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# THE MACRO- IMPACT OF CARBON TAXATION: ANALYSING ENVIRONMENTAL POLICY IN INDIA

**By** *Riya Dumir*
**From** *Law College Dehradun, Uttaranchal university*

**ABSTRACT**

As the world struggles with the growing effects of climate change, governments everywhere are looking for new and creative methods to cut carbon emissions and move toward a more sustainable future. Carbon pricing is one such policy instrument that is becoming more popular; it imposes a charge on carbon emissions to incentivize businesses and individuals to lower their carbon footprints. Given India's strong reliance on coal and other fossil fuels for energy generation and its rapid development, the topic of how carbon taxes might be included into environmental policy is becoming more and more relevant.[1] Over time, India's environmental policies have changed to balance the country's pressing need for sustainability with economic growth. Nonetheless, India faces a special challenge as one of the biggest greenhouse gas emitters in the world. Poor environmental quality can have serious negative effects on human health, according to the Intergovernmental Panel on Climate Change (IPCC). Global warming and climate change are related problems that are mostly brought on by greenhouse gas emissions from human activity, especially the combustion of fossil fuels. Carbon dioxide ($CO_2$) accounts for 76% of worldwide greenhouse gas emissions, with 56.6% of that amount coming from the combustion of fossil fuels, according to the IPCC's Fourth Assessment Report (2014). [2]From an economic, environmental, and social perspective, the patterns of energy production and use that are now in place are unsustainable (IEA, 2009). By 2050, CO2 emissions from energy use may more than treble if these trends continue unchecked. Many legislative initiatives have been put out to reduce carbon emissions and slow the increase in global temperatures, including carbon environmental quality requirements, energy and carbon tariffs, command-and-control laws, and economic policy programs. Notably, businesses are free to choose how much energy they use and how much carbon they emit. Energy and carbon taxes are generally endorsed by economists and international organizations (EEA, 2010) as economical means of accomplishing emission reduction goals. Furthermore, these taxes bring in money for the government, which, when used wisely, can assist offset financial limitation.

The "Double Dividend Hypothesis" is the idea that carbon taxes can be used to both lower emissions and boost economic expansion. With almost 5% of the world's total emissions, India ranks third in terms of greenhouse gas (GHG) emissions. The nation's $CO_2$ emissions rose by 5.2% between 1990 and 2009 (Ahn and Graczyk, 2012). In addition to the fast expansion of the economy, the increased demand for energy has increased the strain on energy supplies, especially biomass and coal, which are plentiful but significant contributors to carbon emissions. India has been involved in environmental action since the Stockholm UN Conference in 1972. Its first approach to climate change focused on "per capita carbon emissions" and was founded on the idea of a fair allocation of mitigation obligations[3]. In keeping with this, India voluntarily committed to lowering its emission intensity by 20–25% by 2020 when it ratified the Kyoto Protocol on August 26, 2002. India was also one of the 175 nations that ratified the 2015 Paris Agreement, pledging to pursue a low-carbon growth path in order to keep the average world temperature well below 2°C. Since carbon dioxide (CO2) emissions are primarily linked to environmental issues including climate change and global warming (IPCC,

[1] Government of India, economy survey 2020-2021; international agency (IEA), India energy outlook 2021
[2] Intergovernmental panel on climate change (IPCC), climate change 2014: synthesis report, contribution of working groups I, ii, iii to the fifth assessment report of the IPCC,2014
[3] Ministry of environment, forest and climate change (MOEFCC), India's intended nationally determined contribution (indc),2015

2007), policymakers have unavoidably pushed for low carbon emitting technology. There is no motivation to regulate these issues at the national level because they are global in scope. The international community can contribute significantly to tackling the global environmental crisis by funding suitable training, policy reforms, information gathering, and public environment education. Consequently, global actions in accordance with some international treaties appear to be the only practical option. To discover answers to these devastating issues, numerous international conventions were established. Historical turning points include the 1992 United Nations Framework Convention on Climate Change (UNFCC) and the subsequent Kyoto Protocol.

## II. PART 1
## THE KYOTO PROTOCOL AND CO2 EMISSION

The Kyoto Protocol and the 1992 United Nations Framework Convention on Climate Change (UNFCC) are significant turning points in the history of addressing greenhouse gas (GHG) and climate change issues. The concept of common but differentiated obligations is established by the Kyoto Protocol, which places the onus of reducing current emissions on industrialized nations. Member nations were expected to cut CO2 emissions by 5% by 2008–2012 and 20–25% by 2020 as part of the Kyoto Protocol (IPCC, 2007). Additionally, low-income developing nations committed to voluntarily reducing their emissions whenever their per capita income level reached a specific threshold. [4]Macrodynamic, which examines significant changes in the economy and environment over time, can be used to analyse the Kyoto Protocol and CO2 emissions. The Kyoto Protocol is a long-term strategic intervention in macroeconomic dynamics that aims to balance economic growth and stabilize CO2 emissions. A few crucial macroeconomic and dynamic ideas that are pertinent to the Kyoto Protocol are as follows

1. Policy Interventions and Dynamic Optimization: Adopted in 1997, the Kyoto Protocol establishes legally binding goals for industrialized countries to cut their emissions of greenhouse gases (GHGs). To maximize long-term environmental and economic results, governments must gradually modify policies like carbon taxes, cap-and-trade schemes, and subsidies for renewable energy.

2. Intertemporal Trade-offs: Macrodynamic takes into account trade-offs between continued environmental sustainability and current economic growth. Countries frequently struggle with the "growth vs. environment" conundrum, where lowering CO2 emissions in the near term may impede economic progress but guarantee stability in the long run. By weighing the long-term advantages against the short-term expenses, nations can engage in emission-reducing projects overseas through the Kyoto Protocol's Clean Development Mechanism (CDM).[5]

3. The relationship between economic growth and carbon intensity ($CO_2$ emissions per unit of GDP) is examined via macrodynamic. Endogenous development theory and green growth models predict that developed nations will eventually move from fossil fuel-based to low-carbon economies. Indirectly, the Kyoto Protocol pushes economies toward innovation, energy efficiency, and renewable energy by promoting structural changes in production.

## III. PART 2
## INDIA'S CO2 EMISSION AND ITS RESPONSE TO INTERNATIONAL CLIMATE POLICIES

The foundation of India's previous stance on climate change was the idea that mitigation efforts should be fairly distributed based on "per capita carbon emission." But adhering to this normative idea doesn't

[4] United nations, united nations framework convention on climate change,1992

[5] Stern.N, The Economics of Climate Change: the stern review, Cambridge university press,2007

seem to guarantee much advancement. [6]As a result, the global community emphasized how vital it is to address and reduce carbon emissions in emerging nations. In light of this, India voluntarily committed to reducing its emission intensity to 20–25 percent by 2020 when it ratified the Kyoto Protocol accord on August 26, 2002. India embraced a number of policy efforts, such as the Clean Development Mechanism (CDM), which is a fundamental principle of the Kyoto Protocol for developing nations. This is a good attempt, but because of its limited ability to mitigate emissions, it is rarely useful. Additionally, by establishing goals and developing markets for the production of renewable energy, India's National Action Plan on Climate Change seeks to increase energy efficiency through institutional and legislative reform. The carbon tax was recently implemented in July 2010 at a rate of Rs 50 per ton of carbon emissions. It was then raised to Rs 100, 200, and 400 per ton in 2017. One of the 175 countries that accepted the 2015 Paris Agreement was India, which pledged to reduce GDP-based emission intensity by 33–35% by 2030 (relative to 2005 levels).40% of electricity should come from non-fossil fuels. To absorb 2.5–3 billion tons of $CO_2$, increase the amount of forest cover. In 2021, India committed to achieving Net Zero emissions by 2070 at the Glasgow Climate Pact (COP26). India has put in place a number of domestic programs to accomplish these goals, including the Renewable Energy Mission, which seeks to increase the capacity of solar, wind, and hydropower, and the Perform, Achieve, and Trade (PAT) plan, which encourages energy efficiency in companies. In order to deter excessive coal use and provide money for green energy projects, India has also implemented a coal cess, sometimes known as a carbon tax. Advocating for the concept of "common but differentiated responsibilities" (CBDR), which holds that developed nations, who have historically been primarily responsible for emissions, should lead the charge in reducing carbon emissions while providing financial and technological support to developing countries, India has also played a significant role in climate negotiations. In order to help developing economies make the shift to low-carbon pathways, India has advocated for more fair climate policy and international financing sources like the Green Climate Fund (GCF)[7]. Overall, India is aggressively reacting to international climate policies through ambitious promises, the expansion of renewable energy, and domestic regulatory frameworks, even if the country's CO2 emissions are still rising as a result of economic progress. But striking a balance between sustainability and economic growth is still difficult, and India's shift to a low-carbon economy will need financial assistance, technological advancement, and ongoing international collaboration.

## III. PART III
## IMPACT OF CARBON TAXATION IN INDIA

Carbon taxation's effects in India by placing a monetary penalty on actions that fuel climate change, carbon taxes are a potent economic instrument intended to lower carbon emissions. Carbon taxes has the potential to significantly alter the environment and the economy in a developing nation like India, where growing urbanization and industry have increased greenhouse gas emissions. A well-designed carbon tax can be crucial in determining India's sustainable future by lowering reliance on fossil fuels, encouraging the use of cleaner energy, and producing funds for green development. The ability of the carbon tax to accelerate India's shift to renewable energy is among its most notable and immediate effects. For the production of electricity and industrial processes, India is still mostly dependent on coal, oil, and natural gas. By raising the cost of these high-emission energy sources, a carbon tax would incentivize consumers and companies to switch to greener energy sources

[6] Agarwal, A. & Narain, Global warming is an unequal world, Centre for science and environment,1991

[7] United nations framework convention on climate change (UNFCCC), report of the conference of the parties, Rio summit,1992

like hydropower, wind, and solar.[8] India's long-term objective of reaching 500 GW of non-fossil fuel energy capacity by 2030 is in line with this. The adoption of renewable energy would be accelerated by the rising cost of carbon-intensive fuels, increasing the appeal and viability of clean energy projects. As a result, the renewable energy sector would grow significantly, creating jobs in green businesses, advancing technology, and improving the nation's energy security. The potential for increased energy efficiency across industry is another significant effect of India's carbon tax. In order to lower their tax burden, high energy-consuming industries like manufacturing, steel, and cement would be encouraged to streamline their operations and implement greener technologies. This move toward energy efficiency may result in lower emissions, less energy uses overall, and long-term financial savings for companies. India's industrial sector, which produces a significant amount of its emissions, would be encouraged to invest in sustainable practices and innovate, which would ultimately make the country's economy more environmentally conscious and competitive. Carbon taxes might have a big budgetary impact by bringing in a lot of money for the government, in addition to changing the energy sector. In order to lessen the impact of rising energy prices on lower-income people, this cash might be utilized to support social welfare programs, sustainable energy projects, and climate adaption projects. Sweden and Canada are two examples of nations that have effectively used tax money to fund environmental conservation initiatives, green infrastructure, and sustainable public transit. India might adopt a similar strategy, making sure that the money raised from carbon taxes is used to finance projects that combat climate change and promote economic growth[9]. Additionally, by lowering the fiscal deficit, the extra money might provide the government more money to spend on other development initiatives. One of the biggest causes of air pollution and carbon emissions in India is the transportation industry, which would also be impacted by a carbon tax. Emissions from this sector have increased recently due to a rise in car ownership and a rise in the demand for transportation based on fossil fuels. The government can stimulate the use of electric vehicles (EVs), support public transportation, and provide incentives for research and development of alternative fuel technologies by levying a carbon tax on fossil fuels. Customers and businesses may be more likely to switch to electric vehicles (EVs) as the cost of gasoline and diesel increases as a result of the carbon tax, which would lower vehicle emissions and urban air pollution levels. In addition to helping the environment, the growth of India's EV market will strengthen the country's auto sector and generate new employment possibilities in the production of vehicles, charging infrastructure, and batteries. Carbon taxes may also improve India's economic standing and international trade. Many wealthy countries are enacting carbon pricing schemes, such as carbon border adjustment taxes, in response to mounting international pressure to address climate change. For instance, if India does not set up its own carbon pricing system, the European Union's Carbon Border Adjustment Mechanism (CBAM), which levies duties on imports that are high in carbon, may have an impact on Indian exports. India can bring itself into compliance with international environmental norms and maintain the competitiveness of its industries in global markets by enacting a local carbon price. Furthermore, a transparent carbon pricing plan will enhance India's standing as a conscientious player in the world economy, drawing in foreign capital and bolstering trade ties with nations that place a high value on sustainability[10]. The enhancement of public health outcomes would be another important effect of a carbon fee. Cities in India, especially Delhi, High air pollution exposure has been connected to

[8] Ministry of new and renewable energy (MNRE), government of India, annual report 2022-23

[9] OECD, effective carbon taxes 2021: Pricing carbon emission through taxes and emissions trading (OECD PUBLISHING 2021)

[10] https://openknowledge.worldbank.org/entities/publication/2d963e18-46e4-4be4-83cf-2e4d6788d8b4.

cardiovascular problems, respiratory illnesses, and shortened life expectancy. Carbon taxes have the potential to significantly reduce air pollution and enhance public health by discouraging the use of fossil fuels and encouraging the use of cleaner alternatives. Millions of Indians' quality of life would improve, healthcare expenditures would go down, and worker productivity would rise with a healthier populace.[11] Furthermore, carbon taxes may hasten the adoption of sustainable farming methods. Because of the excessive use of chemical fertilizers, burning of crop leftovers, and methane emissions from livestock, agriculture is a major source of greenhouse gas emissions. Farmers may be more inclined to use climate-friendly methods like organic farming, precision agriculture, and improved waste management if high-emission agricultural operations were subject to a carbon tax. This change would improve soil fertility, water conservation, and long-term agricultural viability in addition to lowering emissions. In conclusion, India could see significant social, environmental, and economic changes as a result of a carbon tax. A well-executed carbon tax could revolutionize India's climate action efforts by boosting the country's energy efficiency, promoting cleaner transportation, boosting global trade competitiveness, generating government revenue for sustainable development, and encouraging the shift to renewable energy. Its effects on agricultural sustainability, economic growth, and public health would also increase the nation's long-term resistance to climate change. The advantages of carbon taxes greatly exceed the disadvantages, making it an essential step toward India's sustainable future, even though careful policy design is required to address potential economic challenges. Given India's varied economic structure, strong reliance on fossil fuels, and the possible socioeconomic effects of higher taxes, enacting and enforcing a carbon taxing policy there is fraught with difficulties. Although carbon taxes are a useful instrument for lowering greenhouse gas emissions and advancing renewable energy, their implementation in India is complicated by issues with industry competitiveness, inflation, administrative challenges, and political opposition. To guarantee that carbon taxes have the desired economic and environmental effects without placing an undue burden on businesses and consumers, these issues must be resolved. The possible effect of carbon taxes on industrial competitiveness is one of the biggest obstacles to their regulation. Energy-intensive sectors like manufacturing, steel, and cement are vital to India's economy and play a major role in job creation and GDP expansion. For these businesses, a carbon tax would raise production costs, reducing their competitiveness in international markets, particularly if rival nations do not levy comparable levies. Reduced investments, slower economic growth, and possibly job losses could result from higher costs, especially in industries that depend on inexpensive fossil fuels. India must carefully craft a tax structure that strikes a balance between environmental objectives and economic sustainability in order to avoid this. This might be accomplished by providing tax breaks, incentives for green innovation, or gradual adoption to give industries time to adjust.

## IV. PART 4
## CHALLENGES IN REGULATING THE CARBON TAXATION POLICY

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[11] Health effect institute, state of global air 2020: special report on global exposure to air pollution and its health impacts (HEI,2020)

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[12] https://www.imf.org/en/Publications/Policy-Papers/Issues/2019/05/01/Fiscal-Policies-for-Paris-Climate-Strategies-From-Principle-to-Practice-46826.

[13] World bank, carbon pricing leadership report 2021( world bank,2021)

advantages over immediate costs. Another regulatory obstacle is the general lack of understanding and support for carbon taxes. Instead of seeing higher taxes as an environmental imperative, many individuals see them as a financial hardship. Without sufficient public participation and education, there is a chance that the policy may be opposed, which would make it challenging for the government to enact and maintain a carbon price. The success of such programs is greatly influenced by public opinion, and protests and resistance may result from false information or a lack of knowledge about the advantages of a carbon price. In order to combat this, the government must spend money on community involvement programs, open communication, and awareness campaigns that outline how the tax will be used to finance renewable energy projects, lower pollution, and generate long-term economic prospects.

Lastly, another difficulty is integrating carbon taxes with current environmental laws and international agreements. India already has a number of carbon trading schemes, renewable energy incentives, and environmental legislation. To prevent duplication, regulatory conflicts, or unforeseen economic implications, a carbon price must be introduced in harmony with these measures. Furthermore, in order to guarantee that Indian companies maintain their competitiveness in global markets while adhering to international climate agreements, it is imperative that India's carbon tax policy be in line with global carbon pricing mechanisms. This calls for ongoing policy review, collaboration with international organizations, and flexibility in response to shifting environmental and economic circumstances.

## CONCLUSION

In conclusion, even though carbon taxes can be a useful instrument for cutting emissions and advancing sustainability in India, there are a number of obstacles to their implementation, including issues with public opinion, industrial competitiveness, inflation, administrative complexity, political opposition, and policy integration. A well-thought-out, phased strategy that strikes a balance between environmental responsibility and economic growth is needed to overcome these obstacles. Effective public communication, targeted subsidies for low-income groups, financial incentives for green innovation, and transparent governance will all be crucial to the success of India's carbon price. Strategic implementation of carbon taxes can support India's long-term environmental objectives and promote economic resilience in the face of a rapidly shifting global climate.

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