

# Integration and Comparison of Arctic Community

## Vulnerability:

### Preliminary Results From The IPY CAVIAR Research Consortium

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#### Goals of CAVIAR

The underlying purpose of CAVIAR is to better understand how Arctic communities are affected by environmental changes in order to help develop adaptive strategies and policies. The project includes:

- a **conceptual framework** for community vulnerability, including exposures and sensitivities to multiple stresses and adaptive capacities
- a **methodological approach** that is stakeholder-based, and draws upon local and scientific knowledge to document exposures
- **case study analyses** with northern collaborators in communities across the Arctic region
- **comparison and integration of** results from the case studies for a pan-Arctic assessment of community vulnerability and adaptability
- application to **policy** and decision-making relating to community adaptive capacity
- substantive stakeholder engagement and partnerships so that **outreach** is an integral feature of the vulnerability assessment.

#### Key features of CAVIAR

- Considers physical, biological and socio-economic variables, and systematically explores the dynamics and links between natural and human systems
- CAVIAR relates integrated science directly to adaptive decision-making and policy from local to international levels
- Is fundamentally inter-disciplinary, each case study involves social scientists and natural scientists in addressing common objectives
- Is multi-methodological by combining a variety of data collection methods and analytical tools from the natural and social sciences
- Assesses current and past conditions and considers implications for the future
- Is community-based, to ensure that the research is founded on the experiences of people and its findings are relevant to their lives and environments
- Is both place-specific (with insights in each community) and regionally relevant in its comparison and integration of findings over many communities in the Arctic

#### Selected Conclusions from Cross-Community Analysis

- Vulnerability varies within and between communities, depending on the mix of social and ecological variables
- Non-climatic exposure-sensitivities are fundamental for Arctic communities, and climate change is experienced in the context of existing stresses
- Responses to stresses related to food systems and livelihoods are mainly initiated by individuals, with some higher level adaptations
- Actions in response to infrastructure risks are mainly taken by local and higher level governments and institutions
- Climate change will have both positive and negative influences on existing exposure-sensitivities, and on the outcome of existing adaptation strategies

#### Preliminary Results from Selected Case Studies in Progress (see map for other active case study locations)



	Gällivare	Ivalo	Qeqertarsuaq	Venetie	Hopedale
Existing Exposure-sensitivities	<ul style="list-style-type: none"> <li>• Competing land use demands (forestry and reindeer herding)</li> <li>• Increasing reliance of foresters on international markets</li> <li>• Risks to winter roads influence forestry practices (warmer winters)</li> <li>• Viability of reindeer husbandry threatened by market fluctuations and grazing access</li> </ul>	<ul style="list-style-type: none"> <li>• Damage to infrastructure due to flooding</li> <li>• Communication difficulties with professionals from south</li> <li>• Less snow during autumn and spring threaten winter tourism</li> <li>• Delayed formation of ground frost in autumn affects forestry sector</li> </ul>	<ul style="list-style-type: none"> <li>• Changes in weather affecting food security (harvested and store bought foods)</li> <li>• Few employment opportunities that resonate with community skill sets</li> </ul>	<ul style="list-style-type: none"> <li>• High cost of living</li> <li>• Loss of traditional language</li> <li>• Changing animal migrations and access to hunting grounds affecting livelihoods</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced safety while traveling on snow and ice for resource harvesting</li> <li>• Decreased access to, and availability of, key resources due to changing snow and ice conditions</li> <li>• Lack of employment opportunities</li> <li>• High cost of living</li> </ul>
Existing Adaptive Strategies	<ul style="list-style-type: none"> <li>• Increase financing in forestry industry</li> <li>• Supplementary feeding of reindeer in response to winter grazing challenges</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthened cooperation between Environmental Center and town administration</li> <li>• Greater preparedness for flood events (e.g. upstream river level monitoring)</li> <li>• Upgrade and improvement of flood terraces</li> <li>• Encourage autumn tourism by storing snow for skiing</li> </ul>	<ul style="list-style-type: none"> <li>• Community food sharing and trading</li> <li>• Diversify livelihoods</li> <li>• Reliance on government subsidies</li> </ul>	<ul style="list-style-type: none"> <li>• Diversify livelihoods</li> <li>• Modify duration and spatial extent of hunting excursions</li> <li>• Food sharing</li> <li>• Out migration in search of employment</li> </ul>	<ul style="list-style-type: none"> <li>• Use navigational technologies</li> <li>• Out-migration in search of employment</li> <li>• Modify timing and route of hunting, travelling, and resource gathering excursions</li> <li>• Modify harvesting practices</li> </ul>
Future Exposure-sensitivities	<ul style="list-style-type: none"> <li>• Potential opportunities for forestry due to longer growing season</li> <li>• Reindeer herding may be further stressed from reduced ability to graze</li> </ul>	<ul style="list-style-type: none"> <li>• Flood risk expected to remain high despite preventive measures (terraces)</li> <li>• Continued stress on the tourism industry from changing seasonal conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Increased reliance on non-traditional livelihoods</li> <li>• Potential independence of Greenland is expected to influence standard of living</li> </ul>	<ul style="list-style-type: none"> <li>• Loss of traditional knowledge/skills</li> <li>• Increased on- and off-shore industrial developments (e.g. Oil and gas)</li> </ul>	<ul style="list-style-type: none"> <li>• Proposed resource extraction (e.g. uranium mining)</li> <li>• Stagnant employment opportunities</li> <li>• Continued seasonal changes leading to uncertainties in harvested food security</li> </ul>
Future Adaptive capacities	<ul style="list-style-type: none"> <li>• Municipality incapable of providing subsidies to support local reindeer husbandry and forestry in light of market fluctuations</li> <li>• Limited capacity for resolving land use disputes</li> <li>• Financial limits for reindeer herders</li> </ul>	<ul style="list-style-type: none"> <li>• Learning from experience with past hazard events has improved preparedness</li> <li>• Continued co-operation among stakeholder groups to identify and plan for risks</li> <li>• Financial limits on adaptation options (funding for infrastructure)</li> </ul>	<ul style="list-style-type: none"> <li>• Community experiences with transition and change encourages flexibility</li> <li>• Limited anticipatory planning for climate-related stresses on food systems</li> <li>• Decreased prevalence of food trading and sharing</li> <li>• Livelihood support for elders and other groups at risk</li> </ul>	<ul style="list-style-type: none"> <li>• Pool cash and equipment resources for hunting</li> <li>• Reliance on corporate investment strategies</li> <li>• Maintain native traditions through ritualized practices</li> </ul>	<ul style="list-style-type: none"> <li>• Utilize existing multi-level communication avenues to facilitate adaptation</li> <li>• Continued integration of local and traditional knowledge systems within decision-making processes</li> </ul>

