Gigafex

Project Tapir: Biochar Carbon Removal from Costa Rica

High-Integrity Carbon Credits from Waste Biomass

Project Tapir is a next-generation carbon removal initiative developed by Gigafex in strategic collaboration with Coopeagropal R.L., a cooperative representing hundreds of smallholder palm-oil producers in the southern region of Costa Rica. By implementing Gigafex's proprietary modular pyrolysis technology, the project transforms empty fruit bunches (EFBs)—a continuously available, non-hazardous by-product of palm-oil milling—into stable biochar for long-term carbon sequestration.

Costa Rica's strong environmental governance, combined with Coopeagropal's vertically integrated agricultural system, provides an ecosystem of predictability, transparency, and operational excellence. Through the Isometric-certified methodology, the project generates high-durability carbon credits that meet rigorous standards for scientific quality, monitoring, and environmental and social safeguards.

Beyond carbon sequestration, Project Tapir supports rural economic development, promotes regenerative farming practices, and contributes to long-term soil health, biodiversity, and climate resilience across the region.

Project Name	Project Tapir
Location	Corredores, Puntarenas, Costa Rica
Technology	Modular high-temperature pyrolysis
Feedstock	Empty fruit bunches from palm-oil milling
Annual CO_2 Removal	~6,240 tons CO_2e
Durability	200-year carbon permanence
Protocol	Isometric Biochar Production & Storage v1.1
Crediting Start	Q1/ 2026
Supply Model	Vertically integrated cooperative system

Climate Impact

At the heart of Project Tapir lies a scalable, scientifically robust carbon removal approach. During pyrolysis, biomass is heated in the absence of oxygen, converting its carbon content into biochar—an extremely stable form of. This results in long-term storage of approximately 2.1 tons of CO_2(e) per ton of biochar produced.

Project Tapir is designed to maximize net climate benefit. All emissions related to the pyrolysis process, including transport, energy consumption, equipment manufacturing, and start-up emissions, are measured and deducted from gross storage. As a result, the project achieves a net carbon removal capacity of around 6,240 tons of CO_2 annually.

Because biochar is not sold commercially and is returned entirely to farmers at no cost, the project's carbon credits are fully additional. Its removal value depends entirely on carbon revenue, ensuring buyers receive high-integrity credits that are fundamental to the project's financial viability.

Predictability and Stability of Feedstock Supply

Coopeagropal's vertically integrated operational model ensures a uniquely stable feedstock supply. From plantation management to the industrial processing of palm fruits, the cooperative and its members maintain complete control over the production chain. This eliminates the common challenges faced by agricultural carbon-removal projects, such as fluctuating biomass availability or reliance on third-party suppliers.

The cooperative provides at least 30,000 tons of EFBs per year, all of which are committed through a long-term supply agreement with Gigafex. Regular

internal transport cycles – all year round – ensure a predictable and uninterrupted flow of biomass from mill to reactor. This reliability supports consistent operating cycles and provides confidence for long-term carbon project performance. Vertical integration also ensures the feedstock remains free from market pressures, seasonal shortages, or unregulated supply chains. The result is operational continuity, low logistical risk, and a secure foundation for long-term credit issuance.

Regenerative Agriculture and Soil Enhancement

Project Tapir doesn't only remove carbon—it reinvests it into the fertility and resilience of local agricultural systems. Biochar application directly improves soil structure, enhances water retention, and increases organic carbon levels. These benefits translate into long-term improvements in soil health, crop efficiency, and climate adaptation.

In tropical agricultural environments, nutrient loss, soil compaction, and organic matter depletion are common challenges. Biochar counters these issues by improving cation exchange capacity, stabilizing nutrients, and supporting microbial biodiversity. Farmers benefit through reduced fertilizer requirements, reduced erosion, and increased yield stability across more than 100 hectares of cooperative farmland.

By transforming what was once a waste stream into a productive soil amendment, Project Tapir helps close natural resource loops and encourages sustainable regenerative practices that benefit both farmers and the environment.

Environmental Integrity & Compliance

Costa Rica is widely recognized as a global environmental leader, and Project Tapir operates in full compliance with the country's strict legal and environmental safeguards. The installation of Gigafex's pyrolysis module was approved by the National Environmental Technical Secretariat (SETENA), under Resolution SETENA-DT-ASA-1117-2025. The project aligns with major national laws protecting forests, biodiversity, and land, including:

- Forestry Law 7575 – prohibits deforestation and regulates land use.
- Biodiversity Law 7788 – mandates the protection of high-conservation-value ecosystems.
- Executive Decree 43898 – strengthens environmental evaluation and impact auditing.

Additionally, Coopeagropal's internal governance ensures adherence to best practices in environmental management, land rights, labor policy, and community engagement. The cooperative prohibits fire, restricts agrochemical use, protects forested areas, and ensures that all land used in production is legally registered and free of conflicting claims.

Social and Community Co-Benefits

Project Tapir serves as a model for inclusive climate action by creating tangible benefits for rural communities. The project strengthens local livelihoods through job creation, access to sustainable farming inputs, and training in climate-smart agricultural practices.

Coopeagropal's cooperative structure ensures that the economic benefits of the project are widely distributed among smallholder farmers, many of whom rely on palm cultivation as their primary income source. The project supports local education, enhances worker safety, promotes gender equality, and aligns with internationally recognized labor and human rights standards.

By pairing environmental innovation with social inclusion, the project contributes to balanced, resilient, and sustainable development across the region.

Monitoring & Transparency

Project Tapir uses a rigorous MRV system to ensure full transparency and accountability in credit

generation. Gigafex monitors reactor performance, flue-gas composition, feedstock characteristics, and biochar quality using digital sensors and certified laboratory testing.

The MRV system includes continuous temperature and emissions tracking, weekly sampling, monthly batch analysis, soil-impact monitoring, and annual validations by independent verification bodies. All data is securely archived for at least 10 years, supporting long-term traceability and validation for carbon credit buyers. Gigafex implements a digital MRV system: continuous reactor and emissions monitoring, weekly feedstock and biochar testing, and third-party validation under the Isometric Registry. All data are cloud-stored for at least 10 years for full audit traceability.

Why Project Tapir Credits stand out

- High-durability carbon removal method with verifiable permanence.
- Stable and predictable biomass supply due to full vertical integration.
- Strong environmental governance under Costa Rican law.
- Regenerative agriculture benefits supporting local farmers.
- Transparent MRV system using digital tools and third-party validation.
- No-deforestation, no-fire, and sustainable land management policies.
- Strong social impact and cooperative community structure.

Photo Credit: RSPO, Ernst & Young