

- **Arctic human communities are already adapting to climate change, but both external and internal stressors challenge their adaptive capacity.**
- **Despite the resilience shown historically by Arctic indigenous communities, some traditional ways of life are being threatened and substantial investments are needed to adapt or re-locate physical structures and communities.**
- **We do not have a clear picture of the limits to adaptation, or the cost, partly because effective adaptation measures are highly dependent on specific, geographical and climate risk factors as well as institutional, political and financial constraints.**

[Source: Intergovernmental Panel on Climate Change. *Climate Change 2007: Impacts, Adaptation and Vulnerability Summary for Policymakers*, 13 April 2007]

SDWG Adaptation work

- Arctic Council Ministerial Meeting, Salekhard, Russia, October 2006:

"[Ministers] request the SAOs to direct the SDWG, drawing on the expertise of other Working Groups, experts and stakeholders, to identify and share adaptation expertise and best practices and possible actions, unique to the needs and conditions of the Arctic, so that indigenous and other residents can better adapt to climate change, and to report on the status of this activity at the 2008 Ministerial meeting, and to make publicly available any results or lessons learned from this undertaking."

- The identification of adaptation expertise, best practices and possible actions could include, among other things:
 - Studying adaptive capacity of Arctic environment and society to the potential impacts of climate change, taking into account stakeholders' role in provision of information, decision-making process and implementation
 - Identifying gaps in Arctic-relevant knowledge about adaptation to climate change, and policy-relevant research to guide policy-makers (e.g. adaptation methodology, monitoring and indicator studies, research carried out on adaptation, predictive modeling, economic costing, integrated assessment, testing and evaluation of adaptation measures.)
 - identifying best practices on adaptation from various sectors of society, especially from the Arctic region, but also outside the Arctic, whenever considered relevant to Arctic points of view. Availability and use of risk-based planning instruments within and outside the Arctic need overall mapping.



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Status of SDWG work on Adaptation:

- Each Arctic State and Permanent Participant was to send in comments on the present Norwegian proposal by 24 May 2007 and nominate a contact person for this issue.
- If required, a telephone conference could be held to discuss these comments.
- Norway will prepare a revised proposal by 07 June 2007.
- A telephone conference by heads of delegation to the SDWG (Arctic States and Permanent Participants) will discuss the revised Norwegian proposal.
- Any further revisions to the proposal will be incorporated and transmitted to SAOs by 20 June 2007.

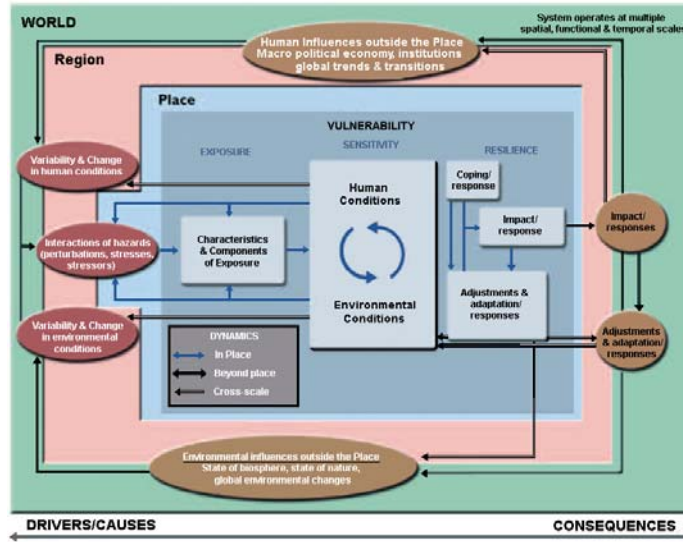
Part Four

Some Considerations in Developing an Adaptation Strategy

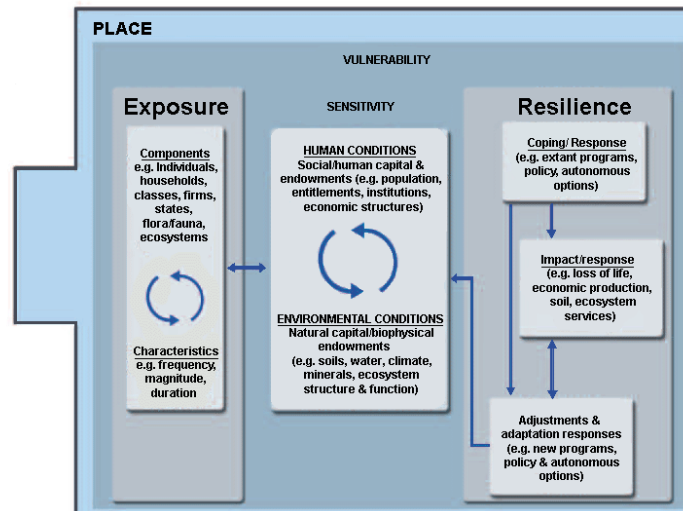
Some Considerations in Developing an Adaptation Strategy

- *Vulnerability*: to what degree are Arctic peoples & systems susceptible to and unable to cope with adverse effects of climate change, including variability and extremes. Vulnerability is a function of the character, magnitude and rate of change in stresses to which a system is exposed, the sensitivity of the system and its adaptive capacity;
 - *Exposure*: to what degree are Arctic peoples and systems in contact with particular stresses;
 - *Sensitivity*: to what degree are Arctic peoples and systems adversely or beneficially affected by stresses; and
 - *Adaptive Capacity (or Resilience)*: do Arctic peoples and systems have the ability or capacity to modify or change characteristics or behaviors so as to cope better with existing or anticipated external stresses.
-

Considerations: Vulnerability



[Source: Turner et al. 2003a)



Details of the exposure, sensitivity, and resilience components of the vulnerability framework (Turner et al., 2003a).

Considerations: Regional and Local Differences in Conditions & Circumstances

- Just as the impacts of climate change are unevenly distributed in the North, so too is vulnerability and resilience. Adaptation to climate change likely means very different things in small, isolated, “traditional” communities, than it does to professionals based in urban centres.
 - Coastal communities might experience significantly different impacts in scope, nature and timescales, from inland communities.
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Considerations: Time Scales

- Adaptation strategies should consider, to the extent possible, the timing of anticipated impacts. Which sorts of impacts are likely to occur or require action first and where should resources and attention be focused as a result? The time scale issue has become of increasing concern to many scientists as certain types of change predicted by climate models begin to occur more quickly than once forecast.
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Considerations: Cultural issues

- In the circumpolar North, adaptation to climate change is a cultural as well as an environmental and economic issue for many peoples.
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Considerations: Impact Analysis

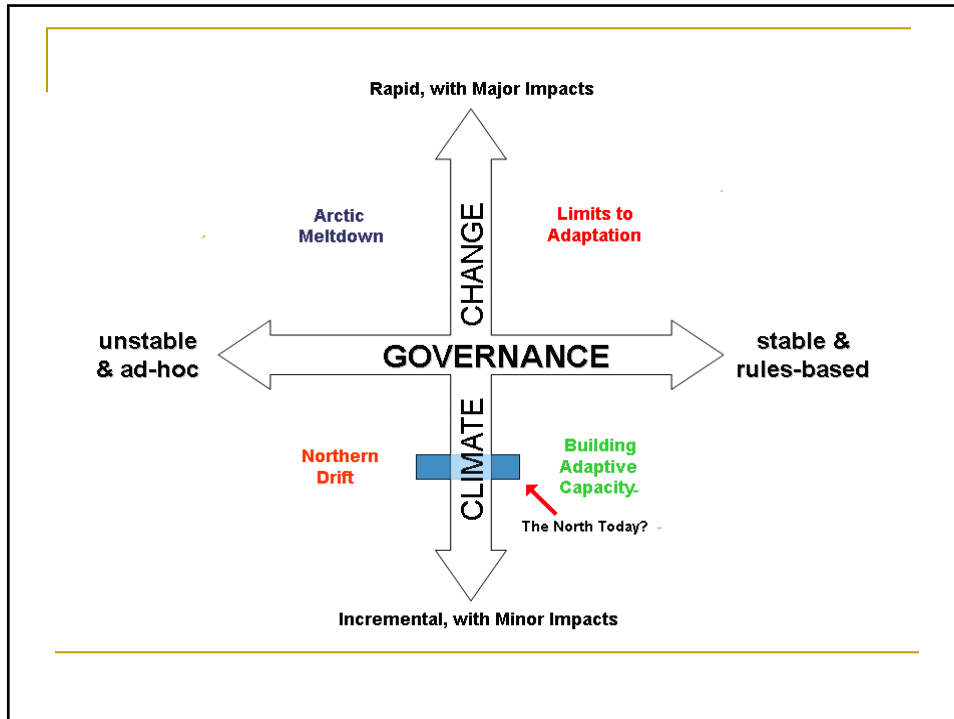
- There are many questions outstanding in relation to the speed, scope and nature of climate change impacts.
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Considerations: What does Adaptation Involve

- Slight modifications in behaviour ?
 - Major modifications of behaviour ?
 - Dislocation within a locality or region ?
 - Dislocation at a national/international level ?
 - Etc.
-

Considerations: Governance

- Many levels of government have a role.
 - What is the general scope of each government's responsibilities in the area of climate change adaptation ?
 - What are some of the unique features of, and challenges facing, governments ?
 - What are the limits and boundaries in relation to the responses of each level of government ?
 - How do domestic roles overlap with commitments and participation internationally ?
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Considerations: Capacity Issues

- In the Arctic there are often human and financial “capacity” deficits for proper research, analysis, strategic planning and implementation of measures in relation to the impacts of external stressors.

Considerations: Adaptive Capacity

- Social, educational, institutional, place-specific and other factors determine adaptive capacity.
- The IPCC specifies eight basic categories:
 - the structure of critical institutions, the derivative allocation of decision-making authority, and the decision criteria employed;
 - the system's access to risk spreading processes;
 - the ability of decision-makers to manage information, the processes by which these decision makers determine information is credible;
 - the availability of resources and their distribution across the population;
 - the range of available technological options for adaptation;
 - the stock of human capital including education and personal security;
 - the stock of social capital including the definition of property rights; and
 - the public's perceived attribution of the source of stress and the significance of exposure to its local manifestation.

Considerations: Political Cycles

- Devolution of governance raises human and financial capital issues
- National governments tend to cater to the large population centres and political cycles that don't facilitate long term planning.
- Rights and interests of peoples in remote regions receive different levels of recognition by state governments

Considerations: Uncertainty Factors

- In the Circumpolar North, adaptation to climate change can not be treated as a prescriptive cure to a precisely known ailment. Changes in the climate are likely to result in myriad threats the severity and imminence of which will differ considerably and may not yet be fully understood. There are many considered views about how to proceed when faced with this sort of uncertainty.
- The International Institute for Sustainable Development, for example, says that while no single best approach exists for integrating adaptation into policies, programs and projects, certain considerations are critical, including:
 - The engagement of institutions at all levels—from the highest political levels to the local level—ensuring cooperation between these different levels of authority;
 - The establishment of appropriate incentives to ensure that finances flow to where they are needed and that a “culture of prevention” is created; and
 - The use of a variety of instruments at the appropriate decision levels.

[Source: Willems 2005, quoted in IISD paper entitled “Climate Change and Adaptation” June 20, 2005, p.8]

Considerations: Other Constraints

- As the April 2007 *IPCC Summary for Policymakers of impacts, adaptation and vulnerability* makes clear, “institutional, political, and financial constraints have a great bearing on the success or otherwise of adaptation.”

[Source: IPCC Climate Change 2007: Impacts, Adaptation and Vulnerability Summary for Policymakers, (April 2007). See: www.ipcc.ch]

Considerations: Many Strong Voices

Moving from a focus on internal circumstances of communities to looking at the external relations influencing their development



- Mitigating external impacts requires the many to change for the few
- Can small northern local communities/SIDS influence large, urban populations?

Part Five

Working with SIDS: Possible Areas for Collaboration

An Ocean Focus

- Sharing IPY research relevant to SIDS
 - Sharing AC Assessments
 - Arctic as barometer of global climate change
 - SIDS as barometers of oceanic change
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Intergovernmental Approach

- The magnitude and importance of climate change trends and projections point to the need for a long-term, strategic, planned, intergovernmental approach toward adaptation.
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Building partnerships: e.g. Bangladesh

- One of the world's most densely populated countries
- Population of 125 million inhabitants
- One of the poorest countries in the world with a GNP of \$200 per head
- Most of the country consists of a huge flood plain and delta
- 70% of the total area is less than 1 metre above sea level
- 10% of the land area is made up of Lakes and Rivers
- Global warming is blamed for sea level rise, increased snow melt & increased rainfall in the region

[Source: <http://www.sln.org.uk/geography/schools/blythebridge/GCSEBangladesh.htm>]