

Mitigating agriculture's contribution to air pollution in India

Pandey and colleagues¹ highlight the health and economic impact of air pollution in India and urge central and state governments to provide long-term funding to prevent these adverse impacts. Agricultural residue burning is a major source of ambient pollution of particulate matter of 2.5 µm or less in diameter in northwest India during October and November every year when the air quality is especially toxic.² Rice-wheat cropping systems dominate the agriculture landscape in the states of Punjab and Haryana. Farmers have a short window to harvest rice and plant the subsequent wheat crop since delays in sowing negatively affect yield and grain quality by exacerbating climate risks. To facilitate the transition between crops, many farmers prepare their fields by burning rice residues. The urgency of reducing burning in northwest India is underscored by a recent sharp rate of increase in burning across a broader geography in northern India.

Crop residue burning is pervasive in northwest India for a variety of reasons including mechanised harvesting driven by rural labour shortages, policies that favour yield intensification, and ineffective enforcement of no-burn regulations. Mechanised harvesting leaves loose residues in the field with limited economic incentives for farmers to collect and use them for purposes such as animal feed and fuel. Additionally, groundwater conservation policies further embolden burning by delaying rice transplanting until the onset of the monsoons and narrowing the window between rice harvesting and wheat sowing.³ The concentration of burning coincides with meteorological conditions that worsen air pollution.

Reducing residue burning requires a multifaceted approach involving

technologies, market development, and novel institutional and policy changes. Advanced mechanical seeders allow for crop establishment into rice residues without burning.⁴ Shifts to crop management practices, such as direct seeded rice and shorter duration rice cultivars, contribute to less water use and permit timely harvest, without compromising yield.⁵ Expanding agricultural extension practices beyond technical training, to support social learning processes and value chain development for new technologies, can also accelerate change. Finally, crop diversification away from rice in northwest India is potentially transformative, but past efforts have largely failed because of subsidies favouring rice such as free electricity for irrigation and minimum support price guarantees for rice procurement. Eliminating these subsidies in favour of payments for ecosystem services for reducing air pollution may encourage farmers to grow alternate crops and to adopt no-burn production technologies. The complex problem of agricultural burning and air pollution will likely only be resolved with coordinated actions across these domains.

We declare no competing interests.

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