CBA Living Lab for Regenerative Coffee, Dairy, and Watershed Restoration

Southern Minas Gerais – Cerrado Biome, Brazil

Overview

The CBA Living Lab for Regenerative Coffee, Dairy, and Watershed Restoration in Southern Minas Gerais (MG) is a multi-year, place-based initiative designed to demonstrate how integrated regenerative production systems can restore degraded landscapes, strengthen water security, and improve livelihoods for low-income small-scale farming communities in the Cerrado biome.

The Living Lab focuses on the transition from conventional sun-grown coffee and degraded pasture systems toward regenerative coffee agroforestry, silvopastoral dairy production, and targeted restoration of upstream river catchments. By combining scientific research, farmer-led innovation, and market engagement, the Living Lab will generate rigorous ecological, social, and financial evidence to support scalable, bankable regenerative models for Brazil's coffee and dairy sectors.

Context and Rationale

Southern Minas Gerais is one of Brazil's most important coffee-producing regions and a key dairy basin, yet it faces growing challenges including:

- Soil degradation and declining productivity in coffee and pasture systems
- Water scarcity and reduced dry-season flows due to catchment degradation
- Loss of native Cerrado vegetation and biodiversity

- Economic vulnerability of small-scale family farmers exposed to climate and price shocks

The region is also facing **growing water quality challenges**, driven by nutrient runoff from conventional coffee farming and poorly managed pasture systems. High use of synthetic fertilisers, pesticides, and unmanaged manure has led to excess nitrogen, phosphorus, and agrochemical residues entering streams and rivers, particularly during heavy rainfall events. These pressures degrade aquatic ecosystems, increase water treatment costs downstream, and heighten regulatory and reputational risks for agricultural value chains.

Upstream catchments are particularly critical for downstream water users, including municipalities, agribusinesses, and hydropower. By reducing chemical inputs, increasing soil organic matter, and restoring riparian buffers in these catchments, regenerative coffee and silvopastoral systems offer a pathway to simultaneously improve water quantity and water quality, delivering benefits for farmers, communities, and downstream water users. Regenerative land-use systems offer a pathway to address these challenges simultaneously, but adoption remains constrained by limited technical support, upfront costs, and lack of clear market incentives.

Living Lab Objectives

The Living Lab aims to:

1. Restore ecosystem functions in coffee landscapes and upstream river catchments through agroforestry, silvopastoral systems, and ecological restoration.
2. Improve and diversify smallholder livelihoods by increasing productivity, reducing input dependency, and creating additional income streams.
3. Generate robust evidence on climate, nature, and financial outcomes of regenerative coffee–dairy systems.
4. Build scalable market and finance pathways for regenerative coffee, dairy, and ecosystem services in Brazil.

Core Activity Areas

1. Expansion of Regenerative Coffee Agroforestry and Silvopastoral Systems

Activities

- Transition conventional coffee plots to shade-based agroforestry systems integrating native Cerrado species, fruit trees, and nitrogen-fixing species.
- Convert degraded pasture into silvopastoral dairy systems with rotational grazing, improved forage, and tree cover.
- Establish community nurseries supplying native, fruit, and multipurpose tree seedlings.
- Support farmer-led experimentation and adaptive management aligned with CBA's regenerative principles.

Expected Outcomes

- Conversion of 300–500 hectares to regenerative coffee agroforestry and silvopastoral systems.
- 10–20% increase in coffee productivity over time, with reduced climate sensitivity.
- Improved milk yields and animal health through better pasture quality and microclimate regulation.
- Reduced dependence on synthetic fertilisers and agrochemicals, lowering production costs.
- Increased on-farm biodiversity and structural habitat complexity.

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2. Restoration of Degraded Pasture and Upstream River Catchments

Activities

- Restore degraded pastureland, prioritising riparian zones, springs, and headwater catchments.
- Reduce nutrient and agrochemical runoff through input optimisation, organic soil management, and manure management in coffee and dairy systems.
- Restore and protect riparian buffer zones to filter sediments, nutrients, and agrochemical residues before they reach water bodies.
- Implement soil and water conservation measures (e.g., contour planting, ground cover, erosion control).
- Re-establish native Cerrado vegetation in legally protected and ecologically critical areas.
- Monitor hydrological, ecological, and water quality outcomes at farm and landscape scale (e.g., turbidity, nitrates, phosphates).

Expected Outcomes

- 200–300 hectares of degraded land and riparian zones restored in priority upstream catchments.
- Improved water infiltration, baseflow stability, and dry-season water availability.
- Measurable reductions in nutrient and sediment loads entering streams and rivers.
- Improved chemical and ecological water quality, benefiting aquatic biodiversity and downstream water users.
- Reduced sedimentation and eutrophication risks in reservoirs and municipal water supplies.
- Annual sequestration of 6,000–10,000 tonnes CO_2e through biomass and soil carbon gains.

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3. Market Development and Value Creation for Regenerative Products

Activities

- Support farmer cooperatives to develop traceable regenerative coffee and dairy value chains.
- Engage coffee roasters, dairy processors, and retailers to co-create procurement models rewarding regenerative practices.
- Explore complementary revenue streams, including fruits, timber, and ecosystem services (e.g., water and carbon).
- Assess certification, claims, and data requirements aligned with TNFD and emerging nature markets.

Expected Outcomes

- Access to premium or preferred markets for regenerative coffee and dairy products.
- Increased farm-gate prices and income stability for participating households.
- Greater value retained locally through cooperative-led aggregation and processing.
- Clear, data-backed sustainability claims supporting corporate and investor engagement.

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4. Capacity Building, Social Inclusion, and Knowledge Generation

Activities

- Deliver continuous technical training and extension support to small-scale farmers, with a focus on low-income households, women, and youth.
- Partner with Brazilian universities and research institutes to embed scientific monitoring and student research.
- Build local governance structures to support long-term landscape stewardship.

Expected Outcomes

- 500–700 farming households supported with training, tools, and technical assistance.
- Increased adoption and long-term retention of regenerative practices.
- Strengthened local leadership, cooperative capacity, and farmer-to-farmer learning.
- A robust, open evidence base on ecological, social, and financial performance of regenerative coffee–dairy systems.

Cross-cutting Expected Outcomes

Across all activity areas, the Living Lab is expected to deliver the following integrated outcomes:

- Improved water quality in priority sub-catchments, driven by lower chemical input use, better manure management, and functional riparian buffers.
- Reduced nitrogen, phosphorus, and agrochemical runoff from coffee and pasture systems.
- Lower water treatment risks and costs for downstream users.
- Strengthened alignment with emerging water stewardship, TNFD, and basin-level governance frameworks.

From Living Lab to Systems Change

By the end of the Living Lab period, CBA will have generated integrated ecological, social, and financial evidence demonstrating how regenerative coffee, dairy, and

watershed restoration can work at scale in the Cerrado. This evidence will underpin a replicable blueprint for other coffee and dairy regions in Brazil and Latin America.

The Living Lab will directly inform:

- Blended finance structures for regenerative agriculture
- Corporate sourcing strategies for nature-positive coffee and dairy
- Public policies supporting watershed restoration and smallholder resilience

The resulting blueprint will explicitly quantify water quantity and water quality benefits, enabling engagement with water utilities, basin committees, regulators, and corporate water stewardship initiatives alongside traditional agricultural and climate stakeholders.

Ultimately, the Living Lab will serve as a proof point for how regenerative land-use systems can simultaneously deliver climate mitigation, nature recovery, water security, and resilient rural livelihoods in one of Brazil's most strategically important agricultural landscapes.