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September, 2024

COPALLI
RUM

GHG Footprint Summary Report

This document presents a summary of analysis carried out by Earth Optics to determine the per-bottle greenhouse gas impact arising from the production and consumption of Copalli Rum.

Summary

Copalli crafts its three-ingredient rum in Belize using: (1) fresh pressed, organic heirloom sugarcane sustainably and locally grown using regenerative practices, (2) pure, filtered rainwater, and (3) yeast. All agriculture, processing, distillation, production, bottling, and packaging take place in Punta Gorda, Belize. The distillery was designed as a closed-loop system, and is powered by biomass in part derived from spent sugar cane. Organic waste products are recycled on-premises into fertilizer for the cane fields. The design of the facility contributes to its low greenhouse gas (GHG) emissions and sustainability.

Copalli Rum engaged EarthOptics to perform a comprehensive cradle-to-grave, product-level, GHG Life Cycle Assessment (LCA). This LCA measured the GHG emissions associated with producing and distributing each bottle of rum, and also measured atmospheric carbon reductions occurring in our regenerative sugarcane fields and our other agricultural areas. This document provides a summary of that LCA work and its principal findings. Copalli Rum currently is in the process of obtaining third-party verification of the LCA and other relevant GHG data.

For the 2023 production year, this analysis shows that each bottle of Copalli Rum generates 0.93 kilograms of GHG emissions per bottle (measured as carbon dioxide equivalent, or CO_2e), and that the overall operation and land-use generates 14.54 kg of CO_2e reductions. The result is **negative greenhouse gas emissions of -13.62 kg/CO_2e for each bottle of Copalli Rum**.

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Methodology

For the 2023 LCA[1], EarthOptics evaluated Copalli's GHG footprint from raw material extraction to end-of-life disposal following widely accepted, independent, international standards. These include the Greenhouse Gas Protocol[2] and its Product Standard, ISO 14040/14044[3], and PAS 2050[4]. Total emissions were measured for the company, including corporate emissions attributable to Copalli operations. Emissions reductions also were measured using state of the art soil science and year-over-year analysis to demonstrate the additional soil carbon removal and storage occurring in Copalli's agricultural areas. These totals were then extrapolated across actual production volumes for 2023, using 750ml bottle equivalent, to arrive at per-bottle GHG emissions data.

Copalli oversees every point in the value-chain before the bottled rum leaves the facilities in Belize. This integration of farming, production, and packaging enables Copalli to track data accurately. EarthOptics used raw business activity data gathered by Copalli staff for the 2023 production year, then applied that data using the approaches and methododologies in the LCA standards noted above. GHG emissions occurring beyond the Copalli distillery gate also were calculated with a very high degree of confidence utilizing data from the downstream supply chain and supplemented by additional industry and academic, well-recognized sources. Accepted emissions factors were employed where needed to convert raw data (for example, fuel consumption) into GHG emissions. In an effort to be comprehensive, EarthOptics conducted a cradle-to-grave LCA including all GHG emissions from sugar cane production and supply chain through end-of-life disposal, including corporate emissions attributable to Copalli's operations.

EarthOptics also evaluated soil carbon stocks to measure atmospheric GHG removals occurring during 2023 in the sugar cane fields and adjacent agricultural areas. Year-over-year soil carbon data was compared to arrive at final GHG removal values. Soil sampling was conducted on-site using proven methodologies, with samples analyzed by an independent laboratory. Baseline sampling occurred in 2023 and resampling in 2024. The organic carbon concentration and bulk density measurements were combined to estimate the soil carbon density in the 0-30 cm layer of soil. Statistical methods were then applied to derive the year-over-year GHG reduction values.

GHG reductions attributable to Copalli operations were then applied against GHG emissions to arrive at emissions of -13.62 kg/CO_2e for each bottle of Copalli Rum. This emissions

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[1] This analysis was completed in 2024, for the 2023 production year.

[2] The GHGP Product Life Cycle Accounting and Reporting Standard enables assessment of the life cycle emissions of a product and a focus on the greatest GHG reduction opportunities. https://ghgprotocol.org/

[3] The ISO 14040 series standards, Life Cycle Assessment, address quantitative assessment methods for the assessment of the environmental aspects of a product or service in its entire life cycle stages. ISO 14040 is an overarching standard encompassing all four phases of LCA.

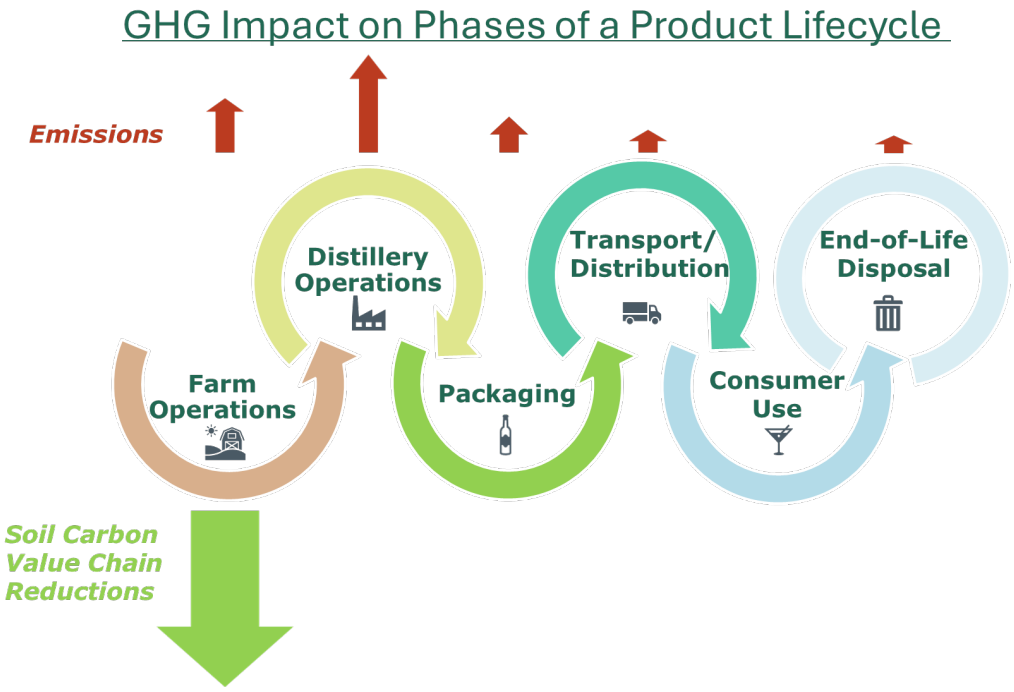
[4] Publicly Available Specification (PAS) 2050 is a specification for the assessment of the life cycle GHG of goods and services.

netting process (accounting for both emissions and reductions) is a feature of the Greenhouse Gas Protocol and is sometimes referred to as “insetting.”

Scope of Analysis

EarthOptics measured the GHG impact from raw materials extraction (largely sugar cane production) to end-of-life disposal (cradle-to-grave) for producing one bottle of Copalli rum. The following phases of Copalli’s production process were identified:

- Farm Operations
- Distillery Operations (including relevant corporate emissions)
- Upstream inputs
- Packaging
- Distribution
- Use
- Disposal



**Note: Arrows in this graphic are not to scale but serve as a visual to portray the level of impact of emissions generated and reduced.*

Life Cycle Analysis – Core Considerations

Farm Operations: Copalli Rum uses heirloom sugarcane sustainably and locally grown using regenerative and organic practices. Through using regenerative agriculture practices that avoid field burning and synthetic fertilizers, pesticides, and herbicides, Copalli has much lower impact during the farming process as compared to industrial sugarcane cultivation. Carbon captured in the air from sugarcane is then stored in the plants themselves and in the soil in the ground. The positive carbon impact of Copalli’s regenerative practices was

measured through comprehensive, on-the-ground soil sampling. Samples were sent to a lab that ran tests and sent results to EarthOptics, who analyzed and quantified the amount of additional carbon in the soil, which was then extrapolated over the entire farm area. Fuel used in farm equipment was the primary source of GHG emissions from the farm.

Distillery Operations: The distillery was designed to ensure that waste is minimized and resource use optimized throughout the production and consumption cycle - in line with principles of circularity. Leftover biomass from cane juice extraction (bagasse) is used to fire the boiler. Liquid by-product of distillation (vinasse) is combined with boiler ash and chicken manure to fertilize the fields. Distillery emissions in 2023 include fuel use, biomass supply, water distillation and consumption, electricity consumption, and residual waste. GHG emissions related to biomass combustion, electricity, and fuel use were estimated using volumes of inputs and applicable emissions factors. Waste, distillation, and other emissions also were calculated using distillery data and emissions factors.

Upstream: Emissions from miscellaneous upstream inputs (barrels, yeast, capital expenditures, etc.) were also included in the 2023 LCA relying on distillery data for the inputs and related emission factors.

Corporate Emissions: Copalli decided to go above and beyond international standards by including its corporate emissions determined based on revenue allocation in its 2023 per bottle LCA.

Packaging: Bottling and packaging is performed onsite at the distillery. In 2023, this process was performed by hand, without the use of GHG-emitting machinery. Packaging includes bottles, corks, shipper/divider material, and labels. Data on these elements was collected and used to calculate packaging emissions. Copalli intentionally does not use any secondary packaging, gift boxes, or inserts.

Distribution: EarthOptics calculated transport and distribution emissions using Copalli's shipment data for 2023 based on distances, shipment routes, and known means of transportation.

Consumer Use: Consumer use is part of a full product lifecycle. Due to the nature of a spirits product like Copalli, there are no associated GHG emissions to consumer use of the product. Packaging disposal (bottles) was accounted for.

End-of-Life Disposal: EarthOptics estimated emissions derived from primary sales data, including information on where bottles were shipped in 2023 and landfill and recycling practices in those locations.

Carbon Footprint Summary by Activity

Phase	kg CO_2e per 750ml bottle
Farm Operations – emissions	0.2754931
Distillery	0.5022697
Upstream	0.0462167
Corporate	0.0021782
Packaging	0.0587448
Distribution	0.0289755
Retail, use, and disposal	0.0134399
Total GHG emissions	**0.9273181**
GHG reductions (farm operations)	**-14.5438644**
TOTAL	**-13.6165463**

The carbon footprint analysis of the 2023 full product lifecycle from cradle to grave including associated corporate emissions yielded a net negative result of **-13.62 kg CO_2e per 750ml bottle of Copalli rum**.

Copalli intends to repeat this LCA analysis annually using a consistent methodology to support comparability. However, future LCA results may vary based on differences in production volume, on-the-ground conditions, and/or measurement of additional carbon reductions not measured for 2023.

About EarthOptics

EarthOptics is a commercial soil data measurement and mapping company (www.earthoptics.com) creating accurate data maps – including compaction, carbon, moisture, nutrients, soil health and more – that deliver insights needed to unlock the full potential of soil. Since our founding in 2018, EarthOptics has served federal, state, local government and commercial agricultural and grasslands customers in research, production, and measurement and verification capacities. Key partners include ecosystem service providers, technical service providers, equipment and sensor manufacturers, universities, food companies, and nonprofit organizations.

EarthOptics's proprietary sensor technology and data analytics make intelligent soil data accessible on a large scale for increased agricultural yields, carbon market acceleration, and improved land management and environmental stewardship. Coincident with laboratory soil samples, EarthOptics conducts vehicle-based digital sensor measurements to create a

complete analysis set. The EarthOptics GroundOwl™ sensor suite measures soil compaction to a depth of several feet, while also measuring changes in soil texture, carbon content, conductivity, and nutrient properties. The digital data is analyzed with a patented machine learning platform and this combination of laboratory and digital scan data enables the measurement of soil parameters at high resolution using one-third or fewer lab samples than traditional soil sampling methods, dramatically improving affordability while maintaining accuracy. The company's success to date is based not only on the accuracy and high resolution of the soil maps, but also on EarthOptics's ability to effectively work with land managers, project managers, and technical partners across a spectrum of projects from research to MRV of carbon credits. EarthOptics's accuracy is trusted by both producer and consumer groups.