SUMMARY OF THE PROJECT IN DESIGN * (*)

Carbono Positivo: Transformando las cadenas de valor agrícolas en sumideros de carbono

PITCH ELIGIBILITY DATE	COUNTRY(IES)
04/30/2024	Costa Rica

ALIGNED WITH COUNTRY STRATEGY?
Yes

PARTNER(S)
Poás Bioenergy

PRELIMINARY CLASSIFICATION ENVIRONMENTAL AND SOCIAL IMPACT
B (**)

TOTAL BUDGET	IDB Lab	LOCAL COUNTERPART AND COFINANCING
US 1,850,000	US 850,000	US 1,000,000

DESCRIPTION

The problem Costa Rica faces a serious challenge that demands immediate resolution: the staggering volume of pineapple and coffee wastes, totaling a daunting 8.9 million tons annually[1]. This environmental burden poses a critical threat to the country's ecological performance and economic viability. Every kilogram of coffee beans yields 2.3 kilograms of rotting fruit pulp and leachate, while a single pineapple leaves behind a staggering 5.4 kilograms of waste in the field.

The present ineffective management of biomass wastes poses a significant environmental and climate change challenge. Producers struggle to handle thousands of tons of biomass wastes, leading to various detrimental outcomes, including methane emissions, pollution from persistent organic pollutants, soil depletion, and increased pest activity. These challenges underscore the pressing need for improved waste management practices within the agricultural sector.

Agribusinesses frequently encounter a complex confluence of challenges, seemingly disparate yet profoundly interconnected. Firstly, there's the pressing issue of waste biomass management, which poses not only a significant financial burden but also a considerable environmental pain. The handling and disposal of vast quantities of agricultural waste biomass present a formidable logistical challenge for these businesses, exacerbating environmental degradation caused by improper waste management practices.

The solution Imagine a Costa Rica where pineapple and coffee wastes, are transformed from environmental burdens into sources of sustainable energy and economic growth, unlocking the potential for bioenergy production and GHG emission prevention/carbon sequestration.

Poás Bioenergy is a circular economy company that is managing problematic agricultural residues deploying carbon negative systems with the vision of transforming agricultural value chains into carbon sinks by developing and deploying groundbreaking technology that converts agricultural waste

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**The IDB categorizes all projects into one of six E/S impact categories. Category A projects are those with the most significant and mostly permanent E/S impacts, category B those that cause mostly local and short-term impacts, and category C those with minimal or no negative impacts. A fourth category, FI-1 (high risk) Financial Intermediary (FI)'s portfolio includes exposure to business activities with potential significant adverse environmental or social risks or impacts that are diverse, mostly irreversible or unprecedented, FI-2 (medium risk) FI's portfolio consists of business activities that have potential limited adverse environmental or social risks or impacts, FI-3 (low risk) FI's portfolio consists of financial exposure to business activities that predominantly have minimal or no adverse environmental and social impacts.

into harmless and valuable resources. They aim to redefine biomass residues processing by optimizing revenue generation and including the challenging high-moisture varieties. Their technology provides more revenue per ton of biomass treated by delivering the highest quality syngas and maintaining top biochar production.

Poás gasification technology takes in the problematic residual biomass and produces high energy density syngas and biochar. The syngas can be used for heat energy or run through a generator to provide cheap, reliable, clean electricity. The biochar can be added to crop soil where it works as both a carbon sequestration technology and a soil amendment that improves the health and production of crops.

Value Proposition

- Carbon Conversion Efficiency
  - Maximizes both energy and biochar output.
  - Superior Synthetic Gas: Produces gas with 5x more methane than competitors.
  - Competitive Biochar Yields: Comparable to leading pyrolizers.
- Innovative Biomass Pretreatment
  - Pioneering biomass pretreatment for vast, untapped high-moisture agricultural wastes.
- Strategically Size
  - The equipment dimensions enable decentralized processing, allowing the technology to co-locate with agricultural processing plants for enhanced scalability.

The beneficiaries Small Farmers: These producers could use the technology to manage their waste more efficiently, by processing, preventing, or recycling non-hazardous waste effectively. This could improve their environmental responsibility and compliance while lowering their operational costs related to waste disposal. Small farmers could also benefit from using biochar to improve their soil and their agricultural output and sustainability. In Costa Rica, the coffee sector alone has 26,725 producing families. By 2027 the project would aim to increase the income of 800 small-holder farmers through sharing the revenue from the carbon credits.

Agribusinesses: Agribusinesses could gain more revenue, sales, and profits from adopting sustainable waste management practices and renewable energy solutions. By cutting down on waste disposal expenses and energy costs, agribusinesses can boost their bottom line and enhance their overall financial performance. In Costa Rica, the coffee sector alone has 307 mills[2]. By 2027 the project targets at least 10 agribusinesses increasing their profitability by lowering waste disposal expenses and energy costs.

Job Seekers: The creation of new jobs by agribusinesses using Poás technology will have a positive impact on local economies and employment. Poás expects to create by 2027, 216 job positions within the agribusinesses using their technology, and another 47 jobs in their own staff for a total 263 jobs. These jobs will directly benefit marginalized target populations like rural peoples and immigrants creating important impacts in those communities. The typical job seekers that Poás would hire belong to families who live in rural areas and find it hard to keep a steady job due to the diminishing returns on agriculture, low educational status, or lack of opportunities. It can also be immigrants who come to Costa Rica for seasonal jobs in rural areas and are left with little to do on the offseason. Further, Poás

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seeks to make opportunities in rural areas for technical jobs that would allow young professionals to stay in those areas and would increase the allure of the agricultural industry.

Poás has worked with four operators and two young engineers in their pilot phase. Of the operators, two were immigrants without a steady job living in a communal home with several families. One of the operators will continue to work with Poás permanently and this has allowed him to get a separate home for him and his family, including an elementary-aged child that will be able to continue his education at the local school. One of the operators was very hard to communicate with. All communication had to be done via Whatsapp voice messages as he and his wife do not know how to read and write. One of the young engineers is from a rural area and is looking to leave the area after graduation due to lack of opportunities. The internship with Poás allowed her to see that new jobs are being created that could allow her to stay near her family to support them and still thrive and practice her engineering and sustainability training. Her family has struggled for a long time to thrive in the rural area but work like this allows the new generation to have a different outlook.

Climate: The environment would benefit from the reduction or avoidance of thousands of tons of CO2e emissions related to biomass waste management and energy production by reducing greenhouse gas emissions and helping with climate change mitigation efforts. Poás estimates the avoidance of 13,846 Tons of CO2 emissions avoided through better waste management practices in biomass utilization, and at least 28,320 Tons of CO2 captured in soil through biochar by 2027.

The partner Poás is a circular economy company that reduces carbon emissions in the agricultural sector by making valuable products from tons of waste that would otherwise harm the environment. Poás produces biochar to improve soils and store carbon while providing clean energy. Their preprocessing of high-moisture wastes also produces sugar-rich water, which is a great input for bioethanol production. Poás' gasification technology was created at the University of Michigan, where the CEO was a professor. The company is poised to grow from prototype to commercial scale, with two customers ready to test pilots with the coffee and pineapple sector in Costa Rica.

The IDB Lab's contribution IDB Lab will play a pivotal role by providing financial support and tapping into its vast network of connections. A proposed contribution of US$850,000, facilitated through the CRIG (Contingent Recovery Investment Grant) modality, is earmarked for the development of technological equipment aimed at converting biomass into high-energy-density syngas and biochar.

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