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Carbon emission mitigation measures in Brazil—case study of biomass policy for a ferroalloy plant in Ceará State

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Abstract

The present work aims at discussing the possibilities of atmospheric carbon emissions mitigation in the scope of the United Nations Framework Convention on Climate Change (UNFCCC) in the forest sector using a case study in the Northeast of Brazil. Taking Ceará State as an example and based on the Ceará State Energy Balances for 1980, 1984 and 1987, the Carbon ($C\text{-}CO_2$) Emission Balances were drawn up covering these same years. An exercise was carried out in order to draw up carbon emissions mitigation proposals through both Environmental Education and reforestation policies replacing forest clearing. The first, environmental education and forest management practices, involves more efficient practices in the woody sector. The second, reforestation policies, instead of felling native forests for fuel-wood burned to produce charcoal, is discussed from the economic point of view. An estimate was drawn up of the carbon abatement costs, using a case study for charcoal production based on reforestation instead of deforestation, for a ferroalloy plant in Ceará State.

Keywords: Biomass; Carbon mitigation; Ferroalloy sector; Charcoal; Deforestation; Environmental policy

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1. Introduction

Brazil is the second in the ranking of iron production in the world, being responsible for around 20% [1] of the global iron production. Although the Ceará State is not representative for this type of industry in Brazil, it was developed in the present work, an exercise as a case study in the Banabuiu Municipality of Ceará, taking into account a pig iron industry located in this city, to use as an example for the construction of baselines methodology for small scale projects in the context of the Clean Development Mechanism being implemented by the United Nations Framework Convention on Climate Change—UNFCCC.

Table 1 shows that the main emission percentages by sectors and sources in Ceará for the years 1980, 1984 and 1987 [2] were referred to the use of fuel-wood plus charcoal by the residential, ranching, farming and industrial sectors, followed by diesel oil and gasoline fuelling the transportation sector. The Carbon Emission Balances built in this exercise were based in the Energy Balances of Ceará State, for years 1980, 1984, 1987 because after the privatization of the Electric Energy Company of Ceará, it has been difficult to obtain new data about this subject.

A forest police for Brazil has been a subject of discussion in several areas of study, mainly because of the forest use for energy source, (fuel wood and charcoal) and the implications of this use. In Brazil, the charcoal production employs around 2,50,000 people, direct and indirectly (around 1,30,000 directly, in 1999) [3]. In 1995, charcoal was responsible for 47.9% of the Brazilian wood energy use and, as we can observe in Table 2, about 48% of which was produced from the native forest and 52% from the homogeneous planted forest for the same year 1995. From 1986 to 2003 the percentual relation of native and planted forest was changed. The year 1986 shows 82.7% for charcoal from native forest and 17.3% for charcoal from planted forest. The year 2003 shows a huge different