

Annexures

Mitigating Stubble Burning in Haryana: Survey Insights from 1500 Farmers

Authors: Srishti Jain, Kurinji Kemanth, Ayushman Saboo and Navjot Singh Sarao

Annexure 1 to 6 | October 2026

Annexure A1: Sampled Districts in accordance with their burn type

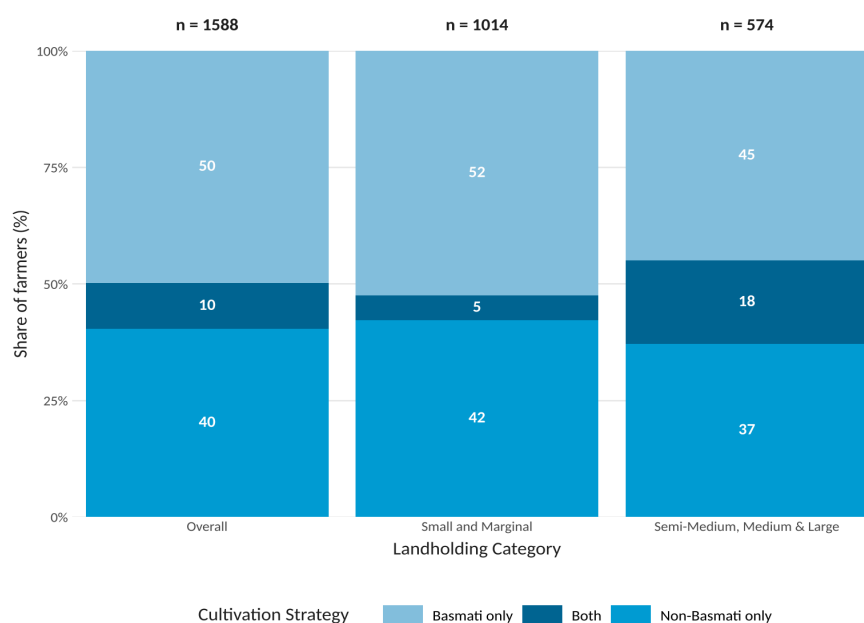
We calculated the average fires per unit area from 2018 to 2024 and divided the districts into three tertiles, i.e., high, medium, and low burn. Subsequently, we randomly sampled districts from each burn category to examine prevailing residue management practices.

Burn type	District name	Average fires (2018-24)	Average paddy sown area (1000 hectares) (2018-24)	Selection status
High	Fatehabad	1138.71	132.53	Selected
	Kaithal	742.43	175.21	Selected
	Jind	647.86	157.07	Selected
	Kurukshetra	416	125.07	Selected
	Sirsa	621.29	106.37	Selected
Medium	Ambala	310.43	97.26	Selected
	Hisar	231.43	88.70	Selected
	Karnal	561.71	178.89	Selected
	Yamunanagar	197.71	85.52	Selected
	Rewari	5.71	1.92	Not selected
	Palwal	107.43	38.37	Not selected
	Panipat	148	81.34	Not selected
Low	Jhajjar	37.29	48.10	Selected
	Panchkula	24.86	13.00	Selected
	Rohtak	78.57	69.42	Selected
	Sonipat	113.86	115.94	Not selected
	Charkhi Dadri	3.29	7.91	Not selected
	Nuh	2.43	10.39	Not selected
	Faridabad	27	15.48	Not selected
	Gurugram	7.14	4.93	Not selected
	Bhiwani	26	25.15	Not selected

Source: Authors' analysis

Annexure A2: Share of Basmati and Non-basmati farmers based on landholding size

We considered the weighted shares of basmati and non-basmati growing farmers and found that varietal diversification increases with landholding size. While small and marginal farmers tend to grow only one type of crop, medium and large farmers tend to diversify more, with a larger share growing both basmati and non-basmati paddy.



Source:

Authors' analysis

Annexure A3: Cost of running the in-situ CRM machine on farms

We calculated the cost of accessing and operating a crop residue management (CRM) machinery as a packaged service—inclusive of the tractor, machinery, fuel, and operator on farms, with a detailed expense breakdown.

Overheads	Rental rates (INR /acre)
Cost of renting a tractor (R1)	650
Cost of renting a CRM machine (R2)	300
Cost of diesel expenses incurred (R3)	900
Cost of labour associated with running a tractor (R4)	150
Total cost of renting CRM as a packaged solution (R1 + R2 + R3 + R4)	2,000 - 2,500
Total cost of renting CRM as a packaged solution (twice)	4,000-4,500

Source: Authors' analysis

Note: The rates are primarily calculated for Super Seeders, which remain the most widely used machine for in-situ management on farms. Furthermore, the figures are based on rental rates, as it remains the dominant mode for accessing machines on the ground.

Annexure A4: Infrastructure cost and land requirements for ex-situ management in Haryana

We estimated the land area and infrastructure investment needed to store paddy straw in Haryana. The estimates reflect the latest ex-situ target for Haryana, using assumptions from a CEEW study.

Parameter	Rectangular Bales (15-25 kg)	Round Bales (200-300 kg)	Assumption
Ex-Situ target (MMT) (R1)	2.3	2.3	Haryana's ex-situ target
Land requirement (acres per 10,000 tonnes) (R2)	7	9.3	Baseline assumption (Saboo et al., 2025)
Total land requirement (acres) (R1 X R2)	1,610	2,139	Ex-situ target x Land estimate
Infrastructure cost (INR per tonne) (R3)	250	400	Baseline assumption (Saboo et al., 2025)
Total Infrastructure investment required (INR crore) (R1 X R3)	57.5	92	(Ex - situ target x Cost per tonne)

Source: Authors' analysis

Annexure A5: Payment strategies for non-burners in the short, medium and long term

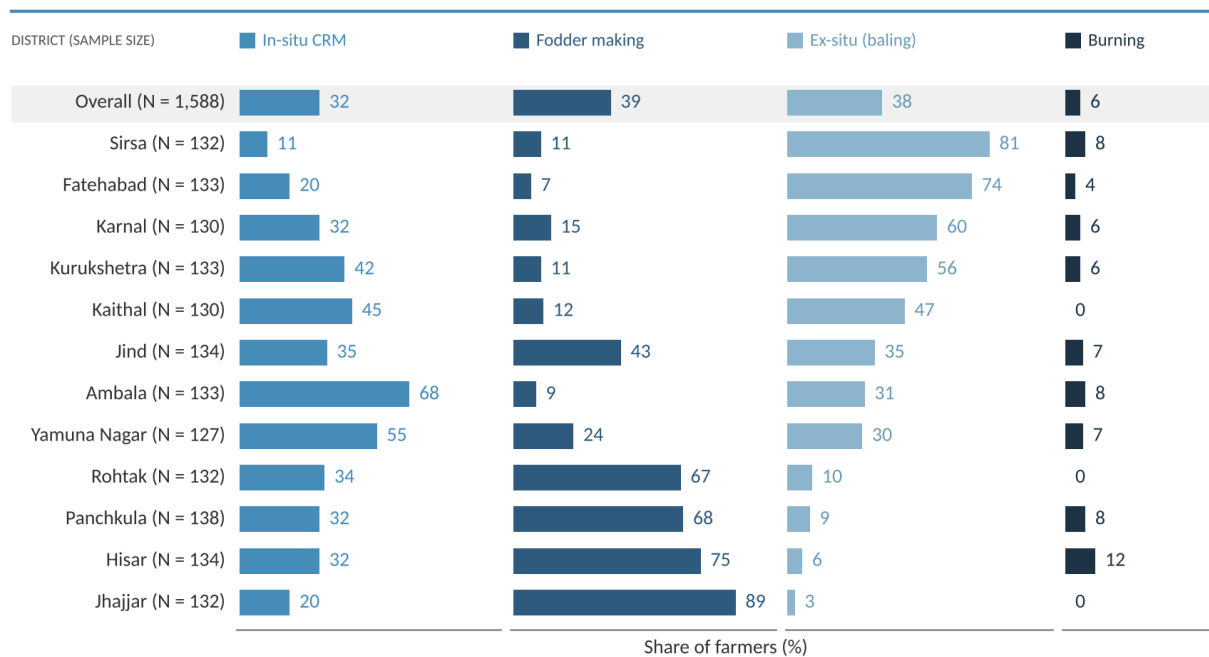
We estimated the government budget required to provide financial payments to farmers adopting non-burning residue management practices. To ensure fiscal prudence and establish a clear phase-out trajectory, we propose a strategic transition over the next 2–3 years.

Payment strategy focus	Timeline	Total land covered by population (Lakh acres)	Payment per acre (INR)	Total payments (INR crore)	Calculation basis
All non-burners (farmers practising in-situ, ex-situ or fodder management)	Short-term (current method)	41.26	1200	495.1	Total area under paddy
Only in-situ practising farmers	Medium-term (proposed method)	21.45	1200	257.46	52 per cent of paddy sown area being managed through in-situ CRM
Only in-situ practising small & marginal farmers		14.80	1200	177.6	64 per cent of all farmers in Haryana are small & marginal

Source: Authors' analysis based on DIPRL Haryana and Agricultural Census, 2015-16

Note: Payment strategies only focus on paddy-growing farmers.

Annexure A6: Crop residue management pathways across districts



Source: Authors' analysis

Note: Values represent weighted shares of farmers practising a particular method within each district. Farmers could report more than one method, so bars sum to more than 100%.