

Monitoring Arctic Sustainability: International Experiences and Agenda to Develop Arctic Sustainability Indicators

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The Belmont Forum project “ASUS: Arctic Sustainability: A Synthesis of Knowledge” brings together an international team of experts from seven Arctic countries to develop an interdisciplinary synthesis and assess the state of knowledge about Arctic sustainability and sustainable development. A special domain of this ASUS project is “Monitoring of sustainability and sustainable development”. The aim of this activity is to assess what has been already done in monitoring Arctic sustainability and sustainable development at different scales, what approaches and methods were implemented to delineate and monitor trends, both positive and negative on the way towards sustainability in the Arctic. The focus on creating knowledge infrastructure for multi-scale socially-oriented observations and assessments of Arctic socio-ecological systems sustainability and resilience in changing natural and living environments is of great importance. A design of the suitable monitoring frameworks of sustainable development and resilience of complex socio-ecological systems is one of the project’s goals. In this case sustainable development should be viewed as both the *process* and as an *outcome*.

ASUS monitoring sustainability domain is built on existing knowledge infrastructure by linking with multiple research projects and networks including IPCC, U.S. (*Arctic-FROST; Arctic-COAST, NSF AON*); Canadian (*ReSDA, ArcticNet, CACOON*); Nordic (*ARCSUS, NCM Arctic Cooperation Programme*), and Russian (*IASOS*), as well as integrative Arctic Council projects (*ASI, AHDR, ARR, AMAP*).

ASUS will synthesize knowledge pertaining to biophysical and social observations under an overarching umbrella of social-ecological monitoring. This transdisciplinary, integrated approach is best suited for understanding and managing coupled human-environmental systems. Many biogeophysical, social and integrative observation systems have been established in various Arctic regions under SAON and other long-term monitoring programs. However, attempts to assimilate social and biogeophysical monitoring frameworks with a focus on sustainability indicators are limited. We will develop principles for an integrated monitoring framework of sustainability indicators by combining existing physical, ecological and social observations and by completing methodological and substantive syntheses of these observations. We will consider data interoperability, accuracy and availability and develop strategies to enhance continuous observations and develop suitable frameworks for incorporating community-based monitoring.

One of the main results of the IPY was the start of the local and regional observing projects and networks. Several of them are focused on the land-based resources and social processes: Traditional Indigenous Land Use Areas in the Nenets Autonomous Okrug (*MODIL-NAO*), Circum-Arctic Rangifer Monitoring and Assessment Network (*CARMA*), Reindeer Herders Vulnerability Network Study (*EALAT*), and Monitoring the Human-Rangifer link (*NOMAD*). Some of them such as Sea Ice Knowledge and Use (*SIKU*), Exchange for Local Observations and Knowledge of the Arctic (*ELOKA*), and the Bering Sea Sub-Network (*BSSN*) are oriented toward the sea, ice, marine and coastal resources. The Community Adaptation and Vulnerability in Arctic Regions (*CAVIAR*) has a number of land-focused case studies of reindeer herding and terrestrial resource use, but also incorporates coastal fisheries and other marine resources. Nevertheless, most of these monitoring networks are concentrated

on changes in different components of natural environment and their impacts on indigenous people and only few put primary attention to “socio-economic” factors impacting human capacities (health, demography, education, etc.) and well-being.

A substantial post-IPY progress in social monitoring human conditions resulted in a set of regional and circumpolar studies. We envision using the established indicators framework developed by the Arctic Social Indicators and IASOS projects. ASI indicators measure six domains:(1) Fate control and or the ability to guide one’s own destiny; (2) Cultural Wellbeing and Cultural Integrity or belonging to a viable local culture;(3) Contact with nature or interacting closely with the natural world; (4) Material Well-being; (5) Education; (6) Health and Population. Integrated Arctic Socially Observation System (IASOS) network that is developing and practicing the methodology of socially-oriented observations (SOO) putting main focus on quality of life, human and social capital development in the Arctic.

ASUS may significantly add to Arctic observing and assessment processes, and will ultimately produce a list of indicators targeting current and near-term priorities for observing networks and systems. It will help to identify societally significant socio-economic environmental variables to assess the capacity of observational networks in the Arctic. The data from key socially-oriented observation sites will help to identify key indicators for on-going observations at the local scale. The synthesis of local and regional observation frameworks will be critical in developing the instruments for socially significant observations at the national circumpolar and global scales.