



THINKFOREST

Facilitated by European Forest Institute

Forest-based climate change mitigation and adaptation in Europe

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Photo: UNFCCC

Newly proposed targets for the EU LULUCF sector require to remove

- 310 Mt CO₂ eq / yr by 2030 (additional: ~50 Mt CO₂ eq / yr)
- 360 Mt CO₂ eq / yr by 2035 (additional: ~100 Mt CO₂ eq / yr)
- 425 Mt CO₂ eq / yr by 2050 (additional: ~170 Mt CO₂ eq / yr)

Background and scope

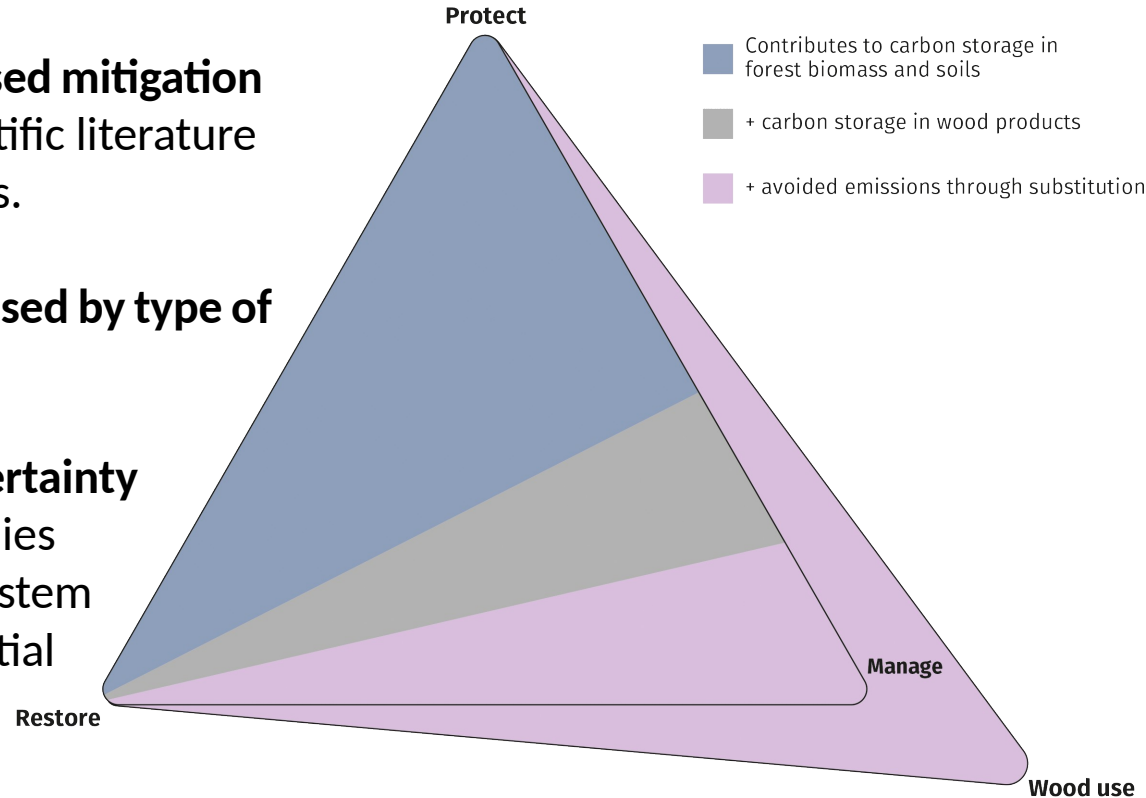


Review and synthesis:

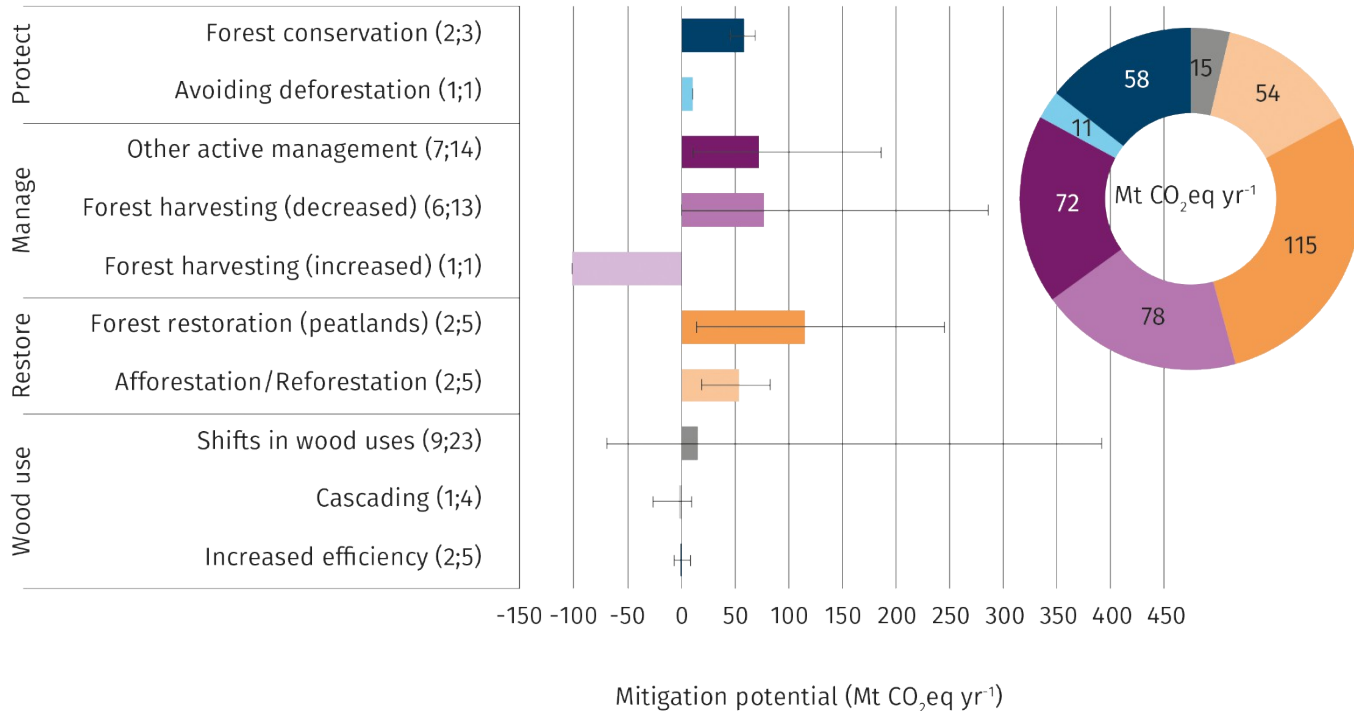
- 1) scientific literature on the **mitigation potential** provided by forest-based activities in the EU-27, Norway, Switzerland and the United Kingdom
- 2) the **impacts of climate change** on forest ecosystems, forestry, industries and markets
- 3) **policies and tools** to stimulate carbon storage.

Approach and uncertainties

- Review of **additional forest-based mitigation potential** reported in the scientific literature
→ Focus on greenhouse gases.
- All potential estimates **categorised by type of mitigation activity**
- **Important: high degree of uncertainty** due to variability between studies
→ Different data, methods, system boundaries, types of potential and scenario assumptions.



Forest-based mitigation potential by activity

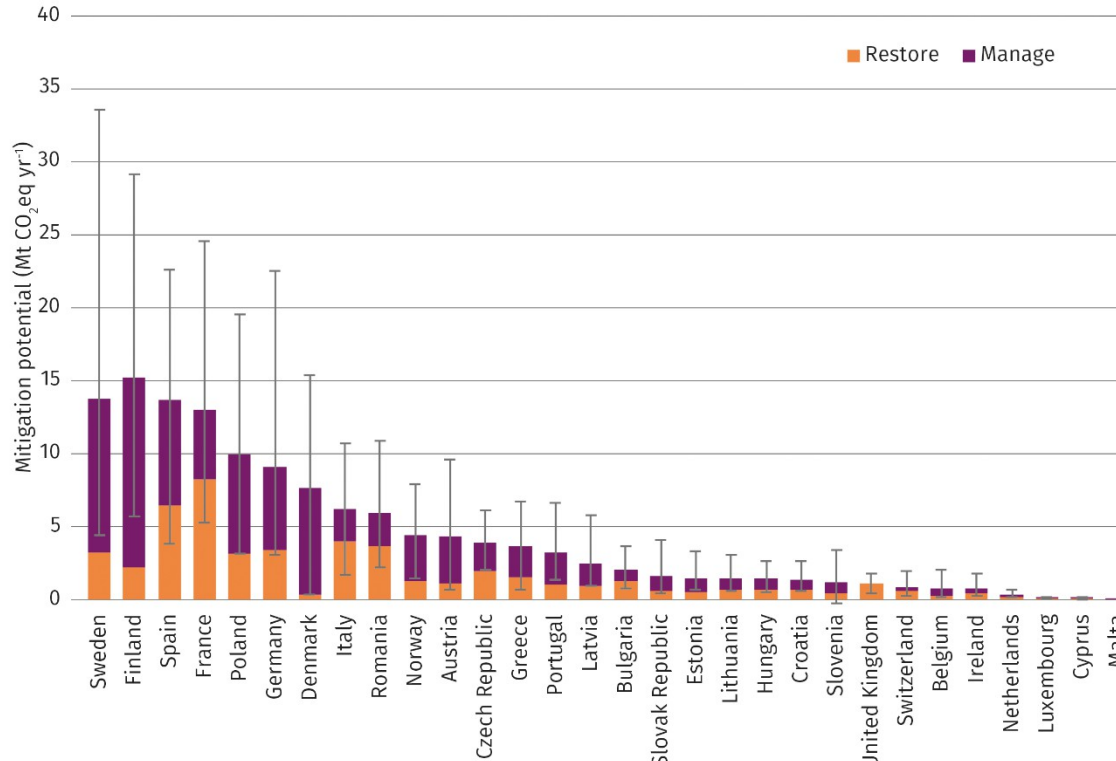


Forest-based mitigation potential by 2050 in the EU-27, NO, CH and UK by activity type.

The data sample size (number of studies; number of datapoints) displayed next to activity type.

Bars = the mean values across all literature reviewed. Error bars = minimum and maximum values of the range

Forest-based mitigation potential by country



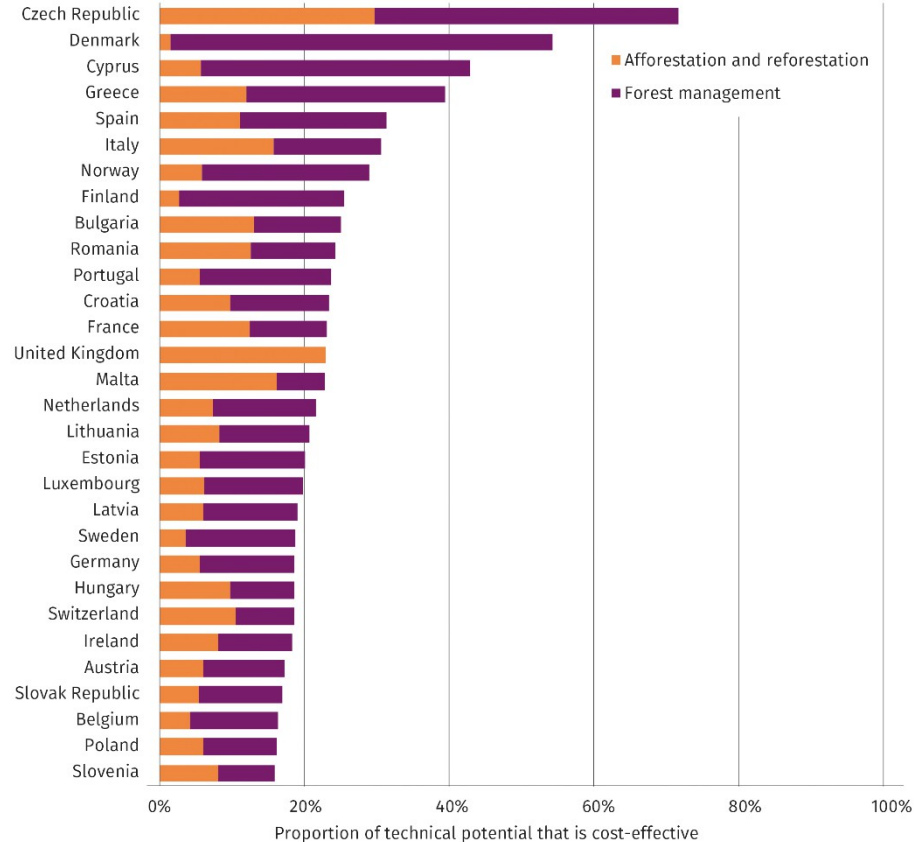
Forest-based mitigation potential by 2050 at country level.

The activities captured include decreased harvest and other active management (Manage), and afforestation / reforestation (Restore).

The national-level potential presented in this figure do not necessarily add up to the European-wide potential.

Source: Verkerk et al. 2022 / FSTP 14

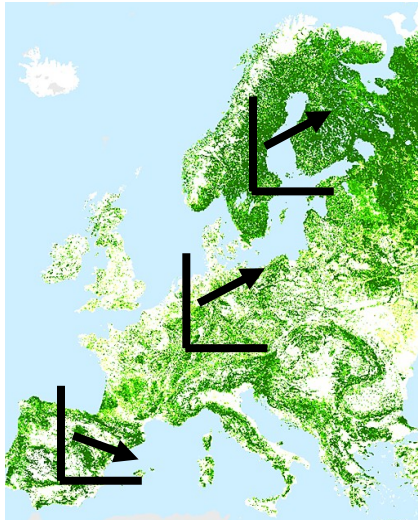
Cost-effectiveness of forest-based mitigation



Cost effective mitigation potential by afforestation, reforestation and forest management activities as proportion (in %) of the technical potential

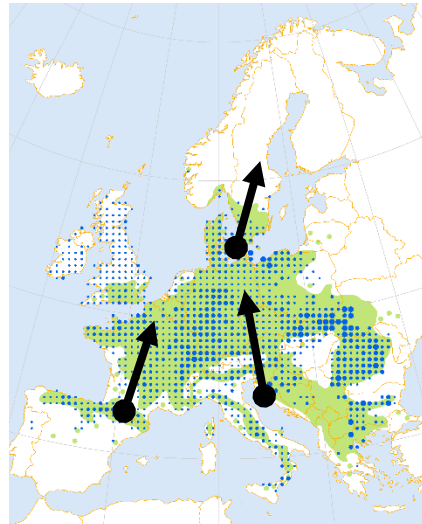
Climate change impacts

Productivity changes



Map: EFI

Tree species range shifts



Map: JRC

Increasing disturbances



Photo: Paulo M.F. Pires / AdobeStock

Disrupting markets

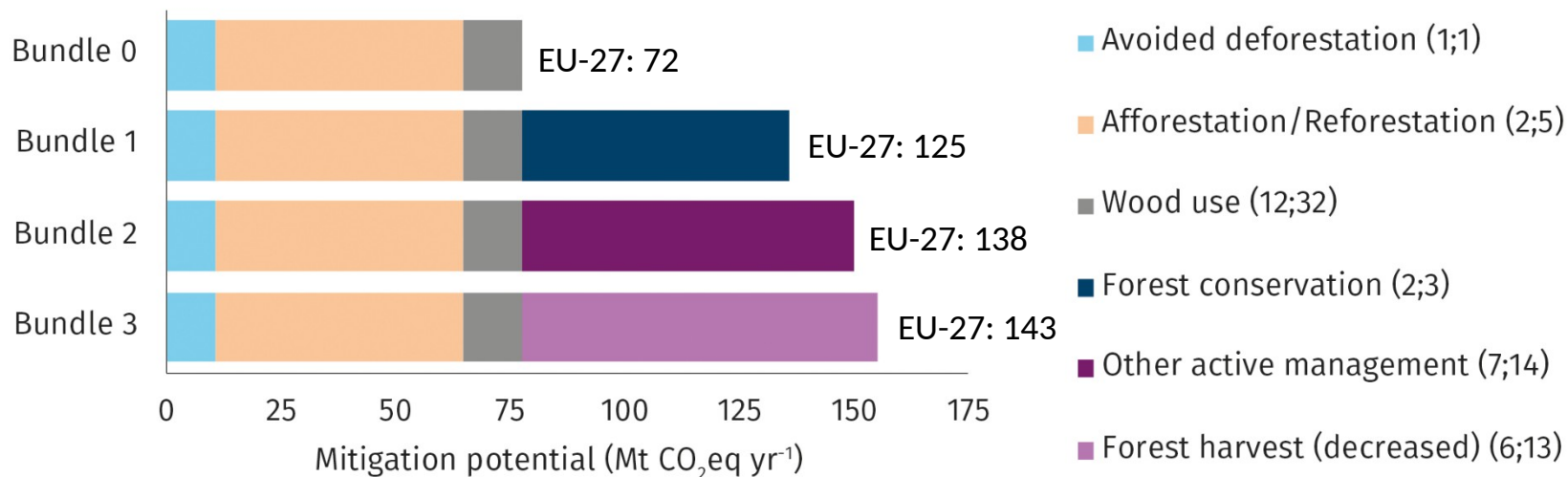


Photo: Magnifica Comunita di Fiemme

Interactions, synergies and co-benefits

Category	Activity	Impact on other mitigation activities	Interaction with adaptation	Impact on biodiversity
Protect	Avoiding deforestation	Limited or no impacts	Supports adaptation of surrounding forests	Avoids loss of biodiversity
	Forest conservation	Potentially reduces active management and wood use	Supports natural adaptation but decreases options for active adaptation	Supports biodiversity in protected forests
Manage	Forest harvest (decreased)	Potentially reduces active management and wood use	Can foster drought tolerance but decrease stand stability	Supports biodiversity in forests experiencing lower harvest pressure
	Active management (other than harvesting)	Potentially reduces forest conservation	Possible trade-off between carbon storage and fitness	Supports or decreases biodiversity depending on the type of active management
Restore	Forest restoration	Limited or no impacts	Careful selection of species and forest types for restoration improves resilience	Supports biodiversity when structural diversity and tree species diversity increases
	Afforestation/ Reforestation	Limited or no impacts	Possible trade-off between establishing resilient forests or maximising sequestration	Supports biodiversity when degraded land is reforested. Reduces biodiversity when ecosystems with high biodiversity are afforested
Wood use	Shifts in wood uses (including by-products)	Limited or no impacts if no additional harvest	Balance between generating revenues to support adaptation actions and increasing harvest pressure which may hamper adaptation	Supports biodiversity when lowering harvest pressure on forests and when less polluting manufacturing processes are applied
	Cascading (end-of-life)	Limited or no impacts	Can reduce harvest pressure on forests to enable focus on adaptation and natural processes	Supports biodiversity by when lowering harvest pressure on forests
	Increased efficiency	Limited or no impacts	Can reduce harvest pressure on forests to enable focus on adaptation and natural processes	Supports biodiversity when lowering harvest pressure on forests and when less polluting manufacturing processes are applied

Total forest-based mitigation potential



Mitigation potential of bundled mitigation activities by 2050 in the EU-27, NO, CH and UK.
 The data sample size (number of studies; number of datapoints) displayed next to activity type

Summary

- New policy targets: EU LULUCF sector to remove additional
 - ~50 Mt CO₂ eq / yr by 2030
 - ~100 Mt CO₂ eq / yr by 2035
 - ~170 Mt CO₂ eq / yr by 2050.
- Literature: forest-based mitigation activities in EU could remove additional 125-143 Mt CO₂ eq / yr by 2050.
- Holistic approach needed that considers:
 - forests and wood use options
 - all relevant carbon pools and flows
 - interactions with other emission sectors
 - up to and beyond 2050
 - adaptation
 - biodiversity and other functions and services.



Recommendations (1/2)

- **European forests and wood products can provide a significant contribution to achieve climate neutrality by 2050.** Maximum efforts needed to reduce net emissions.
- **Combine forest-based mitigation activities to maximise forest-based mitigation potential.** Policy and management strategies to consider all possible forest-based mitigation activities.
- **Prioritise types of wood use that give largest net emission reductions.** Wood-based products to be reused and recycled as many times as possible, energy recovery to be preferred over landfill.



Recommendations (2/2)

- **Forests across countries differ, so do implementation strategies.** Regional and country contexts must be considered during implementation.
- **Move to policy implementation at European, national and sub-national levels.** Appropriate incentive systems, exchange of best practices between countries/regions, and a transparent, harmonized and robust monitoring framework needed.
- **Joint consideration of climate change mitigation and adaptation.** Policy and management strategies to consider forest-based mitigation together with adaptive management.
- **Extend focus of EU policies beyond 2050.**



ForestPaths

CO-DESIGNING HOLISTIC FOREST-BASED POLICY PATHWAYS FOR CLIMATE CHANGE MITIGATION

Duration: September 2022 – February 2027



CHALLENGE

EU targets to significantly reduce greenhouse gas emissions by 2030 and become climate neutral by 2050 require urgent and major reforms by all sectors. Simultaneously, the EU has committed to conserve biodiversity.



OPPORTUNITIES

Clear policy pathways are needed to meet these multiple targets. They need to outline alternatives for how European forests and the forest-based sector can contribute to achieving a climate-neutral and resilient society and economy.



AIM

ForestPaths will co-design, quantify and evaluate holistic forest-based policy pathways to optimise the contribution of EU forests and the forest-based sector to climate change mitigation, while considering the need to adapt forests to climate change, conserve biodiversity and sustain forest ecosystem services provisioning.



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