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INTERNATIONAL EXPERT MEETING ON RESPONSES TO CLIMATE CHANGE FOR INDIGENOUS AND LOCAL COMMUNITIES AND THE IMPACT ON THEIR TRADITIONAL KNOWLEDGE RELATED TO BIOLOGICAL DIVERSITY -THE ARCTIC REGION
Helsinki, 25-28 March 2008

FACT SHEET ON CLIMATE CHANGE

Note prepared by the Secretariat

INTRODUCTION

1. This fact sheet is a compilation of relevant background information on climate change and biodiversity prepared by the Secretariat of the Convention on Biological Diversity (CBD) for use by the participants during the International Expert Meeting on Responses to Climate Change for Indigenous and Local Communities and the Impact on their Traditional Knowledge Related to Biological Diversity – The Arctic Region. Information for this fact sheet was gathered from sources such as the contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), 1/ the Arctic Climate Impact Assessment (ACIA), 2/ as well as inputs from Parties to the Convention on Biological Diversity and relevant organizations, including those received through the biodiversity and climate-change adaptation website of the Convention. 3/

Section 1: The global challenge of climate change

1.1. Overview of climate change

Climate change is real and humans are the cause

2. The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) presents clear evidence that, since the mid-nineteenth century, average annual global temperatures have increased by about 0.74°C.

Climate change will impact many aspects of the physical environment

3. Climate change impacts include atmospheric and oceanic temperature increases, melting glaciers and sea-ice, changes in river flows, shifting patterns of precipitation, heightened storm surges, flooding and drought and rising sea levels.

1/ http://www.ipcc.ch/ipccreports/ar4-wg2.htm

2/ http://www.acia.uaf.edu/

3/ http://adaptation.cbd.int/

/…

Climate change is affecting the way ecosystems look and the way they function

4. Climate change has already begun to affect the functioning, appearance, composition and structure of ecosystems. For example, over the past 100 years, the thickness of sea ice in the Arctic has decreased by 40%. There has also been widespread bleaching of corals due to changes in sea temperature and chemistry, and instances of wetland salinization and salt-water intrusion.

1.2. Impacts of climate change on biodiversity

Climate change will increase threats of extinction for many species

5. The Millennium Ecosystem Assessment identified climate change as a significant threat to biodiversity and the continued provision of ecosystem services. In fact estimates state that as many as one million species may face an increased threat of extinction as a result of climate change.

6. Projected impacts of climate change on biodiversity include:

- Australia's Great Barrier Reef may lose 95% of its living coral by 2050.
- Total available water in the Niger, Lake Chad and Senegal basins has decreased by 40-60%.
- In sub-Saharan Africa, between 25 and 40 per cent of species' habitats could be lost by 2085 as a result of climate change.

Climate change is impacting species life cycles, habitats and vulnerability

7. Examples of the consequences of climate change on the species component of biodiversity include:

- Changes in distribution,
- Increased extinction rates,
- Changes in relationships between species,
- Changes in reproductive timings, and
- Changes in length of growing seasons for plants.

1.3. Impacts of climate change on ecosystem services and food security

Climate change is expected to have negative impacts on biodiversity-based livelihoods

8. Increasing threats to ecosystem services as a result of climate change have negative consequences for biodiversity-based livelihoods particularly among the poor. The negative impacts of climate change on wetland, coastal and reef systems which provided important habitat for fish, for example, is expected to have negative consequences for the fishery sector. Finally, losses of species and pristine habitat will negatively impact biodiversity and nature-based tourism.

Climate change is projected to have significant negative impacts on food security

9. Losses in soil biodiversity and a variety of genetic resources as a result of increased heat or water stress, for example, reduce the productivity of agricultural system and threaten efforts to eradicate hunger. Coral reefs, mangroves and other coastal biodiversity resources are also coming under threat from climate change causing reductions in the availability of fish protein.

Indigenous and local communities are particularly vulnerable to the negative impacts of climate change

10. Indigenous and local communities tend to be among the first to face the adverse consequences of climate change as a result of their dependence on and close relationship with the environment. Indigenous and local communities which have been identified as being particularly vulnerable include those in small island developing States, the Arctic, dry and sub-humid lands and high altitude areas.

Section 2: Climate change and biodiversity in the Arctic

2.1 The Arctic

The Arctic has unique biodiversity value

11. The Arctic region encompasses more than 30 million square kilometres of the Earth surface, much of which is marine habitat. The Arctic contains unique biodiversity which is well adapted to the dark and cold conditions which characterize the region. The wealth of life in the Arctic includes between 500 million and 1 billion birds which migrate from the Arctic throughout the world and more than 20 species of whales. The Arctic also accounts for 28% of the global marine fish catch.

Biodiversity in the Arctic already faces a number of threats

12. Although the Arctic region contains seven of the eleven largest wilderness areas on Earth, the fragile nature of Arctic ecosystems makes them very vulnerable to disturbances. In addition to climate change, Arctic biodiversity is particularly threatened by the accumulation of persistent pollutants, damage to the stratospheric ozone layer and human development.

Arctic ecosystems are among the most vulnerable ecosystems to climate change

13. Since many Arctic species have developed unique and specific adaptations to Arctic conditions, Arctic biodiversity is often not able to adapt to rapid changes in climatic conditions. Furthermore, while one of the most common responses of biodiversity to climate change is a poleward or upward shift in habitat, since Arctic habitats are already at or near the poles, there is little possibility for a natural shift. Furthermore, since the Arctic is warming at about twice the rate as the rest of the Earth, Arctic ecosystems are facing higher and more rapid temperature stresses when compared to other regions.

2.2 Observed and projected impacts of climate change on biodiversity in the Arctic

The Arctic is already facing the physical consequences of climate change

14. In the last 30 years, there have been observed declines in the extent of Arctic sea ice of 8.9% per decade in September and 2.5% per decade in March. On land, annual total loss of mass from the Greenland Ice Sheet more than doubled in the 1990's. Furthermore, permafrost temperatures have increased during the last 20–30 years in almost all areas of the Northern Hemisphere.

Some biodiversity in the Arctic is already under threat from climate change

15. Although some Arctic species will benefit from climate change, such as algae in lakes, other species are already facing negative consequences. A study of polar bears in Hudson Bay, for example, revealed that between 1991 and 1998 the weight of adult polar bears decreased by 15% as a result of melting sea ice. There was also a corresponding 15% decrease in the number of polar bear cubs born during the same period.

Climate change is projected to change the appearance and functioning of many ecosystems in the Arctic

16. Both the extent and the thickness of Arctic sea ice are projected to continue to decline with the possibility of a mainly ice-free Arctic Ocean in summer by 2100 or earlier. Other projected impacts of climate change in the Arctic include:

- Increased rainfall but decreased snow cover in many areas
- Increased river flows
- Reductions in salinity of the North Atlantic
- Increased threats of ice jams in lakes and rivers.

Climate change is projected to have further negative impacts on Arctic biodiversity

17. The breeding areas of many Arctic-breeding shorebirds and waterfowl are projected to decline by up to 45% and 50%, respectively, for global temperature increases of 2°C above pre-industrial. A temperature increase of 2.9°C above pre-industrial would cause larger declines of in breeding areas reaching up to 76% for waterfowl and up to 56% for shorebirds. Furthermore, warmer sea temperatures will result in the expansion of some warm water species such as salmon while also increasing threats of toxic phytoplankton blooms.

Section 3: Responding to the challenge

3.1 Tools for adaptation and mitigation planning

The ecosystem approach presents a methodology to address the multiple impacts of and vulnerabilities to climate change

18. The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes the conservation and sustainable use of biodiversity in a fair and equitable manner. The main principles of the ecosystem approach focus on capacity building; participation; information gathering and dissemination; research; monitoring and evaluation; and governance.

19. Since the ecosystem approach takes a broad perspective to management, it is an ideal methodology through which the multiple impacts from climate change, including on biodiversity, can be reflected in comprehensive and responsive adaptation planning.

Integrated marine and coastal area management (IMCAM) provides a holistic and systematic management framework

20. IMCAM focuses on processes for addressing cross-sector issues and multiple use conflicts related to marine and coastal biodiversity conservation and sustainable use, including threats by global climate change. IMCAM enhances the application of ecosystem approach, the establishment of marine protected areas, and planning of proper coastal land and watershed uses. Essential to successful and sustainable IMCAM implementation are: appropriate institutional and legal arrangements, strategic planning, long-term capacity development, sustainable financing mechanism, adequate scientific advice, and multi-stakeholders involvement. The Conference of Parties to the CBD thus incorporated IMCAM as a key element of the elaborated programme of work on marine and coastal biological diversity (decision VII/5).

Strategic environmental assessments and environmental impact assessments can identify climate change threats to biodiversity and ecosystem services

21. Environmental impact assessment and strategic environmental assessments can be used to evaluate the environmental and socio-economic implications of various projects including climate change adaptation plans and the impacts of adaptation activities on biodiversity.

22. The CBD Technical Series No. 26, “Voluntary Guidelines on Biodiversity-Inclusive Impact Assessments”, includes case-studies, background material and practical examples of the application of impact assessments. The voluntary guidelines explore both direct drivers of change through impact assessments and the review of indirect drivers of change carried out within the framework of the Millennium Ecosystem Assessment.

The risk management approach is emerging as a common framework to manage climate change impacts

23. A number of planning tools have been developed using risk management approaches including: the Ramsar Wetland Risk Assessment Framework; 4/ various disaster-risk indices; 5/ and early-warning systems. 6/

24. Additional information on the risk management approach is available in Technical Series No. 10 of the Convention on Biological Diversity entitled, "Interlinkages between Biological Diversity and Climate Change".

3.2 Global framework for response

The Convention on Biological Diversity (CBD) set the international framework regarding biodiversity and climate change

25. Climate change was first taken up by the Conference of the Parties to the Convention at its fifth meeting in 2000. Since then, the Parties to the Convention have integrated climate-change components within all of the programme of works of the Convention, with the exception of the programme of work on technology transfer and cooperation. A key component of this integration has been accomplished through synergies built with the United Nations Framework Convention on Climate Change (UNFCCC).

26. The CBD also supported an Ad Hoc Technical Expert Group (AHTEG) on Climate Change and Biodiversity which met four times between 2002 and 2005. The AHTEG reports were published as two technical series:

- Technical Series No. 10 - Interlinkages between Biological Diversity and Climate Change
- Technical Series No. 25 - Guidance for Promoting Synergy Among Activities Addressing Biological Diversity, Desertification, Land Degradation and Climate Change

A number of other conventions are also addressing climate change – biodiversity linkages

27. The Convention on Migratory Species adopted resolution 8.13 on climate change and migratory species at its eighth meeting of the Conference of the Parties in 2005. The Ramsar Convention adopted Resolution VIII.3 on the role of wetlands in adapting to and in mitigating climate change. The Scientific and Technical Review Panel of Ramsar also prepared a Technical Report on "Climate change and wetlands: impacts, adaptation and mitigation".

28. Finally, the Convention on Biodiversity, the United Nations Framework Convention on Climate Change and the United Nations Convention to Combat Desertification collaborate, through the Joint Liaison Group, on biodiversity – land degradation – climate change linkages.

3.3 Regional response

The Arctic region has long been a leader in regional environmental management and planning

29. Some highlights of regional activities include:

- The Arctic Climate Impact Assessment
- NOAA State of the Arctic Report
- Arctic Council Salekhard mandate (vulnerability and Adaptation to Climate Change in the Arctic survey)

4/ http://www.ramsar.org/key_guide_risk_e.htm

5/ http://www.undp.org/bcpr/disred/english/publications/rdr.htm

6/ http://www.fao.org/GIEWS/english/index.htm

- CAFF Circumpolar Biodiversity Monitoring Program

3.4 National response

All Arctic nations have taken some action towards addressing climate change in the Arctic

30. Examples of some such activities include:

- The Finnish Environment Institute Research Programme on Biodiversity includes a climate change theme focused on northern environments and their communities and different conservational and management methods that can be used to promote species ability to cope with climate change;
- Canada is completing a study on the vulnerabilities and potential adaptations to climate change for marine fish and marine mammals in the Canadian Beaufort Sea including an additional study on the potential impacts of climate change on key ringed seal habitat variables;
- Norway is completing a Norwegian Arctic Climate Impact Assessment as a follow-up to the Arctic Climate Impact Assessment.
