



# **GROWTH NEXT-GENERATION AGRICULTURE (GAN)**

INSTRUMENT ANALYSIS  
SEPTEMBER 2024



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# Growth Next-Generation Agriculture

LAB INSTRUMENT ANALYSIS

September 2024

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## DESCRIPTION & GOAL

Growth Next-Generation Agriculture is a debt fund accelerating Brazil's transition to regenerative agriculture to build climate resilience. It finances biological and other inputs that contribute to soil health, strengthening local SMEs and the entire supply chain.

## SECTOR

Sustainable Agriculture  
Climate Resilience

## FINANCE TARGET

GAN seeks to raise BRL 250 million (USD 44.4 million) as a first fund to demonstrate its commercial viability and offer investors market-rate returns.

## GEOGRAPHY

For demonstration fund: Brazil  
In the future: Latin America

The Lab identifies, develops, and launches sustainable finance instruments that can drive billions to a low-carbon economy. The 2024 Lab cycle targets four thematic areas (mitigation, adaptation, high-integrity forests, and sustainable agriculture and food systems) and five geographic regions (Brazil, East & Southern Africa, India, Latin America & the Caribbean, and the Philippines).

## AUTHORS AND ACKNOWLEDGEMENTS

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## SUMMARY

The Growth Next-Generation Agriculture (GAN) is a debt facility that furthers the transition towards regenerative agriculture in Brazil by facilitating the sale of biological-inputs. Farmers across Brazil continue to rely heavily on chemical inputs and struggle to purchase biological-inputs (bio-inputs) due to an inability to access credit. Chemical inputs have disastrous environmental consequences and exacerbate farmers' vulnerability to climate change. GAN addresses this issue by providing credit to biological-input SMEs using a proprietary artificial intelligence (AI) credit assessment tool and leveraging a technical assistance facility.

Assessed against the Lab criteria, GAN is:

- **Innovative:** GAN is Brazil's first debt fund to strategically invest in the bio-input market. GAN applies the tested financial structure of aggregating receivable contracts to Brazil's nascent biological-input sector. The fund also uses a proprietary AI credit assessment score that can evaluate farmers' creditworthiness for SMEs.
- **Actionable:** The GAN team comprises Traive Finance and Folio Institute. Traive has already successfully sold asset backed securities (securitizations or ABSs)<sup>1</sup> for biological-input SMEs and has been a pioneer, participating in similar structures (CRA RCF – Responsible Commodities Facility, Lab alumni) as a specialized credit consultant. Folio works with farmers and academic institutions to promote regenerative agriculture. Traive's extensive experience with Brazilian securitizations and Folio's deep familiarity with the Brazilian agricultural supply chain make the partnership well-equipped to implement GAN.
- **Financially Sustainable:** GAN combines different securitization structures to lower risk and provide a competitive return for its senior tranche. High-risk, concessional capital is a buffer (first-loss capital), further protected by the diverse risks of SMEs' asset-backed securities (ABS) and their subordinated tranches. Additionally, Traive's credit analysis will attract commercial investors. Concessional capital will be gradually reduced as the investment strategy proves successful in future funds.
- **Catalytic:** GAN capitalizes on the growing momentum to transition agriculture in Brazil towards regenerative practices. Its ability to tap into this growing demand enables the fund to potentially capture a large share of the Brazilian input market. It mainly serves as the gateway for engaging producers and bridging the gap to the mass market. GAN's fund structure could be replicated across Latin America and other receivables markets.

For these reasons, the Lab Secretariat recommends endorsing this instrument. GAN is currently looking to raise BRL 250 million (USD 44.4 million)<sup>2</sup> for its first fund.

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<sup>1</sup> In Brazil, there is a specific kind of asset backed securities for the agricultural sector called a CRA (Agribusiness Receivables Certificate). This is debt security representing a promise of payment linked to receivables from the referred sector.

<sup>2</sup> Exchange rate as of 26 July 2024. This applies to all currency conversions in this report.

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## CONTEXT

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*Brazil's agricultural growth has relied on synthetic fertilizers and additives, which have harmed soil health and the environment. Shifting to regenerative practices is needed to restore soil health, improve water quality, increase resilience, and reduce carbon footprint.*

**At a global scale, the agricultural sector is expected to be the most severely impacted by climate change compared to other economic sectors** ([Castro, 2020](#)). In Brazil, available cropland could decrease by up to 35% under a high-emissions scenario, leading to significant reductions in soybean and corn production ([Zilli, 2020](#)). This would have disastrous consequences for farmers, the broader Brazilian agricultural value chain, domestic consumers, and global commodity prices. The primary drivers of these climate impacts are increased temperature variability and changing precipitation patterns ([Santos, 2022](#); [World Bank, 2024](#)).

**To address these challenges, accelerating the transition to a resilient agricultural system is crucial.** Synthetic fertilizers and pesticides have degraded the environment by destabilizing soil microbiomes, ecosystems, and water tables due to unabsorbed residues. Research shows that regenerative agriculture can significantly improve soil health, enhance water retention and management, boost biodiversity, and reduce costs ([NRDC, 2023](#)). These regenerative practices offer long-term benefits by enriching the soil with nutrients and organic matter, improving water retention, and maintaining land profitability for farmers.

**Integrating regenerative agriculture practices is also essential for Brazil to meet its climate goals.** In 2023, as part of its updated Paris Agreement commitment, Brazil pledged to reduce greenhouse gas (GHG) emissions by 48% by 2025 and 53% by 2030 compared to 2005 levels ([Brazil, 2023](#)). With 27% of Brazil's emissions coming from agriculture and livestock, transitioning to regenerative practices will be key in reducing emissions.

**Despite the benefits, companies selling biological inputs face challenges in deployment.** In Brazil, large producers of synthetic inputs control a significant portion of farmer financing. While nationwide figures are unavailable, in Mato Grosso, the main three companies control an estimated 47% of the credit market for farmers. They offer a full package of products and services, including inputs, financing, training, and technical assistance, creating a system that incentivizes farmers to rely on them.

Growth Next-Generation Agriculture (GAN) seeks to replicate this system by helping biological input SMEs provide financing and technical assistance, offering farmers a viable alternative that encourages regenerative practices. Developed by Traive and the Folio Institute, GAN is a credit fund with a technical assistance facility. Together, Traive and the Folio Institute bring deep expertise in regenerative agriculture and agricultural finance in Brazil. By replicating the business model of large synthetic producers, GAN fills a critical gap, incentivizing the transition toward regenerative agriculture and enabling the Brazilian agriculture sector to become more resilient and achieve its climate goals.

# CONCEPT

## 1. INNOVATION

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*GAN is the only fund that invests in providing growth capital to small and medium-sized (SME) biological-input companies in Brazil. These SMEs on-lend to their customers to support bio-input purchases, fostering the regenerative agriculture economy through credit.*

### 1.1 **BARRIERS ADDRESSED: ACCESS TO CREDIT, HIGHER PERCEIVED RISK, LACK OF WORKING CAPITAL, TECHNICAL EXPERTISE**

Brazil is a global leader in the production of coffee, sugar, cacao, soybeans, corn, cotton, and meats, among other agricultural products. This dominance has largely been fueled by credit facilities provided by agri-processors (20%), commercial banks, and government-subsidized programs (33%) (Valdes, 2022). However, this funding is primarily directed toward conventional farming—large-scale operations that rely on synthetic fertilizers and other inputs. For SMEs focused on regenerative agriculture, whose customers also rely on credit, these funding sources are largely inaccessible.

As a first-of-its-kind product, GAN addresses the funding gap by leveraging blended capital to develop affordable credit solutions in this higher-risk market. Because bio-inputs are considered non-traditional and riskier than chemical alternatives, investors typically demand higher returns to compensate for the perceived increased risk. GAN overcomes this challenge through a blended finance fund that operates in two ways. First, it attracts commercial investment by integrating investors with different risk appetites, using at-risk, concessional capital in a junior tranche to support a senior tranche. Second, Traive's proprietary AI platform provides a robust evaluation methodology that accurately assesses a farmer's credit risk. Traive has been refining this advanced technology in Brazil since 2019.

Through Traive's platform, biological-input SMEs can offer credit to farmers by packaging these receivables into securitizations. As a result, bio-input SMEs do not need to extend credit directly but rather through an off-balance sheet securitization. This structure is common in Brazil and used in agriculture and across other industries. This offers two major advantages:

1. A user-friendly platform for SMEs to create and manage financial products.
2. A streamlined underwriting and credit management process driven by AI.

In this model, farmers purchase bio-input products by signing a promissory note with the seller (either the bio-input SME or an intermediary like a cooperative or ag-retailer) and repay the purchase after harvest. GAN releases funds to the SME or intermediary upon receipt of the promissory note or other credit documentation. These underlying receivables typically range from USD 5,000 to 50,000 in local currency, with four to eight months short repayment terms.

GAN also provides working capital and training to biological input companies to support their growth. Traive's platform supports this, enabling the management of the credit, including origination and due diligence. In addition, GAN will implement a technical assistance (TA) facility alongside the fund. This TA facility will provide capacity building for

stakeholders (farmers, SMEs, cooperatives, etc.), helping them develop technical knowledge and training in regenerative agriculture practices. These features allow GAN to compete with large chemical companies and banks.

**Table 1: Market barriers and GAN added value**

Market Barrier	GAN Added Value
Limited funding for regenerative agriculture	GAN mobilizes capital for regenerative agriculture by offering investors market-rate returns through a tested debt instrument.
High perceived risk of farmer nonpayment	Traive utilizes its proprietary AI risk assessment tool to assess the creditworthiness of each farmer and biological-input SME.
Lack of working capital for bio-input SMEs	GAN finances the working capital of biological-input SMEs which allows the SMEs to sell their product on credit to farmers.
Lack of Credit Know How and Expertise	With SMEs benefiting from the use of Traive's platform, GAN accelerates these companies' credit capacity, market access, and growth
Farmer lack of expertise with regenerative agriculture	Folio works directly with farmers to educate them on the benefits and practices of regenerative farming.

## 1.2 INNOVATION: FOCUS ON BIOLOGICAL-INPUTS MARKET

While other funds and mechanisms, such as bank credit, focus on regenerative agriculture or climate finance, they target sectors such as degraded pastureland recovery and hard assets (like tractors). In turn, GAN's main environmental and climate goal is to improve soil.

Moreover, the funds that support regenerative agriculture often focus on long-term capital improvements, whereas GAN supports the growth of biological-inputs companies by lending against their receivables. These companies are crucial for sector growth, but the market overlooks them.

Finally, GAN's value proposition has the potential to offer a more farmer-friendly approach, bringing the industry in as a partner in a process transition with initial short-term results. This is the ultimate gateway to engaging small and medium producers in regenerative agriculture.

**Table 2: Comparable instruments**

Similar Instruments	Description	Differentiation
Agrolend	Non-collateralized loans to Brazilian farmers.	Target market is farmers No regenerative agriculture focus.
Low-Carbon Agriculture Transition Mechanism (LATM)	Long-term loans to farmers SMEs with a basic minimum income guarantee; loan tied to climate transition activities.	Similar legal structure, but not related to regenerative agriculture or strengthening of bio-inputs industry
CRA GreenGalaxy	Focused on the agribusiness sector for land restoration by a bio-input company (Agrogalaxy).	Target market is farmers and focus on the restoration of degraded pastureland. Bioinput is not the main business line, and these restrictions limit the ability to scale.
RenovAgro Bio-inputs (Brazil Government Policy)	Subsidized credit from the Brazilian government to the bio-inputs industry under the umbrella of the ABC+ Plan (low-carbon agriculture).	RenovAgro focuses on the farmer instead of directly providing loans to the bio-input companies. Highly restrictive and complicated for small and medium-sized farmers to access.

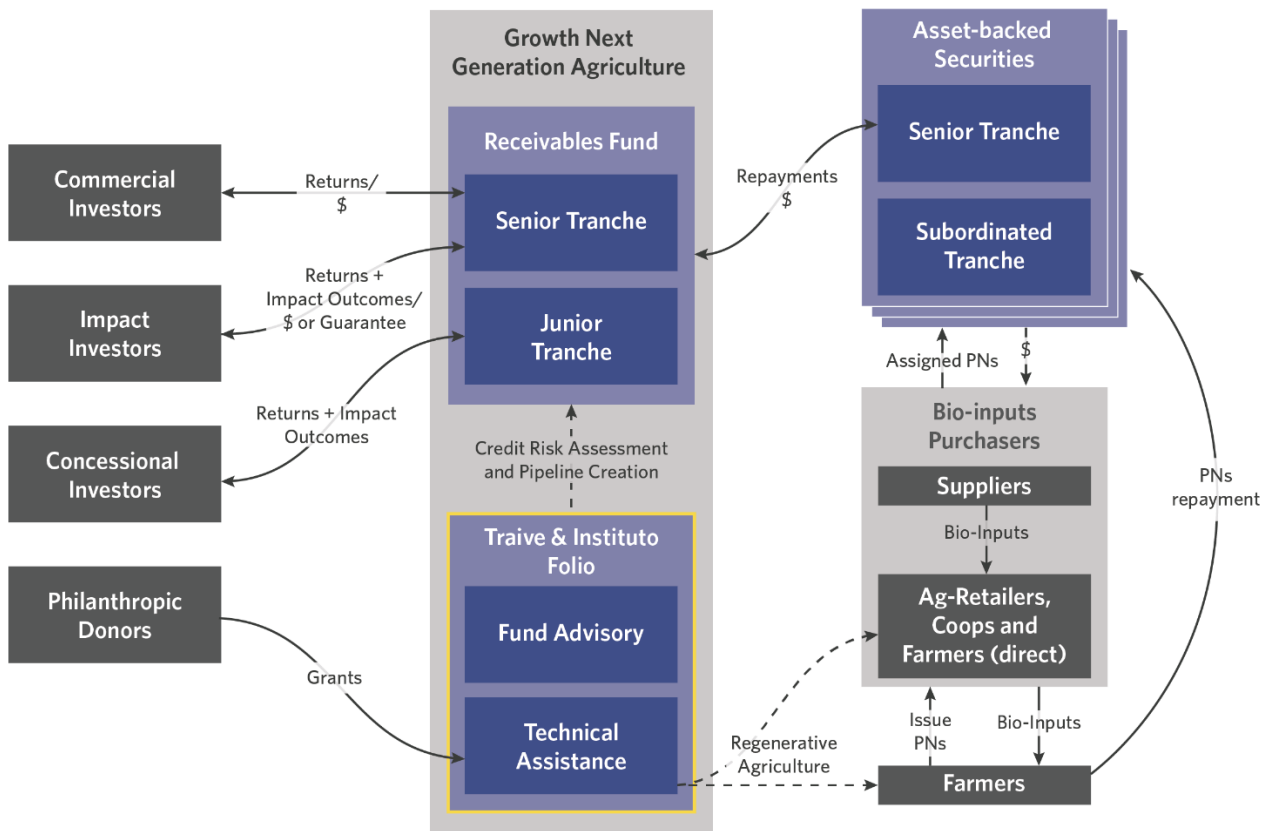


## 2. INSTRUMENT MECHANICS

GAN is a debt fund investing in securitizations to finance the purchase of biological-input products for farmers.

GAN is a BRL 250 million (USD 44.4 million) five-year credit fund and technical assistance facility. GAN's senior tranche is expected to be BRL 200 mn (USD 35.5mn) with a junior tranche of BRL 50 mn (USD 8.9mn). The fund will invest in the senior tranche of securitizations which holds receivables from biological-input product sellers. These companies sell bio-inputs to farmers on credit, boosting sales and growing their market share.

**Figure 1: Instrument Mechanics**



GAN is a blended finance fund with two levels: a junior and a senior tranche. The junior tranche will attract at-risk, concessional investors whose capital will leverage in more risk-averse senior tranche investors. The profiles of these investors are expected to be as such:

**Table 3: Investor Profiles**

Tranche/Facility	Motivations	Returns	Profile
<b>Senior Tranche Investors</b>	Finance	DI + 4%	Brazilian commercial investors, DFIs, Impact investors
<b>Junior Tranche investors</b>	Impact and finance	DI + excess returns	Foundations, High net worth individuals, DFIs, Impact investors, Governments
<b>Synthetic Junior Tranche</b>	Impact and finance	DI	Traive Finance and Folio Institute
<b>Technical Assistance Facility</b>	Impact	Grants	Foundations, High net worth individuals, DFIs, Impact investors, Governments

GAN has explicitly been created as a demonstration fund that can be later scaled and/or replicated to bring needed finance to the biological input sector. As such, while the junior tranche is considered a blended finance tranche, it is possible the junior investors realize market rate returns (see financial modeling section for more details). This will allow for scaling without the continued need for concessional capital in future funds.

GAN's use of a credit fund that invests in the senior tranche of a securitization is through a uniquely Brazilian structure called a Fundo de Investimento em Direitos Creditórios (FIDC)<sup>3</sup> which is investing in Agricultural Receivables Certificates (CRAs). The FIDC will finance 70% of the CRAs as a senior tranche, and the biological-input SMEs will cover the remaining 30% as a junior tranche. This structure for CRAs, in which the seller owns the junior 30% tranche, is standard in the market. An individual CRA (USD 2-10 mn) will be set up for each bio-input SME.

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<sup>3</sup>Fundo de Investimento em Direitos Creditórios (FIDCs) is a widely used financial instrument in Brazilian credit markets that aggregates receivables from multiple entities.

The fund structure (FIDC investing in CRAs) is well-known in Brazil. Its established legal, tax, and structure quality should reassure investors familiar with similar structures. Traive and Folio Institute will originate the securitizations. Their origination fees will be capitalized as a synthetic junior tranche (up to 1.5% of the value of the fund), aligning their interests with the fund and its investors.

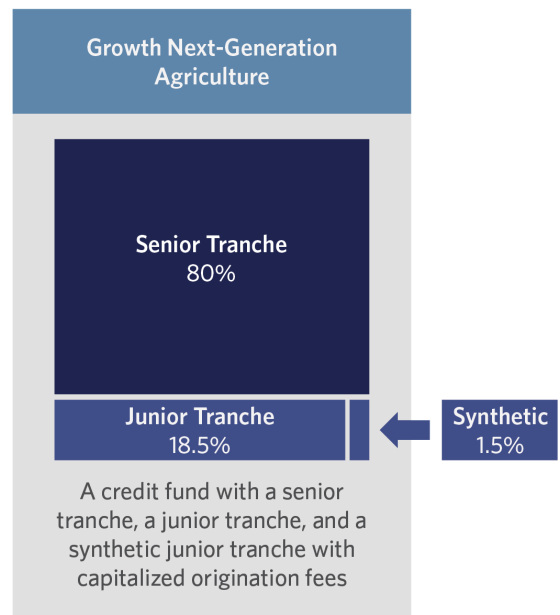
GAN itself is split into a senior, an ordinary junior, and a synthetic junior tranche. The senior tranche has priority in income distributions. The ordinary junior and synthetic junior tranches are pari passu for distributions up to the DI (benchmark rate). Any returns beyond the DI are allocated to the ordinary junior tranche. Both junior tranches also serve as first-loss tranches.

Investors in GAN benefit from significant protection:

- **Senior Level Investment:** The fund invests at the senior level of securitizations, while the bio-input SMEs hold the junior level (30%) of the securitizations, which serves as a first-loss tranche.
- **Additional Subordination:** The senior tranche of the fund is further protected by the subordination of the two junior tranches (ordinary and synthetic), which together form a 20% first-loss tranche. This percentage is based on market expectations and tested against conservative loss scenarios (as detailed in Section 4).
- **Income Waterfall Protection:** The income waterfall for the securitization prioritizes the senior tranche, ensuring it receives its target return before the junior tranches. The same priority applies to the fund's income waterfall, with the senior tranche receiving its target return before the junior tranches.

There are three key parties to this: Traive, Folio, and a fund manager. Traive and Folio will act as originators of the securitizations.

**Figure 2: Capitalization**



**Table 4: GAN stakeholders**

Companies	Role	Tasks
<b>Traive</b>	Investment Manager, as Structurer & Credit Consultant	<ul style="list-style-type: none"> <li>• Development of investment criteria</li> <li>• Credit assessment</li> <li>• Origination of transactions</li> <li>• Due diligence of transactions</li> <li>• Manager of portfolio assets</li> <li>• Manager of technical assistance facility</li> </ul>
<b>(TBD)</b>	Fund Manager	<ul style="list-style-type: none"> <li>• Fund management</li> <li>• Distributor/ Investor Relations</li> <li>• Compliance</li> <li>• Legal</li> <li>• Risk Management</li> </ul>
<b>Folio Institute</b>	Technical Advisor	<ul style="list-style-type: none"> <li>• Origination of transactions</li> <li>• Impact Advisor</li> <li>• Manager of technical assistance facility</li> </ul>

Traive and Folio will co-manage the technical assistance facility, which will focus on near-term benefits and growth in regenerative agriculture. This TA would benefit the agricultural field and may remain necessary as bio-input companies compete with large corporations.

## 2.1 POTENTIAL CHALLENGES TO INSTRUMENT SUCCESS

The main challenges to the fund structure are:

**Table 5: Risk factors**

Risk	Risk Management Approach
<b>Pipeline risk:</b> Traive and Folio are responsible for originating the securitizations (CRAs) they will invest in. There is a risk of not finding enough creditworthy companies, slow deployment, or unfeasible costs.	The GAN team has identified over 200 potential bio-input companies in Brazil and is piloting an SME CRA to demonstrate success. The primary challenge has been the high cost of capital due to traditional investors struggling to price SME risks without GAN.
<b>Portfolio risk:</b> The securitization depends on the successful sale of bio-inputs and the growth of the sector. Farmers must be able and willing to repay their loans. New products may face performance issues, and rapid growth or strategic shifts by SMEs could impact loan performance.	Folio and Traive bring deep sector knowledge and will manage securitizations from start to finish, using technical assistance for market participants. Traive's proprietary credit risk technology and the fund's diversified investments across multiple bio-input SMEs and regions help mitigate idiosyncratic risk, protecting both capital and income.
<b>Operational risk:</b> The fund's complexity lies in offering a credit product and relying on technical assistance to spread knowledge of regenerative agriculture and agricultural finance.	The GAN team, with expertise in finance, agriculture, and sustainability, is well-equipped to handle these complexities. They are partnering with local experts and are in discussions with potential fund managers to ensure successful operations.

The proponents plan larger follow-on funds in Brazil and Latin America. A regional fund requires careful analysis as it would need a legal and fund structure supporting multiple jurisdictions. The current structure may not easily scale to a regional fund, necessitating a new fund structure.

# MARKET TEST AND BEYOND

## 3. IMPLEMENTATION PATHWAY AND REPLICATION

GAN plans to invest BRL 250 million in securitizations issued by biological-input companies and grow investments with subsequent funds.

### 3.1 DEMONSTRATION FUND

GAN will invest BRL 250 million (USD 44.4 million) in approximately 10 securitizations issued by established biological-input SMEs in Brazil for its demonstration fund. These companies sell biological fertilizers and pesticides to farmers who grow grains like soybeans and corn. The goal of the demonstration fund is to prove GAN's commercial viability while promoting the transition to regenerative agriculture by showcasing the benefits of biological inputs. As the investment strategy and the effectiveness of biological inputs are validated, future funds will gradually phase out concessional support to be fully financed by market-rate capital.

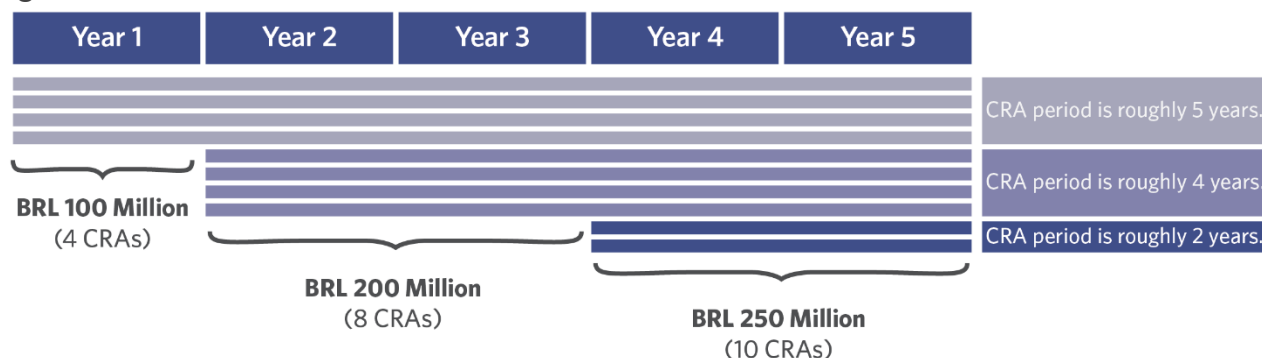
In addition to the financial investment, GAN's technical assistance provider, Folio Institute, will train farmers and SME staff on best practices in regenerative agriculture. Traive will train SME sales teams in essential credit underwriting skills. Folio will also oversee impact monitoring and evaluation (M&E) using a proprietary soil measurement tool known as DRES.

### 3.2 FIRST CLOSE

The GAN team plans to deploy capital once they have raised BRL 100 million (USD 18 million). Upon reaching this first close, the fund is expected to have a five-year lifespan, with the option to extend and potentially transition into an evergreen vehicle. To sufficiently de-risk the fund and start investing, GAN requires at least BRL 25 million in its junior tranche. The team is already actively sourcing potential investments and is in discussions with several established biological-input SMEs.

### 3.3 INVESTMENT TIMELINE

Figure 3: Timeline of GAN's Investments



Note: The period of the fund is five years.

GAN plans to ramp up its investments over the five-year fund period. BRL 100 million will be deployed in the first year, another BRL 100 million in the second and third years, and the final BRL 50 million in the fourth year. The duration of the securitizations will be adjusted to ensure

that GAN's total life span is five years. Typically, it takes two to three months to go from issuing receivables to structuring the CRA. However, the exact investment timeline will depend on the availability of bankable securitizations and GAN's funding.

### 3.4 GEOGRAPHY AND SCOPE

All biological-input enterprises and farmers will be based in Brazil within the biomes of Cerrado (a Brazilian savannah) and in the Amazon. Farmers in these regions are especially vulnerable to climate change impacts, making a quick transition to regenerative practice urgent. The primary threats to Brazilian farmers are chronic drought, unpredictable flooding, and prolonged heatwaves. Bio-inputs can help these farmers respond to these hazards by improving soil health and resilience.

The enterprises will be small and medium-sized enterprises with annual revenues usually between BRL 30 million (USD 5.5 million) and BRL 300 million (USD 55 million). An anonymized example of the type of bio-input SME that GAN will target is a small-sized enterprise that produces and sells several types of inputs, including biopesticides and biofertilizers, in the Brazilian state of Mato Grosso. The enterprise had revenues of BRL 22 million (USD 4 million) last year, and project revenues of BRL 71 million (USD 13 million) for the current year. The GAN team is already in conversation with several bio-input SMEs and has identified a substantially sized and growing pipeline of target enterprises.

### 3.5 REPLICATION

As the investment thesis of GAN is proven, the fund structure can be replicated and expanded to finance a growing share of Brazil's agricultural inputs market. The sale of biological-inputs in Brazil during the 2023/2024 season reached nearly BRL 5 billion (USD 900 million). It is expected to grow exponentially as regenerative agricultural practices become mainstream given the lower input costs it requires (Mano & Samora, 2024). The current market size of just chemical fertilizers in Brazil is approximately BRL 200 billion (USD 35 billion), which bio-inputs aim to replace and optimize (Mordor Intelligence, 2023). The familiarity of Brazil's capital markets with GAN's securitization structure means that private institutional investors would be ready to finance larger ticket sizes following the success of GAN's demonstration fund.

Future funds can expand beyond Brazil to other agricultural markets in Latin America, which also have growing regenerative agricultural markets (Meticulous Market Research, 2023). In fact, Traive expanded into Mexico in 2024, representing an opportunity to develop market learnings. The GAN structure can also be adapted to support SMEs in other sectors that rely on receivables for payment.

## 4. FINANCIAL IMPACT AND SUSTAINABILITY

### 4.1 QUANTITATIVE MODELING

Bio-input SMEs, being unable to access affordable credit from commercial banks, must instead use equity to fund the working capital used to finance the sale of bio-inputs. This reality slows Brazil's transition to regenerative agriculture by inhibiting the growth of enterprises and discouraging new entrants into the sector.

GAN addresses this challenge by providing working capital to biological-input SMEs, enabling farmers to purchase their inputs on credit. As explained earlier, GAN buys

securitizations specific to each biological-input SME, which are backed by the farmers' receivables.

The fund aims to deliver returns of DI + 4% to senior investors and DI plus any excess returns to junior investors. To evaluate this goal against market and agricultural volatility, financial modeling of GAN's cash flows was conducted across three scenarios over a 5-year fund term. The main uncertainty for investors is the actual loss rate on the underlying agricultural receivables in the securitizations.

- **Best-case scenario:** A realized loss rate of 1%.
- **Base-case scenario:** A realized loss rate of 5%.
- **Worst-case scenario:** A realized loss rate of 22%.

These loss rates are based on Traive's experience in Brazilian agriculture, with slight adjustments for the higher risk of transitioning to bio-inputs. In all scenarios, the purchasing of securitizations is staggered over time. The DI rate for calculating the acquisition price of receivables is based on projected rates from Brazil's central bank, with an estimated average DI rate of 10.60% over the fund period. All cash flows and rates are denominated in BRL.

#### 4.1.1 QUANTITATIVE MODELING RESULTS

Based on the base case scenario analysis, the fund is expected to fulfill its financial obligations. Using a base case analysis, the GAN team expects the senior tranche of GAN to receive a 4.0% return above DI and the junior tranche a 1.3% return above DI over a five-year fund period.

The IRR is calculated to be 15.0% and 12.1%, respectively, with a total expense ratio of 2.50%. The return of the fund can fluctuate depending on domestic interest rates, realized loss rates, and the legal costs of structuring the fund and the underlying securitizations. In a worst-case scenario, the return would be 3.0% + DI for the senior tranche of GAN.

**Table 6: Financial Modeling Scenario Analysis**

Scenario	Realized Loss Rate	CRA		FIDC		
		DI+ Senior	DI+ Junior	DI+ Senior	DI+ Junior	DI+ Junior Synth. <sup>4</sup>
<b>Best</b>	1%	4.0%	24.5%	4.0%	1.3%	0.3%
<b>Base</b>	5%	4.0%	18.3%	4.0%	1.3%	0.3%
<b>Worst</b>	22%	4.0%	-1.8%	4.0%	1.3%	0.3%

## 4.2 PRIVATE FINANCE MOBILIZATION AND REPLICATION POTENTIAL

<sup>4</sup>The Junior Synthetic Tranche's above DI return of 0.3% can be explained by the rising DI rate over the Fund's five-year period. If the DI rate was constant then the return for the Junior Synthetic Tranche would be 0.0% + DI.

Finance for GAN's senior tranche will come from Brazilian commercial capital providers, with many of these institutions being domestic Brazilian market participants such as capital market groups. Commercial capital providers in Brazil are already familiar with investing in the agriculture sector and with the financial structure of FIDCs and CRAs. GAN's competitive rate of return of DI + 4% for its senior tranche aligns with the risk appetite of commercial institutions in Brazil. The rest of the senior tranche will come from impact investors, who expect the same returns as the commercial capital providers.

#### 4.2.1 STRATEGIES TO MITIGATE FINANCIAL RISKS

The most likely financial modeling case for GAN assumes a farmer nonpayment rate of 5%, based on Traive's experience in the sector. In addition to having a first-loss junior tranche to mitigate this risk, GAN will overcollateralize farmer receivables in the securitizations to reduce the impact of farmer nonpayment on GAN's return. The financial model overcollateralizes the securitizations by 5% to cover the expected loss of 5% on the agricultural receivables that comprise the securitizations.

Biological-input SMEs can also be required to have co-obligation of receivables payment, which can further de-risk investment into GAN. Furthermore, the aggregation of 10 securitizations will reduce the idiosyncratic risk that each enterprise contributes to GAN through geographical, input product, and crop diversification. A single securitization will not make up more than 30% of the entire portfolio (BRL 80 million or USD 15 million).

#### 4.2.2 LONG TERM REPLICATION

GAN's initial target size will be BRL 250 million, but future iterations of GAN are likely as more biological-input SMEs need help financing farmer purchases. This model can also help offer financing to any enterprise that relies on agricultural receivables.

**Table 7: GAN Investor Profile – Base Case**

Tranche	Type of Capital	Type of Investor	Target Returns IRR	Expected Returns DI+
Senior	Market-Rate	Commercial & Impact	14.5%	4.0%
Junior	At-risk, Concessional	Impact & DFIs	10.5% + excess returns	0% + excess returns
Synthetic	Embedded Costs	Traive and Folio	10.5%	0.0%

## 5. ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACT


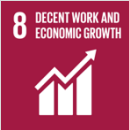



*GAN sets the foundation for sustainable and resilient farming practices by pioneering bio-inputs as a transformative step towards regenerative agriculture.*

GAN will deliver significant environmental and socio-economic benefits by facilitating Brazil's transition to regenerative agriculture. The Fund helps enhance current farming practices to be more resilient to the impacts of climate change while simultaneously reducing GHGs through improved soil carbon sequestration and reduced usage of fossil fuel-based inputs.



GAN also creates economic incentives for farmers to adopt sustainable farming practices by offering reduced input prices, which drives the growth of the market.

**Table 8: Sustainable Development Goals**

SDG	Description
<b>Primary SDGs</b>	
	<ul style="list-style-type: none"> <li>Bio-inputs increase the soil's ability to sequester carbon (SDG 13.2) by improving the soil structure, allowing it to more easily capture and store atmospheric carbon. Using natural fertilizers, compost, and microbial inoculants creates more resilient soil and reduces the amount of greenhouse gas in the atmosphere.</li> <li>GAN's technical assistance facility will also promote knowledge sharing on regenerative practices (SDG 13.3). By educating farmers about the benefits and applications of biological inputs, GAN encourages the widespread adoption of eco-friendly farming techniques, which ultimately support climate change mitigation, adaptation, and agricultural sustainability.</li> </ul>
	<ul style="list-style-type: none"> <li>The fund can help increase farmer income (SDG 8.1, 8.2, 8.3) through improved soil health, which leads to higher yields and reduced dependence on costly chemical inputs.</li> <li>By lowering production costs, food prices might also decrease (SDG 8.4) for consumers.</li> <li>GAN also stimulates market development (SDG 8.3) by creating demand for sustainably produced food, opening new markets, and encouraging investment in sustainable farming practices.</li> </ul>
	<ul style="list-style-type: none"> <li>Promoting bio-inputs can enhance climate resilience (SDG 15.2). Bio-inputs improve soil structure, increase the soil's water-holding capacity, reduce soil erosion, and create habitats for diverse species in the soil, all of which help ecosystems withstand and recover from climate impacts like extreme weather.</li> </ul>
	<ul style="list-style-type: none"> <li>By replacing synthetic fertilizers and pesticides with natural alternatives, bio-inputs reduce the runoff of harmful chemicals into water bodies (6.3), decreasing pollution and enhancing aquatic ecosystems.</li> </ul>
<b>Secondary SDG</b>	
	<ul style="list-style-type: none"> <li>GAN will collect disaggregated data on the gender of bio-input SMEs' employees and on the farmers who purchase inputs from the SMEs.</li> <li>GAN will aim to increase the proportion of women at the SME and farmer levels by developing and implementing a gender-action plan through the technical assistance facility.</li> </ul>

## 5.1 ENVIRONMENTAL IMPACT

The promotion of bio-inputs, such as organic fertilizers and biopesticides, marks a significant step towards regenerative agriculture, yielding environmental benefits by:

- enhancing carbon soil sequestration by increasing the organic matter holding capacity of the soil;
- boosting climate resilience by making crops more resistant to pests, diseases, and extreme weather conditions, thereby reducing crop losses and ensuring food security across the region;
- improving clean water availability by reducing chemical usage, which lowers the risk of water contamination and leads to cleaner water sources for surrounding ecosystems and communities.

Additionally, GAN will facilitate knowledge sharing on biological-inputs' benefits, fostering a culture of environmental sustainability and innovation in the agricultural sector. This collaborative approach drives the adoption of eco-friendly practices and technologies, promoting a more sustainable and resilient agricultural landscape.

Based on an initial fund size of BRL 250 mn (USD 44.4 million), the GAN team estimates the fund will:

1. Transition 2 million hectares of land to be cultivated using regenerative practices
2. Avoid 1,000 tons of artificial pesticides and fertilizers
3. Avoid 2,312 tons of CO<sub>2</sub>e annually through reduced usage of nitrogen-based fertilizer<sup>5</sup>

GAN intends to monitor these key metrics with the following indicators:

**Table 9: Key Environmental Metrics**

Impact	Environmental Relevance	Indicators
Decreased Carbon Emissions	Mitigation	Tons of CO <sub>2</sub> equivalents avoided per annum per hectare based on reduced nitrogen-based fertilizer
Increased Climate Resilience	Adaptation	Hectares of healthier soils, based on improved biodiversity, carbon content, and water-holding capacity
Increased clean water	Environmental	Tons of chemical pesticide and fertilizer avoided
Knowledge sharing on biological-inputs benefits	Mitigation and Adaptation	Number of events and trainings for farmers and SMEs

## 5.2 SOCIAL AND ECONOMIC IMPACT

Regarding social impacts, by adopting bio-inputs, farmers can reduce their reliance on expensive chemical fertilizers and pesticides, leading to lower production costs and higher profit margins. This increased income enables farmers to adopt regenerative agricultural practices more quickly. Lower production costs may also translate into reduced consumer prices, making food more affordable and accessible.

These outcomes can ultimately lead to a shift in the agricultural inputs market, leveraging the market share of bio-input companies and encouraging, through social-economic incentives, the transition to low-carbon agriculture. These impacts contribute to several of the UN Sustainable Development Goals (SDGs), as described below. The full Theory of Change and Impact Metrics can be found in the Annex.

Based on an initial fund size of BRL 250 mn (USD 44.4 million), the GAN team estimates the fund will:

4. Enable 2,000 farmers to purchase biological-inputs (data to be disaggregated by gender)

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<sup>5</sup> Assuming 1,000 tons of avoided artificial pesticides and fertilizers, with an average of 46% nitrogen, and considering the following conversion factors: N – N<sub>20</sub> 1.57, N<sub>2</sub>O to CO<sub>2</sub> 273, as provided in FGV research ([FGV, 2023](#)).

In addition to these key metrics, GAN intends to monitor the following social and economic indicators:

**Table 10: Key Social & Economic Metrics**

Impact	Indicators
<b>Increased Farmer Income</b>	Percentage of income based on yield increases and reduced costs from purchasing biological as opposed to chemical inputs
<b>Lower Food Costs</b>	Based on the reduced cost of production from sampling farmers
<b>Market Development</b>	Number of farmers accessing credit for bio-inputs (disaggregated by gender);  Number of SMEs that are having CRAs purchased by GAN
<b>Jobs Creation</b>	Number of additional jobs created at the SME level due to YoY sales growth (disaggregated by gender)

### 5.3 GENDER IMPACT

According to the latest Brazilian Agricultural Census, less than 20% of Brazil's farmers are women, most of whom are smallholders (Instituto Brasileiro de Geografia e Estatística, 2017). These women struggle to access affordable credit due to size issues and formal land tenure. GAN will aim to improve the proportion of Brazilian women farmers who can purchase biological inputs by mainstreaming gender in its instrument structure. The fund will collect disaggregated data on the gender of bio-input SME employees and the farmers purchasing inputs from these SMEs. GAN intends to increase the proportion of women at the SME and farmer levels by developing and implementing a gender-action plan through its technical assistance facility.

### NEXT STEPS

The GAN team is currently developing securitizations based on the instrument investment thesis to stress-test the financial modeling developed.

They are also in the process of identifying the fund manager, whether Brazilian or Brazilian/international, depending on the type of capital pursued. Additionally, they will further develop their pipeline, identifying additional bio-input companies to create a broader portfolio with varying levels of development. To further attract capital, the team will identify sector companies interested in investing in the instrument and discuss how they can use the impact indicators to comply with disclosure and reporting rules and standards.

## REFERENCES

- Brazil. 2023. Paris Agreement: Nationally Determined Contribution (NDC). Federative Republic of Brazil. Available from: <https://unfccc.int/sites/default/files/NDC/2023-11/Brazil%20First%20NDC%202023%20adjustment.pdf>
- Castro, N. R., Lapan, F., & Nassar, A. M. (2019). Assessing the Economy–Climate Relationships for Brazilian Agriculture. *Empirical Economics*, 59(3), 1161–1188. doi: <https://doi.org/10.1007/s00181-019-01711-7>
- FEDERATIVE REPUBLIC OF BRAZIL. 2023. Nationally Determined Contribution (NDC) to the Paris Agreement under the UNFCCC. Available from: <https://unfccc.int/sites/default/files/NDC/2023-11/Brazil%20First%20NDC%202023%20adjustment.pdf>.
- FGV, 2023. ESTEVAM, C.,G., PAVÃO, E., ASSAD, E. (2023). Quantification of GHG Emissions in the Agricultural Industry: Emission Factors, Metrics and Methodologies. Observatório de Conhecimento e Inovação em Bioeconomia. Available from: <https://agro.fgv.br/sites/default/files/2023-11/3138-FGV%20-%20Estudo%20Bioeconomia%20%283%29.pdf>
- Food and Agriculture Organization of the United Nations. (n.d.). Soil biodiversity | Global Soil Partnership. Available from: <https://www.fao.org/global-soil-partnership/areas-of-work/soil-biodiversity/en/>
- Hayashi, T. (2024). Sustainable Agriculture Programs in Brazil-Past Present and Future. In Podesta, N. (Ed.), *Global Agriculture Information Network*, USDA. Available from: <https://fas.usda.gov/data/brazil-sustainable-agriculture-programs-brazil-past-present-and-future>
- Instituto Brasileiro de Geografia e Estatística. (2017). Census of Agriculture. Ibgegovbr. Available from: <https://www.ibge.gov.br/en/statistics/economic/agriculture-forestry-and-fishing/21929-2017-2017-censo-agropecuario-en.html?lang=en-GB>
- Man, A., & Samora, R. (2024, June 25). Brazil's Bioinputs Market Boasts Four Times Global Average Growth, Research Shows. Reuters. Available from: <https://www.reuters.com/markets/commodities/brazils-bioinputs-market-boasts-four-times-global-average-growth-research-shows-2024-06-25/>
- Meticulous Market Research Pvt. Ltd. (2023, September 11). Latin America Biofertilizers Market to Reach \$408.6 Million by 2030—Exclusive Report by Meticulous Research®. GlobeNewswire News Room. [accessed 2024 Aug 14]
- Mordor Intelligence. (2023). Brazil Fertilizers Market | Growth, Trends, and Forecast (2020-2025). Available from: [www.mordorintelligence.com/industry-reports/brazil-fertilizers-market](http://www.mordorintelligence.com/industry-reports/brazil-fertilizers-market)
- NRDC. (2023). Regenerative Agriculture. Farm Policy for the 21st Century. Available from: <https://www.nrdc.org/sites/default/files/regenerative-agriculture-farm-policy-21st-century-report.pdf>
- Santos, R. R. d., Assad, E. D., & Varella, H. P. (2023). Climate Change in Brazilian Agriculture: Vulnerability and Adaptation Assessment. *International Journal of Environmental Science and Technology*, 20(10), 10713–10730. doi: <https://doi.org/10.1007/s13762-022-04730-7>
- United Nations. (2022, July 27). FAO warns 90 per cent of Earth's topsoil at risk by 2050. UN News. Available from: <https://news.un.org/en/story/2022/07/1123462>.
- Valdes, C. (2022, September 27). USDA ERS - Brazil's Momentum as a Global Agricultural Supplier Faces Headwinds. Available from: <https://www.ers.usda.gov/amber-waves/2022/september/brazil-s-momentum-as-a-global-agricultural-supplier-faces-headwinds/>
- World Bank Group. (2021). World Bank Climate Change Knowledge Portal. Available from: [www.climateknowledgeportal.worldbank.org/country/brazil/vulnerability](http://www.climateknowledgeportal.worldbank.org/country/brazil/vulnerability)

Zilli, M., Vianna, A. S., Navegantes-Crawford, I., & Teixeira, W. G. (2020). The Impact of Climate Change on Brazil's Agriculture. *Science of the Total Environment*, 740, 139384. Available from: <https://www.sciencedirect.com/science/article/abs/pii/S0048969720329016>

# ANNEX – THEORY OF CHANGE

<b>Activities</b> <i>(the activities the fund plans to execute)</i>	Credit Risk Evaluation	Financing Working Capital	Measuring Impact	Modelling Farming Techniques
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<b>Outputs</b> <i>(the intended results of our activities)</i>	Increase Sale of Biological Inputs	Increase SMEs Access to Working Capital	Increase Knowledge of the Benefits of Biological Inputs
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<b>Outcomes</b> <i>(the benefits of these results)</i>	Healthier Soil	Cleaner Water	Reduction in Pesticides	Increased Crop Diversity
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<b>Impact</b> <i>(the ultimate impact)</i>	Increased Carbon Sequestration	Increased Climate Resilience	Increased Farmer Incomes	Lower Food Costs	Market Development
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**To accelerate the transition away from chemical agriculture and towards the use of biological inputs and regenerative agricultural practices.**