

**Roadblocks to Climate Action:
The Case of Indian Agriculture**

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Introduction

Climate change is a defining policy challenge of our times. Recent policy discussions have focused on shifting electricity generation from fossil fuels to renewables and moving the automobile industry from the internal combustion engine (ICE) to electric vehicles. Many countries have announced economy-wide zero-emission targets by 2050 and shift away from ICEs by 2035.

A move to a zero-emission economy will involve a massive societal transformation. The reason is that for the last two centuries, economies have become reliant on fossil fuels. Consequently, decarbonization will adversely affect several industries. Stories from coal mining regions of Appalachia grimly remind us of the economic and social consequences of the declining coal industry.

This economic restructuring generates a political backlash because fossil fuel-dependent sectors believe that the elites are offloading decarbonization costs on them. The climate debate mirrors political polarization, which pits urban voters (who tend to be cosmopolitan, college-educated, and work in the service sector) against rural/semi-urban voters (who tend to be conservative, less likely with college education, and work in the primary or secondary sectors). Thus, the rich-poor, urban-rural, and liberal-conservative divide gets reproduced and reinforced in the realm of climate politics.

To address this political strife, many have called for a "[just transition](#)," whereby the costs imposed on the fossil fuel-dependent communities are offset by government policy or even [private philanthropy](#). For example, the government could fund workforce retraining, create new infrastructure in fossil fuel-producing communities, or compensate workers whose jobs are vanishing in the decarbonizing economy. Just transition, a policy that has been embraced by the European Union as well as President Biden, is a recognition that decarbonization is creating "winners" and "losers."

But these transition challenges are not unique to the fossil fuel sector. The decarbonization of agriculture, which accounts for about [18% of global greenhouse emissions](#), is also posing a major political challenge. The agricultural sector worldwide needs to adopt low-carbon practices, move away from water-intensive crops in water-stressed regions, and become less reliant on chemical inputs. Yet, given the short-term costs, farmers might incur, and their distrust of urban elites, agriculture reform policies face a sustained pushback from well-organized farming interest groups. This is the story of the ongoing farmer's agitation [in India](#).

Reforming agricultural practices could have unexpected implications, such as reducing local air pollution. India's Green Revolution allowed farmers to annually plant two crops,

the monsoon (paddy or rice) and the winter (wheat). But this has created an unexpected air pollution issue. Every October and November, India's capital, New Delhi, faces a severe air pollution problem caused by [stubble burning](#) by farmers in Punjab (Haryana and Western Uttar Pradesh as well). These farmers want to clear their paddy fields to plant the winter crop. Burning is the cheapest and quickest way to remove stubble, although federal laws ban such practices. [Farmer unions](#) oppose the stubble burning ban and demand massive subsidies for farmers to buy stubble removal machines.

Ironically, climate celebrities who vociferously demand decarbonization and oppose forest burning in the Amazon and South East Asia, have [tweeted](#) support for farmers. Thus, while international public opinion tends to play a constructive role in local climate politics, it has taken an ill-informed position in the case of Indian agriculture.

Historical Significance of the Green Revolution

India's Green Revolution is one of the most remarkable 20th century examples of sectoral transformation. In the 1950s and the 1960s, India faced food shortages, often relying on food aid (especially, U.S. government's [PL 480](#) program). The media portrayed India as a hopeless case of chronic hunger, overpopulation, and backward technology. Scholars such as [Garret](#)

[Hardin](#) even suggested cutting off food aid because developing countries such as India face a Malthusian overpopulation problem.

From the 1970s, however, Punjab and Haryana farmers adopted the Green Revolution technologies that transformed India into a food surplus country. The new agricultural package involved using high-yielding variety (HYV) seeds which have a short maturation cycle and are highly responsive to three fertilizers: nitrogen, phosphate, and potassium (often termed as NPK). Fertilizers require irrigation at specific periods in the crop maturation cycle. Thus, water needs to be made available on demand. In addition, because heavily fertilized HYV seeds attract pests and insects, farmers use pesticides, herbicides, and insecticides, which are petroleum-based.

To speed up the adoption of new agricultural practices, the government provided [subsidies](#) for fertilizers, pesticides, and diesel. It also provided [free electricity](#) for tubewells, which soon became the primary source of irrigation. Because farmers purchased expensive inputs, the federal government bought their harvest at a predetermined price, the minimum support price (MSP). Given the strength of the farm lobby, MSPs for wheat and rice are typically above [global market prices](#).

The Green Revolution allowed farmers to use their land intensively. They planted both monsoon and a winter crop. This

two-crop strategy worked well in that India has become a food surplus country. But the model depends on subsidized, carbon-intensive inputs. Cheap fertilizers mean that farmers overuse them. Water subsidies and free electricity for the tubewells lead to overwatering, thereby causing a dramatic [drop in the water table](#). While the Green Revolution model faces an environmental crisis, efforts to reform are failing.

The Water Problem

Climate change is creating a water crisis. Droughts are often followed by extreme precipitation that does not sufficiently recharge groundwater, cause water runoff, and contaminate water sources. Farmers need to rethink their cropping patterns specifically, by moving away from water-intensive crops such as paddy.

The Green Revolution led to a massive increase in paddy cultivation: [from 10%](#) of Punjab's net sown irrigated area in the 1970s to 72% in 2015. Farmers typically pump groundwater using tubewells, a practice encouraged by the state government's supply of free electricity. It is not surprising that [groundwater levels have dropped](#): from 50 feet prior to the Green Revolution to about 130 ft. Recent laws seek to change these practices. After all, given the climate crisis, water availability will be a serious challenge. Just as California

needs to move away from Alfalfa and Almonds, Punjab needs to shift away from rice.

Stubble Burning

The Green revolution has initiated an annual ritual of crop burning, which causes severe air pollution problems in New Delhi, a region with over 25 million people. [Stubble burning](#) is a direct outcome of the two-crop Green Revolution strategy. Historically, farmers plant the paddy (which requires standing water) with the onset of monsoons. But free electricity incentivizes farmers to plant it pre-monsoon and extract groundwater to irrigate paddy fields. Because this is depleting the water table, the government enacted the [Punjab Preservation of Subsoil Water Act in 2009](#), which mandated farmers to plant paddy after the onset of the monsoons. But this also meant delayed paddy harvesting, leaving farmers with a smaller time window to clear the stubble and prepare their fields for planting wheat. Farmers have adopted the easy method for stubble removal - burning it. This causes a very [severe air pollution](#) problem in October and November in Delhi. But here again, while Green Revolution farming is causing this major policy problem, farmers adopt anti-urban rhetoric to oppose anti-burning laws.

Future of Climate Politics

Three implications emerge from the brief discussion of Indian agriculture. First, it is difficult to compartmentalize climate politics from "regular" politics. Even in agricultural policy, climate policy gets interpreted through the prism of party politics (ruling BJP versus others in the Indian case) and the rural-urban conflict.

Second, the Indian case shows that changing the carbon-intensive production practices will be difficult. Of course, unlike the U.S., where climate policy directly targets the fossil fuel sector, Indian farm laws (or anti-burning laws) target climate issues indirectly. They do not seek to put the agricultural industry out of business. Further, Punjab farmers are [affluent](#), unlike coal miners of West Virginia. Yet, Indian farmers have mobilized and even swung global public opinion in their favor. Farmers indeed want to protect their rents. But more fundamentally, they are afraid of economic uncertainty if the existing system were to get dismantled, suspicious of the government's intentions behind policy reforms, and view the new policies to reflect the preferences of big business/urban elites.

Third, implementing a decarbonization plan is challenging when politics are polarized. Sectors losing from decarbonization have incentives to mobilize along the usual fault lines, such as

urban-rural conflict. Democracies have multiple veto points, and social media has reduced the cost of collective action. Consequently, groups can instigate a policy backlash quickly. This necessitates skillful political management of decarbonization policies. Moreover, it requires a transparent policy process with procedural equity and extensive stakeholder consultation so that climate policy does not come across as an elite imposition.