

Transforming the care economy through impact investing case study:

Tierra Grata



The Care Economy
Knowledge Hub

the-care-economy-knowledge-hub.org



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FOREWORD

Vital for our society to function, the care economy – domestic work and caring for children, elderly people, and people with disabilities – as it is now, operates as one of the most pervasive structural barriers to women’s economic autonomy and gender equality.

Across the world care work is mostly done by women and girls, who perform three-quarters of unpaid care work. Representing more than 11 percent of total global employment, paid care work is also a significant source of employment, particularly for women. However, these jobs are poorly paid, in positions that fall outside of formal employment structures, and insecure due to ingrained gender and racial biases and the work’s perceived value. The precariousness of paid care work and the unequal distribution of unpaid care work restricts women’s time and mobility, as well as their equal participation in social, economic, and political life. And this dynamic is unlikely to change without collective action. The climate crisis is increasing the demand for care and domestic work globally, while the COVID-19 pandemic generated a [care crisis](#) that exacerbated pre-existing gender inequalities.

Both formal structures and informal structures (norms) hold care economy inequalities in place. Gendered norms also shape national policies on how care work is recognized and valued, and how the responsibilities between families, governments, and the private sector are distributed.

While public investment and policies must be at the core of the solution, a renewed role for the private sector is crucial. Announced as a [commitment at the Generation Equality Forum](#), in 2021 Canada’s International Development Research Centre (IDRC) and the Open Society Foundation’s impact investment arm, the Soros Economic Development Fund (SEDF), launched an [action-oriented research initiative to help Transform the Care Economy through Impact Investing](#) (TCEII). Through this partnership, IDRC continues to build on its commitment to transform the care economy and mobilize finance for gender equality.



Erin Tansey



Catherine Cax



Since its launch, a global consortium of partners has built an [extensive knowledge and evidence base](#) to mobilize capital and impact investment to address the care economy's challenges in emerging markets. The program is now launching a collection of 20 case studies on care economy social innovations and impactful businesses, which complements 59 business profiles and mapping of 165 market-based solutions operating in emerging markets in Latin America, Africa, and Asia. The [TCEI program](#) also involves care-economy businesses incubation and acceleration, research on regulatory frameworks and policies, awareness raising, and industry policy dialogues.

As we witness growing momentum and understanding of the urgency of addressing the care crisis, we hope these case studies on pioneering companies will help advance concrete strategies to move from awareness to action. These case studies help to demonstrate viable and impactful business models, ranging from building social security infrastructure to labor-saving products and services. They offer a unique and nuanced understanding of the businesses' theories of change and impact journeys. The case studies also help to share the lessons these innovators have learned on their pathways to scale, and it is our hope that they will attract more capital into the care economy for deepened impact.

We invite you to read this collection of case studies and engage with them, and the other resources and tools developed by the TCEI program, to mobilize investment into the care economy.

Together we can advance [towards a care society](#) where social innovation, entrepreneurship, and investment can be part of the solution for economic justice globally.

Erin Tansey

Sustainable and Inclusive Economies
Director
International Development Research
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INTRODUCTION

The care economy consists of paid and unpaid labor and services that support caregiving in all its forms. In Africa, Asia, and Latin America, women spend between 3 to 5 times as many hours on unpaid care and domestic work as men. This represents 80 percent of a household's total hours devoted to unpaid care work.

Care economy enterprises can help recognize, redistribute, reduce, and reward – also known as the 4 Rs – unpaid and paid care and domestic work in the following ways:



Recognize: Initiatives that increase visibility and recognition of paid and unpaid care and domestic activity as "productive" work that creates real value and contributes to economies and societies.



Redistribute: Services and initiatives that redistribute care work from individuals to public and private sector entities, and redistribute care and domestic work within the household.



Reduce: Products and initiatives that reduce the time spent on and the burden of unpaid care and domestic work.



Reward: Products, services, and initiatives that ensure that care and domestic workers are paid fairly and have professional growth potential. This provides them with financial reward and security.

The Care Economy Knowledge Hub – the research pillar of the Transforming the Care Economy Through Impact Investing Program – aims to address the knowledge gap around care businesses by showcasing various business models and creating a resource base for relevant stakeholders. It also aims to raise awareness and increase knowledge of the state of impact-driven care economy business models and attract a broad range of funders to invest in care economy solutions by showcasing opportunities.

A curated set of 20 business case studies, of which this case study is one, has been researched and written between October 2021 and January 2024. The case study businesses were selected out of a set of 165 businesses that were mapped between October 2021 and August 2022, and then a further 59 that were profiled between September 2022 and May 2023. They present a wide variety of different ways in which care work can be recognized, rewarded, reduced, and redistributed, from different sectors and different geographies, from different stages of the growth journey and different business models, from different products and services, and different impact pathways. Each case study was

written based on extensive desk-based research, including a literature review; a review of key business documents; a series of deep conversations with founders, CEOs, and key staff; and impact-focused qualitative research with 8 - 15 consumers of business products and services.

Each case study starts with a 1-page executive summary that provides “at a glance” information on the business and Section 1 provides an introduction. Section 2 describes the ecosystem within which the business operates. The business deep dive can be found in Section 3. Section 4 presents an impact deep-dive, including customers’ own experiences of the care economy solution, and a unique set of qualitative impact data. Section 5 outlines the business’s future plans in their look forward.

Shifting attention towards and investment in the care economy is one of the single most important actions that policy makers, investors, and community leaders can take to achieve gender, racial, and climate justice. We hope that these case studies contribute to the much-needed transformation in our economic and social systems.

**Rebecca Calder**

Principal Investigator, Transforming the Care Economy Through Impact Investing
Co-Founder and Co-CEO, Kore Global

This project is supported by Canada's International Development Research Center, in partnership with the Soros Economic Development Fund at the Open Society Foundations. Building on their track record and commitment to transforming the care economy and mobilizing finance for gender equality, they are jointly supporting this action research program to help transform the care economy through impact focused business and investment. This case study is a joint research product, developed by a consortium led by Kore Global, including Intellectap, Core Woman, Busara, Sagana, and Volta Capital. Copy editing and graphic design were done by Big Blue Communications.

This particular case study should be cited as follows:

CoreWoman, Busara Center for Behavioral Economics, Kore Global. (2024). *Transforming the care economy through impact investing: Tierra Grata case study*. Kore Global, International Development Research Centre, and Soros Economic Development Fund.

1 - EXECUTIVE SUMMARY

Tierra Grata is a for-profit social enterprise, dedicated to developing and implementing sustainable solutions for energy, water, and sanitation in rural villages across Colombia, with a focus on vulnerable Afro-Colombian and indigenous communities. Its range of products includes solar panels, portable solar lamps, drip water filters, and ecological dry toilets. These environmentally-friendly products are cost-effective and also quick and easy to install. Tierra Grata also provides capacity-strengthening initiatives to customers and beneficiaries in rural villages, equipping them with the knowledge and skills to repair and maintain the installed products. Since 2016, Tierra Grata has successfully served over 22,800 customers in 66 rural villages spanning Colombia's Caribbean and Pacific regions. In 2022, the company had revenues of US\$250,251.



Tierra Grata at a glance

Established	2016
Country of operations	Colombia
Offerings	For-profit social enterprise that sells and installs green energy, water, and sanitation solutions for rural villages in Colombia.
Reach	Has provided more than 2,100 products and solutions and reached 22,800 customers in 66 rural villages.
Staff	8 full-time employees
Revenue	US\$250,251 (2022)
Investment to date	US\$35,000 to purchase 450 solar power systems to bring to communities.



Leadership	Jenifer Colpas , Co-founder and CEO
Contact for partnerships	jenifercolpas@tierragrata.org
Website	www.tierragrata.org

2 - ECOSYSTEM

2.1 Colombia: statistical snapshot

 <p>Demographic information</p>	<p>Total population (World Bank, 2022): 51.8 million</p> <p>Female population (World Bank, 2022): 50.7% of total population</p> <p>Urban and rural population (World Bank, 2022): Urban: 59.0% Rural: 41.0%</p> <p>Population by age segment (World Bank, 2022): 0-14 women: 10.5% 0-14 men: 10.9% 15-64 women: 35.2% 15-64 men: 34.4% +65 women: 5.0% +65 men: 4.0%</p>
 <p>Unpaid care work</p>	<p>Proportion of daily time spent on unpaid domestic and care work (ECLAC, 2019): Women: 18.9% Men: 5.9%</p>
 <p>WASH Indicators</p>	<p>% of people using at least basic drinking water services (World Bank, 2022):</p> <ul style="list-style-type: none"> • % of total population: 97.5% • % of urban population: 99.9% • % of rural population: 86.6% <p>% of people using safely managed drinking water services (World Bank, 2022):</p> <ul style="list-style-type: none"> • % of total population: 73.9% • % of urban population: 81.2% • % of rural population: 40.2% <p>Deaths caused by exposure to poor quality air and water as a % of annual deaths (National Health Institute, 2019): 8%</p> <p>Access to clean fuels and technologies for cooking (World Bank, 2021):</p> <ul style="list-style-type: none"> • % of total population: 93.3% • % of urban population: 99.2% • % of rural population: 66.7%

 <p>Social & economic</p>	<p>Literacy level (World Bank, 2020):</p> <ul style="list-style-type: none"> • Global: 86.3% Latin America: 94.1% • Women: (+15) 95.9% Men (+15): 95.4% <p>Poverty (ECLAC, 2020): Women: 36.3% Men: 34.4%</p> <p>Gender-based violence (DHS, 2015):</p> <ul style="list-style-type: none"> • Urban: Around 32.7% of Colombian women aged 15–49 living in urban areas reported having experienced physical violence from their partner at least once in their lifetime, and 7.8% reported having experienced sexual violence. • Rural: Around 29.2% of Colombian women aged 15–49 living in rural areas reported having experienced physical violence from their partner at least once in their lifetime, and 7.0% reported having experienced sexual violence.
 <p>Women's work, labor, and entrepreneurship</p>	<p>Labor force participation (DANE, 2023):</p> <ul style="list-style-type: none"> • National: Women – 52.9% Men – 76.7% • Urban: Women – 55.9% Men – 75.8% • Rural: Women – 40.6% Men – 79.8% <p>Informal employment (DANE, 2023):</p> <ul style="list-style-type: none"> • National: Women – 52.8% Men – 58.2% • Urban: Women – 40.8% Men – 42.2% • Rural: Women – 83.4% Men – 83.9% <p>Unemployment (DANE, 2023):</p> <ul style="list-style-type: none"> • National: Women – 12.2% Men – 8.0% • Urban: Women – 11.1% Men – 9.0% • Rural: Women – 11.1% Men – 4.6% <p>Women-owned businesses (World Bank, 2017):</p> <ul style="list-style-type: none"> • Firms with at least one woman with participation in ownership: 66.9% • Firms with women in top management:¹ 18.9% <p>Entrepreneurship (GEM, 2019): Female/Male TEA Ratio:² 0.88</p> <p>Gender pay gap (Statista, 2021): Gender gap 0=unequal 1=equal: 0.54 (Ranked #8 in LAC)</p> <p>Financial inclusion (World Bank, 2021): Women 15+ with a bank account: 56.2% Men 15+ with a bank account: 64.0%</p>

2.2 Context analysis

Care economy context

In Colombia, a significant portion of the population (17.9%) resides in rural areas,

where access to basic services is notably inferior to that in urban areas.³ While 99.9% of the urban population has access to basic drinking water, this figure drops to 86.6% in rural regions.⁴ The disparity deepens when it comes to safely

managed drinking water, with rural areas having only 40.2% coverage, compared to 81.2% in urban settings.⁵ Furthermore, the availability of clean cooking fuels and technologies is substantially lower in rural communities, standing at 66.7%, against the urban rate of 99.2%.⁶ Disparities in accessing essential services profoundly impact rural communities, especially women and children. Women, typically responsible for water collection, encounter increased health risks,⁷ contributing to the 8% of annual deaths linked to poor air and water quality.⁸ In these rural areas, children, particularly girls, face significant challenges due to inadequate sanitation. They are vulnerable to gynecological problems and have increased school absenteeism during menstruation,⁹ often leading to school dropout.¹⁰ This burden of additional care and household responsibilities usually falls on women, limiting their time for paid work or leisure and perpetuating cycles of economic and gender inequality.¹¹

Market opportunity

The growth in renewable energy and sustainable sanitation markets is opening substantial opportunities, especially in developing countries facing environmental issues and uneven access to resources. These sectors are critical for both environmental health and social welfare, offering considerable prospects for enhancing the lives of vulnerable groups, including women and girls in rural communities.

The renewable energy market is projected to surpass US\$2 trillion by 2030¹² and was

valued at US\$1.1 trillion in 2022,¹³ with developing countries playing a significant role in this growth due to their substantial unmet energy needs. In particular, rural communities in these countries offer a promising opportunity for renewable energy adoption.¹⁴ These communities often lack access to traditional energy grids and heavily rely on fossil fuels, making them an ideal target for clean and sustainable energy solutions.¹⁵

The adoption of renewable energies in Colombia has potential to make a significant environmental impact, reducing greenhouse gas emissions by up to 10 million metric tons per year.¹⁶ According to a report by the International Renewable Energy Agency (IRENA), the renewable energy market in Colombia is expected to grow at a compound annual growth rate of 10% between 2022 and 2030.¹⁷ This projection indicates that the market could reach a valuation of US\$10 billion by 2030. Several factors contribute to this promising growth. Firstly, Colombia's population is growing at an annual rate of 1.5%, driving an increased demand for energy. Secondly, costs associated with renewable energies such as solar and wind have significantly decreased in recent years, making them more competitive compared to traditional energy sources.¹⁸ Lastly, the Colombian government has taken proactive measures to foster development of renewable energies, exemplified by the enactment of Law 1715 in 2014.¹⁹ This law established a comprehensive regulatory framework for renewable energy.

The impact of climate change is causing water resources to become scarce and unpredictable, particularly affecting rural communities already struggling with water access issues. As weather patterns become more erratic and water scarcity intensifies, the need for sustainable water solutions in these areas becomes increasingly crucial. In response to this urgent demand, the market for clean water solutions in rural contexts is expected to witness significant growth. According to the Business Research Company, the global water and sewage market is projected to reach US\$886.14 billion by 2017, with a compound annual growth rate of 6.7%.²⁰ This expanding market addresses pressing needs arising from climate change and also presents an opportunity for economic development. The World Health Organization estimates that for every dollar invested in water and sanitation, there is a US\$4.3 return in the form of reduced healthcare costs, increased productivity, and improved overall well-being of communities.^{21 22}



3 - BUSINESS DEEP DIVE

3.1 Business headline

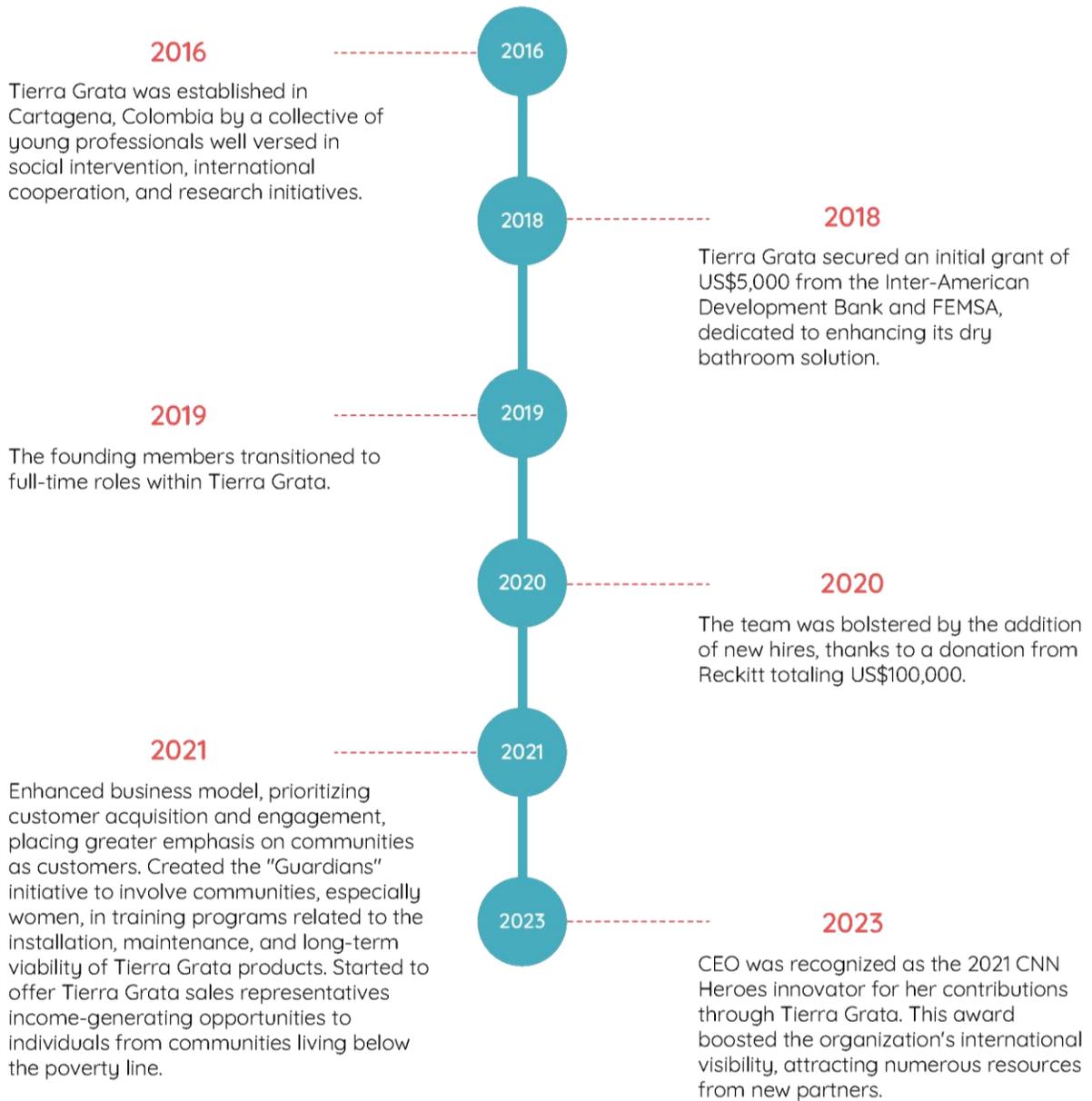
Tierra Grata is a social enterprise that aims to address the lack of access to electricity, clean water, and safe sanitation in rural villages of Colombia. By offering environmentally friendly and affordable products such as solar panels, portable solar lamps, drip water filters, and ecological dry toilets, Tierra Grata brings essential solutions to households, small businesses, and public spaces in rural communities. The company's service and product sales are coupled with a social intervention model that promotes rural villagers' ownership and maintenance for product sustainability, while promoting gender equality and enhancing low-income households' well-being and health outcomes.

With a specific focus on vulnerable Afro-Colombian and indigenous populations, Tierra Grata has successfully served over 22,800 customers across 66 rural villages in Colombia's Caribbean and Pacific regions. Tierra Grata offers interest-free credit with income-adjusted monthly payments to ensure affordability, making its products accessible to a wider range of customers. Furthermore, municipalities, Community Action Boards,²³ private companies, and NGOs have the option to purchase Tierra Grata's products for public use or tailor projects to benefit communities.

Tierra Grata's social intervention model is shaped by its best practices and insights gained from past project experiences. It includes capacity-building initiatives that educate rural villagers on pre-installation, installation, and post-installation techniques for various products. Additionally, the model emphasizes establishing local technical teams responsible for repairs and maintenance, ensuring sustainable product management. The organization also conducts awareness campaigns to challenge discriminatory gender norms and promote women's rights within communities. Moreover, Tierra Grata promotes women as resellers for its products, with women making up 80% of its reseller base. This pilot initiative aims to expand market reach into additional rural communities and provide income-generating opportunities for rural women.



Tierra Grata's journey





3.2 Founder story

Founder of Tierra Grata



Jennifer Colpas

Jennifer Colpas, CEO of Tierra Grata, is a social development leader with over 7 years of experience working with urban and rural communities in Brazil and Colombia. She holds a Bachelor's in International Business from the University of Magdalena in Colombia, a Master's in Social Responsibility from the Federal University of Rio de Janeiro, Brazil, and a second Master's in Social Development from the University of Sussex in the UK, where she was honored as a Chevening scholar in 2021.

Jennifer's journey towards becoming a CEO at age 25 commenced shortly after completing her bachelor's degree in 2013. She started her work in India, as a business analyst with a software company to enhance commercial relations within the Hispanic market. It was during this time that she confronted the harsh realities of extreme poverty, which deeply impacted her perspective and career trajectory. This experience compelled her to reevaluate her professional goals and redirected her ambition towards utilizing her skills and expertise to address the pressing issue of sanitation access for individuals facing severe poverty.



The sanitation issue in India was profoundly evident, marked by widespread open defecation, a reality vividly portrayed in the movie "Slumdog Millionaire." The situation was perplexing and shocking, leaving me wondering about its root causes. Although there was an evident need for solutions, such as preventing children from defecating on train tracks.

Jennifer Colpas, Tierra Grata CEO





Inspired by her experience in India, Jennifer decided to relocate to Brazil and pursue a master's degree in social entrepreneurship. It was during her time there that she delved into the world of social and inclusive businesses. In Brazil, she had the opportunity to meet a former homeless resident from a favela who had established a social enterprise. This enterprise aimed to bring together all of the favela's businesses in Rio under 1 holding, creating a more structured and profitable system. This encounter proved to be truly eye-opening for Jennifer, as it allowed her to witness firsthand how marginalized communities could not only organize themselves and establish successful businesses but also become loyal customers. This experience represented a significant shift in Jennifer's mindset, as it contradicted what she had been told for years.

In 2015, Jennifer returned to Colombia as a social business coordinator for a foundation focused on curbing crime and gang violence through arts and dance programs in Cartagena, Colombia. Although the role did not directly align with her ambition of addressing sanitation issues for community development, the experience exposed Jennifer to valuable insights into public-private partnerships, which were instrumental in launching Tierra Grata. Additionally, she learned how to build long-lasting and trusting relationships with individuals who had been displaced by violence and had settled in areas lacking essential public services such as electricity, clean water, and transportation.

Jennifer's work experience in India, Brazil, and Colombia played a crucial role in shaping the inception of Tierra Grata, alongside reflections from childhood visits to her mother's rural village in the 1990s. Despite being just an hour away from Cartagena, the village faced frequent power outages, forcing residents to end their day before sunset and endure sleepless nights due to the intense heat. These contrasting memories and experiences of rural life and poverty began taking shape in Jennifer's mind. Although uncertain about how to address these challenges initially, she started envisioning solutions to provide clean energy and sanitation for low-income rural communities.

Jennifer's mission was far from a solo endeavor. It initially brought together a group of 5 individuals from diverse backgrounds who crossed paths while volunteering in a neighborhood in Cartagena, Colombia. Among them were a physiotherapist, a bank teller, an electronic engineering student, an environmental engineer, and an industrial designer who dedicated their weekends and skills to lay the foundation for Tierra Grata. The transformation of Tierra Grata from a volunteer project into a social business took place in 2016 with the establishment of the organization, led by Jennifer Colpas and Alexander Duran, the co-founder. Alexander's motivation for founding Tierra Grata stemmed from his firsthand experience in resource-challenged communities. He recognized the urgent need for sustainable access to clean water and energy aiming to harness solar technology to provide reliable and renewable power sources to low-income communities without conventional electricity.



Alexander Duran brings over 10 years of experience in learning and community entrepreneurship, public relations, and communications, with a specific focus on coordinating social and environmental projects for NGOs. His work includes 8 years at Waves for Water, where he helped local networks provide clean water through portable filters, well refurbishment, and rainwater systems in areas without groundwater access. At Tierra Grata, Alexander has leveraged this experience to address the need for basic services in Colombia's rural communities. He is particularly focused on using solar technology to supply energy and improve access to clean water and sanitation, aiming to enhance living conditions through practical and sustainable solutions.

Alexander's expertise in community engagement and project management and Jennifer's work with social enterprises have driven Tierra Grata's expansion over the past 7 years. Currently serving as Director of Operations, Alexander oversees the organization's day-to-day activities, ensuring timely and effective delivery of projects. Meanwhile, Jennifer, the CEO, has positioned Tierra Grata on the global stage, garnering awards from prestigious institutions like the [Bill and Melinda Gates Foundation](#), [CNN Heroes](#), and the [World Economic Forum](#), bringing international recognition to Tierra Grata and highlighting its contributions to rural social development.

3.3 Business model



Products

Tierra Grata offers clean energy, water, and sanitation solutions to rural households, small businesses, and public spaces in rural villages.

Clean energy solutions:

- Solar panel lighting in public spaces: Tierra Grata sells and installs solar panel lighting to private companies, foundations, NGOs, municipalities, and Community Action Boards (CAB) to provide electricity in rural public spaces such as streets, parks, squares, and community rooms. These organizations fund such installations either through donations or public funds, with municipalities and CABs commissioning Tierra Grata for energy projects that improve communal area safety, accessibility, and functionality.
- Solar energy systems and generators: The organization sells solar energy systems and portable solar generators to households and small businesses, enabling them to power appliances such as light bulbs, cell phones, and radios. Through the “Tienda Grata” program, Tierra Grata brings solar power to off-grid communities, facilitating operation of essential appliances such as refrigerators and TVs. This initiative boosts local businesses by allowing them to sell refrigerated goods and enhances the quality of life of rural communities by making new consumable products available.



Clean water solutions:

- Drip water filters: Tierra Grata provides drip water filters to households, schools, and businesses, capable of purifying up to 40 liters of water per day and storing 20 liters at a time. These filters offer a reliable source of clean water for rural communities without regular access to safe drinking water.

Sanitation solutions:

- Dry toilets: Common in rural villages, open defecation and bathing refer to the practice of using open spaces like fields, forests, or bodies of water for these activities instead of proper facilities. To tackle these sanitation challenges, Tierra Grata sells ecological dry toilets to households and businesses. These toilets are equipped with a liquid and solid separator and utilize a combination of lime, sawdust, and ash to prevent odors and promote compost production, thereby promoting environmental sustainability. Furthermore, each unit also includes a designated shower space, ensuring improved hygiene and convenience.

Tierra Grata integrates its solutions with a streamlined social intervention model crucial for project sustainability and community engagement. The model unfolds in 3 stages:

1. **Pre-installation:** This stage involves community engagement and surveying to understand the local context, allowing Tierra Grata to tailor its project plans effectively.
2. **Installation:** This includes training programs like the "Guardians," where local residents, mainly women, learn to maintain and repair the installed solutions. Workshops are also held to foster awareness and promote good practices in sanitation and environmental care.
3. **Post-installation:** Follow-up surveys and community assemblies are organized to discuss project outcomes, invite community feedback, and demonstrate progress.

This approach ensures that communities can independently manage and sustain the solutions provided, with Tierra Grata emphasizing capacity building without additional costs.



Pricing and payment methods

Through a diverse array of strategies of pricing and payment methods, Tierra Grata tailors its products to meet the varied needs of rural communities, from households and small businesses to larger municipal projects.

Project Commissioning: Equivalent to a B2C model in which private companies, foundations, municipalities, CABs, and NGOs commission Tierra Grata to undertake projects that involve installing one or multiple available products in designated villages. Pricing for these projects is adaptable, contingent on the



village size and the grants or donations Tierra Grata receives from these organizations and donors.

Subscription and microcredit: Tierra Grata offers a subscription model for households and small businesses (B2C) that want to purchase solar energy systems, drip water filters, and dry toilets. This model allows customers to acquire different products through monthly deferred payments, with installments adjusted to their income. To identify the amount households can pay, the organization conducts surveys as part of its social intervention process. Families can purchase solar energy systems at a rate of US\$300, while drip water filters and dry toilets are priced at US\$400 and US\$1,200, respectively. Tierra Grata's partnership with microfinance institutions enables customers to pay for 1-3 solutions for up to 30 months. Monthly fees for these solutions are US\$3-7. It is worth noting that approximately 90-95% of families successfully complete their payments.

Tierra Grata leverages various channels and partnerships to extend its reach and improve access to affordable clean energy, water, and sanitation for rural communities:

Resellers: Aiming to tap into the entrepreneurial potential of rural women, Tierra Grata sells its products to women at reduced prices with interest-free payments. These women then resell these products within their communities. The program is designed to spread the organization's solutions through these women entrepreneurs, broadening market presence and enabling further penetration into neighboring areas.

Direct engagement with Community Action Boards (CAB) and local municipalities: Working directly with CABs – local volunteer groups focused on community development – and local municipalities, Tierra Grata taps into community insights regarding electricity, water, and sanitation needs, tailoring its solutions to meet these specific requirements. These local bodies act as vital links, facilitating the organization's connection to and understanding of the communities served.

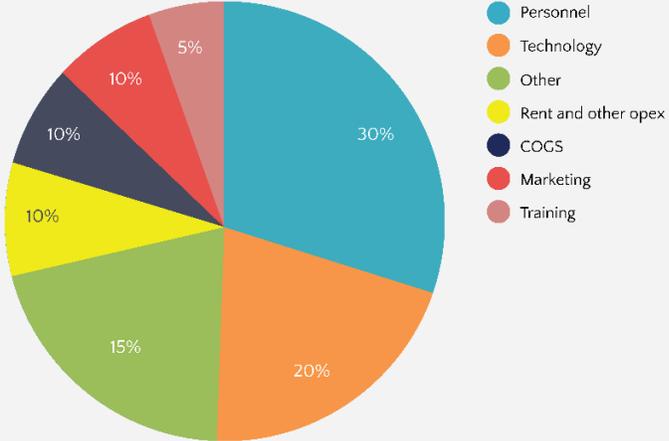
Collaborations and partnerships with local and international organizations: Tierra Grata actively seeks collaborations with other entities to obtain grants and donations, increasing the affordability and reach of its products across various regions. Partnerships with NGOs, foundations, and donors are essential in supporting Tierra Grata's mission.

Microcredit and flexible installment plans: By offering microcredit and adjustable payment plans, Tierra Grata ensures that families of all income levels can acquire their products. The organization does this by partnering with financial and microfinance institutions.



Channels & key partnerships



 <p>Value proposition</p>	<p>Tierra Grata offers affordable and eco-friendly solutions to rural communities, enhancing the well-being and health outcomes of low-income households and small businesses. By improving sanitation and safety, its portfolio brings about positive change, particularly for women and girls, while promoting sustainability and a healthier environment.</p>																
 <p>Competitive advantage</p>	<ul style="list-style-type: none">• Tierra Grata stands out with its unique social intervention model, which enhances rural villagers' capabilities and ensures its products' sustainability and sustainable management by communities themselves.• Income-generating opportunities for rural women through a reseller program.• Interest-free credit and monthly payments tailored to individual incomes.																
 <p>Revenue streams</p>	<p>Tierra Grata primarily generates revenue through direct household purchases, accounting for approximately 74% of total revenue in 2021. Additionally, donations from private companies and NGOs contributed 26% to its income that year. Revenue was approximately US\$41,641 in 2019 and increased to US\$118,113 in 2020 (184%), to US\$165,503 in 2021 (40%), and to US\$250,251 in 2022 (51%).²⁴</p>																
 <p>Cost structure</p>	<p>In 2022, personnel costs represented 30% of total costs. Technology expenses represented 20% of total costs, including necessary infrastructure and equipment for operations and product delivery. Training costs made up 5%. Cost of goods sold (COGS) constituted 10% and reflected expenses related to manufacturing or procuring Tierra Grata's products. Rent and other operating expenses accounted for 10% of total costs. Marketing expenses represented 10% of total costs, to invest in promotional activities and outreach for Tierra Grata solutions. The remaining 15% comprised other costs.</p>  <table border="1"><thead><tr><th>Category</th><th>Percentage</th></tr></thead><tbody><tr><td>Personnel</td><td>30%</td></tr><tr><td>Technology</td><td>20%</td></tr><tr><td>Other</td><td>15%</td></tr><tr><td>Rent and other opex</td><td>10%</td></tr><tr><td>COGS</td><td>10%</td></tr><tr><td>Marketing</td><td>10%</td></tr><tr><td>Training</td><td>5%</td></tr></tbody></table>	Category	Percentage	Personnel	30%	Technology	20%	Other	15%	Rent and other opex	10%	COGS	10%	Marketing	10%	Training	5%
Category	Percentage																
Personnel	30%																
Technology	20%																
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Marketing	10%																
Training	5%																



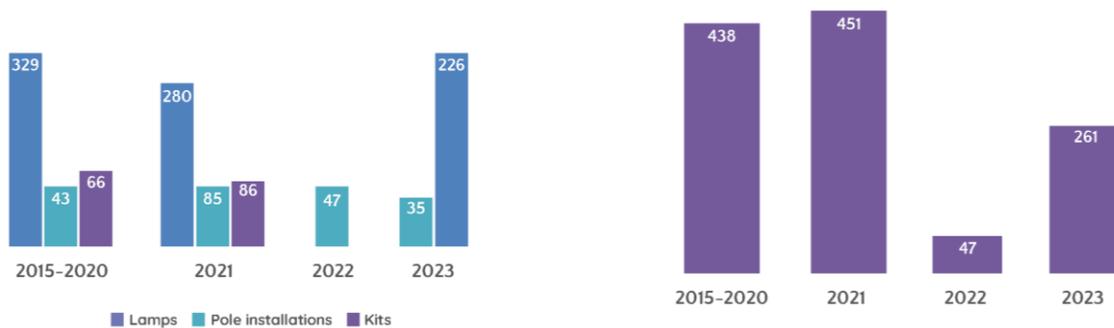
3.4 Tierra Grata's growth story

Tierra Grata's growth trajectory from 2015 to 2023 was marked by distinct patterns of expansion and shifts in focus across its various service offerings, reflecting adaptability and responsiveness to rural communities and market needs. Between 2015 and 2020, lamps were at the forefront of clean energy solutions.²⁵ After 2020, growth was driven primarily by kits.²⁶ Lamp distributions peaked from 2015 to 2020, slightly declining in 2021 (-15%), and stopping in later years. Solar light pole installations saw an increase from 2015-2020 to 2021 (98%), followed by a decreasing trend in 2022 (-45%) and 2023 (-26%), while kits showed an upward trajectory, going from 66 in 2015-2020 to 226 in 2023.

Clean water solutions²⁷ showcased an overall decline during the entire period. Filter distributions experienced a 32% drop between 2020 and 2021, followed by a 2% decrease in 2022 and a 96% decline in 2023. Dry toilets displayed a more fluctuating trend, decreasing between 2020 and 2021 (-46%), then increasing in 2022 (82%) before declining again in 2023 (-50%). The revenue progression followed these trends, increasing from US\$41,640 in 2019 to US\$118,113 in 2020 (183%), and then to US\$165,502 in 2021 (40%), reaching US\$250,251 in 2022 (51%).²⁸

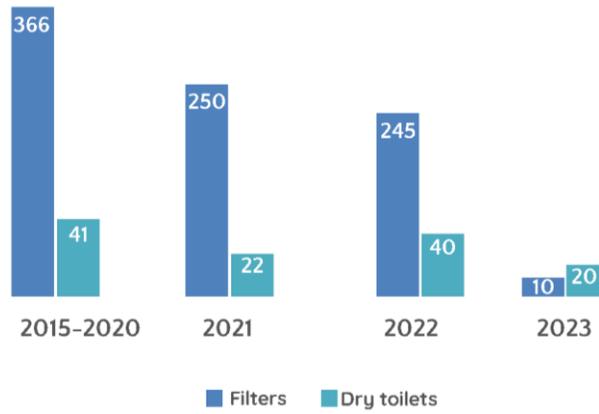
Tierra Grata's EBITDA Margin stood at 23.7% in 2019. In 2020, it declined to 12.8%, followed by an increase to 18.3%, and culminated in a significant surge to 42.5%.²⁹ This recent upward trend could suggest improvements in Tierra Grata's operational efficiency and financial performance.

Clean energy solutions

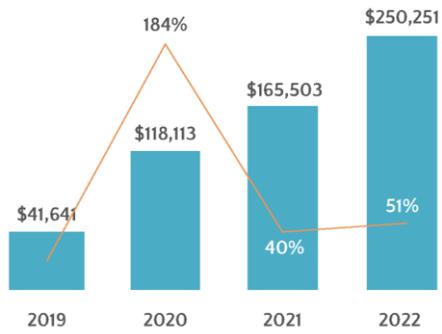




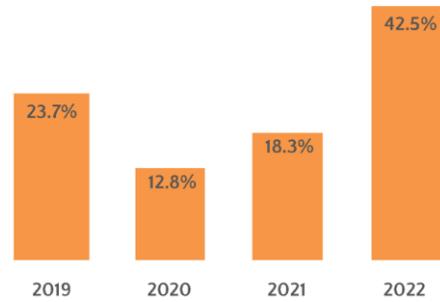
Clean water solutions



Revenue in USD and revenue growth per year



EBITDA Margins per year



INDICATORS	2019	2020	2021	2022
EBITDA	9,860	15,129	30,267	106,238
EBITDA Margin	23.7%	12.8%	18.3%	42.5%



3.5 People and governance

2X Criteria ³⁰	Climate and Gender Justice ³¹
<ul style="list-style-type: none">• 50% women founders.• One woman in leadership acting as CEO.• Advisory board consists of 5 individuals, with women representing 60%. The team brings a wealth of experience in various fields, including entrepreneurship, green technologies, human resources, rural development, and international cooperation.• Tierra Grata has a team of 8 employees, 5 of them being women. Among the team members, there is 1 Afro-Colombian and another from an indigenous group.	<ul style="list-style-type: none">• Tierra Grata provides cost-effective clean energy solutions to households in rural and semi-urban areas. This has contributed to improved women's health outcomes and increased economic participation.• Tierra Grata has extended access to reliable and affordable clean energy, reducing women's caregiving responsibilities and allowing more time for leisure, education, and economic activities.• Tierra Grata supports local economic revitalization and a just transition, lessening the health impacts of environmental pollution and alleviating the caregiving workload on women in vulnerable rural communities.• Tierra Grata prioritizes environmental management in all its operations. Its focus includes minimizing negative environmental impacts, promoting sustainable resource use, waste management, and reducing its environmental footprint. An environmental management manual guides the company's actions, providing rural communities access to clean energy, water, and safe sanitation. Tierra Grata encourages the sustainable use of natural resources and aims to reduce carbon emissions through energy efficiency and renewable energy. Waste management is promoted through reduction, reuse, recycling, and appropriate disposal. The organization complies with environmental legislation and promotes environmental education and awareness in rural communities.
Tierra Grata is a gender-transformative business. ³²	Tierra Grata is a gender-transformative business. ³³



Tierra Grata's human resource and climate policies encompass the following areas:

Human resource policies

Non-discrimination policy: Every person working at Tierra Grata is committed to not discriminating against their colleagues or external individuals based on gender, race or skin color, disability, political opinion, sexual orientation, age, religion, health status (including sexually transmitted diseases), or any other reason. The organization explicitly adheres to ILO Conventions 138 (1973) and 182 (1999) and rejects any paid or unpaid work performed by children under the age of 12. Likewise, it rejects any enslavement, forced recruitment, prostitution, trafficking, or involvement of minors in illegal activities or situations that endanger them. Fairness, respect, and equal opportunities are upheld throughout all operations.

Maternity/paternity leave policy: Tierra Grata Colombia provides its employees with mandatory maternity leave as established by Colombian law, which was extended in 2021 from 12 weeks to 18 weeks, covering paid leave at 100% of the regular salary rate. Fathers are entitled to 2 weeks of paid paternity leave, following legal requirements.

Reward and recognition program: It enables the company to acknowledge the work of teams that excel in achieving monthly goals according to planning indicators, as recognized by their colleagues. Additionally, if the teams achieve at least 85% average annual compliance with their indicators, they are granted a bonus based on the organization's financial availability.

Whistleblower policy: It encourages employees to report any unethical or illegal behavior they witness in the workplace. This policy can protect employees who report such behavior from retaliation and ensure that the organization takes appropriate action to address the issue. The organization also has an employee grievance mechanism for raising concerns or complaints about their work environment.

Climate policies

Tierra Grata has a natural resource management policy that includes the following:

Efficient use of energy: Tierra Grata promotes the efficient use of energy in its products and operations, including the use of renewable energy sources and reducing electricity consumption. This includes the explicit use of low-energy LED lighting in all office areas and the use of equipment and appliances with energy efficiency certification in the office

Responsible water consumption practices: Tierra Grata implements responsible water consumption practices, such as rainwater collection and reuse, installation of water filtration systems, and awareness-raising about the importance of water conservation



Emissions reduction: Tierra Grata uses clean technologies to reduce greenhouse gas emissions.

Environmental education and awareness: Tierra Grata provides environmental education and awareness for rural communities and its employees to promote greater awareness of the importance of natural resource conservation.

The introduction of the above-mentioned practices is based on national laws, such as Law 1124/2007, which promotes proper management of natural resources and the environment, and Law 1259/2008, which aims to promote proper management of solid waste and encourage a culture of source separation, as well as other international standards that seek to promote sustainable practices and environmental protection. Among them are the ISO 14000 and 14001 standards, which address aspects related to environmental management and provide a framework for protecting the environment and responding to changing environmental conditions in balance with socio-economic needs.

The company also has a protocol for managing environmental emergencies. To achieve this, Tierra Grata has developed a table that allows the team to assess risks in order to identify potential scenarios that could affect Tierra Grata's operations, including thunderstorms and heavy rain, floods, droughts, hurricanes, fires, air pollution, and infrastructure collapse. The protocol includes an environmental monitoring and measurement plan that enables the company to evaluate compliance with implemented control and mitigation measures, identify improvement opportunities, and ensure compliance with environmental standards and regulations.

3.6 Support received to date

Over the years, Tierra Grata has received key financial and non-financial support, each contributing to its growth and success. These investments, recognitions, and support validate Tierra Grata's business model and inspire the company to continue its mission of making a meaningful impact.

Financial

Signify	In 2023, Tierra Grata received a grant of US\$35,000 from Signify to bring solar energy systems and poles to La Guajira, Bolívar
Allianz Foundation	In 2022, Tierra Grata Colombia received financial support from the Allianz Foundation for US\$3,000 to implement a project that enabled the indigenous Wayuu community to inaugurate its first store using solar energy.
Bill and Melinda Gates Foundation	In 2021, Tierra Grata received the Gates Foundation Goalkeeper award from Bill and Melinda Gates, which included a grant of US\$10,000 and substantial visibility through appearances on international media platforms such as CNBC.
CNN International	In 2021, Tierra Grata received a grant from CNN International for US\$10,000, in addition to a crowdfunding campaign in which the company raised US\$100,000.
Reckitt	In 2019, Tierra Grata received a grant from Reckitt, totaling US\$100,000 over 2 years, alongside mentoring from Reckitt employees to install dry bathrooms in rural homes.
Inter-American Bank of Development and FEMSA	In 2018, Tierra Grata received US\$5,000 from the Inter-American Bank of Development and FEMSA to improve its dry bathroom solution.

Non-financial

Smurfit Kappa	In 2023, Tierra Grata received infrastructure for clean energy, safe water, and sanitation to install in 5 rural schools located in the state of Magdalena, Colombia, courtesy of Smurfit Kappa. This contribution benefited 400 individuals, including children and educators.
Yunus Social Business Impact Hub, and Bancolombia's Foundation	Tierra Grata received support from Yunus Social Business Impact Hub, and Bancolombia's Foundation during its incubation stage.



3.7 Challenges to growth and key business drivers

Tierra Grata has evolved from a volunteer-driven initiative to a structured social enterprise. Balancing administrative shifts, addressing societal challenges, and leveraging strategic drivers have shaped its trajectory and impact in rural communities.

Challenges to growth

Initially, Tierra Grata operated as a volunteer-driven initiative, providing products and services to rural communities free of charge. However, to ensure sustainability and growth, the organization recognized the need for a paradigm shift. It started viewing individuals from rural villages as customers rather than just beneficiaries. This change in perspective was pivotal in shaping Tierra Grata into a social enterprise focused on growth, structure, and financial stability, reducing reliance on donations.

Consolidating a solid foundation at the grassroots level presented significant societal challenges. Building trust within rural communities, particularly those affected by conflict, required substantial time and effort from Tierra Grata's staff. In Colombia's Pacific and Caribbean regions, women have played crucial roles, stepping in to fill the void left by men who have passed away due to the armed conflicts. These women have actively participated in communal groups dedicated to installation and maintenance of Tierra Grata products. However, in some rural villages, encouraging women's active involvement remains challenging due to prevailing patriarchal norms. To address this, the organization actively advocates for increased women's participation and engagement in projects from the very beginning.

Key business drivers

Strategic partnerships have been fundamental in advancing Tierra Grata's objectives. Collaboration with corporate social responsibility programs, particularly multinationals, has been instrumental in transforming Tierra Grata into a social enterprise. These partnerships have helped develop an ambitious vision for global sanitation access, raising awareness through campaigns and showcasing Tierra Grata's solutions at high-profile events.

Legal changes, such as the introduction of CONPES 3810 (National policy for the provision of drinking water and basic sanitation in rural areas) in 2018, have also been significant drivers. This policy document established guidelines for drinking water supply and basic sanitation in rural areas, aligning seamlessly with Tierra Grata's mission. It has also opened avenues to extend essential services across the country. Furthermore, the growing availability of public information regarding population access to basic services by regions has provided valuable insights to Tierra Grata. Armed with updated evidence, the organization can now plan and develop projects more effectively than ever before.



4 - IMPACT DEEP DIVE

4.1 The impact theory of change of the enterprise

Mission statement

Tierra Grata is a social enterprise that develops and implements decentralized solutions for basic services in rural communities.

Theory of change³⁴

Tierra Grata's impact is focused on installing basic service solutions within rural communities, encompassing household services such as solar energy systems, dry toilets, and water filters, as well as public infrastructure such as public lighting for streets and parks. Additionally, Tierra Grata is actively involved in the development and design of content that educates communities on accessing and maintaining public and household lighting infrastructure within rural areas.

In the short term, Tierra Grata's impact is demonstrated by increased use and uptake of basic service solutions among rural households and communities. There is also notable improvement in knowledge and capacities within these communities and households, enabling them to effectively and sustainably utilize available lighting infrastructure.

The impact extends to medium-term results such as improved infrastructure and increased availability of clean water and sanitation facilities. These improvements contribute to a reduction in the time women spend caring for ill family and community members, a decrease in the number of school days missed by children due to improved public infrastructure, and a noticeable reduction in care expenses, leading to increased savings. Furthermore, communities exhibit improved behaviors and practices in maintaining and managing community infrastructure and available household services, with both women and men acting as 'guardians' to safeguard and uphold the quality of these services.

In the long term, Tierra Grata's impact is evident in improved health outcomes and overall well-being within the community. Notably, women experience a reduced time burden thanks to enhanced public infrastructure and accessible household services.



<p>Long-term result(s)</p>	<p>Improved health outcomes and well being for the community, with women also experiencing reduced time burden as a result of improved public infrastructure and available household services.</p>	
<p>Medium-term result(s)</p>	<p>Improved infrastructure and availability of clean water and sanitation facilities leads to</p> <ul style="list-style-type: none"> - reduction in time women spend caring for ill family and community members. - reduction in number of days children miss school due to improved public infrastructure. - reduction in care expenses and increased savings. 	<p>Improved behaviors and practices around maintaining and managing community infrastructure and available household services</p> <ul style="list-style-type: none"> - women and men act as “guardians”³⁴ to safeguard and maintain quality of services and infrastructure.
<p>Short-term result(s)</p>	<p>Increased use and uptake of basic service solutions among rural households and communities.</p>	<p>Improved knowledge and capacities within rural communities and households to sustainably use available lighting infrastructure.</p>
<p>Product(s)</p>	<p>Installing basic service solutions within rural communities</p> <ul style="list-style-type: none"> - Household services: solar energy systems, dry toilet and water filters. - Public infrastructure: public lighting for streets and parks. 	<p>Develop and design content on accessing and maintaining public and household lighting infrastructure within rural communities.</p>
<p>CEKH Impact axes</p>	<p>Reward</p>	

4.2 Current impact and measurement practices

Tierra Grata tracks its production, customer and beneficiary counts, as well as the quality of its products and services. Prior to initiating each community project, the organization conducts a baseline assessment, followed by ongoing monitoring to measure the impact of the intervention. This is further augmented by conducting testimonial interviews with households. The assessment is seamlessly integrated into the intervention process, with the implementation and monitoring team taking full responsibility.

From 2009 to 2022, Tierra Grata's achievements include:³⁵

- Reached 66 rural communities



- Reached more than 10 rural schools with its products and solutions
- Installed a total of 1,939 products or solutions
- Trained more than 34 guardians in the communities in which it operates
- Benefited 15,168 individuals
- Established a 'Tienda Grata' program in 2 communities in to provide business opportunities to local people

Tierra Grata systematically evaluates its endeavors, not only to assess the achieved outcomes, but also to ensure alignment with community objectives. This process yields valuable feedback, insights, and best practices, which are consolidated into a comprehensive report that the organization openly shares with its customers and beneficiaries, fostering a culture of transparency and collaboration.

Moreover, Tierra Grata is committed to increasing its environmental sustainability and has established several goals to achieve this. These include reducing energy consumption by 20% through efficient technologies by 2025, increasing the use of renewable energy sources by 50% in its solutions by 2030, and providing environmental training to 80% of community members by 2023. To accomplish this, the company has developed a methodology to evaluate the environmental impacts associated with each of its products. Tierra Grata conducts a thorough analysis of its activities and processes, identifying potential environmental risks. These efforts align with internationally recognized ISO 14000 standards for environmental and sustainable management.

In the forthcoming section, qualitative data collected from interviews with Tierra Grata's customers is utilized to address gaps in evidence within the theory of change. Specifically, this data aims to document experiential and impact information that has not been previously recorded by Tierra Grata.

4.3 Customers' own experiences of the solution

Understanding the social context, emotional needs, preferences, and barriers faced by Tierra Grata's customers is key for potential investors to understand where Tierra Grata excels and where it has room to grow. It also creates an opportunity for Tierra Grata to identify ways it can adapt to better meet customer needs. The following sections provide insights into the foundation of the business' market success and its impact on lives of Tierra Grata's customers, with the aim of helping investors make informed investment decisions.

To inform this analysis, the research team conducted 8 in-depth interviews with Tierra Grata's customers to gather insights into their lived experiences and realities.^{36 37} While Tierra Grata sells a variety of products, interviews were held only with those who bought the solar energy systems for their household, as this represented the largest customer group. This section presents results of the qualitative impact deep dive, starting with a



snapshot of customers, followed by an examination of different customer “personas” and their journeys to using Tierra Grata products. This section concludes with a qualitative overview of Tierra Grata’s impact experienced in customers’ daily lives.

4.3.1 Customer snapshot

Tierra Grata’s customers are champions of technological solutions provided by the business and serve as testimonials to the physical, mental, and social benefits of the technological solutions the business offers. Nestled in Colombia’s remote regions, Tierra Grata’s customers grapple with challenges posed by unreliable networks and limited transportation. The research team witnessed this firsthand while attempting to gather insights via phone interviews. Many customers interviewed struggled with both network issues and using phones with insufficient battery life to maintain a long conversation. This experience in itself underscores the everyday realities of the communities Tierra Grata serves daily.

All the customers interviewed were female, aged 27–73, with an average age of 43. Over half were single mothers, while the rest were married. The typical household comprised 4–5 members, often including 2 children under the age of 18.

Most participants were literate, but their educational backgrounds were diverse. Some had high school degrees, and a few were university graduates. However, a small minority had no formal education at all. This highlights that Tierra Grata’s products appeal to customers across different educational levels.

Half of respondents interviewed held jobs as teachers or educational agents in the community, and a few operated small businesses. The remaining respondents either reported being unemployed or identified as doing unpaid care and domestic work at home, with both groups primarily relying financially on their families or spouses. The monthly average household income of Tierra Grata’s customers ranged from COP20,000 to COP180,000 (US\$5–US\$44).³⁸ On average, respondents earn COP121,666 (US\$30), which is slightly lower than Colombia’s minimum wage of COP1,160,000 (US\$282).³⁹ A small minority of respondents reported relying on the old age pension,⁴⁰ though they did not provide specific income figures from the pension. This suggests that Tierra Grata’s customers come from economically vulnerable groups.

“In our remote location, we often lacked even gas. Then Tierra Grata provided hand lamps, essential for our nighttime needs. Without them, our children struggled to complete homework due to the lack of light, and rushed our meals and tasks, limited by the darkness.”

(Resource saver, 28 years old)

Customers learned about Tierra Grata through various means, including family, neighbors, and community outreach organized by Tierra Grata. Regardless of



how they discovered the business, they all recognized the value of its products which included the ecological dry toilets, the drip water filter, and the solar energy systems. Out of the 3 products, the solar energy systems were notably more popular. Previously, customers had to finish tasks before dark. Now, with solar energy, there

is less pressure to prepare meals at particular times or for children to complete homework in the mornings. Many appreciate the solar energy systems for home illumination and phone charging, finding them more dependable and economical than former gas lamps.



4.3.2 Customer personas

The qualitative research revealed 3 distinct customer personas that use the Tierra Grata products:

- ❖ **The Trailblazer (Early Adopter).** got to know about Tierra Grata and its products when the company first visited their community to introduce the products. Early adopters are often community leaders and were the first to receive information on Tierra Grata products, their installation and their repair.
- ❖ **The Follower.** found out about Tierra Grata through their neighbors, friends, or family members. Their trust in their community inspired them to sign up to receive Tierra Grata's products as well.
- ❖ **The Resource Saver.** was primarily motivated to adopt and keep using Tierra Grata's products in order to save resources of time and money.

These distinct personas were created through a qualitative analysis of customers' characteristics, beliefs, attitudes, and behaviors. Each persona is descriptive, actionable, and unique, reflecting the customer's primary motivations, challenges, and awareness of the benefits they receive from the solar products, and provide insights relevant to their decision to use the product. This understanding enables the Tierra Grata team to empathize with the customers, thereby fine tuning their offerings to increase their reach and more effectively address customer demands.

Below is an in-depth examination of these 3 distinct personas.



Luciana's Bio

Luciana, aged 27, is a respected educator at her local community school and a cherished member of her community. As a single mother to 2 children under 18, she juggles her professional duties with familial responsibilities. On a monthly basis, she manages to provide for her family with an income of COP800,000 (US\$197).

Her educational background has empowered her with the ability to swiftly adopt novel technologies. Her introduction to Tierra Grata came about when the company approached her school to showcase their innovative products. Embracing the opportunity, Luciana became an early participant in Tierra Grata's capacity strengthening program, where she received training in the installation, upkeep, and effective use of solar power products, ultimately earning a certification. Armed with this knowledge, she extends her services in installation and repair of solar power systems to her fellow community members.

Luciana Fernandez

The Trailblazer

Demographic information (of the persona she represents)

Age: 25-30 years old

Marital status: Single

Children: 2 children (likely to under 18) 1-2 children

Education: Likely to be in college

Monthly income: COP800,000-1,180,000 (US\$197-US\$292)

Occupation: Likely to be employed (teacher)

Average hours searching for energy prior to Tierra Grata: 3 hours per day

Motivation

Previously, community members, including Luciana, relied on *mechones*, handmade lamps fueled by ACPM (Aceite Combustible para Motores), diesel fuel available locally. These lamps, while serving their purpose, presented grave concerns including harmful smoke emissions, burns - especially to children - and elevated risks of residential fires.

Luciana's personal encounters with these challenges positioned her to readily understand the transformative potential of Tierra Grata's products, especially for households without electric lighting. As an early participant in Tierra Grata's training initiative, Luciana specialized in installation and maintenance of solar energy systems. She now actively helps her community, not just in installing these solar systems, but also in conducting routine repairs when needed.

Demonstrating the traits of a *trailblazer*, she was among the first in her community to adopt Tierra Grata's solar solutions.

These Solar Panels have been making life easier for us. We have more time to do our crafts and at night, we can do other things because there is light. Also, we attend to the kids early, you can send them to do the homework. As an adult, sometimes you would get busy in the daytime, so in the afternoon, in the evening, in the night time, you would dedicate time to the child. That's the benefit, because the child does homework.

The Trailblazer, 37 years old

Some Behavioral Traits:

- Luciana's willingness to explore new products and services without relying heavily on persuasion or others' testimonials suggests her risk-tolerant nature and comfort with taking risks.
- As a potential community leader, Luciana possesses the capability to not only lead but also to inspire and influence her peers and neighbors.
- Luciana does not merely follow trends. She engages with new products early on recognizing their potential benefits.
- As an educator, she noticed a positive impact in the community, particularly an increase in children's homework completion rates due to better lighting.
- Luciana capitalizes on the extended light during evenings to significantly lighten her caregiving load, enabling her to efficiently handle tasks like dinner preparation without the constraint of darkness.
- Being a devoted single mother, the additional evening hours allow her to bond more with her children and assist them with their studies, underscoring her nurturing and family-oriented values.



Mariana's Bio

At 55, Mariana Alvarez has many roles as wife, mother, homemaker, and a small business owner. While her husband is the primary breadwinner, her children occasionally chip in, bringing their monthly household income to approximately COP460,000 (US\$114).

Initially hesitant about solar energy, past experiences with products that failed prematurely made Mariana wary. She sought review from family and neighbors before warming up to the idea of Tierra Grata's solar panels for her home.

Mariana Alvarez The Follower

Demographic Information (of the persona she represents)

Age: 35-75 years old

Marital status: Likely to be in a free union

Children: 2 children

Education: Likely to have completed primary education

Monthly income: COP300,000-800,000 (US\$74-US\$198)

Occupation: Homemaker and a small business owner

Average hours searching for energy prior to Tierra Grata: 6 hours per day

Motivation

Mariana's first encounters with Tierra Grata's products were through the experiences of her neighbors and relatives. Skeptical of the solar power kit, she preferred to gauge their reliability in other homes first. Once she witnessed their advantages and had discussions with her husband, who agreed to finance the initial installation, she decided to invest. While her husband handles the major part of the monthly payments, their children occasionally contribute.

In the past, Mariana's home depended on smoky gas lamps, leading to soot-covered walls and the persistent scent of smoke on clothes. The ever-present danger of burns or fires, especially with unpredictable gusts of wind, was a constant worry. Tierra Grata's solutions provide an effective answer to those concerns. However, past disappointments made her approach the decision with caution, adopting Tierra Grata's products after many of her neighbors.

Her purchasing behavior can be characterized as that of a *follower*, waiting to see the product's advantages in her community before investing.

Tierra Grata came and brought the program to the whole community. But it happens that not all the community was affiliated, and I was one of those and then I said, "I'll pay for my panel." They charged COP10,000 for the lighting of the panel with the 3 bulbs and the cell phone where one can charge so as not to go out to the street, somewhere else to charge it.

The Follower, 55 years old

Some Behavioral Traits:

- Mariana is wary due to past experiences with subpar products from other organizations. She ensures the quality of a product before purchasing, showcasing her risk-averse nature.
- Mariana is likely to adopt behaviors and trends of her community. Given her trust in their opinions, she often follows their recommendations or actions.
- Mariana's decision to engage with Tierra Grata was significantly influenced by recommendations from trusted neighbors or family members. They further assisted her with paperwork and the collection of her products.
- While Mariana understands the basics of the products, she depends on those trained by Tierra Grata for installation and troubleshooting.
- Staying connected with close family members is important to Mariana. Tierra Grata's products now allow her to keep her phone charged without having to travel.
- Mariana, as the lowest earner among all personas, exhibits significant caution and risk aversion, likely due to limited disposable income affecting her willingness to try new products or risk damages during self-installations.



Adriana's Bio

At 46, Adriana balances motherhood with entrepreneurship, raising 3 children while running a shop that offers second-hand items and her handcrafted items. This enterprise earns her roughly COP770,000 (US\$191) monthly.

Recognizing the time and financial savings offered by Tierra Grata's products, Adriana incorporated all 3 of their products into her home: the ecological dry toilets, drip water filter, and a solar panel.

Adriana Diaz

The Resource Saver

Demographic Information *(of the persona she represents)*

Age: 45-60 years old

Marital status: Single

Children: Likely to have 2-3 children

Education: Less than secondary education

Monthly income: COP770,000 (US\$191)

Occupation: Small business owner

Occupation: Likely to be an employee in a private company

Average hours searching for energy prior to Tierra Grata:

5 hours per day

Motivation

Introduced to Tierra Grata's suite of products by a neighbor, Adriana quickly saw the utility of each for her household. Before, the family depended on a neighbor's bathroom. Now, they have the luxury of privacy with their own facilities. Her previous expenditure on purchasing water three times a month, costing COP30,000 (US\$7) has been negated by the new water filter. The solar panels further alleviate expenses, eliminating the COP10,000 monthly cost of ACPM fuel for gas lamps. This cost efficiency has allowed her to invest in better nutrition for her family and set aside savings for other needs.

Moreover, the solar panels and water filter have given Adriana and her family time, reclaiming the 3 hours they used to spend fetching water and gathering firewood. This additional time has translated into more moments dedicated to her craftwork, helping her children with school assignments, and watching her children enjoy under the solar-powered lights at the community fields during nighttime games.

In essence, Adriana embodies the traits of a *resource saver*, aiming for optimal use of both time and money.

When we are in the communal house, we have to go to the neighbor to use the bathroom. Now we don't need to. The water, we don't need to pay for it. And when we're going to walk to the neighbor in another neighborhood, I don't have to bring a lamp in my hand because it is illuminated. It's good, it has advantages.

Resource Saver, 52 years old

Some behavioral traits

- Adriana is resource-conscious, evident in her adoption of all 3 Tierra Grata products, even when most around her only use the solar panels. Her choices are rooted in a rough calculation of cost-benefit analysis.
- As the sole provider, she showcases financial prudence by maximizing available resources to maintain control over her finances.
- Loyalty defines Adriana's relationship with Tierra Grata. She utilizes all their solutions without reservations.
- She is pragmatic about accepting assistance from other organizations that have come to her community since the communal house she currently stays in was built by a different organization.
- Adriana's resourcefulness is prominent in her efficient utilization of time. With the hours saved, she refines her craft while her children enjoy safe recreational activities in the well-lit community field.



4.3.3 Journey maps

The personas are illustrative of different customer groups and how they discover, evaluate, and decide to purchase the Tierra Grata solar lights. In this section, journey maps are used to provide additional detail to describe the step-by-step emotional experience that customers undergo from first awareness of Tierra Grata to finally making a purchase decision and using the solar light.

Journey maps serve as a visual representation of the highs and lows that existing customers navigate as they use the solar products. This map can enable Tierra Grata to identify opportunities for improvement, making sure the different needs, desires, and constraints of distinct customer segments are factored into the ongoing development and refinement of their products.

The journey to using the Tierra Grata solar lights starts with Awareness, in which potential customers discover the product. Consideration follows as they weigh their options and gather more information. Decisions are made in the third stage, where customers decide to purchase the product. This is followed by purchase and installation. The next stage, product usage, marks their first experience using the product and experiencing its impact in their day-to-day life. The journey ends with Loyalty & Advocacy, where the customers remain active users of the Tierra Grata products and recommend it to others.

Table 1: The process a customer goes through while purchasing Tierra Grata products

	Pre-product purchase		Product purchase		Post-product purchase	
Stage	Awareness and mobilization	Consideration	Decision	Payment and purchase	Product usage	Loyalty and advocacy
Activities	Customer seeks information or is made aware of the product	Customer evaluates the need for the product and discusses its purchase	Customer then approaches the seller to make the purchase	After making the initial payment and registering their details, the customer brings the product home	Customer begins using the product, and the family begins to experience its benefits	Customer reviews the product after its sustained use and promotes it
Customer goals	<p>Typically, a customer becomes interested in the new solar lights after observing their use in neighboring households. They see how the solar light allows them to work and cook even after dark.</p> <p>Potential customers often engage with Tierra Grata representatives within their community aiming to understand the product's features or to initiate installation. Key information they seek includes details on payment options, product benefits, and costs.</p>	<p>Women tend to evaluate the product's effectiveness through experiences of existing users in their community network.</p> <p>Purchase decisions are often made after thorough considerations of benefits versus costs and discussions with family members.</p>	<p>A customer typically connects with Tierra Grata either through a friend or by making product requests through Tierra Grata representatives.</p>	<p>The customer makes the initial payment, following instructions to either collect the product from the office or a designated station in their community. Here, customers wait a few days between the payment and the call to receive the product.</p> <p>The customer then brings her new product home.</p>	<p>Gradually, the customer becomes accustomed to using the product, integrating it into their daily routine.</p> <p>The customer begins to enjoy the additional free time, given that they can now work during the night due to the availability of a light source.</p>	<p>Customers evaluate their satisfaction with the product and their willingness to continue its usage.</p> <p>Subsequently, they recommend the product to friends, family, and community members who may also benefit from these products.</p>

 Emotions	 Curious	 A mix of excitement and caution, requires effort	 Restful and satisfied	 Excited	 Happy but slightly stressed about repayment	 Relaxed and satisfied
 Levers	<p><i>Community outreach</i> Tierra Grata enjoys high trust levels from its existing customers, who openly share their positive product experiences with family and friends. These referrals directly connect the business with potential customers.</p> <p>Marketing representatives conducting on-the-ground demonstrations help potential customers to understand the product's benefits.</p>	<p><i>Social influence</i> Favorable first-hand experiences from families and friends who are satisfied with the products.</p>	<p><i>Family support</i> The whole family's endorsement of the product empowers women to make the purchase decision. After the decision is made, they wait for Tierra Grata to give them instructions on the pick-up of the product and after, the installation procedure.</p>	<p><i>Flexible payment</i> The brand has multiple payment options which allows a customer to obtain the product and pay later.</p> <p><i>Installation</i> After customers receive their product, a Tierra Grata representative contacts them to schedule an installation appointment.</p>	<p><i>Ease of use</i> The products are user-friendly. The solar light is self-charging, utilizing sunlight during the day for use at night.</p> <p><i>Free time</i> The solar light significantly increases free time for customers. Instead of rushing to complete work before dark, they can continue their tasks into the night, leading to a more relaxed lifestyle.</p> <p><i>Health benefits</i> Prior to the solar light, customers relied on oil lamps, which produce harmful smoke.</p> <p>The water filter improves the taste of water, making it cleaner and fresher.</p>	<p><i>High satisfaction</i> Most women express satisfaction with the products and readily recommend them to friends and family.</p>
 Barriers	<p><i>Lack of diverse networking</i> Tierra Grata only serves communities that have explicitly requested or purchased the product. Their representatives do not proactively venture out to other communities, leading to a</p>		<p><i>Lack of information</i> Some customers face challenges understanding delivery methods or pickup logistics and rely solely on Tierra Grata agents for this information.</p> <p><i>Lack of community exposure</i></p>	<p><i>Lack of clear instructions</i> After placing an order, customers often face ambiguity regarding the next steps, leaving them reliant on a Tierra Grata representative for further information. It takes a while for the representative to reach out, sometimes over a month.</p>	<p><i>Maintenance</i> Customers bear the responsibility and costs for product maintenance and repair. Repairs and maintenance are not frequent.</p>	<p><i>Inaccessibility</i> Tierra Grata's reach does not extend to all its potential customers' locations.</p> <p><i>Lack of traditional marketing</i> Many community members lack access to phones or the internet, and so are unable to see the advertisements or</p>

	widespread lack of awareness.		<p>Tierra Grata does not visit certain communities due to their remoteness or unknown conditions.</p> <p><i>External factors</i> Factors such as transport or extreme weather conditions such as heavy rain or intense sun, can deter Tierra Grata from setting up products in communities. These factors could potentially cause product malfunctions.</p>	<p><i>Inconvenient pickup locations</i> Products are often delivered to a community site far from customers' homes, which can take up to an hour to reach.</p> <p><i>Delayed and ineffective installations</i> Transportation difficulties can lead to weeks-long delays in installations.</p> <p>Additionally, some installations, particularly of solar lights, are not always carried out effectively. If cables break or get damaged, customers must arrange and pay for repairs themselves.</p>		communicate about the products.
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4.3.4 Tierra Grata's impact

This section presents the impact of the Tierra Grata products on customer's daily lives, based on qualitative data. The quotes below are the customer's own words.

All customers reported experiencing positive changes in their lives since using the Tierra Grata solar lights and water filters, including more time to spend with family at night, improved health conditions, and increased free time. The impact has been consistent across all customer personas.

Qualitative evidence of theory of change

Long-term result(s):

LTO1: Improved health outcomes and well-being for the community, with women also experiencing reduced time burden as a result of improved public infrastructure and available household services

- After the introduction of the Tierra Grata products, specifically the solar lamps, women reported significant changes in their daily routines and overall health. Previously, the pressure to finish all tasks by 7pm was intense due to the impending darkness, leading many to rely on oil lamps or firewood. These sources not only caused health issues like asthma and respiratory complications from smoke inhalation but also restricted nighttime activities. Now, with solar lamps, not only are these health concerns mitigated, but women also enjoy a more flexible schedule, extending work or leisure post-dinner without haste. The consistent and safe lighting not only reduces the chances of nighttime accidents, especially when fetching water or using the bathroom but also offers women an added sense of security at night.

"We don't have to use an oil lamp to look at the pictures, and we go directly to our living room, to our kitchen. Now it's just a matter of turning on the light bulb. You do your own thing, you relax more, it's a different quality of life."

Follower, 55 years old

"Of course, we no longer have to breathe smoke, we no longer have to spend unnecessary money on gas, we no longer have to get up at night to light a gas lamp."

Follower, 55 years old

"Trust, this [Tierra Grata solar light] generates confidence. Because you no longer have to go out with the lamp in your hand, you can drink a glass of water, it will not hurt you. It looks like you can go to the bathroom and people will not look through a hole. That builds confidence."

Trendsetter, 27 years old

Medium-term result(s):

MTO1: Improved infrastructure and availability of clean water and sanitation facilities lead to a reduction in the time women spend caring for ill family and community members.

MTO2: Reduction in the number of days children miss school due to improved public infrastructure.

MTO3: Reduction in care expenses and increased savings.

MTO4: Improved behaviors and practices around maintaining and managing community infrastructure and available household services.

MTO5: Women and men act as 'guardians' to safeguard and maintain the quality of services and infrastructure.

- **Reduced time on domestic work:** Women have reported a significant change in their caregiving responsibilities, primarily in terms of time management. Instead of hurrying to complete tasks before dark, they can now extend their work into the evening, thanks to the solar lighting. Women reported saving up to 3 hours previously spent on fetching water and



gathering firewood.

“I can now cook after it is dark, I do not have to hurry when the sun goes so I have more time to relax and do my other work. I can spend time with my children because I do not have to do everything before it is dark.”

Follower, 55 years old

- **Reduced expenditure:** With the adoption of Tierra Grata products, women have realized significant financial benefits. They no longer incur the COP1,000 charge for each phone charge, nor do they face the monthly COP10,000 expense for ACPM fuel for gas lamps. These ongoing costs are replaced by a one-time investment in the product, which, powered by solar energy, incurs no additional operating charges. Moreover, those utilizing Tierra Grata’s water filters experience added savings, as they no longer need to buy water three times a month.

“Well, it has saved me money because for charging the phone, sometimes I have to send it to the town and I have to pay for the service of charging it there. They charge COP1,000 per cell phone charge. Well, it depends on how long it takes. Also that has saved me from buying oil. Although at night I still sleep in the darkness but if I need it at night, when you wake up and you need to turn a light on, it's like that.”

Follower, 55 years old

- **Impact on children:** The use of solar lighting has greatly benefited children in particular. Before, they felt pressed for time, hurrying through their homework in the waning hours of daylight. Now, they can comfortably extend their study hours into the evening, benefiting their education. Moreover, the consistent and safe lighting allows children to play freely after sunset, alleviating worries about nighttime accidents.

“I feel satisfied, I speak for myself first because I fear darkness. So I feel very satisfied because we now have lighting at night and we can sit down with our children to do their homework, because sometimes we get busy and we don't have time to sit down. Doing it at night is easier now, because we can take our children and sit down and do our homework at night. Some parents and members of the community are also satisfied, they are quite pleased with the illumination we have at night because at night they can sit down to talk.”

Follower, 55 years old

“All of us who live in the community, we have benefited from these solar panels, the children, because as I was telling you, they do their activities. We, the adults, because we also do our handicrafts, we advance things at night so in the morning you can have more time.”

Trendsetter, 27 years old

- **Tierra Grata installation:** The Tierra Grata technician handles the initial setup of the solar lights. Throughout this process, customers are educated about the steps, gaining insights on troubleshooting and potential replacement procedures. This hands-on approach empowers customers to address malfunctions independently and also boosts their confidence. Further, both men and women from these communities, having learned this installation guidance, have started offering installation services to their neighbors.

“Well, normally, it's easy for those who learn and put effort in learning. It is easy because Tierra Grata would normally bring first the technicians from Cartagena and install them here in our communities. Then they trained us, which made us more confident to use and fix the product if it was broken. We are able to do this ourselves.”

Trendsetter, 27 years old

Short-term result(s):

STO1: Increased use and uptake of basic service solutions among rural households and communities.
STO2: Improved knowledge and capacities within rural communities and households to sustainably use available lighting infrastructure.



- **Affordable products:** Tierra Grata promotes broader uptake of their products in communities by offering tailored payment plans. Customers can choose from a variety of packages or “combos” suited to their financial capabilities. For those consistently making payments over several months, an added incentive of a free month is provided, a gesture especially valued by women. The availability of installment payment options further ensure that the products are not just affordable, but also financially manageable, driving a wider adoption within the communities.

“Tierra Grata also gave a lot of alternatives for the payment. Lately, they offer to pay in combos, the ones that pay COP20,000, if you pay 4 months in a row, they would give a month as a gift. So the person would have 5 months paid. They did the same for the ones that pay COP13,000 or those who pay COP10,000. They also did the combo for them. In order to give more ease of payment.”

Follower, 55 years old

Products

- Installing basic service solutions within the rural communities Household services: solar energy systems, dry toilet and water filters Public infrastructure: public lighting for streets and parks.
- Develop and design content on accessing and maintaining public and household lighting infrastructure within rural communities.

- **Product satisfaction:** Tierra Grata solar products received a satisfaction score of 4.1 out of 5 from the respondents, with 89% reporting satisfaction. Tierra Grata’s solar lighting system offers significant advantages to its customers, with its sustainability and user-friendly design being standout features. The light endures throughout the entire night approximately 8 hours, and conveniently recharges during the day for use again in the evening. The majority of customers, who have been using the products for about 5–6 months, express their satisfaction with this system.

“I get light all night, I don’t have to live in the dark anymore when it is night. I don’t have fear because I have the light to get up and go to the bathroom and get water. When the light finishes, it will recharge in the morning so that I can use it the next day”

Follower, 55 years old



5 - LOOK FORWARD

5.1 Growth and sustainability plans

Tierra Grata's primary focus is currently on strengthening its portfolio and presence in the Colombian Caribbean market before expanding into new international markets. The company is considering exploring opportunities in countries like Peru due to their similarities with Colombia. To support its expansion efforts in Colombia and enhance the "Casa Grata" program's reach, Tierra Grata actively seeks funding of US\$350,000-US\$600,000 through low-interest debt or equity. It aims to find a funding partner who shares its core values of environmental protection and providing green energy and sanitation solutions for low-income rural communities.

Tierra Grata aspires to play a significant role in Colombia's transition to renewable energy, with a particular focus on the Guajira region, which lacks access to the national grid. The company plans to establish an office in Guajira to address the energy needs of approximately 40% of the population without electricity. In pursuit of this goal, Tierra Grata has already engaged with key players such as Celsia Energy, Enel Foundation, and the USAID's "Energy for Peace" initiative to participate in large consortia that would provide leverage for bidding on projects. Additionally, Tierra Grata intends to relocate its warehouse from Cartagena to Guajira.

By 2025, Tierra Grata aims to expand its impact by introducing technology beyond basic services, including internet connectivity to rural communities. This endeavor will require establishing new partnerships; for example, Tierra Grata has recently initiated a collaboration with the Internet Society.

In strengthening Tierra Grata's financial model, establishing partnerships with financial institutions and microfinance entities presents a promising avenue. These organizations could be instrumental in enhancing the current microcredit offerings, potentially increasing the reach and impact of Tierra Grata's services. By collaborating with these entities, the organization could secure more favorable terms or broader financial support, thereby making their solutions accessible to a larger number of families. Such partnerships amplify the financial capacity of Tierra Grata and also align with the social objectives of many financial institutions, creating a mutually beneficial relationship that extends the scope of support to rural communities.

5.2 Ask of investors and stakeholders

Tierra Grata actively seeks both financial and non-financial support. Financially, the organization is seeking investments to expand its energy projects, drive scalability, and lead



other impactful initiatives. Concurrently, Tierra Grata is eager to obtain non-financial assistance to address key areas of improvement and enhance operational efficiency

Financial needs

Tierra Grata is looking to secure funding of US\$250,000 to develop and scale more energy projects. Additionally, it is interested in raising approximately US\$100,000 to spearhead other initiatives.

Non-financial needs

Tierra Grata aims to enhance leadership skills and seniority within its team, primarily consisting of junior members and project managers responsible for project activities at all stages.

Furthermore, the organization requires additional engineers and technicians to provide expert advice. Currently, Tierra Grata has partnerships with universities for short-term research projects and guidance. However, there is scope to further develop collaborations in various fields with academic institutions and innovation centers. Tierra Grata recognizes it needs to strengthen its communication strategies by carefully crafting and delivering its messages and ensuring it establishes a strong connection with its target audience.

5.3 Lessons learned

Reflecting on the initial operational hurdles faced by Tierra Grata, the CEO acknowledges the steep learning curve the team encountered. Inexperienced and driven by a strong desire to learn, they relied heavily on trial and error, unaware of potential risks their actions entailed. Looking back, the CEO realizes that these obstacles could have been mitigated by enlisting someone with necessary expertise to guide the organization effectively during its formative stages.

The journey of Tierra Grata, from a mere concept to a full-fledged venture, was significantly bolstered by collaborations with private companies and other organizations. These partnerships proved to be of utmost importance in both the launch and evolution of Tierra Grata. By aligning with groups that shared a similar vision and values, Tierra Grata was able to amplify its impact, pool resources, and leverage collective expertise. These strategic alliances provided crucial support and validation in the early stages and also played a pivotal role in shaping the organization's direction and fostering its growth.

Another valuable lesson learned was to view the community not only in terms of immediate needs but also in terms of its potential. Tierra Grata shifted its perspective to consider communities as active participants rather than passive beneficiaries, which led to the development of a sustainable business model. This approach involved assessing the financial capabilities of the community and creating flexible payment structures that ensure affordability and long-term access to technology. Engaging community members in co-creation activities, such as focus groups, helped build credibility and trust, and expanded



influence beyond a core group. Moreover, Tierra Grata went beyond mere activity engagement by hiring individuals from rural communities within the value production chain and inviting community leaders to join its board. This move, despite the challenges posed by educational gaps, highlights Tierra Grata's commitment to social inclusion and community-led development.

5.4 Recommendations for policymakers and investors

In the current landscape, the care economy stands out as a crucial focal point, commanding attention from both policymakers and investors. Their decisions can either propel growth or inadvertently create hurdles. Policymakers craft regulations intending to facilitate progress, yet these can unintentionally become barriers. Investors are advised to focus on enterprises that yield tangible social benefits and prioritize offering constructive feedback in post-investment rounds. This approach could reduce uncertainty for entrepreneurs, supporting continuous improvement.



Policymakers

Policymakers play a vital role in facilitating development, but regulations can sometimes unintentionally create obstacles. The challenge arises when regulations intended to promote growth inadvertently transform into barriers. For example, public tenders or bidding processes offer an excellent opportunity to expand impact and increase outreach. However, it is often observed that the terms of reference tend to favor larger organizations, overlooking the specific expertise of growing ones like Tierra Grata, which focuses on rural communities.

Similarly, when Tierra Grata collaborates with public organizations, it consistently goes above and beyond to overcome logistical hurdles or challenges that may not directly fall under its responsibility. Unfortunately, these additional efforts are rarely appreciated or recognized by public organizations. Therefore, as the CEO emphasizes, it is crucial to acknowledge the valuable contributions of actors like Tierra Grata, since its goal is not to compete but to collaborate with public entities.



Investors

Investors can identify and support promising companies that could be profitable. However, it is common for them to quickly dismiss companies at first glance during investment rounds, believing they lack growth potential. This happens even with impact investors, from whom a social entrepreneur would expect more balanced metrics with more ambitious impact objectives than a traditional investor. For this reason, the CEO of Tierra Grata highlights the importance of investor feedback during investment rounds. Entrepreneurs often are left without knowing why their proposals have been rejected, leading to speculation and uncertainty. Feedback from investors, ideally constructive feedback, is crucial in guiding entrepreneurs towards continuous improvement. This practice can greatly enhance learning and development, especially for entrepreneurs in the growth and consolidation phases of a company.

ENDNOTES

¹ Top manager refers to the highest ranking manager or CEO of the establishment. This person may be the owner if he/she works as the manager of the firm.

² Percentage of female 18–64 population who are either a nascent entrepreneur or owner–manager of a new business, divided by the equivalent percentage for their male counterparts.

³ World Bank, Data Bank. (2021). World Development Indicators. <https://databank.worldbank.org/source/world-development-indicators#>

⁴ World Bank, Data Bank. (2022). World Development Indicators. <https://databank.worldbank.org/source/world-development-indicators#>

⁵ World Bank, Data Bank. (2022). World Development Indicators. <https://databank.worldbank.org/source/world-development-indicators#>

⁶ World Bank, Data Bank. (2021). World Development Indicators. <https://databank.worldbank.org/source/world-development-indicators#>

⁷ World Health Organization. (2011). Taking Sex and Gender Into Account in Emerging Infectious Disease Programmes: An Analytical Framework. <http://iris.wpro.who.int/handle/10665.1/7977>

⁸ National Health Institute. (2019). INS: 17,549 muertes en Colombia están asociadas a mala calidad del agua, del aire y a la exposición a combustibles pesados. <https://www.ins.gov.co/Comunicaciones/Comunicados%20de%20prensa/Carga%20Ambiental%20en%20Colombia%20Prensa%20INS-%2021%20de%20enero%20de%202019.pdf>

⁹ Sommer, M., et al. (2016). A time for global action: addressing girls' menstrual hygiene management needs in schools. *PLOS Med.* 13:e1001962. DOI: 10.1371/journal.pmed.1001962

¹⁰ The Economic Times. (2020). Access to electricity increases literacy rates: Economic Survey.

¹¹ OECD Development Centre. (2014). Unpaid care work: The missing link in the analysis of gender gaps in labor outcomes. https://www.oecd.org/dev/development-gender/Unpaid_care_work.pdf

¹² Statista. (2023). Renewable energy market size worldwide in 2021, with a forecast for 2022 to 2030. <https://www.statista.com/statistics/1094309/renewable-energy-market-size-global/>

¹³ Grand View Research. (2022). Renewable Energy Market Size, Share & Trends Analysis Report By Product (Bioenergy, Hydropower, Wind, Solar), By Application (Residential, Commercial), By Region (Europe, Asia Pacific), And Segment Forecasts, 2023 – 2030. <https://www.grandviewresearch.com/industry-analysis/renewable-energy-market>

¹⁴ United Nations. (2023). Sustainable Renewable Energy Key to Unlocking Developing Countries' Potential, Achieving Global Goals, Speakers Tell High-Level Political Forum. <https://press.un.org/en/2023/ecosoc7136.doc.htm>



¹⁵ World Bank. (2021). Report: Universal Access to Sustainable Energy Will Remain Elusive Without Addressing Inequalities. <https://www.worldbank.org/en/news/press-release/2021/06/07/report-universal-access-to-sustainable-energy-will-remain-elusive-without-addressing-inequalities>

¹⁶ USAID. (2022). Colombia Climate Change Country Profile. <https://www.usaid.gov/climate/country-profiles/colombia>

¹⁷ S&P Global. (2021). Colombia's prospects for renewables. <https://www.spglobal.com/marketintelligence/en/mi/research-analysis/colombias-prospects-for-renewables.html>

¹⁸ S&P Global. (2021). Colombia's prospects for renewables. <https://www.spglobal.com/marketintelligence/en/mi/research-analysis/colombias-prospects-for-renewables.html>

¹⁹ International Trade Administration. (2023). Energy Resource Guide. Colombia - Renewable Energy. <https://www.trade.gov/energy-resource-guide-colombia-renewable-energy-2>

²⁰ The Business Research Company. (2023). Water and Sewage Global Market Report 2023. <https://www.thebusinessresearchcompany.com/report/water-and-sewage-global-market-report>

²¹ World Health Organization. (2022). Sanitation. <https://www.who.int/news-room/fact-sheets/detail/sanitation>

²² United Nations. (2014). Every dollar invested in water, sanitation brings four-fold return in costs – UN. <https://news.un.org/en/story/2014/11/484032>

²³ Community Action Boards are local civic, social and community management organizations with legal capacity and private property rights, made up of residents who volunteer to identify, formulate, execute, manage and evaluate community development plans, programs and projects. <https://latinno.net/en/case/5111/>

²⁴ The revenue conversion utilized an exchange rate of 4,000 Colombian Pesos (COP) to 1 US Dollar (USD).

²⁵ Clean energy solutions include lamps, solar light pole installations and kits.

²⁶ Tierra Grata offers kits of solar energy systems designed for households, which include solar panels and light bulbs.

²⁷ Clean water solutions include filters and dry toilets.

²⁸ For the revenue conversion, an exchange rate of \$COP4,000 to 1 USD was used.

²⁹ For the EBITDA conversion, an exchange rate of \$COP4,000 to 1 USD was used.

³⁰ 2X criteria can be found [here](#).

³¹ We assessed businesses that worked in the sectors of energy and emissions or water and sanitation against 4 climate and gender justice criteria related to: environment and land use; health, safety and security; education and training; and time use.

³² Businesses were assessed on a 21 point scale, with scores of 0-7 being gender unintentional, scores of 8-14 being gender intentional and 15-21 being gender transformative.

³³ Businesses were assessed on a 12 point scale where 0-4 is gender unintentional, 5-8 is gender unintentional and 9-12 is gender transformative.



³⁴ Tierra Grata refers to the people in the community that provide technical assistance to its basic service solutions as 'guardians'. They are provided with capacity building training to manage the infrastructure installed by Tierra Grata.

³⁵ Tierra Grata. (2023). Informe de Gestión 2022. <https://drive.google.com/file/d/1NBqfwFpO-Spl-85WS8R3WbflJ-C9tKPo/view>

³⁶ The research team conducted 8 in-depth interviews with customers of Tierra Grata's solar products: Luz Grata and Casa Grata. Tierra Grata shared a list of customers who fulfilled the following criteria: female customers, have been a customer of the solar products for a minimum of 3 months and a maximum of 6 months. The customers for interview were selected through purposive sampling to ensure diversity in age, occupation, socio-economic status. An interview guide was used to ensure consistency in the questions asked, although some follow-up questions were added as necessary to explore topics in more detail. The interviews were conducted in Spanish, audio-recorded and transcribed verbatim for analysis. The data collected from these interviews was analyzed thematically in NVivo to identify key themes and patterns in participants' responses. Given the small sample size and purposive sampling, one of the limitations of our analysis is that it might not be representative of the different socio-demographics of all Nazava customers.

³⁷ While the research team initially set out to conduct 9 interviews, the study ultimately relies only on 8 interviews. Securing the 9th interview is challenging, primarily due to the dual constraints: the remoteness of their location and the inherent challenges of the remote research.

³⁸ US\$1 = COP 4111.52 Retrieved from: <https://totoro.banrep.gov.co> on 29 August, 2023.

³⁹ Castellanos, A. (2022). Colombia: Looking Ahead In 2023. <https://www.mondaq.com/employee-benefits-compensation/1279566/looking-ahead-in-2023--columbia#:~:text=Wage%20increase%3A%20The%20minimum%20wage,2613%20of%2028%20December%202022>

⁴⁰ According to Colpensiones, the national pension common fund administrator, of the 1,433,966 retirees in 2020, the average pension was distributed as follows: 52.7% of total retirees received an average pension of COP 877,803, 24.6% received COP 1,246,656, and 9.8% received on average COP 2,133,189. The rest received more than \$3,000,000. <https://www.bloomberglinea.com/2021/10/25/cuanta-gente-se-pensiona-al-ano-en-colombia-y-con-cuanta-plata/>



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