United Nations
Educational, Scientific and
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pour l'éducation,
la science et la culture

International Experts Meeting

Climate Change
and Arctic Sustainable Development:
scientific, social, cultural and educational challenges

3-6 March 2009, Monaco

MEETING CONCEPT AND BACKGROUND

INTRODUCTION

The changes underway in the Arctic and Subarctic engendered by global warming will have multiple and complex repercussions on the natural, social and cultural landscapes of the Arctic and sub-Arctic. The implications of these changes, including their global impact, have yet to be comprehensively monitored and evaluated. To address these repercussions, a coordinated effort is required to bring together the relevant bodies of scientific expertise, appropriate ethical frameworks and specialised educational and cultural perspectives on adaptation strategies. This expert meeting is designed to respond to this challenge. The objective of the meeting is to comprehensively assess the scientific, social, cultural and educational challenges to be met in order to ensure the region's sustainable development within a global context.

UNESCO has organised this meeting with the active collaboration of Professor Jean Malaurie, UNESCO Goodwill Ambassador in charge of arctic polar issues. H.S.H. Prince Albert II of Monaco has provided his support for this effort to address the knowledge gap and identify the most significant scientific, social, cultural and educational challenges that need to be met in order to ensure the region's sustainable development. UNEP and the Arctic Council are also contributing to the meeting's deliberations.

CLIMATE CHANGE: TOWARDS ADAPTATION

Understanding and responding to global climate change is a challenge that requires the combined efforts of the scientific community, civil society, governments and national and international organisations from across the globe. Over the past decades, much scientific work has been dedicated to data collection and analysis in order to understand the origins and processes of climate change. However, now that the anthropogenic origin of climate change is widely acknowledged, research on climate change must extend beyond assessing causes and monitoring impacts and trends. Furthermore, the world community has been forced to recognise that their efforts to mitigate climate change are fraught with uncertainty and are limited by economic and political constraints. Even with effective mitigation, it is now clear that major change in the world's climate is already an unavoidable reality. Adaptation and response are therefore essential, and yet they have remained largely unexplored. The development of appropriate adaptation and response strategies has therefore emerged as a central preoccupation of all actors, including the UN System.

Adaptation strategies require a broad interdisciplinary response. They must be rooted firmly in the knowledge-base of scientific monitoring and assessment, which provides data on changes in climate and their direct impacts on the physical environment. Also it is essential to understand how these changes will impact on the network of biological systems that sustain life on the planet. Adaptation to climate change adds a social, economic and cultural problematic as it encompasses the ability of different societies to respond to the challenges put before them by climate change.

The Arctic represents a crucial region of environmental and social transformation due to climate change. These transformations will impact the entire planet, as ramifications of change in the far north spread through the global networks of environmental, biological, cultural, economic and political interconnections. The changes currently seen in the Arctic also serve as a forewarning of what may occur in other global regions as climate change advances. Lessons learnt now in the Arctic,

about how to collaborate in monitoring, mobilising and responding to climate change, may therefore be of crucial importance for other world regions.

THE MEETING AND ITS RELATIONSHIP TO UNESCO PRIORITIES

The meeting is designed to focus on issues of major significance to climate change and sustainability in the Arctic and Subarctic. At the same time, it seeks out synergies with key areas of UNESCO's mandate and expertise.

As a UN specialised agency, UNESCO is unique in that it brings together the domains of natural sciences, social sciences, including environmental ethics, culture, education andcommuncation. Given this broad cross-cutting mandate, UNESCO is uniquely placed in the UN system to foster integrated approaches to global challenges such as those posed today by climate change and the need for a broad knowledge base for monitoring and adaptation. Indeed, the UNESCO Strategy for Action on Climate Change outlines a strategic vision that emphasizes intersectorality and adaptation to climate change as key to the organization's response to climate change. The establishment within the Organization of a dedicated institution-wide platform on climate change ensures that intersectoral and interdisciplinary efforts are a mainstay of UNESCO's work in this area. UNESCO, together with the World Meteorological Organization, has also been charged with the role of convenor for United Nations agencies in the cross-cutting area science, assessment, monitoring and early warning.

KEY QUESTIONS

The meeting aims to address the following three questions:

- Where are the most severe gaps in knowledge and action with respect to the challenge that climate change poses for Arctic sustainable development?
- What needs to be done to ensure a comprehensive, interdisciplinary and multi-actor approach to achieving sustainable development in the Arctic?
- What modalities are required for a long-term and sustained approach to addressing sustainable development in the Arctic?

MEETING ORGANISATION

A combination of discussions at the plenary and working group level has been planned so as to ensure an interdisciplinary outcome for the meeting. The agenda outlines the timetable of the sessions spent in **plenary and working groups**.

A series of plenary **keynote talks** on the morning and afternoon of Tuesday 3 March will outline the current state of knowledge, recent developments, and predictions for future trends with respect to the meeting's themes. These keynote addresses will set the stage for deliberations in parallel working groups over the following days.

Working groups will be established to address each of four major themes:

1. Oceans, ice and atmosphere
2. Biodiversity and ecosystem services
3. Economic development and social transformations
4. Circumpolar indigenous peoples and intangible heritage

Four cross-cutting themes will also be explored in these same working groups:

1. Environmental ethics
2. Education for sustainable development
3. Monitoring and observing systems
4. Global connections and change in the Arctic

Each of the eight themes mentioned above correspond to areas of particular interest for UNESCO.

MEETING THEMES

Oceans, ice and atmosphere

One dramatic indicator of climate change is the rapid decrease of the Arctic ice sheet. In 2007, summer sea ice extent in the northern hemisphere plummeted to an all time record low. Sea ice extent in summer 2008 again approached this minimum. Indeed, some estimates indicate a reduction in sea ice thickness in 2008, suggesting a record minimum in sea ice volume. Scientists expect this trend to continue.

Over the past 30 years, UNESCO has actively contributed to building the global knowledge base on climate change, particularly in the areas of oceanography, hydrology and the ecological and earth sciences. These contributions form an integral part of the overall UN response.

The UNESCO Intergovernmental Oceanographic Commission catalyzes the development of scientific research and monitoring throughout the world's oceans, including the Arctic and Antarctic Oceans. Alongside the World Meteorological Organization, the IOC plays a central role in providing authoritative scientific information on global climate observation and prediction systems. The IOC is also the recognized United Nations focal point and mechanism for global cooperation in the study of the oceans, a key climate driver. Through the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM), it coordinates and manages the implementation of an operational ocean observing system in support of the Global Ocean Observing System (GOOS) and the Global Climate Observing System (GCOS), which report to the UNFCCC. In addition, UNESCO's oceans and climate programmes carry out global and regional research and monitoring programmes on climate impacts on fisheries and coral reefs, as well as the impacts of ocean acidification on marine ecosystems.

Biodiversity and ecosystem services

Arctic ecosystems are threatened by the direct effects of climate change and resultant increases in industrial development. The distributions of many biological species are shifting northwards with rising mean temperatures. Certain arctic species, such as walrus and polar bear, are reported to already be impacted by changing environmental conditions. Growing international pressure to protect Arctic species and places may lead to heightened conflict with expanding industrial development, and may also restrict the subsistence activities of indigenous peoples whose livelihoods and cultures are based upon hunting wildlife.

UNESCO's Man and the Biosphere programme, with its global network of Biosphere Reserves, focuses on both biodiversity and ecosystem services. Of a total of 531 Biosphere Reserves in 105 countries, there are 5 Biosphere Reserves in the Arctic region:

North East Greenland Biosphere Reserve, Denmark
Laplandskiy Biosphere Reserve, Russian Federation
Taimyrsky Biosphere Reserve, Russian Federation
Lake Torne Biosphere Reserve, Sweden
Noatak Biosphere Reserve, USA

They are threatened by climate change, and need to be managed accordingly. These sites offer opportunities to study biological and ecological impacts, including the impact of climate change on the ecosystem services upon which human well being depends, including CO_2 absorption, nutrient recycling, pollination, water, air and soil purification, production of food and fibres, and cultural and recreational values.

Climate change has been mainstreamed into the various operational mechanisms and processes of UNESCO's World Heritage Convention, through innovative studies and strategies. In October 2007, a policy document was adopted which identifies key research priorities for World Heritage sites, to use them as laboratories for long-term climate change impact monitoring and testing of innovative adaptation solutions. UNESCO also held an international experts meeting on World Heritage and the Arctic in 2007, for which the Prince Albert II Foundation of Monaco provided its gracious support. The participants specifically recognized the Arctic Council's "Arctic Climate Impact Assessment" (ACIA in 2004), integrated into the results of the "International Panel on Climate Change" (IPCC) and welcomed the World Heritage document "Strategy to assist States Parties to implement appropriate management responses" and the "Policy document on the impacts of climate change on World Heritage properties" adopted by the General Assembly of the States Parties of the World Heritage Convention in October 2007. The expert meeting of Narvik recommended that further attention be given to impacts of climate change on the natural and cultural heritage of the Arctic.

Economic development and social transformations

Climate change derives from human activity, it is mediated by social patterns of land use and energy consumption, and it shapes in turn the social systems that contribute to it. These powerful feedback loops within the "socio-ecosystem" are of major significance both for the scientific knowledge base and for adaptation strategies.

Changes in the physical environment brought on by climate change are engendering significant shifts in the Arctic's industrial landscape. With sea ice reduction, new opportunities are emerging for natural resource exploration and exploitation, as well as for new and intensified use of shipping routes across the polar region. This has further ramifications, including work force migration into the Arctic and urbanisation of Arctic areas. These human responses to transformations brought on by climate change will in their turn precipitate further changes to the natural, social and cultural environments of the Arctic,

With respect to social change, UNESCO coordinates the intergovernmental programme on the Management of Social Transformations, or MOST. Through the MOST programme, UNESCO seeks to address climate change with respect to significant social phenomenon, such as migration and urban development. It is crucial to understand what might happen – who might move where, to do what, and how – and to equip policy-makers with adequate information to plan accordingly.

Circumpolar indigenous peoples and intangible heritage

The Arctic and sub-Arctic regions are home to many indigenous peoples, whose lives will be dramatically affected by the climate-induced environmental changes that are taking place. Indigenous peoples may also be particularly well placed to observe environmental changes caused by this phenomenon. Attentiveness to fluctuations and alterations in the natural milieu is an integral part of their ways of life, and remains of crucial cultural importance even in areas where lifestyles have been modified by colonialism and globalisation. Knowledge of specific localities may stretch back over many generations. When shared amongst elders and youth, this knowledge provides the basis for important comparisons between what is observed today, and what occurred in the past. Indigenous knowledge thus offers valuable insights into local changes in ecological processes and could be a vital resource in assessment and monitoring of the Arctic's physical, ecological and social environments. While the environmental transformations engendered by climate change are expected to be unprecedented, existing in-depth indigenous knowledge on strategies for coping with change may also provide a crucial foundation for new adaptation measures and sustainable development in the face of climate change.

Cash-poor indigenous communities may look to increasing industrial activity and shipping as sources of economic development. However, the economic benefits of industrial development may largely bypass local communities, while negative impacts are borne directly. Such negative impacts include the duel threats of environmental degradation and the further erosion of traditional livelihoods and cultural heritage through shifting social situations and pressure to engage in wage labour. Moreover, increased industrial development is likely to be accompanied by expanding migrant worker populations, changing the cultural landscape of the Arctic. Whether indigenous land rights established in some parts of the Arctic may allow for more beneficial outcomes for indigenous peoples from industrial development remains an open question. It is increasingly urgent to provide indigenous communities throughout the circumpolar Arctic with an opportunity to explore and voice their ambitions for their own self-determined development.

The 2003 Convention for the Safeguarding of the Intangible Cultural Heritage and its Operational Directives provide guidelines for implementing measures to allow communities and groups to continue transmitting their oral traditions, rituals, festive events, social practices, skills and knowledge about nature, within the framework of sustainable development. Ratification of this Convention by Arctic States as completed by Norway and Iceland, would allow the implementation of safeguarding measures in a coordinated way in order to soften the impact of climate change on the cultures and identities of Arctic indigenous and other communities.

UNESCO also carries out innovative work with indigenous peoples and their knowledge systems through its Local and Indigenous Knowledge Systems Programme. The LINKS programme has recently launched activities specifically focusing on local-level observations by indigenous communities of the impacts of climate change, as well as the ways that indigenous communities are responding and adapting to environmental change.

Education for sustainable development

Education has a crucial role to play in the sustainable development of the Arctic. Formal Western-style education is often highlighted as a threat to indigenous cultures and the transmission of indigenous knowledge. However, the development of appropriate formal and informal educational mechanisms may aid indigenous and

other local communities to maintain, develop and transmit their lifestyles, languages and intangible cultural heritage in a modern context. Various innovative methods of combining indigenous ways of knowing and learning with Western teaching processes have been explored. However, the balance between the two forms of learning –Western and indigenous – remains delicate, and is fraught with difficulties.

Education also has the potential to influence both circumpolar peoples and the world community to ensure the sustainable development of the Arctic and sub-Arctic regions. It has the potential to mobilize all strata of society and available expertise to further the principles, values and behaviour linked to sustainable development and to induce the necessary behavioural and attitudinal changes required to minimize negative climate impacts, and enhance and disseminate adaptation strategies.

UNESCO is the UN specialized agency for education. It has also been designated as the lead agency for the United Nations Decade of Education for Sustainable Development, which runs from 2005 to 2014. This Decade includes climate change as a thematic priority, aiming to mobilize both formal and non-formal education to further the values and behaviours linked to sustainable development in the face of climate change. Another key foci of UNESCO's work in education is the study of formal and non-formal educational mechanisms that may aid indigenous and other local communities to maintain the transmission of their knowledge, lifestyles and languages, whilst also receiving the benefits of learning Western curricula content.

Environmental ethics

The impacts of climate change will be unevenly distributed across the globe, and those who have done the least to cause it may find themselves at the forefront of its negative effects. Climate change adaptation therefore raises many ethical and human-rights based questions. The ethics of climate change is thus a debate of growing importance both internationally and within the United Nations system. UNESCO, with its convening power and multidisciplinary competences, could create the conditions for a constructive dialogue and debate. This could focus on the notion of differentiated responsibility among countries and issues of intergenerational equity.

UNESCO's environmental ethics programme, which benefits from the expertise of the World Commission on the Ethics of Scientific Knowledge and Technology (COMEST), works to improve education and awareness on the ethics of climate change, addressing questions crucial for decision-making. These include how to assess the needs and rights of future generations, and how to determine what is worth protecting, and at what cost.

Monitoring and observing systems

Without a strong and sustained monitoring presence the effects of climate change on all aspects of the Arctic Oceans will not be quantifiable, or indeed, perceptible. The capacity of countries to monitor climate trends and utilize climate predictions is crucial in assessing the impacts of mitigation activities and effective strategies for adaptation to climate change, as well as in developing early warning systems on extreme climate events and hazards. Increased investment in scientific research to improve climate prediction, reduce uncertainties, and generate more precise and quantitative information on the impact of climate change at regional and local levels is required.

UNESCO and the IOC as part of the multilateral system, work with their member states and international organizations to guarantee open and responsible access to ocean data for the benefit of all nations and their people. Through international agreements, sustainable and continuous environmental monitoring of the Arctic Ocean can be achieved.

In the 1990s, UNESCO's International Oceanographic Commission was at the heart of efforts to set up climate observing systems, alongside such organisations as WMO and UNFCC. Working jointly with WMO, UNESCO coordinates and manages the implementation of an operational ocean observing system, which supports the Global Ocean Observing System and the Global Climate Observing System. UNESCO thus played a central role in providing authoritative scientific and technical information that has enabled evidence-based policy and decision making and informing the work of the IPCC. Global weather and climate observation and prediction systems are a unique resource coordinated by these key United Nations entities concerned and require continuous involvement and support by Member States.

As it is increasingly recognised that these natural science-based monitoring systems need to be expanded, to also monitor the impacts and responses to climate change in biological and socio-cultural systems, UNESCO, with its interdisciplinary mandate, is well placed to play a prominent role in the development of such interdisciplinary monitoring efforts.

Global connections and change in the Arctic

The Arctic represents a crucial region of environmental and social transformation due to climate change. These transformations will impact the entire planet, as ramifications of change in the far north spread through the global networks of environmental, biological, cultural, economic and political interconnections. Due to its global mandate, UNESCO is ideally placed it to trace and highlight the networks and interconnections that link changes in the Arctic region to global processes.

The changes currently seen in the Arctic also serve as a forewarning of what may occur in other global regions as climate change advances. Lessons learnt now in the Arctic, about how to collaborate in monitoring, mobilising and responding to climate change, may therefore be of crucial importance for other world regions. UNESCO's global focus positions the organisation to disseminate lessons learnt in the Arctic to other regions that will also undergo profound socio-environmental transformation due to climate change. The exchange of knowledge, wise practice and lessons learnt between the Arctic and other eco-cultural systems facing pronounced environmental change and development is indeed a focus of UNESCO's Education Sector.

Recommendations: The meeting is invited to provide a series of recommendations to guide UNESCO's future action on climate change and the sustainable development challenges faced by the Arctic and Subarctic regions. These should ensure that the Organization contributes in a manner complementary to the efforts of other actors.