

Biodiversity and climate change adaptation: the role of forest and grassland ecosystems

Nairobi work programme on impacts, vulnerability and adaptation to climate change



United Nations
Climate Change



This briefing paper summarizes knowledge gaps in integrating forest and grassland biodiversity and ecosystems into adaptation strategies.¹

In an ever-changing, increasingly uncertain world, nature can be our strongest ally when it comes to adapting to climate change risk and vulnerability. This briefing note responds to a mandate from the fiftieth session of the Subsidiary Body for Scientific and Technological Advice for the UNFCCC secretariat to prioritize the thematic areas of forests and grasslands under the Nairobi work programme.² Furthermore, the Adaptation Committee at its 15th and 17th meetings³ invited the Nairobi work programme to address linkages between biodiversity and adaptation. As part of this thematic work, the secretariat collaborated with an expert group on biodiversity and adaptation⁴ to:

- Articulate the role of biodiversity and ecosystems in adaptation strategies, and identify challenges, including knowledge gaps, in relation to integrating biodiversity and ecosystems into adaptation strategies.

¹ Scoping paper on knowledge gaps in integrating forest and grassland biodiversity and ecosystems into adaptation strategies.

² See document [FCCC/SBSTA/2019/2, para. 18\(c\)](#). Upon the invitation of Subsidiary Body for Scientific and Technological Advice 50. Report of the Subsidiary Body for Scientific and Technological Advice on its fiftieth session, held in Bonn from 17 to 27 June 2019.

The paper draws on national reports and examples across the world, including least developed countries, small island developing States and African countries;

- Discuss approaches and strategies needed to address gaps and challenges, including examples of good practices in integrating biodiversity and ecosystems into adaptation strategies (focusing on forest and grassland ecosystems), through case studies;
- Identify a specific set of actions that the expert group can co-design and deliver to address the knowledge gaps.

Examples of integrating forests and grassland into adaptation strategies include:

- Participatory catchment-level planning to ensure pastoral access to water;
- Diversifying livelihoods with community forest enterprises involving honey production;

³ See [AC/NWP/2019/1](#) and [AC/NWP/2020/1](#).

⁴ See annex I of the scoping paper on Knowledge gaps in integrating forest and grassland biodiversity and ecosystems into adaptation strategies.

- Using traditional knowledge to restore mountain grassland;
- Developing conservation corridors to connect fragmented forest habitats and protected areas.

Biodiversity underpins ecosystem processes and functions that provide critical services to society. For example, forest and grassland ecosystems help to protect against climate extremes and floodwater retention, stabilize slopes and serve as windbreaks, while also providing food, fodder and vast number of recreational and cultural services.

There is growing momentum for implementing ecosystem-based adaptation,⁵ reflecting a recognition of the critical role of biodiversity and ecosystems in providing essential services to society. For example, a recent analysis of National Determined Contributions (NDCs) under the Paris Agreement⁶ indicated that many countries are planning for an integrated approach to managing land, water and living resources in order to promote conservation and sustainable use, including ecosystem-based adaptation. In turn, these actions can enhance ecological integrity and the capacity to provide essential ecosystem services, including adaptation.

Role of the UNFCCC knowledge-to-action hub for climate adaptation and resilience

The Nairobi work programme, the UNFCCC knowledge-to-action hub for climate adaptation and resilience, uses a knowledge-to-action-approach⁷ that guides knowledge co-development through partnerships. This collaborative approach responds to the adaptation needs of Parties, and supports the formulation and implementation of National Adaptation Plans (NAPs) and relevant mandates of UNFCCC constituted bodies.

⁵ Ecosystem-based adaptation is a nature-based solution that uses biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change and reduce disaster risk through the sustainable management, conservation and restoration of ecosystems.

⁶ See [FCCC/PA/CMA/2021/2/Add.1](https://www.unfccc.int/PA/CMA/2021/2/Add.1)

Evidence of the efficacy of integrating ecosystems into adaptation strategies is increasing. Recent communications from Parties to the UNFCCC, via NAPs, NDCs and in technical discussions, indicates that ecosystem-based adaptation and related approaches are increasingly common in national adaptation efforts. However, multiple challenges and knowledge gaps hamper the widespread implementation of integrated approaches to adaptation, including ecosystem-based adaptation. For example, ecosystem-based adaptation approaches are described in broad rather than specific terms in national reports and often lack measurable targets.

Compounding this challenge is the loss of biodiversity due to interactive drivers of change, including climate and land-use change, which alters the functioning of ecosystems across temporal and spatial scales.

Findings

A review of national reports, relevant literature and in-depth case studies reveals several opportunities and challenges in incorporating biodiversity and ecosystems into adaptation strategies.

- Forest and grassland biomes are home to critical biodiversity and ecosystem functions and services. These essential biomes face critical threats from multiple drivers of change, which reduce their potential to deliver essential services to people, including in terms of adaptation. In 2019, the first global assessment report on biodiversity and ecosystem services⁸ emphasized that nature and its vital contributions to people are deteriorating worldwide;

⁷ Learn more about about the [knowledge-to-action approach](#).

⁸ IPBES. (2019). Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (p.56). IPBES Secretariat. <https://doi.org/10.5281/zenodo.35535798>.

- Actions to conserve and restore biodiversity and ecosystems are an integral part of adaptation strategies. There are many examples of how countries are already using integrated forest and grassland approaches to adapt to climate change.

The initiatives, outlined in the scoping paper, provide critical lessons learned regarding innovative financing mechanisms, multi-actor and stakeholder participation, integration of diverse values and knowledge systems, gender-responsive planning and actions, risk management, capacity-building, and creating enabling conditions for interaction among policy makers and decision makers.

For example:

- In South Africa, adaptation efforts were supported by funds from government entities and social protection programmes for job creation, which facilitated implementation of large-scale operations and reduced its dependence on short-term, location-specific, donor-funded approaches;
 - In Myanmar, a cross-learning visit by the forest department of Myanmar and the Pa-O Leading Body to a community in Nepal helped to promote gender-responsive community forestry initiatives;
 - In the Hindu Kush Himalayas, a transboundary adaptation programme was implemented involving interdisciplinary research, participatory planning at the local and global level, multi-stakeholder consultations and regional commitments to conservation and development outcomes by the participating countries;
 - In the Gambia, three sectoral policies (transhumance, agriculture and energy) that integrate adaptation actions into their annual plans, with explicit budget and monitoring structures, were established. Land-use plans are currently being developed to support transhumance corridors and prevent human–wildlife conflicts;
- Knowledge generation and knowledge-sharing facilitated implementation of ecosystem-based adaptation at several sites. Participatory plant breeding was practiced in China and Peru, and farmer-to-farmer meetings and exchange visits were important knowledge sharing and learning approaches in Burkina Faso, China, Senegal and Uganda.

In addition to lessons learned regarding integrated approaches to adaptation, including ecosystem-based adaptation and nature-based solutions, the scoping paper also identifies knowledge gaps and possible actions for widespread implementation:

- **Capacity knowledge gaps** exist in terms of engaging different actors across sectors and disciplines, sustaining investments beyond project timelines, scaling up innovative financing mechanisms and engaging in long-term monitoring and evaluation programmes;
- **Knowledge gaps in data and methods** include linkages between biodiversity and ecosystem functions; constraints and limits related to adaptation; and different ways of appraising adaptation options and methods for comprehensively evaluating the social, economic and environmental benefits over time of ecosystem-based adaptation strategies, including quantitative socioeconomic assessments and economic cost-benefit analyses;
- **Knowledge gaps related to governance** for implementation include weak mandates and institutional support for adaptation, siloed approaches across sectors and lack of adequate mechanisms for cross-sectoral, transboundary cooperation across different scales. Other challenges include a lack of equitable and bottom-up participatory processes and decision-making, and the need to fully consider and balance different trade-offs, such as between adaptation and other societal goals, and between different communities that may be impacted by adaptation actions;

- **Cross-cutting knowledge gaps** relate to, for example, traditional knowledge, knowledge of indigenous peoples and local knowledge systems, which are underrecognized and undervalued; securing land tenure and a lack of recognition and understanding of customary access/rights; and ways of addressing the differentiated vulnerabilities of women and men, and of vulnerable communities, groups and ecosystems.
 - **Adaptation action** must integrate considerations of biodiversity into forest and grassland biomes to build resilience, protect life on land and in the ocean, and foster sustainable land management – priorities for countries and global frameworks alike.
 - **Adaptation and mitigation co-benefits** can be linked through ecosystem-based adaptation and nature-based solutions in combination with other approaches to adaptation, including conservation and restoration of forest and grassland ecosystems. Case studies show the importance of ensuring that social and environmental safeguards are in place.
- Targeted and actionable knowledge can help countries to scale up adaptation strategies that integrate ecosystems and biodiversity, enhancing resilience to climate change impacts. Important actions to consider include:
- Strengthen legitimacy and support for traditional management institutions;
 - Gather and use gender-disaggregated data for planning, monitoring and evaluation purposes;
 - Seek out appropriate protocols, including for obtaining free, prior and informed consent, for engaging with indigenous peoples and local communities;
 - Select appraisal and assessment tools appropriate to local contexts to identify adaptation options for forests and grasslands;
 - Develop innovative financing models including public–private partnerships and blended finance for forest and grassland adaptation;
 - Increase public awareness of the importance of forests and grasslands in adaptation efforts;
 - Apply knowledge about catchment-level planning, landscape-level approaches and other integrated approaches;
 - Exchange knowledge to enhance synergies and facilitate multiple benefits through cross-sectoral and institutional coordination mechanisms, among national focal points of climate, land and biodiversity-related conventions.

- Strengthen networks of adaptation actors;
- Foster community engagement at all stages of planning, design and implementation;

Resources

1. [The Nairobi work programme](#)
2. [Biodiversity page on the Adaptation Knowledge Portal](#)
3. [Scoping paper on knowledge gaps for integrating forest and grasslands biodiversity and ecosystems into adaptation strategies.](#)