Forest restoration risks large-scale failure if tree seed supply is not addressed as priority

According to a survey of 139 forest restoration projects worldwide, 35% of restoration practitioners often end up restoring the same site again, 47% experience increased costs and 41% experience delays with their projects simply because of difficulty obtaining suitable tree seed and seedlings. Unless action is taken to improve access to and increase the use of suitable planting material, many restoration efforts are likely to fall short in restoring resilient, productive ecosystems that have the capacity to adapt to environmental change and effectively mitigate climate change through sustained biomass growth.

What prevents restoration practitioners from using fit-for-purpose seed?

Seed supply for restoration purposes is largely underdeveloped. Seventy-eight percent of the respondents surveyed had often experienced problems in obtaining suitable tree seed from markets, due to, among other factors, an overall lack of seed (54% of projects) and a shortage of seed of preferred (58%) and known (50%) provenance or origin.

In the majority of the projects, the project staff collected at least part of the seed on their own, possibly due to the lack of availability of seed in markets. Most commonly, seed was collected from natural forests (81%), often from forests close to the restoration site (51%). Contrary to the common belief, seed from nearby forests is typically not superiorly adapted to the restoration site, especially as climate change progresses. Furthermore, forests remaining in target landscapes for restoration are likely to have suffered from degradation and habitat fragmentation, which reduces their viability and suitability as seed sources (reported by 40% of respondents). Seed sources should not be selected simply based on their proximity to the restoration site, as this can clearly compromise seed quality and therefore effective restoration.
Improving the availability of suitable seed is not the only challenge for ensuring successful restoration. There is an alarming lack of capacity and seed selection criteria at the project level. For example, only 56% of the surveyed projects used any criteria to ensure the genetic diversity of seed obtained, such as specifying a minimum number of seed trees or a minimum distance between seed trees, and as few as 29% of projects reportedly avoided degraded or fragmented seed sources that yield seed of low viability.

**How can we improve restoration success through better planting material?**

Gaps in seed supply and strategies to address them can effectively be identified only if analyzed beyond the project-level. Therefore, it is important to carry out national assessments of seed demand and supply for meeting restoration targets. Restoration targets and funding cycles also need reviewing to ensure that quality is not compromised. Overly ambitious forest landscape restoration targets and short funding cycles can result in selecting species and seed sources based on what is readily available, rather than what best meets project objectives.

Few countries currently have regulations on tree seed markets. Useful regulations include the accreditation of seed sources and nurseries that meet quality standards. Local entrepreneurs, non-governmental and community-based organizations can benefit from job and income opportunities associated with seed production, but need support to achieve accreditation and to access seed markets.