AN ENVIRONMENTAL SOCIAL ACCOUNTING MATRIX FOR THE BRAZILIAN AMAZON REGION

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Abstract:

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The System of National Accounting (SNA) calculates aggregate indicators that present income and factors flows amongst the economic agents. The Gross Domestic Product (GDP), one of these indicators, accounts for all goods and services that are produced in a nation. As an economic welfare indicator, GDP has flaws, because it does not include the negative externalities and it fails to reflect social development or welfare. For example greenhouse gas emissions from anthropogenic activities reduce air quality and generate costs that should be incorporated into the GDP. How can negative externalities be considered in the macroeconomic indicators? The Environmental Social Accountings Matrix (ESAM), guided by environmental economic principles, considers these negative externalities and present itself as an analytical tool to understand economic performance and its impact on the environment and vice versa.

The Brazilian Amazon Region (which include the states of: Acre, Amazonas, Roraima, Rondônia, Pará, Amapá, Tocantins, Maranhão and Mato Grosso) has been responsible for over 2% of all world emissions caused by deforestation, positioning the region in a place of considerable importance for fighting global warming (IMORI et alli, 2011). Therefore the incorporation of emissions information in the social accounting matrix allows us to determine which activities are responsible for emissions and at the same time, to provide a platform for sensitivity analysis about economic performance outcomes.

This paper aims to expand the traditional framework of Social Accounting Matrix (SAM) to include some greenhouse gas emissions (specifically CO2, CH4 and N2O) derived from economic activities in the Brazilian Amazon Region. The target is to build a tool to analyze the participation of each industrial and agricultural sector in the emission of these pollutants and calculate an economic welfare indicator that will include the emissions as a reduction of the economic welfare.

The Environmental Social Accounting Matrix is developed from the theoretical basis of the Pollution Generation/Elimination Model proposed by Leontief (1970) and the conventional SAM. In the matrix, the environment is handled according to the United Nations guidelines in its handbook on national accounts (ONU, 2003).

The environmental protection expenditures method is used to estimate the costs of greenhouse gas emissions. This allows including pollutant emissions in the matrix expressed in monetary units.

The environmental data is from the Brazilian Inventory of Anthropogenic Emissions and Removals of Greenhouse Gases, elaborated by the Ministry of Science and Technology and published in the late 2010.

The SAM is a model that combines information of the System of National Accounts and the input-output analysis methodology to provide a detail of the roles of employment, households and social institutions of the economy.

The ESAM is an expanded SAM to include the environmental data. In this model, environmental issues (greenhouse gas emissions) are represented in three accounts by four categories.

In the production account they are represented by the abatement activities; in the added value account by depreciation of natural capital and environmental rates; and in the final demand account by investment in natural capital.

The ESAM is a useful tool that allows for simulations to understand the behavior of the economy and its agents in response to exogenous changes. It can offer macro indicators and provide to policy makers the possibility to do economic analyses that support their planning.

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Important: I have preference to present in Portuguese, although I am able to present in Spanish and English.