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# The Trade-off between Poverty Alleviation and GHG Mitigation: Is It True for All Income Levels in Brazil?

by Thiago Fonseca Morello, Vitor Schmid and Ricardo Abramovay Socioenvironmental Economics Centre, University of São Paulo, Department of Economics

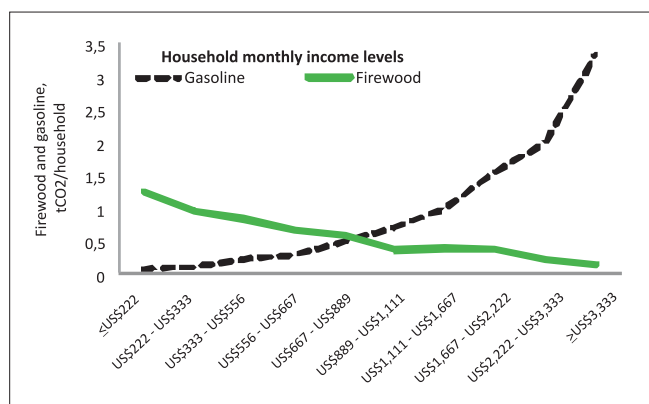
**A Goldman Sachs study** (2008) estimates that between 60 and 80 million people are introduced to the consumer market of durable goods annually, forming a kind of new worldwide middle class. The environmental impacts of these new consumers are not insignificant, and motivate important international negotiations regarding limits to greenhouse gas (GHG) emissions. This is a matter of concern even if the technological innovations aimed at the 'decarbonisation' of economies advance faster in the future than currently. Typically, one would expect that improving the living standards of poor people would almost unavoidably result in an increase in GHG emissions. However, this relationship may not be valid for all types of changes in consumption, especially those observed at lower income levels.

With regard to the contribution of the fuels consumed by families to GHG emissions, it is well documented that firewood is currently the most important energy source used by the world's poorest households. Firewood is harmful to the environment for three main reasons: first, a significant part of the household firewood results from cutting down untouched forests, which compromises biodiversity. Second, the wood stoves used by poor households are often precarious, representing a serious hazard to families who depend on them in several parts of the world, mainly in India and Africa. Finally, the use of firewood as household fuel is responsible for a significant part of the world's GHG emissions.

This means that improving the quality of wood stoves and, above all, replacing firewood with other fuels—even if they are fossil fuels such as liquefied petroleum gas (LPG)—would reduce GHG emissions, improve the living conditions of firewood-dependent households and reduce pressure on biodiversity. Such improvements can be fostered by poverty reduction policies that increase the income of poor people, allowing them to move away from firewood to other sources of energy.

Morello et al. (2011) show that this seems to be the case in Brazil, where firewood (and also charcoal) consumption is inversely correlated to household income. The opposite is true for fuels associated with individual transportation, especially for gasoline used in family-owned private automobiles. The authors also find that despite the large proportion of traditional fuel in the consumption bundle of the poorest households and even if one takes into account the use of public transportation, the net 'carbon

## Firewood and Gasoline Emissions by Household Income



cost' in terms of changes in the consumption bundle of families that move above the poverty line is much lower than any other upward movement in the income distribution of other well-off groups.

However, how far up the income scale can the fall in firewood consumption due to poverty reduction neutralise increases in gasoline consumption related to the use of private automobiles? The figure depicts the consumption of firewood and gasoline (measured in CO<sub>2</sub>) by household monthly income level and shows that, although there is an increase in gasoline consumption as income level rises, the reduction in firewood consumption can compensate for such a carbon-intensive outcome up to a monthly family income of US\$888.89. Increases in income levels beyond this threshold will, inevitably, increase national GHG emissions.

Differentiating between household income groups regarding fuel consumption habits must, therefore, be considered in the fine tuning of pro-climate policies, given the relevance of equity considerations and of the climate justice debate.

### References:

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