

## KNOWLEDGE FOR A SUSTAINABLE ARCTIC

### Observe, Understand, Respond, and Strengthen

“Knowledge for a Sustainable Arctic,” is the theme of the Third Arctic Science Ministerial (ASM3). The themes of ASM3 are focused on taking action on the most urgent challenges facing the Arctic which can be met through international scientific cooperation.

The discussions in the past two Arctic Science Ministerial meetings demonstrates that the following four-step process is indispensable to meet the challenges of a rapidly changing Arctic: 1.) **Observe** the status of the changes, 2.) **Understand** the local and global impacts, 3.) **Respond** to the changes based on a shared understanding, and 4.) **Strengthen** these efforts through education and capacity building for the next generation.

These four steps are not independent, but rather an iterative cycle. They represent the necessary actions required to realize our overarching goal.

### 1. Observe

#### Observing networks; Data sharing – towards implementation

The desired action for this step is to provide support for the implementation of an observation and data sharing system, and to develop collaboration between scientists and Arctic communities.

Information on the status of ongoing changes in the Arctic is still limited. There are vast data gaps, especially with long-term data which has largely been observed only since the satellite era. There is also room for improvement with data sharing. As observations in the Arctic require considerable human resources and costs due to its remote and harsh environment, it is difficult for a single country alone to build and maintain a long-term observation system. It is, therefore, necessary to collaborate on a system of systems with an international platform to promote cooperation for observing and data sharing.

It was noted in ASM1 and ASM2 that the Sustaining Arctic Observation Network (SAON) initiative can play a key role in resolving these issues. Following the recommendations in the previous meetings, ASM3 will seek an organizational mechanism to provide support to SAON and other necessary actions. Empowering national focal points and offices in each country as well as focusing on recommendations from international assemblies would be the first step.

### 2. Understand

#### Enhance understanding and prediction capability on Arctic environmental and social systems and its global impact

The desired action for this step is to recognize the complexity of the system connecting all environmental and socio-economic components, and to encourage further interdisciplinary research.

The interconnected effects of both globalization and global climate change are impacting Arctic communities and the environment. It is increasingly understood that the Arctic environment is not only a very complex system on its own, but it is connected to the global weather and climate system as well as

the global socio-economic system. The people who call the Arctic home also depend inextricably on the Arctic environment and its living and non-living resources. The changes in the natural environment in the Arctic will have cascading impacts on the social environment, affecting the rest of the world as well. We must understand the structure and dynamics of this complex system.

Reliable predictions are essential for developing effective planning for mitigation and adaptation measures and processes. To enable informative predictions, our understanding of Arctic change needs to improve significantly. ASM3 will strengthen international collaboration for comprehensive and holistic Arctic science to improve the assessment of ongoing change and prediction for future change.

### 3. Respond

#### Sustainable development; Evaluation of vulnerability and resilience; Application of knowledge

The desired action for this step is to recognize the necessity of knowledge-based decision-making, and to establish a framework for taking effective measures.

Warming at twice the speed of the global average, the Arctic is experiencing drastic changes in both the physical and ecological environment. The changes are visible in many natural phenomena, and their impacts to culture and society are also becoming clearer. It should be noted, as reported in the IPCC Special Report on the impacts of global warming of 1.5°C, that further warming will continue at least until mid-century, and will likely occur regardless of any prompt action taken to reduce carbon emissions.

It is, therefore, a matter of urgency to consider and implement adaptation and mitigation measures for the sustainable future of the Arctic including taking global action to slow down climate change, seeking compromise between development and protection in the Arctic, and supporting adaptation and mitigation strategies for Arctic residents. This approach requires making full use of the Arctic Knowledge system. ASM3 will emphasize the necessity of active response based on the best available knowledge and evidence, which we obtain through *observation* and *understanding*.

### 4. Strengthen

#### Capacity building; Education; Networking; Resilience – prepare the next generation

The desired action for this step is to recognize the urgent need and identify gaps in capacity building, education and networking, both in Arctic and global communities, and provide pathways of support.

The problems triggered by warming in the Arctic are long-lasting and will impact culture and society for generations. It is the responsibility of the current generation to pass on the knowledge needed to meet the challenges of the changing Arctic and to establish the network and infrastructure required for supporting the work of future generations. ASM3 will encourage and strengthen these efforts in capacity building, education, and networking with participating countries in order to build resilience.

It is necessary to encourage and support young scientists and knowledge holders who will become the next generation of leaders. It is critical that people around the globe see the Arctic as linked to their lives and not as a distant and irrelevant place. It is also crucial to build capacity in education for Arctic residents, including Indigenous communities, acknowledging the importance of practicing their knowledge within their education system. Adapting education systems to include traditional and local knowledge is essential for Arctic residents in building resilience within their changing environment. Empowering citizens is also important for fostering a stable observation system that includes community-driven observation.

