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Paddy Stubble Management: A Study on Farmers' Opinions

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Abstract. The purpose of the study is to examine the paddy straw management practices by farmers amidst the various difficulties faced by them in terms of machinery, resources, etc. The study was conducted in Rohtak district of Haryana (India). A well-structured interview schedule was formulated and one hundred farmers were interviewed accordingly. Simple random sampling technique was adopted for the selection of twenty paddy growing farmers from each of the blocks viz. Rohtak, Sampla, Meham, Lakhan Majra and Kalanaur of the selected district. The data was analysed, tabulated and the results were drawn using the statistical tools of SPSS and MS Excel. The Chi-square test was used to establish the relation between the paddy straw management technologies and the reasons for non-adoption of these technologies.

It is found that maximum number of farmers are marginal land holders. Many farmers are unaware of the conservation techniques to manage paddy stubble viz. use of decomposers, etc. The high cost and low availability of paddy stubble management machinery also plague the farmers. The results of the study help in understanding the behaviours of farmers towards tackling the paddy stubble. Also, useful inputs can be drawn to design, manufacture and adopt the agricultural implements for stubble management.

The study is based on a sample of just hundred farmers and is limited to Rohtak district only.

Nevertheless, the study is valuable for it comprehensively interrelates the myriad aspects of paddy stubble management in the stubble burning prone area of Rohtak.

Keywords: agriculture, environment, paddy, stubble, waste management, pollution.

1. Introduction

Rice forms a vital source of staple food diet at the global level. The notion "Rice is life" can be considered relevant in the case of India as it provides her significantly with food security and provides livelihood on large scale to the ever-booming population of India. According to Ricepedia (2021), the cultivation of rice is done in about 158 million hectares across many countries in the world. Over 700 million tons of rice is being produced annually. Out of this estimate, the milled rice is nearly 470 million tons (Ricepedia, 2021). The largest continent Asia which houses approximately 90% of the world population cultivates approximately 640 million tons of rice on annual basis (Bramley & Ouzman, 2019). The leading producers of rice are China and India worldwide. The area of China under paddy cultivation is lesser than the area cultivated in India but still, the rice production is higher in China. This is generally attributed to the well-established irrigation system that irrigates almost the total paddy cultivated area of China. The same is not the case with the irrigation facilities and total irrigated areas in India. Indonesia, Bangladesh, Vietnam, Thailand, etc. are also among the largest producers of rice worldwide (Ricepedia, 2021). The rice-wheat is the most dominant cropping pattern of Indo-Gangetic plains comprising almost 13 million hectares of area in Pakistan, India, Nepal, and Bangladesh. During the year 2018-19 India exported 4.42 million tons of Basmati rice to the tune of INR 32,860 crores and in this

export, 44% share was of Haryana state. The export of non-Basmati rice during 2018-19 was 7.60 million tons (INR 21,185 crores) (APEDA, 2019).

In north India, especially in Haryana state the harvesting of Basmati rice starts with the advent of November and gets completed by the initial days of December month. During the period of harvesting, labor availability is adequate in the state as well in the district of survey study. About 75% of paddy harvesting is done by employing combined harvester in Haryana and this trend is on ascend not only in Haryana but also in other parts of India due to the adoption of the paddy-wheat cropping pattern (Chauhan et al., 2012; Mehta et al., 2014). Most farmers who follow the rice-wheat cropping pattern prefer harvesting paddy by the combined harvesters. Hence, due to this practice rice crop stubble remains in the harvested fields of paddy (Gupta, 2012; Kumar et al., 2013). Paddy residue management has been troubling the northern Indian farmers for many years now. Farmers must manage the crop stubbles before sowing the next crop. For paddy straw management, farmers usually adopt straw management practices such as bailing, residue incorporation, use of decomposers, straw selling/using, and straw burning (Boyer et al., 2018; Bramley & Ouzman, 2019).

The amount of paddy residue in the fields, where combine harvester is used is more, thereby resulting in in-situ paddy stubble burning by the paddy growers (Lambert et al., 2004). Unlike the basmati variety, the other varieties of paddy stubble do not make a good quality animal fodder. The basmati variety paddy stubble can be utilized as animal fodder because of its high palatability. Concerning this, there are many farmers, who prefer to go for paddy stubble burning in the north Indian states of Haryana and Punjab. As per the 'Basmati Crop Survey Report' (APEDA, 2019), the farmers from the Indian states of Haryana and Punjab during the paddy harvesting season burnt paddy stubble to the shocking range of 35 million tons in 2018. The farmers usually resort to the practice of paddy stubble burning due to the availability of very little time-space in the rotation of the rice-wheat cropping system. Moreover, they view the burning of paddy residue as an economical and easy way to get rid of the useless straw (Isgin et al., 2008; Deutz, 2018). The burning of the stubble contributes to the smoky haze that engulfs the many northern Indian states during the season. This smoky haze often leads to the pronouncement of air pollution emergency in northern India every other year. However. agricultural harvesting implements viz. Happy Seeder, Rotary Stubble Shaver, and loose Straw cum Spreader, that chop the paddy stubble into fine pieces and evenly fine out to the expanse of the fields are some of the available alternatives to combat the menace of leftover stubble burning (Sidhu et al., 2015). Nevertheless, several farmers have their reservations in using these implements due to the high amount of costs involved in comparison to the burning of stubble in the fields (Ahmed & Ahmad, 2013; Koga et al., 2016).

In view of the above stated difficulties and problems of environmental pollution, stubble management, etc., it becomes essential to study the opinions of the farmers in relation to paddy stubble management. Hence, it was decided to conduct a survey study of paddy growers to seek an idea about how the farmers manage the paddy straw in order to timely sow the next wheat crop with different established methods after harvesting the paddy with different harvesting techniques. The problems associated with the purchase of the corresponding machinery are also examined. The survey study was conducted in Rohtak district of Haryana state, as the region suffers from the menace of high air pollution due to agricultural fires, vehicular pollution, etc. The survey study also aims to throw light on the non-adoption of different technologies and means by farmers that aim to combat paddy stubble burning.

2. Materials and Methods

The study was performed purposively in the Rohtak district of Haryana (India) in 2019. Rohtak was chosen as area of study as it is a highly polluted area and the causes of its pollution are usually attributed to agricultural fires, vehicular emissions, industries, etc. The simple random sampling technique was adopted for the selection of farmers from all the blocks namely Rohtak, Sampla, Meham, Lakhan Majra, and Kalanaur of the selected district. Twenty paddy growing farmers were selected from each of the blocks and were interviewed randomly. Thus, a total number of hundred farmers (20 farmers from each of the 5 blocks) were interviewed for the data collection. The data was collected through a well-structured interview schedule which was specifically prepared for the conduct of study. Then the data was analyzed, tabulated and the results were drawn using the statistical tools SPSS and MS Excel. A Chi-square test was employed to assess the association between the cost-incurred and the blocks of the district. The Chi-square test was also used to establish an association between the different paddy stubble management technologies and the reasons for their non-adoption.

3. Results and Discussion

3.1 Land Holding

The data tabulated in Table 1 shows the average landholding of the respondents in various blocks of Rohtak district. Lakhan Majra was ranked first (rank I) followed by Rohtak

(rank II), Kalanaur (rank III), Meham (rank IV), and Sample (rank V) respectively. In a nutshell, it can be said that the maximum number of sampled farmers were in the category of marginal landholding i.e., less than 2.0 hectares in the district. The landholding size of 59% of the farmers was found to be less than 2 hectares (ha) followed by 28% farmers (2-4 ha), 9% farmers (6 ha), and 4.0% farmers (4-6 ha) respectively.

Table 1. Distribution of Land Holding in Rohtak District (n=100)

Blocks	< 2 ha	2 to 4 ha	4 to 6 ha	> 6 ha	Avg. land holding (ha)	Rank
Rohtak	9	4	2	5	3.80	II
Lakhan Majra	11	5	1	3	5.60	I
Kalanaur	13	5	1	1	2.05	III
Meham	11	9	0	0	1.97	IV
Sampla	15	5	0	0	1.79	V
Total	59	28	4	9	--	--

3.2 Basmati and Non-Basmati Paddy Area

The data presented in the Table 2 shows that the total cultivated area under all crops was 720 ha and under paddy, it was 520 ha. The different varieties of Basmati cultivated by the respondents occupied 96.15% (approximately 500 ha) of the area and the area under non-Basmati varieties was found to be 3.85% of the total cultivated area under paddy cultivation. It was also reported by the APEDA report (Kharif, 2019, Vol. 1) that out of the total paddy cultivated area throughout the whole district of Rohtak, 80.7% of the area was cultivated under the Basmati.

At the level of the blocks, the highest area under Basmati varieties was found to be in the Lakhan Majra block, i.e., 196 ha followed by Rohtak (143 ha), Meham (64 ha), Kalanaur (53 ha), and Sample (45 ha), respectively. In the case of non-basmati rice varieties, the maximum area was cultivated in the Lakhan Majra block to the tune of 13.8 ha followed by 5.3 ha in Sampla block.

3.3 Adoption of Different Harvesting Methods

The data from Table 3 reveals that in the Rohtak block of Rohtak district out of 20 farmers, 12 farmers harvested paddy manually. The remaining 8 farmers employed both the methods i.e., manual as well as mechanical. In the Sample block, 18 farmers harvested paddy manually whereas only two farmers used mechanical methods of paddy harvesting. In the Meham block, 13 farmers used manual harvesting while 4 farmers used mechanical methods, and only 3 farmers used both the methods of paddy harvesting. In the case of the Lakhan Majra block, 9 farmers used the manual

Table 2. Area under different varieties of Basmati (Bas.) and Non-Basmati paddy in different blocks of Rohtak

Blocks	Area (ha)									
	P1121	P1509	P1718	Other	Bas.	Non-Basmati	Total paddy area	Leased land	Owned land	Total cultivated area
Rohtak	104.2	16.2	20.6	2.0	143	0.0	143	132.3	77.7	210
Lakhan Majra	109.9	18.2	62.7	4.9	196	13.8	209	132.9	112.0	245
Kalanaur	44.9	0.8	7.5	0.0	53	1.0	54	40.1	41.1	81
Meham	44.1	2.8	16.6	0.0	64	0.0	64	49.8	39.5	89
Sampla	37.8	6.9	0.0	0.0	45	5.3	50	59.3	35.8	95
Total	341	45	107	7	500	20	520	414	306	720

Table 3. Farmers' adoption level towards different paddy harvesting methods (n=100)

Blocks	Methods of Harvesting			If Manually Harvested		
	Manual	Mechanical	Both	Family Labour	Hired Labour	Both
Rohtak	12	0	8	3	16	1
Lakhan Majra	9	0	11	3	16	1
Kalanaur	20	0	0	7	12	1
Meham	13	4	3	7	11	2
Sampla	18	2	0	3	15	2
Total	72	6	22	23	70	7

harvesting method and 11 farmers used both the methods. All the 20 farmers in the Kalanaur block used manual methods of paddy harvesting. Overall, we can state that 72% of the farmers used manual methods of paddy harvesting; only 6% of the respondents used mechanical methods and 22% of farmers used both the methods for paddy harvesting in the Rohtak district. In manual harvesting of paddy, 70% hired labor and 23% family labor was employed.

3.4 Paddy Stubble Monetization and Other Gains

The income generated by the farmers through the selling of paddy residue in different blocks of Rohtak district during the Kharif season of 2019 was also calculated. According to Figure 1, the maximum additional income was generated by the farmers of Rohtak block (Rs. 5214/ha) followed by Sampla (Rs. 4954/ha), Kalanaur (Rs. 4818/ha), Lakhan Majra (Rs. 3744/ha) and Meham (Rs. 3459/ha) respectively depending on the selling price of paddy residue. Higher-income through the selling of paddy straw was observed in Rohtak block due to the easy availability of transportation facilities and city impact; while the lowest was recorded in Meham block due to the longer distance from the national capital New Delhi.

The data in Table 4 shows that the average cost of manual harvesting in the district was found to be Rs.10573 /ha while the average cost of mechanical harvesting was Rs. 6511/ ha. The average income generated through paddy straw selling was Rs. 4438/ha. In Sample block, the gain in manual harvesting over mechanical harvesting was found to be maximum at Rs. 3189/ha and minimum gain of Rs. 411/ha was recorded in Meham block. It was due to the proximity of Sampla to Delhi.

Table 4. Monetary benefits of manual harvesting over mechanical harvesting in basmati rice (Rs. /ha)

Blocks	Cost of manual harvesting	Cost of mechanical harvesting	Straw sold	Gain in manual harvesting over mechanical harvesting
	I	II	III	(I-III) – II
Rohtak	11352	7011	5214	873
Lakhan Majra	10444	8738	3744	2038
Kalanaur	9447	0	4818	4629
Meham	11202	8154	3459	411
Sampla	10422	8649	4954	3189
Avg.	10573	6511	4438	

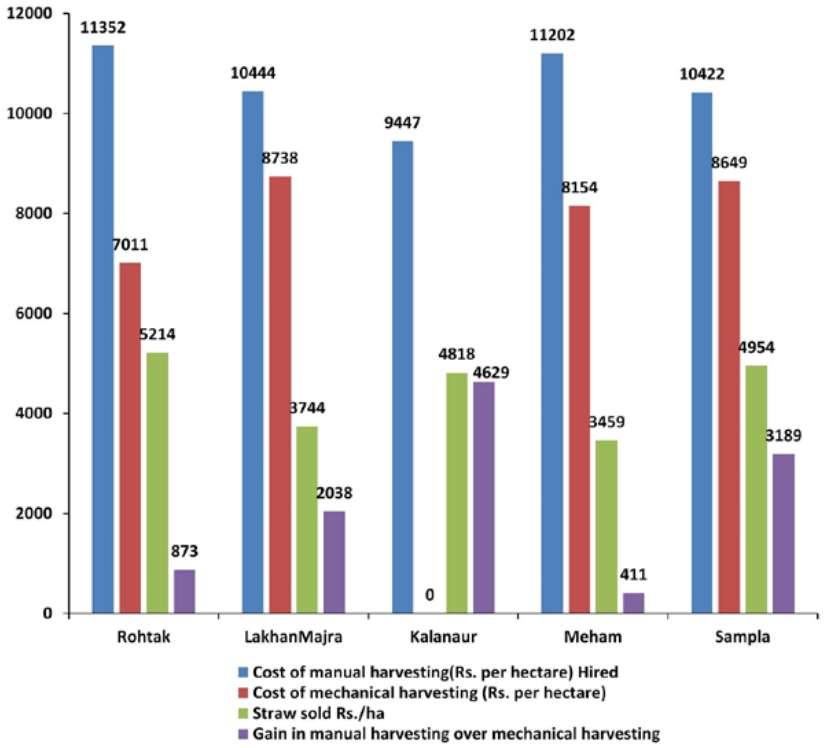

Figure 1. Paddy stubble monetization and other gains by the farmers

3.5 Different Post-Harvest Paddy Straw Management Techniques

The data tabulated in Table 5 shows that bailing and decomposers were not used by the farmers of the survey study area and incidents of paddy straw burning were also not observed in the district. The collected data shows that only 10% of the paddy growers were used to in-situ management and 8% of the respondents were used to the incorporation of paddy straw in the fields only. While 82% of the farmers either sold or used paddy straw for domestic purposes in the study area. Among the blocks, the maximum practice of in-situ management of paddy straw was found in the Meham block. Also, the practice of incorporation of paddy straw was found maximum in the Meham block only. In the case of the Kalanaur block, all the sampled farmers (20 respondents) either sold or utilized the paddy residue.

Table 5. Post-Harvest management of straw with different techniques (n =100)

Blocks	Post-Harvest management methods					
	In-situ	Incor-pora-tion	Bailing	Decom-poser	Straw Burning	Straw Sold/ Used
Rohtak	2	0	0	0	0	18
Lakhan Majra	2	3	0	0	0	15
Kalanaur	0	0	0	0	0	20
Meham	4	5	0	0	0	11
Sampla	2	0	0	0	0	18
Total	10	8	0	0	0	82

3.6 Paddy Straw Management Implements and Wheat Sowing Expenses

Table 6 shows that in the Rohtak district the farmers used different agricultural implements for the management of paddy straw on their fields. In the case of in-situ management of paddy straw, maximum farmers used happy seeders in the study area. Whereas other implements such as Rotary Stubble Shaver + Happy Seeder, Loose Straw Chopper cum Spreader + Happy Seeder, and SMS (Straw Management System) + Happy Seeder were not used by the selected farmers of the respective blocks. Three farmers in the Lakhan Majra block used super seeder for the incorporation of paddy residue, while only five farmers used Harrow + Rotavator + Planker for in-situ incorporation of paddy straw so as to sow the wheat crop. Manual harvesting was done by the 82 farmers in the district. While eighteen farmers adopted mechanical harvesting to harvest the paddy in the study area. Amongst the blocks, in the Kalanaur block, all the paddy growers harvested their paddy manually followed by Rohtak (18 farmers), Sampla (18 farmers), Lakhan Majra (15 farmers), and Meham (11 farmers) respectively. After manual harvesting of paddy, the wheat sowing was done using the seed drill. In this case, the tillage operations were accomplished using harrow, rotavator, cultivator followed by planking. The average expenses towards wheat sowing were found to be maximum in the Sampla block (Rs.2920/ acre) followed by Rohtak (Rs. 2642.45/acre), Meham (Rs. 2545/acre), Kalanaur (Rs. 2373.50/acre), and Lakhan Majra (Rs. 2110/acre) respectively. In the Lakhan Majra block, 15% of farmers used super seeder, and 10% farmers used happy seeder in wheat sowing for in-situ and incorporation management of paddy residue respectively.

There is a statistically significant difference in the cost incurred on wheat sowing after paddy harvesting in Lakhan Majra and Sampla blocks as the p-value (0.007) is less than 0.05. Whereas, in the rest of the blocks, this difference was found to be at par. Higher sowing expenses in the Sampla block were due to less land holding for in-situ management and incorporation of paddy residue and a greater number of preparatory tillage operations are required due to waterlogged conditions in the block. In the Lakhan Majra block due to more landholding among all the blocks, farmers can use big tractors and machinery for in-situ management and incorporation of paddy stubble, therefore, the cost incurred on wheat sowing was estimated to be less as compared to all the other blocks (Table 7).

Table 6. Agricultural implements used by the farmers for paddy straw management (n=100)

Methods	Farm machinery used	Rohtak	Lakhan Majra	Kalanaur	Meham	Sampla	Total
In-situ	Happy Seeder	2	2	0	4	2	10
Incorpora-tion	Harrow + Rotavator + Planker	0	0	0	5	0	5
	Super Seeder	0	3	0	0	0	3
Manual Harvesting	Harrow +Rotavator + Cultiva-tor + Planking + Seed Drill	18	15	20	11	18	82
Average wheat sowing expenses (Rs. /acre)		2642.45	2110	2373.50	2545	2920	6244

Table 7. Statistical analysis of expenses incurred on wheat sowing after paddy harvesting

(I) Block Name	(J) Block Name	Mean	Std. Error	Sig. Difference
Lakhan Majra	Rohtak	2642.45	293.791	0.073
	Kalanaur	2373.50	293.791	0.372
	Meham	2545.00	293.791	0.142
	Sampla	2920.00	293.791	0.007

3.7 Problems Associated with Agricultural Implements

The data revealed that the major problems faced by farmers in the use/purchase of different agricultural implements for paddy stubble management included the high cost of implements, lack of availability, feasibility, etc. Most farmers belong to marginal and small landholdings. In the survey study, more than 50% of farmers opined that the costs of implements were high, 20-22% of farmers stated the lack of availability of implements at the time of requirement. In the case of mulcher, MB plough, cutter cum spreader, rotary slasher; about 40% of farmers viewed them as not feasible while more than 93% of farmers opined that happy seeder, zero tillers, rotavator are economically feasible options for wheat sowing (Fig. 2).

3.8 Reasons for Non-Adoption of Different Paddy Straw Management Technologies

The various reasons for the non-adoption of straw management technologies by the farmers in the Rohtak district are presented in Table 8. The data in Table 8 reveals that in the case of incorporation of paddy straw, most farmers stated the high cost of machinery as the major reason for non-adoption of incorporation practices followed by the high cost of operation, lack of availability of machinery, domestic/other utilization of straw, and fear in the decline of wheat yield respectively. Whereas, in the case of in-situ management of paddy straw, majorly paddy farmers opined that high cost of machinery, high horsepower tractor requirement for the workability of the happy seeder, and lack of availability of machinery at the time of wheat sowing were the main reasons for non-adoption of straw management technologies. In case of bailing, again high cost of machinery, lack of availability, high cost of operation, and lack of awareness were observed as some of the major reasons for non-adoption. As far as decomposer use is concerned, low availability and lack of awareness turned out to be the major constraints in the study area.

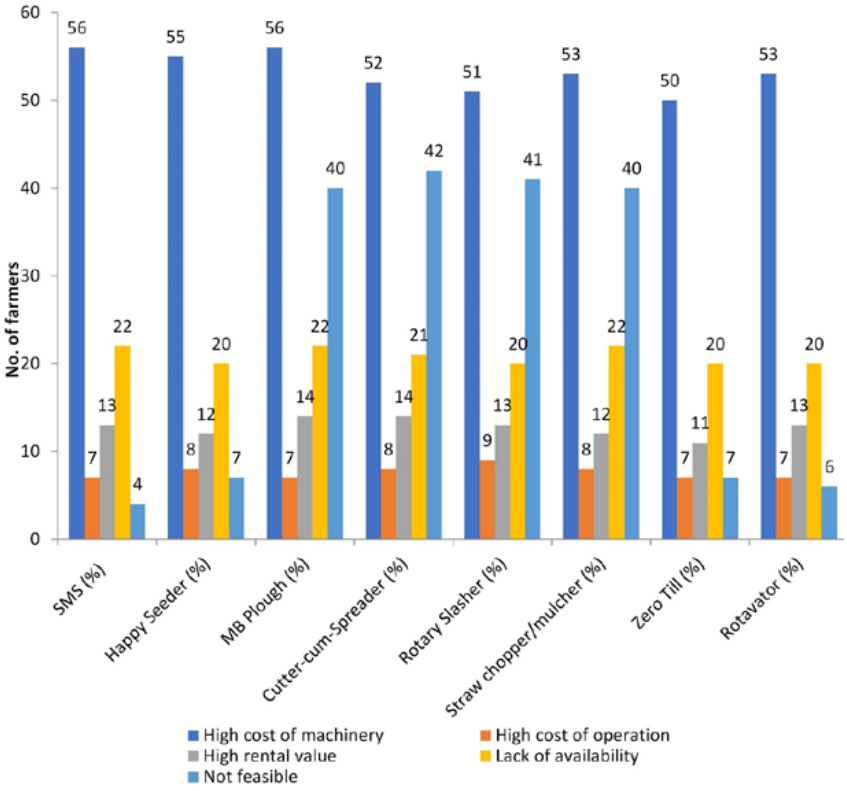

Figure 2. Problems associated with different agricultural implements (n=100)

Table 8. Reasons for non-adoption of different paddy straw management technologies by farmers (n=100)

Technology	Opinion/Reasons for non-adoption	Blocks					Total
		Rohtak	Lakhan Majra	Kalanaur	Meham	Sampla	
Incorporation	Fear of decline in yield	2	3	4	2	1	12
	High cost of machinery	20	14	18	14	13	79
	High cost of operation	17	15	17	9	11	69
	Lack of availability	13	12	6	4	6	41
	Straw Utilisation	6	1	4	6	7	24
In-situ	High cost of machinery	18	16	18	16	16	84
	New/High power tractor required for Happy Seeder	18	12	18	11	14	73
	Lack of availability	13	10	4	8	7	42
	Straw Utilisation	7	3	4	5	4	23
Bailing	High cost of machinery	2	1		4	2	9
	Lack of availability	1			3	2	6
	High cost of operation	1				1	2
	Awareness	6	5	5	3	6	25
Decomposer	Availability		2	1		1	4
	Awareness	6	6	4	1	3	20

For statistical analysis, the chi-square test was applied to the reasons for the non-adoption of paddy straw management technologies by farmers of Rohtak district of Haryana

(India). The strength of association between various variables was found in between 33% to 36% both in the case of incorporation and in-situ management of rice residue. This very much signifies that these are statistically significant. Whereas, bailing and decomposer were observed to be statistically non-significant in the study area (Table 9).

3.9 Comparison of Stubble Burning Cases in Haryana during 2018 and 2019

Table 10 clearly shows that no case of stubble burning was registered in the Rohtak district during the year 2019 as compared to the previous year i.e., 2018. As discussed in Table 5, the survey study of the selected farmers of five different blocks of Rohtak district also confirms that there was no burning of paddy residue during 2019 in Rohtak.

Table 9. Statistical analysis of the reasons for non-adoption of different paddy straw management technologies (n= 100)

Technology	Reasons for Non adoption	Percentage	Rank	Chi Square	Cramer's Value
Incorporation	Fear of decline in yield	12	V	0.651	0.157
	High cost of machinery	79	I	0.026·	0.333
	High cost of operation	69	II	0.015·	0.351
	Lack of availability	41	III	0.010·	0.366
	Straw needed	24	IV	0.181	0.250
In-situ	High cost of machinery	84	I	0.775	0.134
	New/high power tractor required for Happy Seeder	73	II	0.027·	0.331
	Lack of availability	42	III	0.055	0.305
	Straw needed	23	V	0.627	0.161
Bailing	High cost of machinery	9	II	0.251	0.232
	Lack of availability	6	III	0.197	0.246
	High cost of operation	2	IV	0.548	0.175
	Not Aware	75	I	0.809	0.126
Decomposer	Availability	4	II	0.456	0.191
	Not Aware	80	I	0.229	0.237

As per the current study, the farmers should be further informed and encouraged to use conservation agriculture techniques viz. use of decomposers, Happy seeders, etc. so as to reap positive benefits on the environment.

Although stubble burning is banned in India, many farmers do not have the necessary farming equipment to clear their fields of the leftover organic waste. There were fewer recorded cases of agricultural fires in the year 2019 than in the preceding years. The significant drop in the number of fires maybe attributed to a significant rainy season in September 2019, thereby forcing a late and scattered harvest. To some extent, the interruptions by rains might have played an obstacle to the agility of pollution control authorities. As well the rains to an extent could have prevented the pollution smoke haze from becoming a large-scale smoke cloud. In the satellite images released by NASA from time to time the pollution by actively burning fires, industries, vehicles, etc. is usually shown in yellowish to red patches (severe). The industrial areas of Delhi, Gurugram, Rewari, and Hisar show high pollution probably due to their high vehicle and industrial density. While Rohtak shows light yellow patches, which are also scattered.

Table 10. Comparison of stubble burning cases in Haryana during 2018 and 2019

Sr. No	District	Total no. of registered cases in 2018	Total no. of registered cases in 2019
1	Kaithal	6	0
2	Jhajjar	18	0
3	Rohtak	39	0
4	Hisar	126	0
5	Karnal	132	927
6	Yamuna Nagar	21	236
7	Sonipat	72	0
8	Kurukshetra	737	0
9	Panchkula	12	0
10	Sirsa	1765	0
11	Fatehabad	2898	1
12	Faridabad	2	5
13	Palwal	274	204
Total		6102	1373

Source: HPCB, Haryana (India)

4. Conclusions

The maximum number of farmers are marginal landholders. In the Rohtak district of Haryana, northern state of India, basmati paddy is grown in about 69.5% of the total cultivated area in five blocks. Non- basmati cultivation area is negligible. In the maximum area, the varieties P 1121 followed by P 1509 are cultivated. In regards to the harvesting of paddy, 72% of farmers harvested manually and 6% mechanically due to the high sale rate of paddy straw in the market. The reason is that paddy residue is sold and used as animal fodder (mixed with green fodder) nearby. Also, it is noted that mechanical harvesting is done where waterlogged conditions exist and hence manual harvesting is not possible. In Lakhan Majra block cost incurred on wheat sowing was significantly low as compared to Sampla due to small landholdings and in-situ and incorporation management of paddy residue was not done due to lack of machinery in Sampla block.

Decomposer and Bailer for paddy waste management are not used by the farmers due to lack of availability and unawareness. The reason for the non-adoption of waste management machinery is that the machinery is costly, requires high horse-power tractors, high rent, and high cost of operation. The farmers already use machines, harrows, cultivators, and rotavators, that they usually possess. The paddy straw is mainly harvested due to favorable prices of both paddy and its straw. The farmers are also benefitted from the residue management machinery that they get on a custom hiring basis by the state agriculture department. An officially unrecorded scanty burning of paddy residue during the study year rather than a large-scale one could only be possible as 72% manual harvesting of paddy was done and straw was sold/used by 82% of farmers. The burning/ thermal spots as presented by satellite images from various sources over the district of study may be attributed to fires on bunds to burn the grass and weeds, other fires, industrial and vehicular pollution heat, etc. It is suggested that strict policy formulation and implementation be done towards managing pollution from other sources viz. industries, vehicles, other fires, etc. Also, farmers need small feasible tools for paddy harvesting and stubble management on subsidized rates.

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