

Climate Change Policies and Their Social and Developmental Impacts: the Case of Brazil

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Introduction

Since the 2015 United Nations Climate Change Conference in Paris, global warming has acquired extraordinary priority and attention. The notion that humanity has reached an environmental tipping point, first defended in the 1970s by the Club of Rome², has assumed great prominence, particularly among OECD countries (Medeiros and Majerowicz 2024). In response to this challenge, renewable energy and mineral extraction (such as rare earths and lithium) have emerged as key areas of investment, and governments, particularly in the OECD, have introduced carbon trading markets and new taxes to penalize fossil fuel use and subsidize investments in renewable energy.

These policies, as currently designed, involve one major contradiction: they tend to exacerbate income inequalities both within and between countries. Regarding the former, the penalties for fossil fuel consumption fall predominantly on the poor and the working class. Though prices have fallen, renewable energy technologies remain relatively expensive. Thus, their diffusion must be encouraged by means of subsidies, tax incentives, and quantitative restrictions on CO₂ emissions. Cap-and-trade schemes and a new relative price structure, however, are not reliable solutions for environmental problems. The system of carbon credits simply shifts pollution from one company or country to another. Furthermore, the emissions caps that have been set on corporations in the European Union, the United States, and China are arguably too high to achieve the desired environmental targets. Other problems include fraud and the granting of exceptions to certain sectors, such as oil and gas (Lessmann and Kramer 2024).

The orthodox approach to environmental problems puts poor countries at a disadvantage by raising the cost of living and hindering economic growth in regions with income per capita levels well below that of advanced countries. It is thus not surprising that many developing countries perceive the new priorities of the developed

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² An informal group of corporations, academics, politicians, and policy analysts which first convened in Rome in 1968. *Limits to Growth* (Meadows et al. 1972) was a landmark in the development of the mainstream environmental movement, arguing the pace of modern economic growth was unsustainable.

world as yet another instance of the old strategy of kicking away the ladder of industrialization (Chang 2002; Ayu 2020).

The first part of this article analyzes challenges facing the environmental agenda in wealthy countries. The second part turns to the developing world, focusing on the case of Brazil.

The Climate Agenda in an Unequal World

The main focus of the global climate agenda has been the OECD countries, in which there are three basic, very distinct positions on climate change. The first is adopted by politicians and segments of public opinion who simply deny the evidence with regard to global warming and consequently the implications for economic policies. This position, backed by oil and gas companies and obtaining support among workers affected by the energy transition, was taken by President-elect Donald Trump when withdrawing the United States from the 2015 Paris agreement.

The second position, which we call the mainstream approach, is supported by a broad contingent of governments, multilateral organizations, and corporations who propose reducing greenhouse gas (GHG) emissions through the creation of carbon markets and investment in renewables. Though carbon pricing has a recessionary effect, taxes imposed on fossil fuels will, mainstream environmentalists argue, create jobs through allocation in green activities and new technologies (Terzi 2022). This approach was enshrined in the UN's Sustainable Development Goals, established in 2015 as part of the 2030 Agenda for Sustainable Development (Pham et al. 2022).

The third approach is more radical and includes Marxist and non-Marxist representatives of the green left who propose “degrowth” (reduced economic output) for developed economies as the only way to avoid ecological catastrophe (Saito 2024; Hickel 2020). The revival of this neo-Malthusian perspective began with Paul Ehrlich's bestseller *The Population Bomb* (1968), soon followed by the Club of Rome's *The Limits of Growth* (Meadows et al. 1972).

The perspective adopted here shares some of the concerns of the mainstream approach, but also identifies problems highlighted by the other approaches as well. Raising the price of carbon emissions without compensatory income and employment policies, we believe, excessively penalizes the working class, as climate change skeptics have long argued. The electoral force of right-wing political leaders in France and other countries derives in part from their support among workers most affected by the

elimination of fossil fuel subsidies and the decline of energy-intensive manufacturing employment. The infamous Yellow Vest protests in France, for example, began as a popular movement against taxes on fuels.

As Huber and Phillips (2024) argue in their critique of Kohei Saito's (2024) brand of ecological Marxism, the main climate challenge is not the "extravagant lifestyle" of the working class in developed countries, but the unwillingness of governments in the OECD to exercise the degree of economic planning and social control over production required to confront environmental problems.

To offset cost increases due to carbon taxes and job loss in energy-intensive sectors, governments should compensate affected workers and lower-income groups, and invest in public transportation. The need for such policies contrasts with the fiscal austerity agenda followed in recent decades by OECD countries, particularly in the EU. Though the US's Inflation Reduction Act and Europe's Green Deal Industrial Plan devote substantial resources to green technologies, a disproportionately large share has been directed to subsidizing automobile manufacturers, energy corporations, and relative wealthy consumers of electric vehicles and solar panels (Gerasimcikova 2024). These policies boost profits and promote the technological leadership of US and European corporations in renewables, but they will not achieve the "radical reorganization of electricity, transport, industry, agriculture, and buildings" needed to meet stated environmental targets (Huber and Phillips 2024).

Domestic policies, furthermore, are not sufficient. Climate change does not respect political borders (Whalen 2023). Poor countries disproportionately affected by floods, droughts and wildfires lack the resources to implement comprehensive environmental strategies. Rich countries should transfer resources to poorer ones in the form of donations and affordable financing for large-scale public investments (Songwe et. al. 2022). Implementing these policies, both domestically and abroad, requires abandonment of the institutions and economic interests that control policy in OECD countries.

Green developmental strategy in a just transition must be adapted to different levels of economic development (See Pham et al. 2022 for a discussion along these lines in the case of Vietnam). Consider, for instance, the carbon border taxes established in European countries, which assess taxes on imported goods based on how much CO₂ was emitted in producing them (Terzi 2022). Just as carbon taxation domestically disproportionately penalizes the poor, carbon taxation at the border penalizes poorer

countries and reinforces income inequality between nations. Reversing these inequalities requires compensatory measures such as climate finance for investment in renewable energies, made available to the latter countries and adapted to different national conditions.

Although the expansion of renewable energy and a reduction in the burning of coal and wood for fuel (still significant in many poor countries) is essential, this transition cannot be imposed on developing countries by wealthy ones for the ostensible purpose of “leveling the playing field”. This amounts to “pull[ing] the ladder of fossil-based development, after having climbed it themselves” (Terzi 2022, p. 227).

Given this scenario, large non-western countries like China, India, and Brazil are following national strategies based on domestic resources. China is embracing a broad agenda for energy diversification, reducing dependency on coal and investing heavily in new public infrastructure, renewable energy, and electric vehicles. India follows a less comprehensive strategy, while Brazil, as discussed below, faces significant challenges in terms of reducing its GHG emissions, mainly in agriculture. Most other developing countries lack the resources to effect meaningful change to their economic structure and energy systems.

When we consider the sectoral composition of greenhouse gas emissions in the planet, the greatest emitters are energy and agriculture, forestry, and land use (Observatório do Clima 2023). Thus, the greatest contribution of developing countries to tackling global warming should be the reduction of emissions caused by carbon-intensive energy sources (coal), and the reduction of deforestation, particularly in large countries in Asia, Africa and South America.

The Case of Brazil

The world's eighth largest economy, Brazil is responsible for only 1.2% of global CO₂ emissions, ranking twelfth in absolute CO₂ emissions and 90th in emissions per capita (IEA 2024). The country's relatively clean energy system is the result of decades of public investment in hydropower and biofuels. Though solar and wind capacity has increased rapidly since 2010, this has had little effect on the share of renewables in power generation, as it has come at the expense of hydropower's share. Renewable sources (hydropower, wind, solar, and biofuels) account for roughly 50% of primary energy consumption in Brazil, well above the world average of 15% (EPE 2024).

Biofuels, mainly ethanol used as a transportation fuel, became an important part of the country's energy system in the mid-1970s, when balance of payments problems forced Brazilian authorities to seek ways to reduce oil imports. The federal government's *Pró-Álcool* program, launched in 1975, subsidized sugarcane and ethanol producers and imposed minimum levels of ethanol in gasoline, leading to a sharp rise in ethanol consumption.

Solar and wind power now account for over 20% of electricity generation (EPE 2024). This development has been compatible with the overall neoliberal orientation of energy policy since 1990. All three segments of the electricity sector—generation, transmission, and distribution—underwent rapid privatization in the 1990s, and Eletrobras, the state-owned company which built most of Brazil's existing generation and transmission network, was privatized in 2022.

Solar and wind power capacity in Brazil is owned and operated largely by private investors aided by generous government loans and subsidies. AES (USA), Enel (Italy), and Engie (France) and other multinational corporations participate in over 75% of all solar and wind power projects in Brazil, in partnership with other private investors and state-owned banks such as the *Banco Nacional de Desenvolvimento Econômico e Social* (BNDES) (Klingler et al. 2024).

Solar and wind power are relatively clean sources of electricity with low marginal production costs, but they have certain drawbacks, aggravated in Brazil's case by public policies that reinforce inequality. Given their low energy density, large wind and solar farms require the clearing of huge tracts of land, which in Brazil have been transferred to energy corporations through land privatization, a process described by Klingler et al. (2024) as “green grabbing”. Most of the newly installed solar and wind capacity is located thousands of kilometers from consumption centers, requiring a costly expansion of the power transmission network. Finally, as intermittent energy sources, solar and wind facilities must operate in tandem with backup generators—thermal plants running, in Brazil's case, on coal, natural gas, nuclear power, and biomass (EPE 2024)—capable of providing electricity on demand.

All these factors have raised electricity costs, costs that have been transferred to residential consumers in highly regressive ways. Electricity prices are very high in Brazil, even relative to OECD countries (Salomão 2023), and this is partly because of

heavy taxes embedded in energy bills used to subsidize thermal plants, renewable energy corporations, and relatively wealthy consumers with the means to install solar panels on their rooftops.

These costs might arguably be justified in terms of their environmental benefits, but it is worth recalling that power generation has never been a major source of GHG emissions in Brazil, 75% of which are the result of agriculture and changes in land use (mainly deforestation). Livestock account (through flatulence and burps) for 80% of emissions caused by food production in Brazil (Observatório do Clima 2023).

Deforestation and agriculture are closely related, as livestock and soybean production are the two leading causes of deforestation in Brazil (Garcia 2021). Lowering GHG emissions thus requires a reduction in the rate at which land is being cleared for food production. This raises economic and political concerns.

Soybeans, destined mainly for China, were Brazil's number one export product in 2023, soybeans and beef together accounting for almost 20% of total exports (APEX 2024). Landowners and agribusiness are well-represented in Brazilian politics and constitute an important social base of the extreme right, which firmly opposes environmental regulation and was supported by roughly 50% of the electorate in the most recent presidential election in 2022. A bill approved in December 2023 by the Brazilian Chamber of Deputies (*Projeto de Lei* 2148/15), based on the European cap-and-trade system, imposes emissions caps on steel, cement, aluminum, and other industrial polluters, but excludes agriculture and livestock.

On the other hand, other segments of the Brazilian elite have provided political support for current President Luis Inácio Lula da Silva's environmental policies. These include the *Plano de Ação para a Prevenção e Controle do Desmatamento na Amazônia Legal* (Plan of Action for the Prevention and Control of Deforestation in the Amazon), which reduced deforestation in the Amazon and the Brazilian *Cerrado* in 2023, the two regions most affected by predatory agricultural and extractive activities (Boehm 2024).

We turn to a brief discussion of biofuels and electric vehicles (EV) in Brazil, which play an important role in recent environmental initiatives.

Biofuels and Electric Vehicles

Demand for EVs (including hybrids) has grown rapidly in Brazil, their share in passenger and light commercial vehicle sales increasing from around 4% in 2023 to 7% through October 2024 (ANFAVEA 2024). This expansion has been made possible by means of tax breaks and other incentives benefitting, primarily, wealthy consumers and foreign-owned EV manufacturers. Though Brazil has a large, integrated automobile industry, it does not yet produce pure EVs (battery electric vehicles, BEVs), nor the batteries required for their production³. These vehicles must thus be imported, and their cost is prohibitive for most Brazilians. Prior to 2024, however, import taxes for BEVs were waived completely, making them competitive alternatives to high-end conventional and flex-fuel vehicles. The import tax on BEVs was reinstated in January 2024, but will remain at low levels until 2025. This is in contrast to the heavy federal and state taxes imposed on non-electric vehicles and which can amount to 40% of the sales price or more (Hessel 2024).

It will likely be some time, however, before EVs dominate the Brazilian market. Notwithstanding the tax incentives, EV prices remain prohibitive for most Brazilians. High electricity prices (see above) and the lack of charging stations and secondary markets for EVs, pose further obstacles. Furthermore, Brazil is a major producer of biofuels, and powerful segments of Brazilian capital, notably agribusiness, automakers, and fuel distributors (such as Raízen, a joint-venture between Shell Energy and the Brazilian conglomerate Cosan) have promoted ethanol and biodiesel as transportation fuels.

The *Programa Mobilidade Verde e Inovação*, or *Programa Mover*, signed into law in June 2024, imposes stricter emissions requirements on vehicles sold in Brazil and provides R\$20 billion in federal subsidies for green transportation technologies (Montoia 2024). Biofuel advocates played a key role in formulating *Programa Mover*, as evidenced by the law's adoption of the "well-to-wheel" approach to measure vehicle emissions. Contrary to the traditional "tank-to-wheel" approach, which assesses efficiency based on tailpipe emissions, "well-to-wheel" takes into account emissions during the entire life cycle of the fuel (MDIC 2023). Thus, the carbon absorbed by sugarcane and soybean plantations (the raw materials for most biofuels in Brazil)

³ Earlier this year, the Chinese automaker BYD began construction of a factory in the state of Bahia that will produce BEVs and hybrids.

compensate the greater emissions of flex-fuel vehicles (relative to BEVs) during fuel combustion. This dramatically increases the measured emissions efficiency of biofuels, ensuring that traditional automakers, auto parts suppliers and biofuels producers will receive a large share of the program's subsidies.

The *Combustível do Futuro* (Fuel of the Future) Law, approved in October 2024, raises the mandated level of ethanol in gasoline from 22% to as high as 35%, and of biodiesel in traditional diesel from 10% to as much as 20% by 2030 (PLANALTO 2024). The law provides incentives for biomethane companies and institutes the *Programa Nacional de Combustível de Aviação* (National Aviation Fuel Program) to encourage the production of sustainable aviation fuel (SAF). Evidence suggests agribusiness interests and large fuel distributors played a key role in formulating this law, leading them into a closer relationship with the governing Workers' Party (Waltenberg and Campos Jr. 2024).

Conclusion

We examined in this article aspects of the political economy of climate change policy. Tackling environmental issues on a global scale requires multilateral financing and cooperation, as well as the adoption of standards that are adapted to the unequal capacities of different countries. In the developing world, meeting environmental goals also requires reducing deforestation and providing universal access to clean water, while at the same time creating jobs and reducing poverty.

The social inequalities within and between countries make it difficult to enforce universal policies to contain global warming. In advanced countries, the penalty of carbon taxation falls essentially on the poor. Manufacturing unemployment and growing competition with China (the main producer of photovoltaic cells, wind turbines and electric vehicles) helped create a political environment exploited by right-wing politicians that deny the need for urgent structural changes. The vast inequalities existing between nations demand transfers of resources to poor countries, which, though contributing much less to global warming, suffer the greatest impacts. The inability or incapacity of governments in developed countries to provide adequate finance for energy transition and deforestation, and the introduction of tariffs on carbon-intensive goods, reinforce historical inequalities.

The second part of the article examined the case of Brazil. The vast majority of GHG emissions in Brazil are the result of agricultural activities. Deforestation is directly related to Brazil's growth model, and its economic relationship with China has exacerbated this problem. Despite some important efforts to mitigate deforestation during the PT administrations (2003-2015; 2023-present), including the creation of the Amazon Fund in 2008, a comprehensive environmental strategy conflicts with the interest of important fractions of Brazil's dominant classes. Even under the more progressive government of Luis Inácio Lula da Silva, these interests threaten the political viability of a more pro-active environmental agenda.

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