



MAIN MESSAGES FROM THE AD HOC TECHNICAL EXPERT GROUP ON BIODIVERSITY AND CLIMATE CHANGE

1. The Second Ad Hoc Technical Expert Group (AHTEG) on Biodiversity and Climate Change was convened in response to paragraph 12 (b) of decision IX/16 B of the Conference of the Parties to the Convention on Biological Diversity (CBD).
2. This decision established the AHTEG to provide biodiversity-related information to the United Nations Framework Convention on Climate Change through the provision of scientific and technical advice and assessment on the integration of the conservation and sustainable use of biodiversity into climate change mitigation and adaptation activities. The second meeting of this AHTEG took place in Helsinki, from 18 to 22 April 2009.
3. The main messages from the second meeting of the AHTEG are being distributed by the Secretariat of the CBD on behalf of the AHTEG and in conjunction with statements made under agenda items 3 and 10 of the thirtieth session of the Subsidiary Body for Scientific and Technological Advice.
4. The following document has not been peer-reviewed and, as such, presents an initial summary of the findings of the second meeting of the Second AHTEG on Biodiversity and Climate Change.



Biodiversity has a vital role to play in adaptations to the adverse impacts of climate change

1. *Adaptation activities that make use of biodiversity and associated ecosystem services, when integrated into an overall adaptation strategy, may contribute to cost effective climate-change adaptation and generate additional environmental and societal benefits.*

- Ecosystem-based adaptation may be further described as the use of sustainable ecosystem management activities to support planned adaptation. Ecosystem-based adaptation:
 - Identifies and implements a range of strategies for the management, conservation and restoration of ecosystems to provide services that enable people to adapt to the impacts of climate change;
 - Can be applied at regional, national and local levels, at both project and programmatic levels, and benefits can be realized over short-and long-time scales;
 - May be more cost-effective and more accessible to rural or poor communities than measures based on hard infrastructure and engineering.
- Means of implementing ecosystem-based adaptation include activities such as sustainable water management where river basins provide water storage, flood regulation and coastal defences and the establishment and effective management of protected area systems that ensure both the representation and persistence of biodiversity to increasing resilience to climate change. The ecosystem approach has been identified as an appropriate set of guidelines for designing and implementing ecosystem-based adaptation.
- There are many ecosystem-based adaptation approaches that deliver significant value for planned adaptation and an ability to provide additional benefits, including the use of coastal ecosystems to reduce risk of flooding from storm surges, and the maintenance of diverse agricultural landscapes to support productivity under changing climate conditions. Ecosystem-based adaptation, if designed, implemented and monitored appropriately, can:
 - Generate multiple social, economic and cultural co-benefits for local communities.
 - Contribute to the conservation and sustainable use of biodiversity.
 - Contribute to climate-change mitigation, by conserving carbon stocks, reducing emissions caused by ecosystem degradation and loss, or enhancing carbon stocks.
- Ecosystem-based adaptation may require managing ecosystems to provide particular services over others. It is therefore important that decisions to implement ecosystem-based adaptation are subject to risk assessment, scenario planning and adaptive management approaches that recognise and incorporate these potential trade-offs.

2. *Adaptation to the adverse impacts of climate change can have both positive and negative consequences for biodiversity and ecosystem services.*

- The impacts of adaptation strategies on biodiversity will vary across sectors and will depend on the way in which such strategies are implemented. For example, the development of plantation forests, including those with non-native species, will result in novel ecosystems and may have impacts on the endemic species of the area. Additionally, the construction of hard infrastructure approaches in coastal areas (e.g., sea walls, dykes, etc.) often adversely impact natural ecosystems processes by altering tidal current flows, disrupting or

disconnecting ecologically related coastal marine communities, and disrupting sediment or nutrition flows.

- In most cases, there is the potential to reduce negative impacts and increase positive impacts to minimize trade-offs and the risk of maladaptation. Steps to achieve this include strategic environmental assessments (SEA), environmental impact assessments (EIA), and technology impact assessments, which facilitate the consideration of all adaptation options. Furthermore, an examination of case-studies of maladaptation can provide important lessons learned.
3. ***All adaptation activities should aim to maintain or enhance and take advantage of the natural adaptive capacity of species and ecosystems so as to increase the effectiveness of adaptation and reduce risks to biodiversity from climate change.***
- To optimize their effectiveness as well as biodiversity co-benefits, adaptation activities can:
 - Maintain intact and interconnected ecosystems to increase resilience and allow for biodiversity and people to adjust to changing environmental conditions.
 - Restore or rehabilitate fragmented or degraded ecosystems, and re-establish critical processes such as water flow or pollination to maintain ecosystem functions:
 - Taking into account the adverse effects of climate change including impacts on disturbance regimes and extreme events; and
 - Emphasizing restoration of functionality and habitat value rather than species composition since some pre-existing species may no longer be suited to changed environmental conditions;
 - Preserve and enhance protective ecosystem service values that help buffer human communities from floods, storms, erosion and other climate-change hazards;
 - Ensure that the use of renewable natural resources will be sustainable under changed climatic conditions;
 - Collect, preserve and disseminate traditional and local knowledge, innovations and practices related to biodiversity conservation and sustainable use under climate change and variability.
 - To increase the adaptive capacity of species and ecosystems to the stress of accelerated climate change, especially in light of tipping points and thresholds, it is further recommended that:
 - Non-climatic stresses, such as pollution, habitat loss and fragmentation and invasive species, are reduced or eliminated;
 - The resilience of ecosystems be improved or maintained by the wider adoption of conservation and sustainable-use practices;
 - Biodiversity values are recognized, maintained, and restored across land uses and tenures as suggested below;
 - Protected-area networks are strengthened and enhanced because of their central role in maintaining biodiversity and enabling migration of species;
 - In some cases, relocation, captive breeding, and *ex situ* storage of germplasm may be implemented when necessary to prevent a species becoming extinct, but such measures are often very expensive, less effective than *in situ* actions, are not applicable to all species, usually feasible only on small scales, and very rarely maintain ecosystem functions and services. In the case of relocation, potential effects on other species need to be considered.

- Risks to biodiversity from climate change and maladaptation can be assessed using available vulnerability and impact assessment guidelines with priority given to ecosystems and species of particular ecological, social, or economic importance.
- Planning and implementation of effective adaptation activities relies upon:
 - Considering traditional knowledge, including the full involvement of local and indigenous communities;
 - Defining measurable outcomes that are monitored and evaluated; and
 - Building on a scientifically credible knowledge base concerning climate change impacts and evidence-based effective responses.
- Given ongoing development efforts, including through the Millennium Development Goals, identifying and reducing potential negative impacts of climate change on biodiversity is especially important in developing countries that are particularly vulnerable to the effects of climate change. As recognized by the UNFCCC, these countries include, especially, small island developing States and the least developed countries, given their high levels of endemism, high exposure to risk, and limited capacity to adapt.

4. *Accounting for the value of biodiversity and the ecosystem it supports, is important for the decision making process, and for the provision of appropriate incentives for planned adaptation to climate change.*

- Ecosystem services contribute to economic well-being and associated development goals (e.g. MDGs) in two major ways – through contributions to the generation of income and well-being (e.g., provisioning of food and fibre), and through the reduction of potentially costly impacts of climate change and other stresses on society (e.g., coral reefs and mangrove swamps protect coastal infrastructure).
- Many methodologies have been developed to estimate the economic value (including both market and non-market values) of ecosystem services, and these should be applied in order to promote the full range of financial options when implementing ecosystem-based adaptation.
- Both economic and non-economic incentives could be used to implement ecosystem-based adaptation:
 - Economic measures include:
 - Removing perverse subsidies to sectors such as agriculture, fisheries, and energy;
 - Introducing payments for ecosystem services;
 - Implementing appropriate pricing policies for natural resources;
 - Establishing mechanisms to reduce nutrient releases and promote carbon uptake; and
 - Applying fees, taxes, levies, and tariffs to discourage activities that degrade ecosystem services.
 - Policies should be assessed in all sectors to reduce or eliminate cross-sectoral impacts on ecosystem services.
 - Non-economic incentives and activities include improving or addressing:
 - Laws and regulations;
 - Governance structures, nationally and internationally,

- Individual and community property or land rights;
 - Access rights and restrictions;
 - Information and education;
 - Policy, planning, and management of ecosystems; and
 - Development and implementation of technologies relevant for biodiversity and climate change adaptation (e.g. technology that makes use of genetic resources and technology to manage natural disasters).
- In order to achieve intended adaptation objectives while avoiding market distortions, such as through tariff and non-tariff barriers, incentives for ecosystem-based adaptation should be carefully designed to consider social, economic and biophysical variables.

Annex
ECOSYSTEM-BASED ADAPTATION

Ecosystem-based adaptation may be described as the use of ecosystem management activities to support planned adaptation. Ecosystem-based adaptation identifies and implements a range of strategies for the management, conservation, and restoration of ecosystems to provide services that enable people to adapt to the impacts of climate change. It aims to increase the resilience and reduce the vulnerability of ecosystems and people in the face of climate change. Ecosystem-based adaptation is most appropriately integrated into broader adaptation and development strategies.

Ecosystem-based adaptation can be applied at regional, national and local level, at both project and programmatic levels, and over short or long time scales. Means of implementing ecosystem-based adaptation include:

- Sustainable water management where river basins, aquifers, coasts and their associated vegetation provide water storage, flood regulation and coastal defences;
- Disaster-risk reduction where restoration of coastal habitats such as mangroves can be a particularly cost-effective measure against storm-surges;
- Sustainable agriculture where using indigenous knowledge of specific crop and livestock varieties, and conserving mosaic agricultural landscapes secures food provision in changing local climatic conditions;
- The establishment and effective management of protected area systems that ensure both the representation and persistence of biodiversity to increasing resilience to climate change, and ensuring the continued delivery of ecosystem services.

Adaptation approaches that include ecosystem-based adaptation may often be cost-effective, and can provide significant social, economic and environmental co-benefits. In addition to the direct benefits for adaptation, ecosystem-based adaptation activities can also have indirect benefits for people, for biodiversity, and for mitigation. For example, the restoration of mangrove systems can provide shoreline protection from storm surges, but also provide increased fishery opportunities, and carbon sequestration.

Ecosystem-based adaptation activities are often more accessible to the rural poor than actions based on infrastructure and engineering. The poor are often the most directly dependent on ecosystem services and thus benefit from adaptation strategies that maintain those services. Ecosystem-based adaptation can be consistent with community-based approaches to adaptation; most effectively builds on local knowledge and needs; and can provide particular consideration to the most vulnerable groups of people, including women, and to the most vulnerable ecosystems.

Restoration of ecosystems can be a cost-effective ecosystem-based adaptation strategy. Restoration activities include limiting human activities such as grazing or logging to allow ecosystems to recover, or restoring ecological components such as connectivity, hydrological regimes, through activities such as re-flooding wetlands. For example, an alternative to constructing additional dams or reservoirs for increased flood water storage could be flood plain restoration, which would also improve riparian habitat. Restoration of ecosystems can be of economic importance where those systems protect property, but also critically important to biodiversity and to those people whose livelihoods are drawn from the ecosystem. However, it is often cheaper to conserve ecosystems rather than restore them, so careful cost-effective analyses are required to ensure the most appropriate approach is adopted.

Intact, well functioning ecosystems, with natural levels of biodiversity, are usually more able to resist and recover more readily from extreme weather events than degraded, impoverished ecosystems. They are also usually better able to provide ecosystem goods and services for ecosystem-based adaptation. The conservation of such ecosystems and the restoration of degraded ecosystems is an important element of ecosystem-based adaptation.

Like all adaptation activities ecosystem-based adaptation is not without complexity and risk. Ecosystem-based adaptation may require giving priority to particular ecosystem services at the expense of other services. For example, using wetlands for coastal protection may require emphasis on silt accumulation and stabilization possibly at the expense of wildlife values and recreation. Slope stabilization with dense shrubbery may expose the area to wildfire, especially in an increasing wet-dry alternation under a changing climate, and possibly a disastrous reversal of the adaptation goal. Hence, it is important that decisions to use ecosystem-based adaptation be subject to risk management procedures and cost-effectiveness. In addition, the implementation of ecosystem-based adaptation requires an adaptive management approach, which allows management adjustments in response to changes in external pressures, and uncertainty in ecosystem functioning.
