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Estimating loss of ecosystem services due to paddy straw burning in North-west India

Suresh Kumar[a], D. K. Sharma[a], D. R. Singh[a], H. Biswas[b], K. V. Praveen[a] and Vikas Sharma[a]

[a]ICAR-Indian Agricultural Research Institute, New Delhi, India; [b]ICAR-Indian Institute of Soil and Water Conservation, Research Centre, Bellary, India

ABSTRACT

Crop residue burning is severe in rice–wheat cropping system of North-western states (Punjab, Haryana, Uttarakhand, and western Uttar Pradesh) of India, where mechanized harvesting of rice using combine harvesters is a common practice, and management of leftover residue in the short window of 10–15 days for timely sowing of wheat is a formidable task. Moreover, there is a lack of user-friendly, cost-effective, and economically viable options and, around 23 million tonnes of rice residue is burnt annually in the region. Burning biomass not only pollutes environment but also results in loss of appreciable amount of plant's essential nutrients. Straw burning releases soot particles, nitrogen oxides, sulphur dioxide, carbon dioxide, carbon monoxide, and polycyclic aromatic hydrocarbons, thus causing serious deterioration in atmospheric quality and human health hazards. We attempted to identify and quantify the environmental cost of paddy straw burning in North-west India. Using extant coefficients, it is estimated that cost of paddy residue burning is INR (Indian National Rupee) 8953 per ha, and the social cost of burning is INR 3199 crores per annum in the region.

KEYWORDS

Crop residue burning; ecosystem services; North-west India