Biodiversity and Climate Change

Secretariat of the Convention on Biological Diversity
Biodiversity – Climate Change Links
Biodiversity Links to Mitigation and Adaptation

- Ecosystems play a key role in the global carbon cycle: about 2,500 Gt C is stored in terrestrial ecosystems.
- The loss of biodiversity in many ecosystems is significantly reducing their carbon storage and sequestration capacity.
- Ecosystem-based adaptation, which integrates the use of biodiversity and ecosystem services into an overall adaptation strategy, can be a cost-effective climate change adaptation approach.
Some Impacts

- As many as 1522 plant species in China could become extinct.
- In the Amazon, forest fire frequency is expected to increase by 60% for a 3°C temperature increase.
- The Succulent Karoo ecosystem in Southern Africa will lose more than 50% of its natural habitat by 2050.
- By 2050, the Great Barrier Reef may have lost 95% of its living coral.
Climate Change and Conservation Practices
As ecosystems are affected by climate change, conservation strategies will also need to change.

- Adaptation in the conservation sector will need to involve not only reducing the impacts of climate change on biodiversity but also assessing and, where necessary, adjusting traditional conservation practices and targets in order to reflect changing conditions.
Ecosystem Restoration

- Ecosystem restoration strategies in the future will need to consider a wider set of issues to address the additional stress from climate change. These will include:
  - The role of extreme events:
  - A focus on the restoration of function rather than species composition (i.e., maintaining ecological resilience)
  - Genetic provenances used in re-establishment
Assisted relocation / migration of species affected by climate change

In cases where there are existing barriers to migration or limits to dispersal capacity:

- simple assisted relocation - movements between areas with suitable habitats are facilitated by human intervention
- relocation supported by additional engineering measures - habitat in the new area must be created or modified
- there are limitations, risks, uncertainties, and often high costs associated with assisted relocation techniques
  - relocated species become “introduced” species
  - disruptions of predator-prey interactions or symbiotic interactions
  - changes in parasitism rates
  - potential competition with existing species
Ex situ Conservation

Store species or genotypes so that they can be used in re-introductions or assisted migration:

- widely regarded as a final effort
- storing species on a large scale is likely to be infeasible
- extremely expensive
- the storage of species leads to the loss of ecosystem services
Climate Change & Invasive Alien Species

Direct Impacts:

- **Range Shift**: can expand the range of IAS or be the trigger that causes previously benign alien species to become invasive.
- **Facilitated Movement**: severe weather events, such as storms and floods, can introduce and spread IAS, particularly insects and plants.
- **Natives vs. Alien Invasive Species**: ecosystem and climatic changes may weaken the natural controls on some native species.
- **Sequestration Ability**: IAS can degrade the ability of ecosystems to mitigate climate change.

Indirect and Second-Order Impacts:

- **Disturbance Events**: severe weather events may increase disturbance in ecosystems, making them more vulnerable to biological invasion.
- **Changes in Species Composition/Ecosystem Function**: broader changes in relations between species and ecosystem functions due to climate variability may provide advantages or new niches for IAS.
- **Human Responses**: mitigation and adaptation measures can increase the risk of IAS.
Recommendations – In many cases we already know the actions we can take to minimize the impact of invasive alien species as an additional stressor on ecosystems.

- **Assess the potential for biological invasions** associated with adaptation and mitigation measures through the use of environmental impact and risk assessments.

- **Prevent the introduction of new alien species** to minimize the potential of future biological invasions.

- **Eradicate or control priority existing invasive alien species** (as well as damaging native species) to enhance ecosystem resilience.

- **Develop early detection and rapid response mechanisms** that take into account climate-related variables and human activities.

- **Support synergies between climate change and invasive alien species policy**, such as ecosystem-based adaptation and enhancing of ecosystem resilience.

For more information see: *Climate Change, Invasive Species and Ecosystem-Based Adaptation: Addressing Multiple Drivers of Global Change* by S.W. Burgiel and A.A. Muir (GISP, 2010).
The Role of Indigenous Peoples and Local Communities
Climate Change, Conservation and ILCs

Indigenous people will be disproportionately impacted by climate change because their livelihoods and cultural ways of life are being undermined by changes to local ecosystems - however:

- It is difficult to give a precise projection of the scale of these impacts
- Responding to these impacts can only be accomplished in collaboration with ILCs
ILC Participation in Vulnerability and Impact Assessment

Monitoring the impacts of climate change on biodiversity in partnership with ILC can benefit from:

- Promote the documentation and validation of TK
- Revitalize TK on climate change impacts on traditional biodiversity based resources and ecosystem services through education and awareness-raising, including in nomadic schools.
- Explore uses of and opportunities for community-based monitoring linked to decision-making
ILC Participation in Adaptation

Principles for adaptation activity planning and implementation:

■ Establish objectives and define expected outcomes
■ Monitor measure and evaluate the effectiveness of adaptation activities
■ Inform decision-making by integrating TK and scientific information about climate change impacts and the effectiveness of adaptation
■ Build and strengthen capacity for biodiversity conservation and sustainable use under changing climatic conditions by involving ILCs
ILC Participation in Ecosystem-based Mitigation

While it is generally recognized ecosystem based mitigation have potential benefits for indigenous peoples and local communities, a number of conditions are important:

- Land ownership or use rights are clearly established
- The principle of free, prior and informed consent are applied
- Identities and cultural practices are recognized
- There is space to participate in policy-making processes