**Development of a Macauba-based silvopastoral System and value chain**

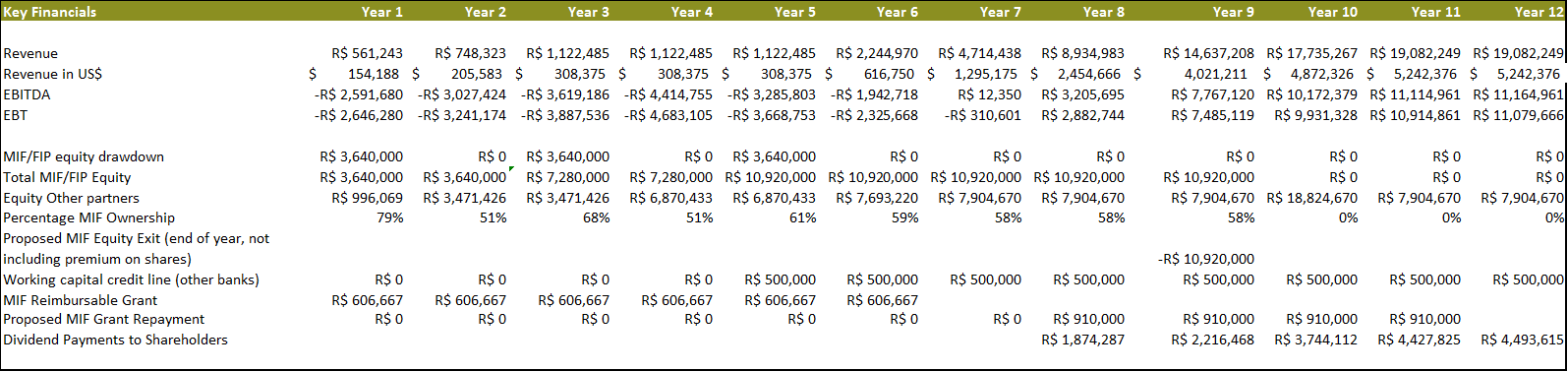
1. **What is the problem (in what country)?** Smallholder farmers in the project region of Minas Gerais, Brazil, are increasingly exposed to the negative impacts of both climate change (heat, drought, worsening soil fertility) and they depend on monoculture cattle farming due to the topography, which impedes access with agricultural machines. The lack of diversification and other non-agricultural economic opportunities encourages deforestation to increase pasture sizes and makes these smallholder farmers even more vulnerable to pests, soil degradation and income volatility. Cattle farming also negatively impacts the environment as the land degradation and deforestation reduces CO2 capture by forests and soil, increases runoff, and adds to erosion. At the same time, local harvest workers face seasonal unemployment due to a lack of jobs during the low season for coffee production, reducing incomes and driving outmigration. There are opportunities to develop silvopastoral systems to diversify agricultural activities, increase productivity, reduce the environmental impact of the cattle farming, and rehabilitate degraded land while generating income for smallholders and harvest workers.
2. **Is the potential executing agency and are partners strong / strategic?** The project includes a number of strong and strategic partners – mostly at the local and regional level:

* [Inocas](http://www.inocas.com/), the executing agency, is a Brazilian company whose key personnel have been working as project developers in the field of alternative oil plants for over a decade. Inocas carried out an EU-funded EUR2.7m Macauba applied research project to demonstrate the economic, social and environmental feasibility of a Macauba-based silvopastoral system in Minas Gerais (2012-2013).
* [Coopatos](http://www.coopatos.com.br/), an implementation partner, is one of the largest cooperatives of smallholders in Brazil, will make up to 98,000 hectares of its cattle farmers’ land available for the Macauba silvopastural system. Coopatos also owns 51% of Cemil, a cooperative of cooperatives, further increasing the replication and scalability potential.
* [Viveiro Nativo](http://www.viveironativo.com.br) (seedlings/saplings), [Precisa](http://www.precisaagroambiental.com.br/) (agronomy), and [Perfil Agrícola](http://www.perfilagricola.com.br/) (distribution) are local and regional Brazilian companies that are investors (cash and in-kind) in the project, as well as future scaling partners along the value chain.
* The [city of Patos de Minas](http://www.patosdeminas.mg.gov.br/) donated land worth USD300k to the project in order to kick-start a Macauba industry and the [state of Minas Gerais](http://www.mg.gov.br) adopted a law to support Macauba plantations.
* Purchase agreement (Macauba oil offtaker) LoIs have been signed with [ADM](http://www.adm.com/), a global food processing trading/commodities company and biodiesel producer, as well as Petrobras.
* Research partners include [Embrapa](http://www.embrapa.br) and Yale University.
* The project will leverage funding (USD3m) from the Climate Investment Fund’s [Forest Investment Program](http://www-cif.climateinvestmentfunds.org/fund/forest-investment-program) (FIP), providing visibility, opportunities to scale, and replicability in other countries.

1. **What is the solution proposed?** In the project area naturally occurring Macauba trees exist on the degraded pasture land unproductively used by smallholder farmers in livestock activities. Thisproject seeks to develop the first Macauba value chain in the world by designing a model in which smallholder farmers harvest existing trees and a local company plants additional Macauba trees on their land. In return, farmers receive payments for land use, harvesting, and fruits, and other harvest workers receive a salary. Macauba is a palm tree whose fruits can be processed into different oils (vegetable oil, biodiesel, cosmetic oil), animal feed, and a dense biomass granulate (for the sandblasting industry). The solution proposed consists of several elements: (i) identification of participating farmers by the local cooperative Coopatos and structuring of agreements and contracts between farmers, harvesters and Inocas, including wage and price structures; (ii) organization of farmers and harvesters into groups and training in the planning, cultivation, harvesting, and overall management of Macauba agroforestry-related activities; (iii) planting of 660,000 trees to supplement existing naturally occurring Macauba trees as part of a 2,000 hectare commercial pilot; (iv) harvesting either by farmers or local harvest workers; (v) processing of the harvested fruit and selling of the products into local and regional markets (both by Inocas); (vi) scaling of the 2,000 ha pilot project to an additional 96,000 ha of Coopatos’ pastures.
2. **What is the wow factor/ the innovation?** This will be the first commercial Macauba project in the world. As part of a global call for proposals [to access competitive funding for projects that engage the private sector in the FIP](https://www-cif.climateinvestmentfunds.org/fip-private-sector-set-aside), an independent expert evaluation committee assessed projects for concessional FIP financing. Only five projects were endorsed for funding as FIP interventions. Based on its’ transformative nature [this project received the highest score of all project proposals](https://www-cif.climateinvestmentfunds.org/sites/default/files/FIP_SC.11_5_Review_and_selection_of_concepts_to_be_financed_from_the_private_sector_set_aside_rev1.pdf) reviewed by the experts. In the Brazilian Cerrado alone, there are 50 million hectares of pasture, most of which are suitable for Macauba. With Macauba-based silvopastoral systems, oil quantities exceeding the size of today’s total global palm oil market can be produced without any impact on food security or natural ecosystems. There is strong recognition among relevant local actors regarding the potential of developing a Macauba value chain, as well as readiness to invest in its commercialization, but this potential has not materialized yet due to a lack of pilot projects. The MIF intervention is therefore crucial to bridging this pioneer gap.
3. **What is the path to scale and who are the potential scalers?** Following the successful completion of the 2,000 ha pilot project, Coopatos will make available up to an additional 96,000 hectares of pastures for the scaling up of the Macauba silvopastoral system (a scaling factor of almost 50) with the existing project partners. Furthermore, Coopatos owns 51% of Cemil, a cooperative of cooperatives, offering additional scaling opportunities directly through Coopatos. Preliminary agreements are in place with local, regional and international partners required to commercialize Macauba along its value chain, including support for additional research, nursery, storage, processing, transport, sales, and financing (e.g. Embrapa, ADM, University of Vicosa, Petrobras, Acrotech). A strong value chain will be required to meet [global demand for vegetable oil, which is projected to increase from 168 Mt to 210 Mt by 2024](http://www.fao.org/fileadmin/templates/est/COMM_MARKETS_MONITORING/Oilcrops/Documents/OECD_Reports/OECD_oilseeds2015_2024.pdf). In this context, the production of palm oil, for which Macauba is a substitute, is projected to increase from 58 Mt to 77 Mt. In addition to Brazil, the Macauba palm tree is native to several countries in the region, including Argentina, Bolivia, Colombia, Guyana, Mexico, Paraguay, Suriname, Uruguay and Central America, thereby offering significant additional scaling potential.
4. **How does it align to the IDBG strategies (including country strategy)?** The project is co-led by INE/CCS and has team members from ENE and IIC. It aligns with: (i) [IDB Climate Change Sector Framework Document](http://manuals/go.cfm?do=Page.View&pid=2767) (countering climate change), (ii) [IDB Integrated Strategy for Climate Change Adaptation and Mitigation and Sustainable and Renewable Energy](http://www.iadb.org/document.cfm?id=35802849) (assistance in sustainable agriculture and maximizing the use of resources, particularly grant and concessional loans from the CIF), (iii) [Renewed Vision for the IDB Group Private Sector Merge-Out](http://www.iic.org/sites/default/files/pdf/reforma_idbg_en.pdf) (carbon reduction efforts, and the creation of new business opportunities that contribute to sustainable development), (iv) [IDB Biodiversity and Ecosystem Services Program](http://www.iadb.org/en/topics/environment/biodiversity-platform/biodiversity-platform/idb-biodiversity-ecosystem-services-latin-america,7721.html) (promotion of private sector innovation for protection of ecosystems in key regional economic sectors, including agriculture and forestry), (v) [OVE Thematic Evaluation of Climate Change at the IDB](https://publications.iadb.org/bitstream/handle/11319/6692/CC_EnglishBRIK.pdf?sequence=1) (increase in activities fostering climate resilience and climate change mitigation, and improvement of private sector leverage (concessional funds)), (vi) [Country strategy Brazil](http://mif.iadb.org/documents/mngt.html) (improvement of productivity and competitiveness; promotion of innovation and diversification of products and services; promotion of green growth, with a particular focus on climate resilience and agribusiness value chains.
5. **Which of the 3 main thematic areas of the new MIF does it align with and why?** This is a climate-smart agriculture (CSA) project. The project will (i) *sustainably increase agricultural productivity and incomes* by increasing the productivity of existing pastures, thereby increasing and diversifying the incomes of smallholder farmers and seasonal harvest workers; (ii) *adapt and build resilience to climate change* by improving micro climates (reduced wind velocity and temperature swings due to the trees and the resulting shade) and soil quality (carbon sequestration in the soil, improved water cycles); and (iii) *reduce and/or remove GHG emissions*by increasing carbon sequestration by around 287 tons of CO2 per hectare, as well as substituting fossil fuels through Macauba oil-based biofuels.
6. **What are the key indicators to feed the aspirational indicator of the thematic area?** Contributing to the MIF’s CSA aspirational indicator of *reducing the gap between high and low productivity agricultural firms by half in 10 years*, this project will improve the smallholder farmers’ productivity with respect to the following: i) the pilot will benefit around 400 smallholder farmers and harvest workers, with the expectation of scale upon proof of concept; ii) smallholder farmers will receive land lease payments and payments per ton of Macauba fruits harvested from their land; harvest workers’ average incomes during the Macauba harvest season (which is after the coffee harvest season, thereby countering seasonal unemployment) will increase; iii) degraded pasture land will be recovered, thereby improving soil quality and stopping soil erosion; iv) carbon sequestration of about 575,000 tons of CO2 while (a) avoiding emissions from deforestation and (b) substituting fossil fuels through the production of Macauba oil-based biofuels; v) reduction in the amplitude of temperature swings, which reduces water consumption of cows; vi) increase in smallholder farmer total factor productivity growth, given that the increase in outputs (additional Macauba products) only requires comparatively minimal increase in inputs (labor, fertilizer, but no additional land).
7. **What instruments will you use? How much you think the project will cost the MIF and how much you think it can leverage from other partners?** The total project size will be USD6m. The MIF contribution to the project will consist of a reimbursable grant and a FIP equity investment. The reimbursable grant of US$1 million in MIF funds will be disbursed during years 1 through 5, to cover operational costs (extension services) and salaries, and will be gradually reimbursed over a period of four years once cash flow permits (break-even estimated at around year 8), using a revenue-based mechanism to be determined. Sales from oil processing start in year 1 but are minimal. Sizable sales start in year 6 and reach maximum sustained levels in year 11 onward.

The equity portion of US$3 million, from FIP funds channeled through MIF, will be disbursed in equal tranches in years 1, 3 and 5, to cover investment in the processing mill, plantations and other operating costs. MIF will seek to exit by selling its shares to other investment funds or interested investors between years 8 and 10. Equity disbursements in years 3 and 5 will be conditioned upon achievement of milestones that demonstrate contribution of other planned investor equity contributions and binding purchase agreements signed with identified buyers of the final products, which will help to ensure an acceptable level of revenues into the future.

The instrument mix has been chosen based on the high level of commercial risk in the project and based on an analysis of the financial projections of the company. Selected results below. The model does not include some potential revenue sources such as Social Fuel Seal Bonuses and Carbon Credits. If obtained, revenues could be higher.



The project also includes USD2m counterpart contribution from local and regional organizations with an interest in the development of the Macauba value chain, including [Viveiro Nativo](http://www.viveironativo.com.br) (seedlings/saplings), [Precisa](http://www.precisaagroambiental.com.br/) (agronomy), [Perfil Agrícola](http://www.perfilagricola.com.br/) (distribution), and Reinaldo Melo (palm industry investor). The project also benefits from a donation of the Patos de Minas municipality of 0.9 hectare of land (used for the training center, processing, and storage facilities for the harvest from native Macauba trees. Several partners have reviewed the project and have expressed strong interest once it is ready to get scaled. Both the IIC as well as the [Althelia Ecosphere Fund](https://althelia.com/) completed a first due diligence of the project and have expressed interest in providing financing for scaling. INE/ENE was one of the 18 founding members (including Gol, Boeing, GE) of a biofuel platform in Minas Gerais (where the project is located) with an interest in providing financing for a Macauba value chain.

1. **Who is in your team (teams should preferably be led a COF staff)?** The project team includes: Greg Watson (MIF/CSA), Michael Hofmann (MIF/CSA) Gloria Visconti (INE/CCS), and Luciana Brito (MIF/CBR) co-team leaders, Ana Castillo (MIF/CUR), Dieter Wittkowski (MIF/CPE), Carlos Sanchez (MIF/IC), Arnaldo Vieira de Carvalho (INE/ENE), Katalin Solymosi (INO/NFP).