WHY IS NATURE RESTORATION CRITICAL FOR CLIMATE MITIGATION IN THE EU?

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The EU has set targets to reduce its greenhouse gas emissions by at least 55% by 2030 and to reach climate neutrality by 2050 to keep global temperature increase below 1.5°C. Europe's land is vital to achieving this goal. The land use and land use change and forestry (LULUCF) sector will contribute by saving and storing an additional 310 to 400 $MtCO_2eq$ by 2030.

It will be impossible for the EU to meet its climate neutrality goal by 2050 and the LULUCF land sink target without a significant scaling up of nature restoration.

Nature restoration is central to our efforts to mitigate climate change as it reduces and avoids emissions from land, enhances the capacity of ecosystems to capture and sequester carbon in natural sinks, and can prevent future emissions by increasing ecosystem resilience.

WHAT CAN THE NRL ACHIEVE?

- Restoring **peatlands, agroecosystems and forests** holds great potential to safeguard carbon stocks and increase sequestration.
- Theoretically, restoring 90% of terrestrial Annex I habitats which are in not good or unknown condition to good condition could lead to a total carbon stock between 2,858 and 9,210 million tC in the EU and sequester around 286 MtCO2eq/year [1]. While the time needed to achieve these rates would largely exceed the 2030 deadline, these figures illustrate the theoretical magnitude of the carbon storage and sequestration benefits which could be achieved by Article 4 of the nature restoration law.
- Events such as forest fires, floods and droughts will become more frequent and severe with climate change over this decade. These events release large amounts of stored carbon into the atmosphere. Restoration can increase the resilience of habitats to climate events and reduce their impact on carbon stocks.

WHAT WOULD HAPPEN WITH NO RESTORATION?

- If nature restoration is not scaled up, the EEA projects a decrease in the overall level of net removals for the period 2020-2040, with an average of 200 MtCO2e removed each year - compared to the historic average of 300 MtCO2e for the period 1990-2019 [2]. This would mean the EU is very likely to fail to achieve carbon neutrality by 2050.

Peatlands

Peatlands cover around 3% of the EU-27 agricultural area – yet emit 25% of the EU's annual emissions from agricultural land [3].

WHAT CAN THE NRL ACHIEVE?

- The restoration of peatland and wetland Annex I habitats under Article 4 could achieve additional net GHG mitigation benefits between 7.8 and 22.8 million tCO2eq/year to 2030 and between 26.7 and 62.9 MtCO2eq/year to 2050 [4]. The technical mitigation potential of rewetting and restoring all EU peatlands is much larger – it is estimated at about 185 MtCO2eq/year, on average for the 2020-2050 period [5].
- Rewetting 35% of the total area of agriculturally used peatlands in the EU under Article 9.4 will **reduce their total emissions by 25% (around 45 Mt CO_2eq)** [6].

WHAT WOULD HAPPEN WITH NO RESTORATION?

The IPCC estimate that if no rewetting is done, emissions from peatland would take up 12-42% of the global emission budget needed to keep warming below 1.5-2°C [7].

Keava raba, Ohekatku, Rapla County, Estonia, Photo by Single.Earth

Agroecosystems

Restoring agroecosystems can re-establish their natural carbon cycling and storage capacities - thereby achieving climate mitigation benefits through avoiding some current emissions and enhancing carbon sinks.

WHAT CAN THE NRL ACHIEVE?

- Increasing soil organic carbon stocks on arable land in the EU under Article 9.2(b) could achieve **an additional sequestration of 50.48 million tCO2eq/year** [8].
- The economically feasible carbon sequestration potential of EU27 agricultural soils is at least **20 million tCO2eq/year**, whilst the maximum technically achievable carbon sequestration potential could be 200 million tCO2eq/year [9].

WHAT WOULD HAPPEN WITH NO RESTORATION?

Under a business-as-usual scenario, soil organic carbon (SOC) is predicted to increase between 12.8 and 13.9-14.1 Gt in cropland by 2050, and from 6.7 to 8.9-9.4 Gt in pastures [5]. This is much less than what can be achieved through restoration.

Forests

Forests are the largest carbon sink in the EU, sequestering around one tenth of Europe's gross CO2 emissions in 2020 [10]. They have the highest sequestration rate of any terrestrial habitat [2]. Their natural capacities, however, are decreasing, and forests have started to become net sources of emissions in many EU member states, due to increased harvesting, climate change, forest fires, and pest damage [11-12]. The nature restoration law proposal also requires no further degradation of existing forest habitats important for biodiversity (Annex I habitats), which includes old growth forests. **Restoring, re-establishing, and adapting forest habitats to climate change can significantly contribute to climate mitigation by increasing the forest carbon sink and avoiding emissions.**

WHAT CAN THE NRL ACHIEVE?

Restoring forests and making forests more resilient to climate change is estimated to have an **additional mitigation potential in the order of 90 to 180 million tCO_2/year by 2040** [13]. Recent studies estimate significantly larger **potentials of up to 440 million tCO_2eq/year**, which could double the climate mitigation potential of forests by 2050 [4].

Eibsee, Grainau, Germany, Photo by Daniel Seßler

WHAT WOULD HAPPEN WITH NO RESTORATION?

Without restoration, forests' carbon storage potential may decline by 180 million tCO_2eq annually from 2021-2030, reducing the sink by more than 50% [14]. Many forests are already becoming net sources of emissions and this risk will increase as climate change increases the risks of forest disasters and as the intensity of forest management increases.

Not all nature restoration will increase or safeguard carbon – sometimes saving biodiversity means losing carbon but increasing long-term habitat resilience.

- On heaths, scrub habitats, and grasslands, actions that increase carbon and biomass – planting trees or adding nutrients or letting the habitats get overgrown - can destroy their biodiversity value.
- Restoration actions may remove carbon by cutting down trees planted on peat bogs or heaths, clearing overgrowth on abandoned grasslands, or cutting away over-fertile soil and vegetation.
- Restoration can prevent or minimize fire risk in these habitats, which can avoid significant emissions in future.

Peatland restoration reduces emissions and global warming potential of restored sites

The LIFE PEAT RESTORE project contributed to rewetting degraded peatlands to restore their function as carbon sinks in five EU countries around the Baltic Sea (Germany, Poland, Lithuania, Latvia, and Estonia) on an area of 5,300 hectares. The preliminary results in 2021 showed that the peatland management and restoration actions support CO_2 uptake or reduction of CO_2 emissions and has shown first steps of recovery towards functional peatland ecosystems.

It is estimated that around **30% of the global warming potential of all sites was reduced**, amounting to 14,500 tons CO_2eq/year [15].

Viru bog, Kolga, Harju County, Estonia, Photo by Jaanus Jagomägi

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