QUICK TIPS

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WORKING WITH NATURE IN FORESTRY SECTOR

This document is part of the "Working with Nature" Quick Tips series, comprising 7 sectoral Quick Tips on Agriculture and Livestock, Cities, Disaster Risk Reduction, Renewable Energy, Transport, and Water.

The links between forestry and nature

Forests cover about 31% of the earth's land mass and host about 80% of the world's biodiversity.

The tropics host the largest proportion of the world's forests (45%), followed by the boreal, temperate and subtropical regions.

Over 90% of the world's forests are naturally regenerating and over 50% are covered by forest management plans or equivalents.

Between 20 and 40% of forest plants, animals and fungi have been estimated to depend on dead or dying wood, at some point in their life cycle.

All forest management activities have some impact on landscape structure, forest composition, wildlife disturbance, distribution of microhabitats and therefore on forest ecosystem functioning and biodiversity. When it comes to deforestation and forest degradation, although there are many drivers of these processes (one of the main drivers is agriculture), this Quick Tips focuses on the deforestation and forest degradation caused by unsustainable forest management practices.

Some of the **main pressures on biodiversity** caused by deforestation, forest degradation and unsustainable management of forests are:

▶ **Intensive forestry operations** such as planting of dense and structurally homogenous tree monocultures, preparation of site for tree planting, and the use of chemicals (including pesticides, herbicides, nitrogen and other fertilizers) reduce biodiversity, increase vulnerability to pest outbreaks and disease, damage soil structure, and cause soil and water pollution.

▶ **Harvesting of old-growth forest**[1] reduces populations of species largely confined to those habitats (fairly undisturbed and continuous parts of old undisturbed forests).

▶ **Opening up of roads in forests,** increasing access for poachers and agricultural settlements.

▶ **Removal of old, dead and dying trees** reduces a wide range of tree-related microhabitats such as hollows, crevices and wounds as well as standing dead wood of different sizes and decay stages and corresponding microhabitats for insects, birds, bats and other species.

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[1] Old growth forests are defined as undisturbed climax forests.

- **Clearcutting with extraction of all trees** has negative impacts on species that need a stable forest-interior climate.
- **Overexploitation of selected tree species** can alter forest composition, and lead to local extinctions or unsustainable regeneration rates – with broader ecological impacts through species relationships.
- **Treatment and salvage logging of naturally disturbed forest areas** (by fires, storms, pests): Natural disturbances provide forest development stages that are often rare in managed forest landscapes. They can enhance the structural heterogeneity of forests, create habitats for species-rich assemblages of high conservation value and increase the long-term resilience of forests to future stressors. Salvage logging reduces abundance of some specialist species[2], such as cavity-nesting-birds that usually breed in fire-killed trees or particular species that depend on dead wood. Similarly, fast reforestations hinder the occurrence of numerous specialist species.
- **Conversion of forest type** has considerable effects on species composition and may cause decrease and loss of species adapted to natural forest landscapes. Variation in forest types and habitats is fundamental to a rich biodiversity. Forestry influences tree-species composition, structural and age variation of tree stands, and alters hydrology.
- **Introduction of non-native or poorly adapted species/provenances:** The use of introduced tree species and ill-adapted provenances[3] may lead to changes in ecological processes such as nutrient dynamics, in turn affecting plants, animals and fungi or lead to unintended consequences that may arise from the introduction of species cohorts or disturbance of established species relationships through co-evolution.
- The impact of different **forest fire management** on biodiversity can vary depending on the specific practices used and the ecological context in which they are applied. For example, some tree species require periodic fires to stimulate seed germination and regeneration of habitats. In such habitats, strict **fire prevention** can lead to the loss of habitat for species that depend on fire, while prescribed burning can be beneficial for biodiversity. However, if not carefully planned and executed, **prescribed burning** can have adverse impacts on biodiversity, particularly if the fires are too frequent because forest will not have time to recover.
- **Illegal logging** poses a significant threat to forests as it contributes to the process of deforestation and forest degradation, which is responsible for about 20 % of global CO_2 emissions, **threatens biodiversity, livelihoods and undermines sustainable forest management** ("unfair competition") and development. It also **contributes to desertification and soil erosion and can exacerbate extreme weather events and flooding**.

How forestry sector can contribute to and benefit from nature

Forests are hugely important for biodiversity, climate and water regulation, the provision of food, medicines and materials, carbon sequestration and storage, soil stabilisation and the purification of air and water. At the same time, to improve forest resilience and adaptation, it is necessary to halt deforestation and forest degradation, as well as increasingly protect and restore forest biodiversity and adopt biodiversity-friendly forest management practices.

The 2022 _Global Biodiversity Framework_ requires us, by 2030, to ensure that areas under forests are managed sustainably, including through a substantial increase of the application of biodiversity friendly practices (target 10), as well as to restore, maintain and enhance nature's contributions to people, including ecosystem functions and services (target 11). Both the EU _New Forest Strategy for 2030_ and the EU _Biodiversity Strategy for 2030_ call for sustainable forest management practices to ensure benefits for society and biodiversity are maintained.

Some sustainable forest management practices with co-benefits to nature and biodiversity are:

- **Closer-to-Nature Forest Management**[4] implies that actions to promote biodiversity within managed forests are reinforced. It includes the following principles: retention of habitat trees[5] and dead wood, promotion of native tree species, promotion of natural tree regeneration, partial harvests and promotion of stand structural heterogeneity, avoidance of intensive management operations and supporting landscape heterogeneity and functioning. **Adaptive management** should be used as a way to tackle uncertainties, by regularly observing forest response to management interventions, evaluating these responses and adjusting management strategy accordingly. It is important to bear in mind that Closer-to-Nature Forest Management **is not a 'quick-fix'** and that policy makers must provide **long-term and consistent support measures** to encourage forest managers and other stakeholders to adopt this strategy.

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[2] Species adopted to narrow habitats, limited food resources, or other specific environmental conditions.
[3] Provenance: the geographical source or place of origin from where a given lot of seed or plants are collected, often restricted to refer to material from a specified race.
[4] Also: Nature-based Forest Management, Forest Ecosystem Management
[5] Individual trees or small clusters of trees that provide critical habitat for a variety of wildlife species, including birds, mammals, insects, and fungi. Habitat trees are often mature or old-growth trees, and they may be living, dead, or dying. Retention of habitat trees is synonym to "green-tree retention" (in FSC), "forest retention" (often used by foresters), "wildlife trees retention", etc.

▶ **Reduced-Impact Logging** (RIL) refers to careful planning and control of timber harvesting operations to minimize the environmental impact and waste. It is implemented through codes of practice and guidelines that include activities such as improved forest management planning, road construction, tree felling, bucking and log yarding. Implementation of RIL is a fundamental component of sustainable forest management and a critical step towards forest certification.

▶ **Establishing and managing set-aside areas** is one of the main tools for biodiversity conservation in production forests. Usually, a minimum of around 15 percent set-aside is required within a managed forest. These include areas that should be protected for ecosystem services, such as steep slopes and buffers along waterbodies and salt licks, as well as specific habitats, including threatened habitats. Set-aside is also used to protect cultural values and local community resources (e.g. community-managed land within a forest), areas providing critical ecosystem services to local communities (e.g. watershed forest), and areas for hunting and Non-Wood Forest Products (NWFP) collection.

▶ **Restoration** may be applied to a wide range of forest ecosystems, from montane forest to mangroves, tropical to boreal, and in production versus conservation contexts. Common elements include maintaining and enhancing existing natural forests; engagement of multiple stakeholders and focus on governance; restoring for multiple benefits with a focus on maximizing biodiversity recovery. To a substantial degree, restoration success will be determined by the quality of planning, including careful matching of species and genetic material to sites. Using seeds and seedlings of high genetic diversity and quality improves tree survival.

Priorities for action:

▶ Expand the surface of forests covered by **long-term and integrated management plans and ensure such plans** are complemented with appropriate **governance, capacity and financial arrangements**.

▶ **Prevent conversion of natural forests into monospecific forest plantations**.

▶ **Improve forest governance at all levels**, including through participatory approaches, monitoring and disclosure of corporate and value-chain impacts on people, biodiversity, water and climate. Ensure human rights clauses are embedded in land-use related policies and processes, such as the "Free, Prior, and Informed Consent (FPIC)" of local populations, as well as the establishment of grievance mechanisms. Support a culture of transparency, multi-stakeholder and cross-border cooperation.

▶ **Adopt a multisectoral perspective**: Forest management plans should integrate biodiversity concerns and consider wider spatial planning objectives and strategies for biodiversity conservation. Also, integrate sustainable forest management practices into the River Basin Management Plans.

▶ Ensure **adaptive and closer-to-nature principles** in forest management for long-term resilience and enhance protective role of forests contributing to multiple ecosystem services, including soil protection, provision of water of adequate quality and quantity.

▶ Strengthen **international cooperation** to halt deforestation and forest degradation and encourage forest restoration.

▶ Provide **economic incentives for sustainable forest management practices** and high-quality forest biodiversity management through a variety of means, including: tax breaks for compliance with specific

management objectives; issuing and renewing licenses and permits conditional on performance; subsidies and investments for achieving biodiversity outcomes; compensation for reduced production to promote biodiversity benefits.

▶ Work in **partnership with local communities** through community-based forest management. Local people have knowledge on traditional methods of resource management and natural processes in the area.

▶ Improve **knowledge transfer** and the creation of **schemes that reward** private forest owners for providing ecosystem services.

▶ Mainstream biodiversity through **certification schemes**, such as Forest Stewardship Council (FSC) certificate. Certification provides assurance that the forest manager is following best practices in managing forests that will result in not only stable forest production, but also conservation values.

▶ **Protect forests from illegal and unauthorized activities** through FAO-EU FLEGT Programme / Legal and Sustainable Wood (LSW) Programme[6].

Good practice examples of nature-friendly forest management

The Case of VERENIKE – Enhancing biodiversity and forest resistance against forest fires

Each summer forest-fire is becoming a more prominent issue all over Europe, particularly in the Mediterranean. There are disparities and differences among countries in managing forest fires. However, in most cases the post-fire management of burned areas has been given much less attention than fire suppression and prevention. Usual practice of active restoration is limited to planting only a few species that can be easily produced on a large scale, resulting in a 'restored' ecosystem characterised by low biodiversity and often high vulnerability to fire.

The VERENIKE project focuses on developing a new methodology for germination and cultivation of a wide range of forest species in mini-plugs[7] for post-fire restoration of forest ecosystems.

The first step was the collection and handling (cleaning and storing) of more than 65 kg of seeds from 26 targeted Mediterranean species (shrubs and trees), and development of cultivation manuals for seedlings in mini-plugs. A prototype system was constructed, with the capacity to produce numerous high-quality seedlings for a variety of the targeted species throughout the year. In the field, the project reforested three pilot areas using seedlings from 18 different species at each site. The survival and growth characteristics of the transplanted seedlings were monitored for two years to assess the success of the developed methodology, and the ability of the species to overcome transplantation shock and adverse field conditions.

The project demonstrated that a large number of different species may be used to regenerate burnt areas. Nevertheless, the characteristics of the regenerated sites and the species that are aimed to be planted are crucial and determine the success of the regeneration effort. The project also provided guidelines as to which species are more suitable for each site, as well as germinability protocols for 22 Mediterranean forest species.

Best practice lessons: Instead of planting monocultures in post-fire restoration of forest ecosystem, post-fire reforestation may be implemented with a large number of different species, in order to increase resistance against forest fires and enhance biodiversity of burnt forest ecosystems. In order to enhance biodiversity and increase the forest ecosystem resilience, as many different forest species as possible should be used, bearing in mind they are native to the ecosystem.

The Case of Mainstreaming Biodiversity Conservation in Sustainable Management of Forest Landscapes in Mongolia

Mongolia is an impoverished country highly dependent on its natural resources. Sustainable management of forests in Mongolia represents an alternative revenue source for many of the country's poor, and participatory forest management has recently been piloted and introduced in the country.

The FAO-GEF-Government of Mongolia project aims at improving the management of over 460 000 hectares of forests, including important habitats of endangered species such as musk deer and saker falcon. The project, implemented by the Mongolian Ministry of Environment and Tourism in collaboration with provincial and district governments and with assistance from FAO and financial support from GEF, works directly with 101 Forest User Groups. All forest management plans developed with support from the project include biodiversity conservation objectives and wildlife-monitoring activities. In addition to activities designed to enhance forest health, productivity and carbon stocks (e.g. pest control, fire prevention, forest-stand enhancement), the project promotes income-generating activities based on fuelwood, small crafts and NWFP. These have opened

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[6] The work of the FAO-EU FLEGT Programme will continue through the Legal and Sustainable Wood (LSW) Programme, which is currently under development.
[7] A plug plant is a seedling that was sprouted and grown in a small cell. Plug plants are often grown together in a large tray with many cells. Plug plants grow easier than starting plants from seed.

up opportunities for multipurpose forest management by the Forest User Groups. Project monitoring data indicate that the number of some wildlife species, including musk deer and wild boar, have increased in the project area.

Best practice lessons: Community involvement is crucial for successful conservation. Sustainable livelihoods can support conservation. The project promoted the development of sustainable livelihoods, such as eco-tourism and non-timber forest product collection, that do not rely on forest degradation. These livelihoods provided economic opportunities for local communities while reducing pressure on forest resources, which helped to conserve biodiversity and ecosystem services.

Source: FAO (2020): State of the World's Forests

Further information and support

▶ *QuickTips on Working with Nature*
▶ *EIB (2022): Forests at the heart of sustainable development*
▶ *European Forest Institute (2022): Closer-To-Nature Forest Management*
▶ *Thorn, S. et all (2017): Impacts of salvage logging on biodiversity: A meta-analysis*
▶ *EU Timber Regulation*
▶ *FAO (2016): Traceability, A Management Tool for Enterprises and Governments*
▶ *FAO (2022): Mainstreaming Biodiversity in Forestry*

All documents are available on capacity4dev (public group: *Environment, Climate Change and Green Economy*).

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