Reviving Forests, Restoring Futures: A Philippine Threatened and Endemic Tree Species-Based Restoration Model in the Bac-Man Geothermal Reservation

BACKGROUND

The Bacon-Manito (BAC-MAN) Geothermal Reservation, spanning in the provinces of Albay and Sorsogon, represents a unique landscape where energy production and biodiversity conservation intersect. As one of the Philippines' key geothermal power sources, the area is equally significant as a Key Biodiversity Area (KBA), harboring a rich assemblage of endemic and threatened flora and fauna. However, like many forest landscapes across the country, BAC-MAN has experienced decades of ecological degradation driven by timber poaching, agricultural encroachment, and unsustainable land-use practices. These pressures have not only reduced forest cover but also weakened ecosystem services critical to downstream communities, including water regulation, climate buffering, and biodiversity conservation.

While the Philippine government has made substantial strides through the National Greening Program (NGP), restoration efforts have often been constrained by the limited availability of native planting materials and a historical reliance on fast-growing exotic species. Moreover, private sector participation in forest restoration has traditionally been limited to short-term tree planting initiatives, lacking sustained engagement and long-term ecological focus.

This project, launched in 2023, is a collaborative initiative (involving Energy Development Cooperation, AFoCO, the Department of Environment and Natural Resources, the Forest Management Bureau, and local groups) designed to tackle forest restoration gaps in the Philippines. Its core goals are to restore 100 hectares of degraded land using native Philippine trees, establish a 2-hectare arboretum, and develop propagation methods and policy advice. The initiative emphasizes a science-based, community-driven, and public-private partnership model to strengthen national reforestation efforts.

Key Messages

1. **Restoring Forests through Native Biodiversity**: The project highlights the importance of restoring forests with native and threatened tree species (PTES), strengthening biodiversity conservation, enhancing ecosystem resilience, and addressing gaps in conventional reforestation approaches.
2. **Demonstrating Effective Public–Private Partnerships**: The collaboration among EDC, DENR, FMB, AFoCO, and local communities demonstrates how Public–Private Partnerships (PPP) can effectively mobilize resources, expertise, and shared responsibilities to scale up forest restoration.
3. **Strengthening Science-Based and Community-Led Restoration**: By integrating scientific research, technology, traditional knowledge, and community participation, the project enhances restoration practices through evidence-based decision-making, local capacity building, and sustainable livelihood opportunities, ensuring long-term ecological and social benefits.

Figure 1. From perspective to reality: The perspective design of the AFoCO/040/2023 project's arboretum (Upper), and the photo of the project's constructed and functioning arboretum (Lower) .
Source: Annual Report 2024 (Upper) and EDC 2026 (Lower).

IMPACTS

Restoring Ecosystems and Enhancing Climate Resilience

The project successfully restored 100 hectares of degraded forestland by planting approximately 62,500 native, threatened, and endemic tree seedlings representing more than 20 species. These efforts strengthen biodiversity, restore forest ecosystems, and improve habitat connectivity. With high seedling survival rates (89–94.8%), the restored forests are projected to sequester approximately 1,711 tons of CO_2e annually at maturity, demonstrating the project's contribution to climate change mitigation through effective, science-based forest restoration.

Safeguarding Biodiversity through Native Species Conservation

A defining feature of the project is its focus on PTES. By prioritizing these species, the initiative directly addresses the risk of biodiversity loss and contributes to the conservation of genetically important and ecologically valuable tree populations.

The establishment of a 2-hectare arboretum serves as both a conservation and educational platform, showcasing native species and providing a living repository for research, awareness, and demonstration. Increasing visitor engagement from local communities to academic institutions reflects rising interest in biodiversity conservation and highlights the potential of such sites as hubs for environmental education and advocacy, further strengthened through structured programs like guided tours, workshops, and citizen science initiatives.

Advancing Knowledge, Innovation, and Replicability

Through systematic research and field trials, at least 15 propagation protocols for PTES have been developed, addressing one of the critical bottlenecks in scaling native species-based restoration. These protocols, combined with a comprehensive biodiversity database and the publication of reference materials, provide a valuable knowledge base for practitioners, policymakers, and researchers. Where publicly accessible, these propagation protocols and related knowledge products may be made available through the BINHI platform, further enhancing transparency, knowledge sharing, and replication potential. Importantly, the project emphasizes documentation and knowledge sharing, ensuring that lessons learned are not confined to the project site but are accessible for replication across other regions.

Figure 2. The seedlings propagated and planted in the 100-hectare project sites.
Source: Annual Report 2024

Figure 3. Aerial View of arboretum established under the AFoCO/040/2023.
Source: 2025 Annual Report

Strengthening Forest Governance, Protection Systems, and Policy Influence

Beyond The project strengthened forest governance by implementing a Forest Protection Plan, deploying forest patrollers and Wildlife Enforcement Officers, and establishing regular monitoring and evaluation systems. These measures enhanced protection against illegal activities, improved accountability, and supported adaptive forest management for long-term sustainability.
The project promoted policy development and institutional learning through multi-stakeholder consultations and collaborative workshops. It generated key recommendations to integrate Priority Threatened and Endemic Species (PTES) into restoration initiatives and strengthen Public–Private Partnerships (PPP), supporting stronger forestry policies, technical guidelines, and the scaling up of successful restoration approaches.

Empowering Communities and Building Local Capacity

The success of the project is deeply rooted in its engagement with local communities, particularly the Alliance of Bacman Farmers Association, Inc. (ALBAFAI).

Through training, capacity-building activities, and active participation in restoration and monitoring efforts, community members have transitioned from passive beneficiaries to active stewards of forest resources.

This empowerment has not only enhanced local technical capacity but also fostered a sense of ownership and responsibility toward the restored landscapes. By linking restoration activities with potential livelihood opportunities such as nursery development and agroforestry, the project contributes to reducing dependence on unsustainable practices for livelihood and strengthening socio-economic resilience.

FUTURE OPPORTUNITIES

Building on its demonstrated achievements, the project presents a compelling opportunity to transition from a site-level intervention to a nationally influential model that shapes restoration practice, policy, and investment frameworks, while also expanding its physical footprint and knowledge contributions.

Mainstreaming PTES-Based Restoration in National Programs

The success of the PTES-based approach provides a strong foundation for its integration into the National Greening Program and other large-scale restoration initiatives. Institutional adoption of this model can significantly enhance biodiversity outcomes by shifting restoration practices toward ecologically appropriate, native species-based systems.

Advancing Policy Reform and Institutional Integration

A key opportunity lies in translating field-level successes into systemic change. Strategic policy recommendations include: (i) embedding PTES in national reforestation standards, protocols, and seedling procurement systems; (ii) establishing enabling policies and incentive mechanisms to scale Public-Private Partnerships as long-term financing and implementation vehicles; and (iii) integrating science-based monitoring frameworks, including biodiversity and survival indicators, into national forestry reporting systems. Collectively, these measures can institutionalize innovation, improve accountability, and ensure sustainability of restoration investments.

Figure 4. On-site community organizing and training conducted by the Project.
Source: Annual Report 2024

Figure 5. Maintenance activity of local community in the Cabacongan Restoration Site.
Source: Annual Report 2025

Unlocking Sustainable Financing and Private Sector Engagement

The project highlights the untapped potential of private sector participation in restoration. Expanding innovative financing mechanisms such as blended finance models, corporate sustainability investments, and results-based approaches can mobilize long-term resources and reduce reliance on public funding.

Strengthening Community-Based Green Economies

There is significant scope to scale forest-based livelihood opportunities that align conservation with economic development. Supporting enterprises such as native species nurseries, agroforestry systems, and high-value non-timber forest products can enhance local incomes while reinforcing stewardship of restored landscapes.

Positioning Restoration Sites as Knowledge and Learning Hubs

The project provides opportunities to expand the arboretum into a larger center for research, environmental education, and ecotourism.

With adjacent land available within the BAC-MAN Reservation and support from future partnerships, the arboretum can be scaled up as a national model for conservation, knowledge sharing, and public engagement.

Figure 6. A flowering *Xanthostemun bracteatus* (locally known as *Mapilig)* observed in the Project site which is endemic in the Philippines and included as Vulnerable in the IUCN list..
Source: Annual Report 2025

Figure 7. A propagation trials of *Xanthostemun bracteatus* conducted in the Project's established arboretum..
Source: Annual Report 2025

THE WAY FORWARD

Moving forward, the project will prioritize consolidating its achievements through targeted and strategic actions that ensure sustainability, scalability, and lasting institutional impact. Emphasis will be placed on embedding successful approaches within national systems while strengthening the foundations for long-term resilience.

Maintaining the ecological integrity of restored areas will remain paramount. This will require sustained investment in site maintenance, appropriate silvicultural interventions, and reinforced forest protection systems. Equally important is the continued engagement of local communities as active stewards, ensuring that restoration gains are protected, nurtured, and allowed to mature into resilient forest ecosystems.

A key priority will be the translation of field-based experiences into practical, policy-relevant outputs. The finalization and broad dissemination of policy briefs, and evidence-based knowledge products will support informed decision-making, facilitate replication, and promote the large-scale adoption of PTES-based restoration approaches, particularly within programs such as the National Greening Program.

Sustained impact will depend on strong human and institutional capacity. The project will continue to invest in enhancing the technical and organizational competencies of local communities, forestry practitioners, and partner institutions. Strengthening skills in native species propagation, restoration practices, and monitoring systems will be essential to ensuring continuity and effectiveness beyond the project lifecycle.

Figure 8. Presentation of the policy brief focusing on PPP in forest restoration and mainstreaming PTES.
Source: Annual Report 2025

Figure 9. The Khayah International conducted educational tour in the AFoCO/040/2023 project sites.
Source: Annual Report 2025

Figure 10. The AFoCO Secretariat project monitoring in one of the project sites of AFoCO/040/2023 project.
Source: Annual Report 2024

Building on its successful collaborative model, the project will focus on formalizing and scaling partnerships particularly with private sector actors through strengthened Public-Private Partnerships. These partnerships will play a critical role in mobilizing resources, fostering innovation, and ensuring shared responsibility for long-term restoration outcomes.

Efforts will be directed toward replicating the project's proven methodologies across priority landscapes, while allowing for adaptive application based on local ecological and socio-economic contexts. This balanced approach will enable standardized yet flexible scaling, maximizing both efficiency and relevance.

Future interventions will further align restoration efforts with national climate commitments and local development priorities. By linking restoration with climate mitigation, adaptation strategies, and sustainable livelihood opportunities, the project will contribute to strengthening ecosystem resilience while enhancing the well-being of forest-dependent communities.

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https://afocosec.org/project/040/

This Project Impact Brief (PIB) is prepared by the Fellowship Officials (Rogelio Caramihan Gibe and Hsu Sandar Aung) serving at the AFoCO Secretariat under the Fellowship Program. Designed as a sustainability-focused brief, it highlights selected projects with strong potential for scale-up, communicates the expected impacts and added value of expansion, and recaps key achievements. It also serves as a platform to encourage engagement and collaboration among relevant experts and partners.