RESTORATION STARTS IN THE NURSERY:

Why stronger native tree nurseries matter for credible restoration

The Challenge

Across East Africa, commitments to restore degraded landscapes increasingly emphasize native trees. Yet implementation is lagging behind ambition. The supply of high-quality native tree seeds and seedlings remains limited, nursery systems are often under-resourced, and markets for native planting material are weak and fragmented. As a result, restoration programmes frequently struggle to source the right species, in the right quantities, at the right quality.

This is not a marginal technical issue. It is a strategic bottleneck for restoration finance, climate outcomes, biodiversity recovery, and rural livelihoods. Without stronger native tree nursery systems, countries risk falling short of restoration targets, while donors and investors face lower survival rates, weaker ecological outcomes, and poorer returns on planting investments.

This brief argues that improved native tree nurseries are a practical and investable entry point for strengthening restoration efforts in East Africa, with wider relevance across Sub-Saharan Africa. Drawing on evidence from Ethiopia, Kenya, Uganda, and Rwanda, it outlines why native trees and seedling quality matter, where the major supply-side constraints lie, and what governments, donors, and private actors can do to build more reliable, resilient, and scalable nursery systems.

» Key message

- Restoration targets in East Africa are unlikely to be met credibly without a stronger supply of high-quality native tree seedlings.
- Native tree species are essential for biodiversity recovery, ecosystem resilience, and long-term restoration performance, but they remain under-supplied relative to policy ambition.
- Nursery systems are a major bottleneck. Across the region, weak seed supply, limited technical capacity, poor quality assurance, fragmented markets, and underdeveloped business models continue to constrain the production.
- Investing in seedling quality improves survival, reduces restocking and maintenance costs, and increases the long-term impact of restoration spending.
- Governments, donors, and the private sector should treat native tree nurseries as strategic restoration infrastructure and support them through procurement reform, technical assistance, seed-system development, and longer-term finance aligned with native seedling production cycles.

Within **The Right Tree in the Right Place for the Right Purpose – Seed** project (RTRP-Seed), funded by the German International Climate Initiative (IKI), unique land use GmbH is developing practical business and delivery models for high-quality and prioritised native planting material.

Why native trees and quality seedlings matter

Native tree species are central to restoration efforts that aim not only to increase tree cover, but to recover ecosystem function, biodiversity, and long-term landscape resilience. As they are adapted to local ecological conditions, native trees are better aligned with restoration approaches that seek to re-establish the structure, composition, and functions of native ecosystems. They can support habitat provision, ecological interactions, and connectivity across fragmented landscapes, while also delivering services that matter to local communities, including food, medicine, firewood, livestock feed, soil improvement, water regulation, and carbon sequestration.

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Yet, restoration outcomes depend not simply on planting native species, but on using them appropriately: species choice, successional dynamics, and site conditions matter. Native trees are thus essential for effective restoration, but only when the right species are planted in the right places and successfully established.

Seedling quality is one of the strongest determinants of whether restoration investments succeed or fail. Many nurseries in East Africa claim to produce high-quality seedlings, and many planting initiatives state that they use only good-quality planting material. In practice, this is often not the case, especially for native tree seedlings. The shortage of quality seed and seedlings remains a major constraint to afforestation, reforestation, agroforestry, and restoration activities. Poor-quality seedlings are less likely to survive and grow well after planting, particularly under degraded or water-stressed conditions. This increases replanting needs, raises maintenance costs, and weakens the ecological and financial performance of restoration programmes. By contrast, high-quality seedlings establish more quickly, survive at higher rates, and improve the efficiency and durability of restoration investments.

High-quality seedlings

- Are sourced from appropriate seed, develop strong root systems and sturdy stems.
- Show low susceptibility to pests and diseases.
- Are properly hardened off before planting.
- Their performance is shaped by seed sourcing, growing media, container choice, watering, shade, spacing, and nursery hygiene.

Seedling quality depends on both genetic and physical characteristics, shaped by the nursery system in which seedlings are produced. Traditional nursery systems often struggle to provide these conditions consistently, especially for native species, where production protocols may be less established and technical knowledge more limited. These are not marginal technical flaws: they directly affect survival rates, planting success, and the return on restoration spending. Improving seedling quality should therefore be treated not as a technical add-on, but as a core requirement for credible, scalable, and cost-effective restoration.

Common practices that undermine quality

- Seeds are often collected opportunistically rather than from selected mother trees.
- Nursery infrastructure and management are frequently weak, while staff may have limited technical training.
- Plastic bags remain widely used despite their tendency to cause root deformities, and growing media are often unsustainable or poorly suited to seedling development.
- Uneven spacing, poor pricking-out practices, and inadequate hardening-off further reduce seedling performance.

Relationship between seedling quality and post-planting survival

Figure 1: Conceptual line graph illustrating that improved seedling quality can increase seedling survival and growth after out-planting

Investing in high-quality seedlings is a cost-effective strategy

- Ecologically, better seedlings are more likely to survive, establish quickly, and contribute sooner to canopy development, erosion control, and habitat recovery.
- Economically, they reduce the number of seedlings required to compensate for high mortality, lower weeding and maintenance costs, and improve the long-term value of tree-planting efforts.
- For nursery businesses, stronger quality systems can also support more reliable demand, better client relationships, and improved business viability.

Why tree nurseries are a critical bottleneck

A major reason why rising demand is not translating into reliable supply is that seed sourcing and nursery operations remain weak. Across East Africa, restoration targets are increasing, but nursery systems are often not equipped to produce the quantity, quality, and diversity of native planting material required. The result is a persistent mismatch between policy ambition and delivery on the ground.

This challenge is not only technical. Nursery businesses, particularly in the Global South, often face barriers to the markets, tools, knowledge, and finance needed to support quality seedling production systems. For native trees, these constraints are even greater, as production protocols are often less established, demand is less predictable, and production cycles may be longer or more variable than for commonly grown exotics.
Without stronger enabling conditions, nurseries face high risks in committing to unfamiliar species, improved inputs, or more skilled labour.

In practice, nursery performance depends on both infrastructure and management. However, infrastructure alone is not enough. Seedling quality is ultimately shaped by day-to-day management, including sorting, spacing, watering, hardening-off, supervision, and the ability of staff to respond to pests, diseases, and species-specific needs. Weak systems in any of these areas reduce plant quality and undermine restoration outcomes.

A further challenge is the limited use of monitoring and feedback to improve nursery performance over time. In many cases, production is not guided by clear plans, routine record-keeping, or systematic tracking of germination, sorting rates, spacing needs, and losses to pests or disease. Monitoring often ends when seedlings leave the nursery, even though feedback from planting sites on survival and early growth is essential for improving species choice, stock type, and production practices. Without these learning loops, native tree production remains ad hoc and difficult to scale.

Improvements through well desinged nurseries

- Plant hygiene and root development
- Spacing, production consistency, and operational efficiency
- Seedling survival and establishment after planting
- Restoration outcomes such as canopy development, erosion control, and habitat recovery
- Monitoring, forecasting, and the matching of seedling supply to planting

Nursery systems are also held back by weak business foundations. Without reliable demand and secure offtake, nursery operators face prohibitive financial risk in investing in improved infrastructure, higher-quality inputs, or the skilled labour that native species production requires. Production costs are often not systematically tracked, which makes it harder for operators to price seedlings accurately, demonstrate viability, or make a credible case for investment. In this context, strengthening nurseries means not only improving production systems, but also reducing commercial risk and creating clearer incentives for quality.

What needs to change?

Improving nursery systems for native tree species requires coordinated action across production, monitoring, and business development. There is no single blueprint for a best-practice nursery: design choices depend on local conditions, species requirements, labour capacity, available materials, budget, and market demand. However, experience from commercial forestry nurseries offers practical lessons that can be adapted to strengthen native tree production.

At the production level, nurseries need infrastructure and management systems that support consistent seedling quality. This may include raised tables, reusable tubes and trays, shade net houses, reliable water systems, and basic irrigation automation. Substrates should be adapted to species needs using locally available and sustainable materials where possible, while shade and irrigation management should support proper hardening-off before planting. Additionally, continuous sorting, timely spacing, routine supervision, and stronger staff skills are essential to ensure that infrastructure translates into better plant quality rather than simply greater output.

Monitoring systems also need to improve. A clear production plan, combined with routine tracking of species performance across key production stages, can help nursery managers identify bottlenecks, refine practices, and improve forecasting. Record-keeping on germination, sorting rates, spacing requirements, and pest or disease issues provides the evidence needed to strengthen production in subsequent cycles and better match seedling supply to planting needs. Monitoring should also extend beyond nursery dispatch, with survival and early growth data from planting sites used to improve future production decisions and reinforce the principle of planting the right tree in the right place.

Business models must also be strengthened if nurseries are to invest in native species production with confidence. Pre-purchase agreements and split-payment arrangements, where part of the production cost is covered at the beginning of the cycle, can reduce financial exposure without increasing total costs to buyers. Longer-term offtake agreements can further improve planning and allow nurseries to offer more competitive pricing. Financial transparency is equally important: operators need better cost tracking and business metrics to understand what investment is required, what prices to charge, and over what timeframe returns can be expected.

Finally, nursery improvement depends on people as much as infrastructure. **Building local technical capacity**, improving working conditions, and supporting a stable and skilled workforce are essential to maintaining production quality over time. Demonstration nurseries and locally rooted training models can help build in-country expertise and provide practical examples that can be adapted more widely. Strengthening nursery systems means treating them not as a temporary project input, but as a core part of restoration delivery systems.

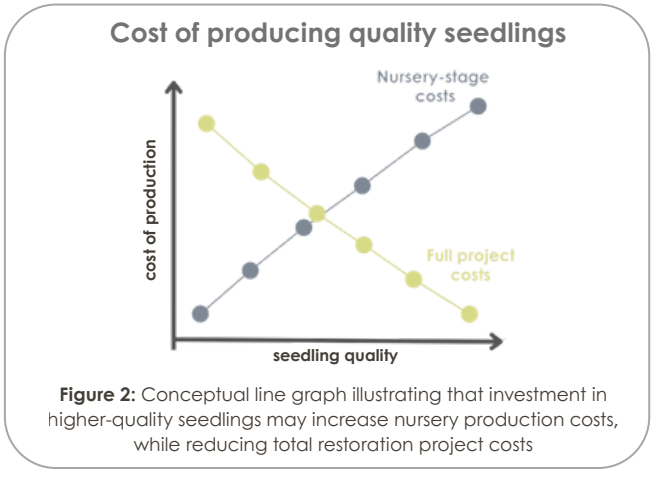

Figure 2: Conceptual line graph illustrating that investment in higher-quality seedlings may increase nursery production costs, while reducing total restoration project costs

Priority actions for governments, donors and the private sector

For governments

- Integrate seedling quality into restoration targets and procurement systems, not just planting numbers.
- Support national and subnational seed systems for native species, including source identification, seed stands, and quality assurance.
- Develop or strengthen nursery accreditation and quality standards for restoration planting material.
- Create enabling conditions for private nursery investment through clearer procurement pipelines and multi-season planning.

For donors

- Fund nursery systems as core restoration infrastructure, not as a peripheral input.
- Support long-term technical assistance for native species production, species-site matching, and nursery management.
- Use financing models that reduce nursery risk, including advance purchase commitments, phased payments, and outcome-linked contracts.
- Require monitoring of survival and early growth, not just numbers planted.

For private sector and investors

- Invest in commercially viable native tree nursery models where demand can be aggregated and quality can be rewarded.
- Build long-term offtake agreements with restoration programmes, carbon projects, and certified value chains.
- Invest upstream in seed sourcing and traceability, not only in nursery infrastructure.
- Support demonstration nurseries and partnerships to reduce technical uncertainty and demonstrate business viability.

Conclusion

East Africa's restoration ambitions will not be met by planting targets alone. Sucessful restoration depends on the availability of the right planting material: high-quality native tree seedlings matched to local ecological and livelihood needs. At present, that supply remains too limited, too fragmented, and too weakly supported.

Improving native tree nurseries is not a narrow technical concern. It is a strategic investment in biodiversity, climate resilience, rural livelihoods, and the effectiveness of restoration finance. Governments, donors, and private actors each have a role to play in building nursery systems that can deliver quality at scale. If restoration is to succeed, it must start in the nursery.

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Contact:
unique land use GmbH
Schnewlinstrasse 10
79098 Freiburg, Germany
+49 761 208534-0
unique@unique-landuse.de

unique land use

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Country insights

The four country cases below show a common regional pattern: restoration ambition is rising, but the systems needed to supply high-quality native planting material are still underdeveloped. While market structures differ, all four countries face some combination of weak seed supply, fragmented nursery production, limited quality assurance, and distorted incentives.

Ethiopia

Market signal

Ethiopia has a very large seedling market, with annual demand estimated at approximately 7.5 billion seedlings, of which about 20% (1.5 billion) are native species. Production is highly decentralised and dominated by smallholder farmers, who account for about 90% of all nurseries. Meanwhile, under a business-as-usual scenario, the share of native forest is projected to fall from about 75% of total forest area to about 50% by 2033, even as overall forest area increases through expansion of exotic species.

Demand drivers

Demand is driven by ambitious national restoration and forest targets. Ethiopia aims to increase forest cover from 17% in 2020 to 30% by 2030, while NDC 3.0 targets an expansion of natural forest from 3.8 million to 7.2 million hectares between 2025 and 2035. These goals are supported by national policy frameworks and by restoration programmes financed largely by international partners and implemented through regional and local actors.

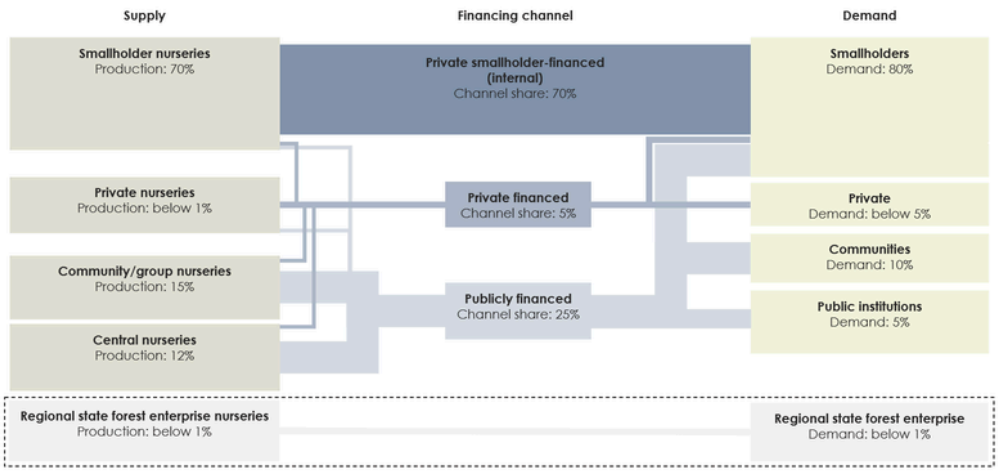
Main constraints

The supply system remains heavily dependent on public and smallholder channels, while privately financed production is limited. Publicly financed projects account for about 25% of total supply, but privately financed production contributes only 5%, and private commercial nurseries account for less than 1%. Large-scale planting efforts, including the Green Legacy Initiative, have expanded seedling production, but with a strong emphasis on exotic species. Public programmes also continue to focus mainly on the quantity of seedlings and trees planted, with limited monitoring of species composition or quality.

Strategic implication

Ethiopia's restoration ambition is clear, but scaling native trees will require stronger alignment between policy goals, financing flows, and nursery supply systems. In a highly decentralised landscape, shifting from quantity-driven planting to quality-focused native restoration will depend on better coordination across public programmes, local producers, and private actors.

Figure 3: Illustrative seedling value chain assuming annual seedling demand at 7.5 billion



Source: Based on *Consultancy on a Tree Seed Sub-Sector Assessment* (Lillesø and Derero, 2019)
Note: Further input from Green Leacy Iniative (7.5 billion seedling demand per year), nursery supply study (PATSBO, 2018) and expert judgment to include private commercial nurseries based on field visit by unique in 2024

Country insights

Kenya

Market signal

Kenya's annual demand for native tree seedlings is projected at approximately 135 million units, with an estimated annual primary market value of KES 5.4 billion. This reflects the scale of the country's wider restoration agenda, including the national goal of planting 15 billion trees by 2032. As of early 2026, more than 783 million trees had been logged through the official JazaMiti tracking application.

Demand drivers

The main demand driver is the public sector, particularly the national tree-growing campaign. Additional demand comes from international NGOs, agroforestry programmes, and emerging carbon projects, which often require a more diverse range of native species. These non-state actors are helping to create more structured demand for native planting material, including in smallholder farming systems.

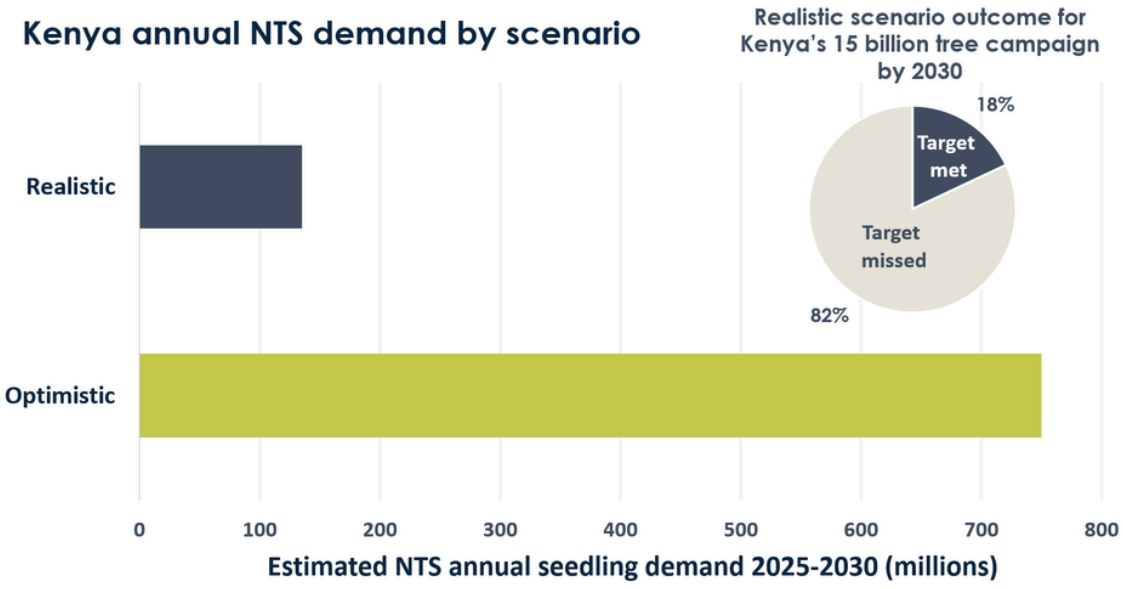
Main constraints

Despite strong demand, supply remains fragmented and constrained. Private, commercial, and community nurseries produce most planting material, but their ability to scale native tree production is limited by poor seed availability, inconsistent seed quality, uneven nursery standards, and the absence of a universally enforced certification system. Recent regulatory disruption in the seed sector and the operational effects of the plastics ban have added further pressure by raising costs and reducing net yields of sellable seedlings.

Strategic implication

Kenya has a large and growing native tree seedling market, but it remains structurally fragile. Strengthening seed supply, nursery quality assurance, and market incentives for private and community nurseries will be essential if restoration targets are to translate into reliable and high-quality native planting material at scale.

Figure 4: Bar chart and pie chart showing the estimated annual native tree species (NTS) seedling demand in Kenya (2025-2030) by scenario and the realistic scenario outcome for the 15 billion tree campaign, respectively.



Country insights

Uganda

Market signal

Uganda's native trees market shows significant potential, but actual uptake remains well below estimated demand. Based on current evidence, realistic annual demand is around 19 million seedlings, with an optimistic scenario of up to 112 million.

Demand drivers

Demand is shaped by national restoration commitments as well as public, NGO, and private-sector initiatives. Under the Bonn Challenge and AFR100, Uganda has committed to restoring 2.5 million hectares of deforested and degraded land by 2030. Public demand is currently driven mainly by the ROOTs project, while additional demand comes from NGO restoration programmes, FSC-linked private-sector activity, and emerging carbon projects.

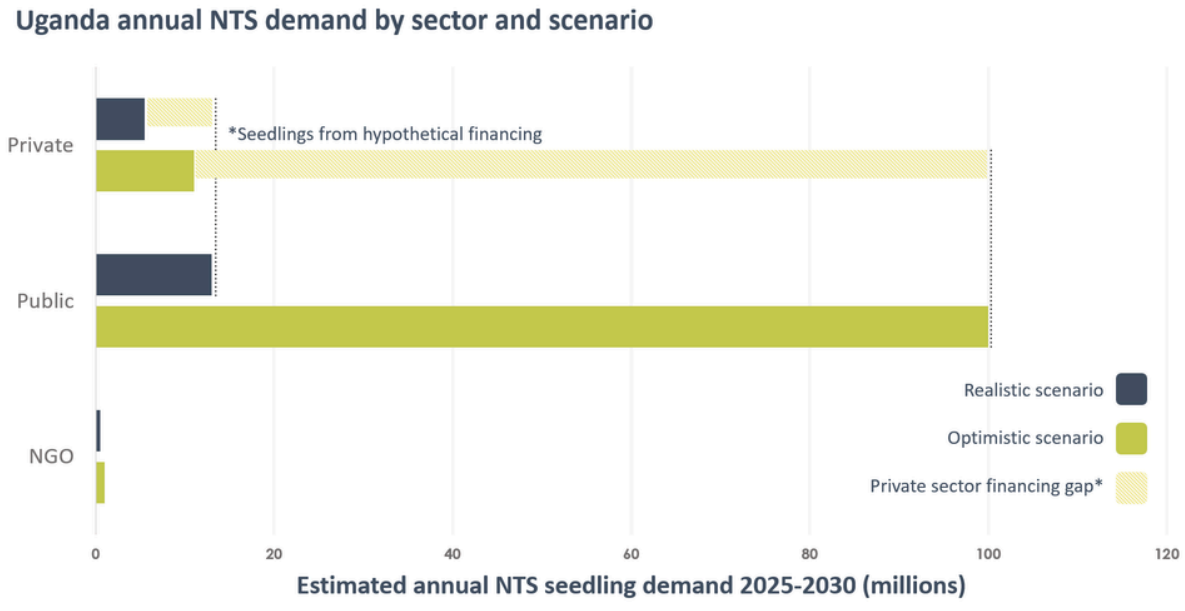
Main constraints

The supply system is active but weakly coordinated. Public nurseries cannot meet required volumes on their own, while private nurseries are reluctant to produce native tree seedlings without bankable orders. The market is further constrained by weak procurement signals, fragmented NGO nursery models, limited seed availability, and persistent quality challenges. Farmer preferences for eucalyptus and fruit trees, together with free seedling distribution, also weaken price signals and reduce incentives to invest in quality.

Strategic implication

Uganda's central challenge is not the absence of demand, but the gap between restoration ambition and effective market uptake. Closing this gap will require more reliable procurement, stronger quality assurance, and clearer commercial incentives for private nurseries. There is also scope for NGOs and private actors to play a stronger market-shaping role through better coordination, survival tracking, and more predictable sourcing models.

Figure 5: Bar chart showing Uganda's estimated annual native tree species (NTS) seedling demand (2025-2030) by sector and future scenario, and the private sector native tree financing & seedling gap.



Country insights

Rwanda

Market signal

Rwanda's annual demand for native tree species seedlings is projected at 80 million seedlings from 2025–2030 under a realistic scenario. At an estimated average price of approximately RWF 70 per seedling, this represents a cumulative market value of roughly RWF 28 billion. National planting targets remain high, with more than 60 million trees targeted for 2025–2026.

Demand drivers

Demand is driven primarily by public restoration commitments and donor-supported programmes. Rwanda has pledged to restore 2 million hectares of deforested and degraded land and has already reached 30.4% forest cover nationally. State-led planting campaigns remain the main driver of volume, while international NGOs and climate-funded projects also play an important role in generating demand for tree seedlings, including native species.

Main constraints

Rwanda's seed system is centralised at the national Tree Seed Centre, but seed availability and quality remain persistent constraints. At the nursery level, supply is fragmented, largely unregulated, and dominated by small roadside operators, with significant quality-control challenges. Free seedling distribution through NGO and project-based programmes further weakens market signals, while farmer demand continues to favour fast-growing exotic species. Commercial forestry investment also remains focused mainly on exotics.

Strategic implication

Rwanda's native tree market is substantial, but its future growth depends on addressing structural weaknesses in both the seed and nursery system. More reliable seed supply, stronger nursery regulation, and better market incentives will be necessary to support a stronger commercial market for high-quality native planting material.

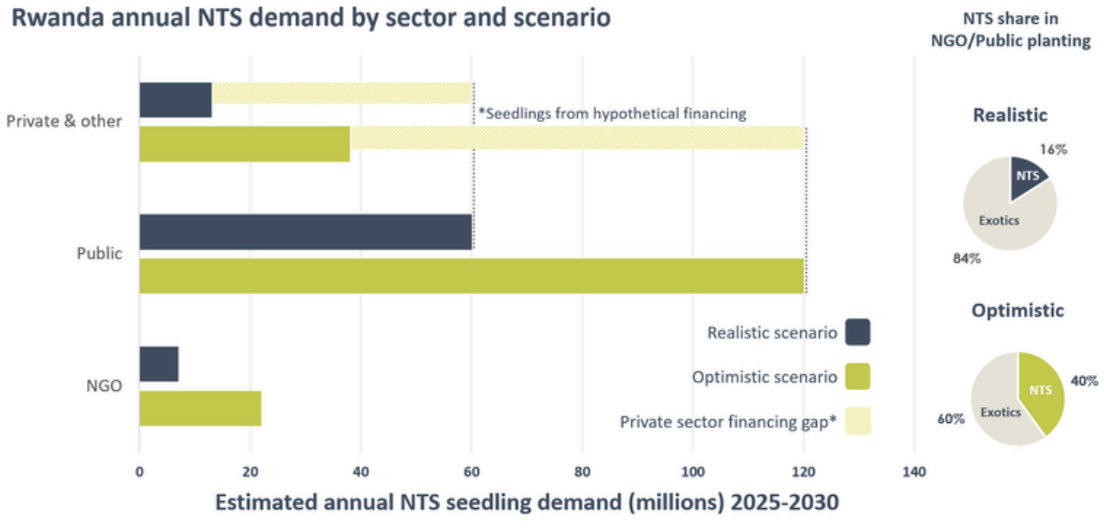



Figure 6: Bar chart and pie charts showing the estimated annual native tree species (NTS) seedling demand in Rwanda (2025-2030) by sector and future scenario, the private NTS financing & seedling gap, and the estimated NTS planting share in NGO/public planting by scenario, respectively.