

## Need for seeds: securing a safe supply chain for successful nature restoration

This Policy Brief is part of a series aiming to inform policymakers involved in the implementation of the EU Nature Restoration Regulation (NRR) with science-based policy recommendations building on the expertise of the BiodivRestore Knowledge Hub members. This brief may also support any stakeholders involved in the implementation of the NRR.

This publication emerged from the BiodivRestore Knowledge Hub, was funded and supervised by Biodiversa+, and produced by Robin Goffaux, Cloé Durieux and Julie de Bouville.

The key research results presented were co-drafted and validated by a researcher from the BiodivRestore Knowledge Hub: Katalin Török - PhD, as well as external contributors: Balázs Deák - DSc, Orsolya Valkó - DSc.

### The BiodivRestore Knowledge Hub

In October 2020, BiodivERsA and Water JPI launched the BiodivRestore ERANET COFUND to support research on conservation and restoration of degraded ecosystems and their biodiversity, including a focus on aquatic systems, co-funded by the European Commission under Horizon 2020. Building on its success and the funding of [22 research projects](#), BiodivRestore partners established a pan-European Knowledge Hub on Nature Restoration.

The [BiodivRestore Knowledge Hub \(KH\)](#) was launched in May 2024 to strengthen the science-policy interface for the implementation of the EU Nature Restoration Regulation (NRR). Bringing together 50 experts across Europe, the KH provides a coordinated platform to synthesise knowledge, inform national restoration planning, and support evidence-based decision-making. Its activities are structured around two task forces focused on implementation and research & innovation.

### Footnotes

1. Regulation (EU) 2024/1991 of the European Parliament and of the Council of 24 June 2024 on nature restoration, and amending Regulation (EU) 2022/869.
2. <https://onlinelibrary.wiley.com/doi/10.1111/rec.12381>
3. **Table 2:** Guidance to build a roadmap for native seed supply from planning to planting

Step of the seed supply chain	Activities and important points	Resources
Planning	<ul style="list-style-type: none"><li>• This step has to be anticipated 3 to 4 years before implementation</li><li>• Evaluation of the state of the restoration area</li><li>• Identification of a reference community</li></ul>	Use Seed Transfer Zones, if not developed yet, <a href="#">biogeographical or eco-regions can be applied</a>

	<ul style="list-style-type: none"> <li>• Estimate of the needs for restoration material</li> <li>• Plan specialized courses, internships, and field experiences to train personnel.</li> <li>• Engage research institutions, universities, networks, and associations.</li> </ul>	
<b>Collection</b>	<ul style="list-style-type: none"> <li>• First areas to be restored can act as a seed source in the future</li> <li>• Do not impact seed sources areas (collect &lt;20% of all seeds in the area, not every year)</li> <li>• Correct storage and transportation of seeds to avoid overheating or excessive moisture</li> </ul>	<a href="#">Manual for native seed collection by European Native Seed Conservation Network</a>
<b>Propagation</b>	<ul style="list-style-type: none"> <li>• Collected native seeds can be put in production to increase the quantity and/or install a living collection of target species for restoration use</li> <li>• Seed multiplication techniques should preserve genetic diversity in wild species</li> </ul>	<a href="#">International Standards for Native Seeds in Ecological Restoration</a>  <a href="#">ENSPA Code of Conduct</a>
<b>Selection of target species for preservation mixtures</b>	<ul style="list-style-type: none"> <li>• Selection of species for habitat restoration should be typical to the given target habitat type and consider pollinators requirements</li> <li>• Mixtures should not contain any alien species and generalist species should not exceed in 20% in total</li> <li>• Provenance should be clearly indicated</li> </ul>	To identify a given habitat, a <a href="#">three level ecosystem typology</a> can be used. However, even level 3 of the typology might be too broad for restoration purposes; the <a href="#">European Vegetation classification system</a> is suggested to help find the relevant origin and target habitat for species introductions.
<b>Cleaning and storage</b>	<ul style="list-style-type: none"> <li>• Cleaning of the seed material from dispersal organs for adapted machine seeding</li> <li>• Cleaning of the seed material for the accurate estimation of the propagule numbers and calculation of requested seed amount</li> </ul>	A <a href="#">detailed decision tree on cleaning</a>
<b>Testing, certification</b>	<ul style="list-style-type: none"> <li>• Verification of seed purity and viability % for each seed lot</li> <li>• Establishment of native seed certification programmes</li> </ul>	<a href="#">Seed testing procedure</a> ; Models of native seed certification programmes <a href="#">here</a> or <a href="#">here</a>
<b>Seed enhancement treatments and technologies</b>	<ul style="list-style-type: none"> <li>• Seed treatment to break seed dormancy</li> <li>• Enhancement of seed quality, like seed coating and priming to promote germination or protects seeds from pathogens or help even distribution of seeds</li> </ul>	A <a href="#">decision tree for identifying seed dormancy</a>
<b>Seeding and planting</b>	<ul style="list-style-type: none"> <li>• Designing a seeding plan to optimise germination environment for seeds and involve potential mitigation options for unexpected difficulties</li> </ul>	