

POLICY BRIEF

How natural forest expansion in Europe can offer cost-effective benefits to people

Main findings

- Natural forest expansion (NFE) in Europe can offer a **cost-effective nature-based solution** to restore biodiversity and nature's contributions to people in both abandoned rural areas and the urban fringe.
- NFE may present an effective and novel method for implementing **climate change mitigation** measures by increasing the carbon stocks stored in forests. NFE habitats also tend to be more genetically diverse than those with plant material grown under plantation conditions, and thus display higher potential of local adaptation to climate change.
- Depending on the land use history NFE **may enhance local biodiversity** by increasing species richness of woody plants, associated insects and birds, with direct links to local ecosystem functioning.
- **Societal groups perceive NFE in different ways.** Perceptions depend on the social, economic, cultural, political and geographical context. Studies show it is mostly viewed as negative in rural areas and more positively in peri-urban areas.
- NFE is sometimes **perceived to cause harm**, such as increased **fire hazards, spread of invasive alien species or loss of biodiversity from open landscapes**.
- Realising the **potential of NFE** requires understanding of, and **customisation** to, the socio-economic, political and environmental context.

Key policy recommendations

- **Relevant policy sectors** such as biodiversity, climate, agriculture and rural development, and forestry could **view NFE** as a policy option **at all governance levels** while considering **synergies and trade-offs between the different contributions nature makes to people**.
- **Decision-makers** could better explore and support the **cost-effective opportunities** presented by the nature-based solutions offered by NFE to support **multiple policy objectives**.
- **Decision-makers, spatial planners and scientists** could **recognise self-established young forest as a distinct land use category** in support of the integration of NFE in policy, planning and research.
- **Managers** are advised to **define NFE management options on the basis of evidence**, taking account of land use history, and involving stakeholders.

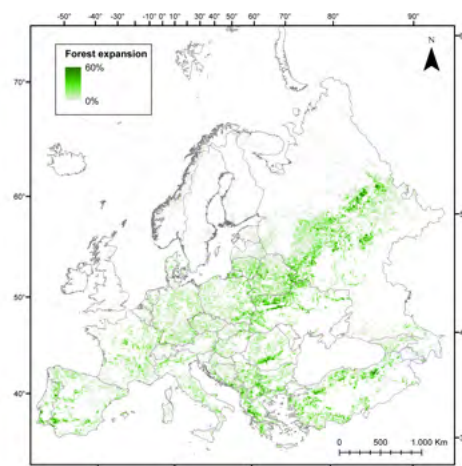
Context

Europe faces more landscape fragmentation than any other continent, with nearly 30% of the habitats in EU landscapes experiencing fragmentation. This fragmentation negatively affects biodiversity and ecosystem services as natural systems are less able to function as ecologically coherent units. Since 1950, the continent has also experienced the greatest proportional gain in tree cover of all continents, expanding by some 300,000 km², an area the size of Italy (see figure covering the 1992-2015 period). This gain in forest cover is driven by active tree planting and through natural forest expansion (NFE), both mainly taking place on former agricultural land.

Rural development and forestry policies have supported high-intensity land management and afforestation with over € 3 billion of public funds provided under the [EU common agricultural policy](#) (CAP) in the period 2007-2020. However, the objectives of [EU nature and biodiversity policy](#) (EU Habitats and Birds Directives, EU Biodiversity Strategies) are only partly integrated in active reforestation efforts under the CAP.

European countries have often neglected opportunities for cost-effective nature-based landscape restoration through passive NFE in unproductive, economically marginal or sparsely populated rural areas. This may be because early forest habitats, resulting from NFE, are often not perceived as landscape units in their own right and they are usually not systematically managed. For the same reasons, NFE is also often seen as a challenge for landscape conservation, management and policy. However, NFE is important in several countries and its expansion is expected to continue.

Untapping the full positive potential of NFE and its multiple benefits can support several EU and national policies in the frame of the [European Green Deal](#). For instance, NFE may offer opportunities for the [EU Biodiversity Strategy for 2030](#) and its ambitious nature restoration plan, e.g. by providing nature-based solutions to increase ecological connectivity, climate resilience, biodiversity and ecosystem services. This can support the conservation objectives of the EU Nature Directives (including [Natura 2000](#)) and the [EU Forest Strategy](#) which calls for Member States to maintain, enhance and restore forest ecosystems' resilience and multifunctionality as a core part of the EU's green infrastructure. In agricultural landscapes, NFE can also support the future CAP through reducing soil erosion and enhancing other ecosystem services such as woody biomass, bioenergy production, climate mitigation and adaptation.



Forest expansion in Europe between 1992-2015
(data from Palmero-Iniesta and coworkers, 2020)

This policy brief presents results of the BiodivERsA-funded research project [SPONFOREST](#) to inform the debate on the role that natural forest expansion can play as a cost-effective nature-based solution to restore and conserve biodiversity and ecosystems more effectively, while also helping to mitigate and adapt to a changing climate.

Research in SPONFOREST addressed socio-cultural and policy aspects of natural forest expansion (NFE) in Europe as well as ecosystem services and the role of environmental conditions and plant ecology in shaping NFE.

Key results

Natural forest expansion in South-West Europe affects nature's contributions to people

Natural forest expansion can be an economically cost-effective opportunity to restore ecosystem functioning, increase ecosystem services, diversify multifunctional landscapes, and help achieve environmental policy goals¹. Forest expansion and densification is generally associated with greater climate regulation and energy provision through biobased fuels. Changes in contributions that nature provides to people, especially non-material ones such as inspiration and cultural identity and

heritage, are strongly context-dependent. The social perception of NFE is found to be more negative in rural areas because of its assumed association with a deteriorating socio-economic situation and associated risks. The more positive perception in peri-urban landscapes is attributed to an expected increase in benefits such as physical experiences and cleaner air. To optimise nature's contributions to people and to increase the societal awareness of and benefits from NFE, the effects of NFE should be further

1. Martín Forés and coworkers 2020

analysed together with local stakeholders to understand and quantify complex trade-offs.

The BiodivERsA-funded project SPONFOREST concluded that NFE can represent a valuable tool for passive restoration when the specific socio-economic and ecological context is properly addressed and considered. For instance, different stakeholder perceptions and trade-offs between competing land uses need to be carefully addressed in order to enhance forest multifunctionality

and sustainability. Alternative management practices could modify nature's contributions to people, especially in rural areas where the maintenance of traditional land use activities, cultural heritage and conservation policies should be implemented in tandem.

It is recognised that NFE can also contribute negatively to society, such as by increased forest fire risk or spread of invasive alien species. This was however not specifically addressed by SPONFOREST research.

How cultural beliefs define stakeholders' perceptions of natural forest expansion

Natural forest expansion (NFE) following rural land abandonment is a cross-cutting topic, connected to agriculture and rural development, nature conservation and forestry. It holds opportunities, challenges and questions relevant to various scientific disciplines². Based on four case studies conducted in Spain and France, the research team found that a variety of stakeholders in these sectors perceive NFE very differently. The authors confirmed that these differences in perception are mainly driven by cultural aspects structuring the stakeholders in three clusters of social perceptions and related 'narratives': rural fatalism perceiving NFE as lost territory, pro forest management, and a pro nature narrative. Each narrative defines problems related to NFE differently, and proposes different solution strategies.

For example, rural fatalists tend to associate land abandonment with agricultural decline and its negative consequences for livelihoods and rural community viability. While these fatalists often call for boosting agriculture

instead of accepting the role of new forests, the other two clusters see opportunities in NFE, albeit in different and often competing ways. For example, the pro forest management supporters want new forest resources to benefit the local economy, whereas pro nature actors mainly see ecotourism and rewilding as opportunities offered by NFE.

These social perception results stress the need for inter- and transdisciplinary assessments of land use opportunities and trade-offs connected with NFE to consider the local conditions and the different culturally shaped views on NFE.

The systematic use of NFE as a tool for evidence-based landscape management requires careful analysis of the benefits and harm new forest patches can potentially deliver and of the perceptions and demands of the local population, stakeholders, and the wider public.

Expansion characteristics depend on the land use history and environmental context

SPONFOREST showed that the environmental context has a significant bearing on the way in which forests naturally expand. A key element is land use legacy, the type of land use before forest expansion commenced. On former agricultural land NFE leads to an increase in habitat supply, landscape connectivity, biomass production and carbon stocks. There is a risk though, that these recently formed forests might suffer more harm from future drought conditions than forests with a more continuous land use history. This is because early pioneer trees on agricultural land show higher growth and lower wood density in response to higher nutrient availability, making them more sensitive to climate extremes³.

Fluctuations in environmental conditions are also important to other species attributes that define forest expansion rate and forest cover patterns. For example, seed dispersal rate, water use efficiency and growth potential are tree characteristics which define where plants settle, become established, and mature⁴.

Ecological processes, such as insect herbivory and insect predation by birds, are also influenced by similar environmental conditions⁵. These findings support the need for integrated landscape management to ensure good diversity in habitat types to offer a variety of refugia for species that are effective in expanding their ranges naturally.

The fear of some conservationists that forest expansion is a general threat to biodiversity at the landscape level was not supported by the study's results, though in some instances forest expansion can represent a local-scale threat for high-diversity open habitats (not addressed by SPONFOREST). NFE does not necessarily result in lower landscape diversity. Forest habitat expansion rates are themselves affected by landscape diversity, topographic elevation and geographical gradients⁶.

2. Frei and coworkers, 2020

3. Alfaro-Sánchez and coworkers 2019

4. Alfaro-Sánchez and coworkers 2020; Gerzabek and coworkers 2017, 2020; Lamonica and coworkers 2020; Vilellas and coworkers 2020

5. Boivin and coworkers, 2018; Castagneyrol and coworkers, 2020; Doublet and coworkers, 2019; Espelta and coworkers, 2020; Ruiz-Carbayo and coworkers, 2020; Valdés-Correcher and coworkers 2020

6. Palmero-Iniesta and coworkers 2020

Policy recommendations

Although no specific studies on the effectiveness and cohesion of current policies were conducted by SPONFOREST or assessed during the production of this policy brief, the knowledge presented highlights important links between natural forest expansion (NFE) and EU and national policy measures, tackling several aims outlined by the European Green Deal.

- **Relevant policy sectors** such as biodiversity, climate, forestry, agriculture and rural development could **consider natural forest expansion as a policy option at all governance levels**. For instance, NFE may offer:
 - natural restoration and creation of habitats that absorb more carbon than arable land, in support of the EU Biodiversity Strategy for 2030 call for **significant areas of degraded and carbon-rich ecosystems to be restored by 2030**;
 - an opportunity to support the future EU Forest Strategy aim for forest preservation and restoration in Europe, e.g. to **help increase the absorption of CO₂ and promote the bio-economy**, in full respect of ecological principles favourable to biodiversity;
 - nature-based solutions for climate adaptation, which are cost-effective and have multiple benefits such as carbon sequestration as well as improving soil, in support of the new EU Climate Law, which states that the **natural sink of carbon by e.g. forests and soils should be maintained and further increased**;
 - new resources for sustainable forestry, including support to the local timber market, providing local jobs and livelihoods, in response to the European Green Deal call, and linked to the CAP post 2020, to **incentivise forest managers to preserve, grow and manage forests sustainably**;
 - contributions to proposed specific objectives of the CAP post 2020, e.g. to foster sustainable development and efficient management of natural resources by **reducing soil erosion and nutrient leakage**; and to **contribute to the protection of biodiversity, enhance ecosystem services and preserve habitats and landscapes**.
- **Decision-makers, spatial planners and scientists** could **recognise self-established young forest as a distinct land use category** in support of the integration of NFE in policy, planning and research.
- **Policymakers** from different sectors could adopt a **cross-sectoral approach** towards nature conservation, agriculture and forestry while considering **synergies and trade-offs** in order to reap the potential benefits offered by NFE as a passive restoration practice.
- **Scientists** could carry out **multidisciplinary assessments** of the potential of NFE in Europe, considering the local conditions and the culturally determined perceptions regarding its application.
- **Step up inter- and transdisciplinary research and innovation** across Europe to increase the science-based understanding of NFE in the context of climate, socio-economic and policy change, and to evaluate its potential as a cost-effective nature-based solution for restoring biodiversity and multifunctionality in the rural and peri-urban landscapes of the near future.



Links to sources

[SPONFOREST project website](#)

Scientific publications used in this policy brief can be found in the Information Sheet of this briefing, downloadable from: www.biodiversa.org/policybriefs

Photo page 1: Sponforest
Photo page 4: Pixabay.com

About this Policy Brief

This Policy Brief is part of a series aiming to inform policymakers on the key results of the biodiversity research projects funded by BiodivERsA and provide recommendations to policymakers based on research results.

The series of BiodivERsA Policy Briefs can be found at www.biodiversa.org/policybriefs.


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The policy recommendations made do not necessarily reflect the views of all BiodivERsA partners.

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