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Valuation of the externality of carbon sequestration promoted by the restoration activities in Brazil Mata Viva®[®], in Guaratingueta, Sao Paulo

EXECUTIVE SUMMARY

BASF is a German company operating in five segments: chemicals, performance products, materials and functional solutions, solutions for agriculture, oil and gas. In Brazil, the company operates in the states of Sao Paulo, Paraná, Rio Grande do Sul, Bahia and Pernambuco and, with activities to promote the reduction of greenhouse gas emissions (GHG), BASF started, in 1984, a forest restoration project at its plant in Guaratingueta, Sao Paulo. In this process, 135 hectares were restored, transforming old pastures into a forest called Mata Viva® – the largest forest in an urban route of the municipality in which it is located.

More than 30 years after the beginning of the restoration activities that resulted in Brazil Mata Viva®, this case study seeks to assess the benefits brought in terms of global climate regulation by the investments made in the recovery of the area, with focus on the carbon sequestration promoted by the area restoration.

This externality was valued using the Replacement Cost Method (RCM), considering the Social Cost of Carbon (SCC), which represents the estimated cost of eventual impacts – due to the addition of one ton of carbon in the atmosphere – in agricultural productivity, human health and infrastructure. The valuation

was conducted for the period of existence of the project, based on primary data collected locally by the company.

The study of the biomass stored by Brazil Mata Viva® was carried out in 2011, calculating the amount of carbon in the aerial part of the forest, in the litter, in the soil and in the area equivalent to use and to occupation of the soil prior to the restoration activities to serve as base line of the study. By collecting primary data on the existing carbon stock in the Forest, and of pastures existing in its surroundings (situation of use and occupation of the soil previous to the restoration activities undertaken, which served as base line), it was possible to quantify the Brazil Mata Viva® contribution to the atmosphere carbon sequestration, representing the amount of 33,5 thousand tons. This net carbon removal was, then, valued at US\$ 1,28 million.

The results of the study support the company's strategy to develop with sustainability-oriented management and, consequently, makes tangible the results of effort and dedication, encouraging the development of new initiatives. This case contemplates only one of the ecosystem services provided by the restoration of degraded areas, making possible, in the future, to expand its analysis.



Reporting of Dependencies, Impacts and Externalities

Responsible for completing: Tiago Egydio Barreto

Project drivers

Goals: Understand the business relationship with ecosystem services.

Description: In 1984, BASF began restoration activities in the Permanent Preservation Areas (PPA) of the Paraiba do Sul River, which are located within the premises of BASF in the municipality of Guaratingueta/SP. Since then, maintenance activities are developed to maintain the forest for its preservation, and, from this perspective and on its own initiative, there was an effort to know what was the biomass stocked by the forest from the beginning of the restoration activities started in 1984; and if the forest was on an environmental trajectory comparable to others native forests.

To do so, an on-site study was developed to quantify the CO₂ stock of the forest, by studying the biomass of the most abundant trees in the forest, which allowed us to arrive at an equation with a high level of precision for this estimate, and to understand the successional *trajectory* of the forest, evaluating if new interventions were necessary to guarantee its conservation.

With these data in hand, seeking to understand the consequences of forest development in relation to the carbon stocks, we evaluated the generated externalities, which reflect the potential costs that would be caused to society in public health, maintenance works and damages generated by climate events and agricultural losses as others, if this carbon were in the atmosphere.

Project scope

Object of the project analysis: Project.

Description: Thirty three years after the beginning of the restoration activities, that resulted in Brazil Mata Viva®, we seek to better understand the benefits of the investments made in the area recovery, focusing on the valuation of the ecosystem service restricted to the externality of CO₂ sequestration promoted by Brazil Mata Viva®, based on the Social Cost of Carbon (SCC).

Geographic Area: municipality of Guaratingueta, Sao Paulo state, Hydrographic Basin of the Paraiba do Sul River.

Step(s) of the value chain included: Own operations.

Type of approach: Retroactive.

Time horizon: 32 years (1984 – 2016).

Ecosystem Services: Global climate regulation.

Global climate regulation

Role played by ecosystems in carbon and nitrogen biogeochemical cycles, thus influencing emissions of important greenhouse gases, such as CO₂, CH₄ e N₂O.

Method(s) used: Replacement Cost Method (RCM).

Results

Externality: US\$ 1,28 million

Data used	Type of data
Net emissions	
Actual removal resulting from environmental recovery, in tCO ₂ e: 33,5 thousand tons.	Primary

Further information

- About 80% of the Mata Viva® area is considered Permanent Preservation Areas (PPA); and the other 20% are outside legal reserve areas, because the industrial plant is in urban area and, consequently, is a stretch of vegetation protected voluntarily by BASF.
- Exchange rate used to convert the Social Cost of Carbon (SCC) into Brazilian Reais: we prefer not to convert the calculated amount into Brazilian Reais (R\$), since there is exchange variation in recent months and this will help keep the text updated.

Adjustments or derivations applied to the methods and tools used: N/A.

Others: N/A.

Explanatory Notes: The quantification of the Mata Viva® contribution to carbon sequestration from the atmosphere was carried out locally by surveying primary data of the existing carbon stock in the Forest (aerial part, underground part, litter and soil carbon); and of existing pastures around the Forest (land use and occupation of soil prior to the restoration activities, which served as base line to subtract from the total of carbon found in the Forest).

Analysis of the results

For the internal public, the result brings a positive perspective to the generation of awareness of the return on investments in the environmental area and for planning new actions in other facilities; consolidates its reputation and image with several stakeholders of the company; and enables actions of infrastructure that are related to commitments assumed by the company, such as: Global Pact, Sustainable Development Goals (SDGs), Biodiversity pledge and others.

For the municipality of Guaratingueta and its population, the planted forest is the largest green area in urban area of the municipality. This area contributes in a decisive way so that the municipality has the amount of green area recommended by the World Health Organization (WHO), improves the environmental quality of the municipality, stocks a significant amount of carbon and helps to protect the Paraíba do Sul River, of extreme importance for the urban supply, industries and agricultural activities, of several municipalities and of two Brazilian states.

Management of ecosystem services

Use of ecosystem services valuation results: Cost-benefit analysis; Definition of strategic goals and progress monitoring; Reporting.

Description: In addition to the 135 hectares restoration activities that resulted in the Mata Viva®, which generated the positive externalities mentioned, BASF is currently developing a management plan for the Forest, enabling a better development of its structure and, consequently, the increase of forest biomass and biodiversity.

Realização

