

Farmers' Attitude towards Custom Hiring Centers: An Exploratory Study in Punjab

**Kuldeep Kumar¹, H. R. Meena^{1*}, K. S. Kadian¹, B. S. Meena¹, Gunjan Bhandari²
and Jasvinder Kaur³**

¹Dairy Extension Division, ICAR-National Dairy Research Institute, Karnal 132001(Haryana), India.

²Division of Dairy Economics, Statistics and Management, ICAR-National Dairy Research Institute,
Karnal 132001(Haryana), India.

³Extension Education Institute, Nilokheri, District Karnal, Haryana 132117, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Stubble burning is a major threat to environment in trans-gangetic plain region, where there exists bright prospect to reap the benefits of custom hiring centers by leveraging the suitable farm machinery helpful in overcoming the stubble burning issue. Present study was conducted in Punjab state and three districts namely, Ludhiana, Sangrur, Moga were selected purposively due to highest stubble burning cases in last five years. From each district two block were selected randomly. Subsequently, three villages from each block were randomly selected. Finally, from each village 20 respondents were selected randomly constituting of total 360 farmers. Two scales were constructed exclusively for the study in order to measure the attitude of farmers towards custom hiring centres (CHCs) and elicitation of perception regarding stubble burning. Results indicated that majority of the respondents had favorable attitude towards CHCs, followed by 22.78 per cent of respondents having neutral attitude towards CHCs and only 8.89 per cent of respondents has unfavorable attitude towards CHCs. CHCs were not sufficient in number to cater the high demand during the peak seasons. Those machines which are of least demand should be

*Corresponding author: E-mail: drhrms@gmail.com;

replaced by machines with high demand. Majority of the respondents agreed that crop residue burning has a negative effect on plant health, air, human health, animal health, biodiversity, vehicular traffic and soil health. It was found that less than half (47.23%) of the respondent had high level of perception.

Keywords: Attitude; custom hiring center; machinery; perception; stubble burning.

1. INTRODUCTION

Attitude refers to a complex mental state that involving collection of beliefs, feelings and values and disposition to act in certain ways. This refers to the degree of strong positive or negative effects associated with some psychological object. By psychological object we mean the feeling about custom hiring centers, which farmers could differ with respect to positive or negative effects [1]. Farmer's perceptions on some important indicators relating to the performance of the CHCs. Timely availability of machinery was found to be a reason for the significant presence of the private owners in the market providing their services at higher rentals. The farmers resort to the private player's consequent to their inability to access the services from the CHCs. It is evident from the fact that only 40 per cent of the farmers reported the private owners as the solution of untimely availability of machinery services [2]. Kingra *et al.* (2013) reported that the hiring of the farm machines through the CHCs rather owning would provide a viable solution, as they believed it to be the cheaper option. Despite some problems, most of the farmers expressed satisfaction on the overall functioning (89%) and pricing of machinery services (96%) of the CHCs. All the farmers desired strengthening of these machinery centers to solve the problem of inadequacy and timely non-availability of machines, especially to the small and marginal farmers. While 73 percent of the farmers desired increase in the number of machines owned by the centers, 19 percent suggested increase in the government support in the form of subsidies and 8 percent emphasized on the training of manpower for efficient handling of farm machinery. Due to significant contribution of CHCs towards improving economic viability, especially of the small and marginal farms, increased support by the government in the form of subsidies to expand the scope and extent of the machinery hiring services of the existing machinery centre and encouraging the establishment of more such machinery centres in the other villages of Punjab will go a long way towards improving the

cost-effectiveness of farm machinery operations.

Singh *et al.* [3] reported that high cost of hiring a tractor was a major problem faced by most of the farmers who were availing the service. Another major constraint cited was timeliness i.e. farmers were unable to get the machinery at the time of requirement. It was found that respondents were dissatisfied with the inadequacy of machinery according to the demand. Crop sowing also get delayed due to the above said problem. Almost 98 per cent of the respondents said that cooperative custom hiring services centres in Punjab should be expanded which would be useful in solving many of the above problems. About 95 per cent farmers suggested that rents of machines should be reduced. Fixed custom hiring rates should be there and subsidy should be provided for fuels were the views of 38 percent farmers. Awareness should be created about custom hiring of machinery which will result in reduction of the fixed costs of farm operations. It will also decrease the burden of heavy capital investments. So, it is very much required to solve these problems. Chalam and Prasad [4] studied the perception of member farmers towards services provided by the society and suggested that societies must arrange loans for farming against hypothecation of agricultural produce stored in rural godowns, cooperative must have to reduce the interest rates on agricultural loans bringing them at par with commercial banks, an agriculture inputs business plan must be prepared, take up of consumer good business, arrangement of other services for members like farm guidance, extension services, education, training, technical consultancy for transfer of technology etc.

2. MATERIALS AND METHODS

The study was conducted purposively in Punjab state due largest quantity of stubble burning in North-West region of India and easy accessibility of the investigator to the study area. Also very few studies with respect to mitigation of stubble burning through custom hiring centers has been conducted in this region. The present

study was conducted in Punjab state. Punjab consists of 22 districts and further divided 146 development blocks. Three districts, namely Ludhiana, Sangrur and Moga were selected purposively due to highest burning area and highest number of primary agricultural cooperative societies that provide custom hiring services for agricultural machinery. From each district 2 blocks were selected randomly. Further from each block three villages were selected randomly. So, total 18 villages were included in the study. Further from each village 20 respondents were selected. Hence, total sample size of present study was 360 farmers. Two scales were constructed exclusively for the study in order to measure the measure the attitude of farmers towards custom hiring centers and elicitation of perception regarding stubble burning.

2.1 Development Attitude Scale

To measure the attitude of farmers towards custom hiring centers a scale was developed. The technique for construction of attitude scale was the Likert's technique of summated rating scale was used and scale was standardized by following the procedures described by Likerts [5].

2.2 Collection of Items

The content of the attitude scale is composed of questions called items. Items for the scale were collected from different sources, such as by reviewing literature, field extension personnel and Scientist in ICAR-National Dairy Research Institute, Karnal (Haryana) and other sister institutes located in Karnal city etc. The questions were designed to measure the attitude of farmers towards custom hiring centers. The suitability and applicability of these attitude scale items in the study areas was further validated by experts. Also, every effort was made to see that the sentences were simple, easily understood and each had only one idea.

2.3 Editing the Statements

These statements were edited as per the 14 criteria enunciated by Edwards [6], and Edwards and Kilpatrick [7] as a consequence out of 58 statements 16 statements were eliminated. The remaining 42 statements were included in the performa. These statements were framed in such a way that they could express the positive or negative attitude.

2.4 Pre-Testing and Item Analysis

The preliminary attitude scale consisting of 28 items was administered to 30 farmers. These farmers were selected based on the criteria that taking services from custom hiring centers. The farmers were asked to indicate their degree of agreement on a five-point continuum namely strongly agree, agree, undecided, disagree and strongly disagree with scores of 5, 4, 3, 2 and 1 for each positive statement and 1, 2, 3, 4 and 5 for each negative statement respectively.

2.5 Final Selection of Items for Test

Then the total score of each, respondent was calculated by summing of their score for all the items. For the purpose of item analysis 25 percent of respondents with highest total score and 25 percent of respondents with lowest total scores were selected. The t-test was conducted for each statement using the responses of these two groups. The statement with t value of 1.75 and above was considered for final inclusion in the scale. So total 22 statements were included in final scale.

2.6 Reliability of the Attitude Scale

The reliability of the attitude scale was assessed using the split half method. All the 28 items of the attitude scale were first arranged randomly and then divided into two halves with odd numbered in one half and even numbered in the other. These two sets having items were administered separately to 30 respondents selected randomly in the non-sampling area of the study area. These two sets of score were treated as two halves of the test. The half test reliability coefficient was calculated by using Cronbach's Alpha is SPSS 20. The Pearson product movement correlation coefficient between two set of scores was calculated and the "r" value of 0.72 was found to be significant at 1 per cent level of significance. The reliability co-efficient, thus obtained, indicated that the "Internal consistency" of the knowledge test developed for the study was quite high.

3. RESULTS AND DISCUSSION

3.1 The Attitude of Farmers towards Custom Hiring Centers

Nearly half of the respondents (45.56%) agreed that harvesting of paddy crop attached with

straw management system (SMS) available at Custom Hiring Center (CHC) was found helpful for the crop residuals management with the mean value of 70.00 percent. About 35.56 percent of respondents agreed that happy seeder available at CHCs was useful for the sowing of the crop without ploughing with a mean value of 62.2 percent. More than half of respondents (55.00%) agreed that the Cutter cum spreader available at CHCs was found useful for chaffing of paddy straw and mix in soil with the rotavator with the mean value of 74.00 percent. Nearly 60.00 percent of respondents revealed their attitude score in 'agree to continuum' towards the role of Paddy straw chopper available at CHCs in helping crop sowing with zero tillage machines/ rotavators mean value of 75.00.

It was found that about 54.44 percent of respondents expressed their attitude in agreeing with continuum towards the fact that reversible M. B. plough could help a mix of crop residual in soil with the mean value of 74.40. Whereas 55.00 percent of respondents agreed with seed cum fertilizer drills available at CHCs helped in the introduction or expanding the intercropping area with a mean value of 78.20. Slightly more than half (52.22%) of respondents were agreed with the availability of seed cum fertilizer drills at CHCs helping improve the fertilizer use efficiency with the mean value of 77.40 percent. About 56.67 percent of respondents agree that CHC proved a useful tool for availing machines at a reasonable rate with a mean value of 76.00 percent. The majority (62.78%) of respondents agreed that CHC is a boon for small and marginal farmers in the area with a mean value of 75.60 percent.

About 56.67 percent of respondents agreed that conditions of machines were good in the CHCs with the mean value of 75.20 percent. The majority 57.23 percent of respondents agreed that different kinds of crop threshers available in CHCs enabled farmers in timely harvesting operations at a lower cost with a mean value of 78.20 percent. Whereas 53.33 percent of respondents agreed that Zero till drill/ happy seeder available at CHCs helped save time, water, fuel and escape terminal heat stress besides enabling farmers to make early sowing of rabi crops with the mean value of 78.60 percent the findings was supported by Keil, [8] that only 44% of sample households knew about Zero-tillage technology, and there was substantial scale bias in favor of larger scale

farmers both with respect to awareness and adoption. About 56.67 percent of respondents agree that Nepotism is not prevailing in the CHCs with a mean value of 70.80 percent. The majority (55.56%) of respondents agree that CHC is a good business opportunity for rural unemployed youth with a mean value of 71.20 percent. The majority of respondents that is 5.67 percent agree that Advisory services provided by society are helpful for farmers with the mean value of 73.80 percent.

In contrast, the more than half (57.28%) of respondents disagreed towards lack of benefit from machinery available at CHCs with a mean value of 76.6 percent. Nearly 60.00 percent of respondents disagreed that CHCs do not help reduce crop residue burning in the area having a mean value of 75.4 percent. About 58.89 percent of respondents disagreed that CHCs charge for machinery rent more than the prevailing rate in the locality having a mean value of 75.20 percent. More than half (55.56%) of respondents disagree that dealing with the staff of CHCs was not so easy for getting machinery as per need having a mean value of 76.40 percent. About 58.89 percent of respondents disagreed that maintenance of the machines at CHCs is a big issue a mean value of 75.20 percent. About 51.11 percent of respondents disagreed that CHC was not able to make machines available to farmers at the required time having a mean value of 74.60 percent. Whereas 55.56 percent of respondents disagreed that the process for the establishment of CHC was very complicated made by the government having a mean value of 74.40 percent. The finding is also supported by Lyngdoh et al. [9].

3.2 Distribution of Respondents According to their Overall Attitude Level towards CHCs

Overall attitude level of farmers towards custom hiring centers have been enumerated in Table 2. It was found that majority (68.33 percent) of respondents were having a favorable attitude towards CHCs followed by 22.78 percent of respondents having a neutral attitude, while only 8.89 percent of respondents revealed an unfavorable attitude towards CHCs. Rawat et al [10]. reported that in Khandwa district of Madhya Pradesh that the adoption by the farmers of the relevance of technologies i.e. CHCs was not only affected by the basic characteristics of CHCs but also by its owner's level of education, land

holding, previous experience, requirement and availability of implements and machinery. Alagu and Bose [11]. The results of the study revealed that 63.33% of the respondents were having

medium level attitude towards climate change effects followed by high (25.83%) and low (10.83%) respectively.

Table 1. Distribution of respondents according to their attitude towards CHCs n=360

Sl. No.	Attitude Statement	SA	A	N	DA	SDA	Mean
1	Harvesting of paddy crop with SMS attached combine available at CHCs helpful for the crop residuals management	78 (21.67)	164 (45.56)	24 (6.67)	48 (13.33)	46 (12.78)	70.00
2	Happy seeder available at CHCs is useful for the sowing of the crop without plowing.	56 (15.56)	126 (35.56)	26 (7.22)	100 (27.78)	50 (13.89)	62.20
3	Cutter cum spreader available at CHCs useful for chaffing of paddy straw and mix in soil with the rotavator	70 (19.44)	198 (55.00)	34 (9.44)	32 (8.89)	26 (7.22)	74.00
4	Paddy straw chopper available at CHCs helped in crop sowing with zero tillage machines/ rotavators	64 (17.78)	212 (58.89)	30 (8.33)	38 (10.56)	16 (4.44)	75.00
5	Reversible M. B. plough help in the mixing of crop residual in soil	74 (20.56)	196 (54.44)	30 (8.33)	36 (10.00)	24 (6.67)	74.40
6	Seed cum fertilizer drills available at CHCs helped in the introduction or expanding the intercropping area.	88 (29.44)	198 (55.00)	34 (9.44)	32 (8.89)	8 (2.22)	78.20
7	Seed cum fertilizer drills available at CHCs helped in improve fertilizer use efficiency.	92 (25.56)	188 (52.22)	34 (9.44)	32 (8.89)	14 (3.89)	77.40
8	CHC proved useful tool for availing machines at reasonable rate	76 (21.11)	204 (56.67)	28 (7.78)	38 (10.56)	14 (3.89)	76.00
9	CHC is a boon for small and marginal farmers in the area	66 (18.33)	226 (62.78)	12 (3.89)	32 (8.89)	22 (6.11)	75.60
10	Conditions of machines were good available in the CHCs	76 (21.11)	204 (56.67)	16 (4.44)	44 (12.22)	20 (5.56)	75.20
11	Different kinds of crop threshers available in CHCs enabled farmers in timely harvesting operations at a lower cost.	82 (22.78)	206 (57.22)	38 (10.56)	24 (6.67)	10 (2.77)	78.20
12	Zero till drill/ happy seeder available at CHCs helped save time, water, fuel and escape terminal heat stress besides enabling farmers to make early sowing of rabi crops.	94 (26.11)	192 (53.33)	40 (11.11)	22 (6.11)	12 (3.33)	78.60
13(-)	Farmers are not benefited with machinery available at CHCs	16 (4.44)	38 (10.56)	18 (5.00)	208 (57.78)	80 (22.22)	76.60
14(-)	CHCs not helpful in Reducing crop residue burning in the area	16 (4.44)	34 (9.44)	16 (10.00)	206 (57.22)	68 (18.89)	75.40
15(-)	CHCs charge for machinery rent more than the prevailing rate in the society	24 (6.67)	38 (10.56)	12 (3.33)	212 (58.89)	74 (20.56)	75.20
16(-)	Dealing of staff of CHCs is not so easy for getting machinery as per need	20 (5.56)	36 (10.00)	18 (5.00)	200 (55.56)	86 (23.89)	76.40
17(+)	Nepotism is not prevailing in the CHCs	50 (13.89)	204 (56.67)	28 (7.78)	50 (13.33)	30 (8.33)	70.80
18(-)	Maintenance of the machines at CHCs is big issue	18 (5.00)	38 (10.56)	24 (6.67)	216 (58.89)	68 (18.89)	75.20

Sl. No.	Attitude Statement	SA	A	N	DA	SDA	Mean
19(-)	CHC is not able to make Machines available to farmers at required time.	18 (5.00)	34 (9.44)	50 (13.89)	184 (51.11)	74 (20.56)	74.60
20	CHC is a good business opportunity for rural unemployed youth.	52 (14.44)	200 (55.56)	32 (8.89)	48 (13.33)	28 (7.78)	71.20
21	Advisory services provided by society is helpful for farmers	74 (20.56)	186 (51.67)	36 (10.00)	44 (12.22)	20 (5.56)	73.80

SA= Strongly Agree, A= Agree, N=Neutral, DA= Disagree, SDA= Strongly Disagree, WM in Percent

Table 2. Overall attitude level towards custom hiring centers

Category	Frequency	Percentage
Unfavorable (22 to 51)	32	8.89
Neutral (52 to 81)	82	22.78
Favorable (82 to 110)	246	68.33

Table 3. Respondents' perception regarding crop residue burning (n=180)

Sr. No.	Statements	SA	A	U	D	SD	WM%
1.	Loose straw creates a microenvironment that is susceptible to pathogen infection in the field	64 (17.78)	216 (60.00)	26 (7.23)	40 (11.11)	14 (3.88)	75.22
2.	Baling is the most common practice followed by the farmers for efficient straw management	208 (57.77)	1200 (33.34)	22 (6.12)	10 (2.77)	0 (0.00)	89.33
3.	The role of the state pollution control boards should be more stringent	40 (11.12)	92 (25.55)	160 (44.44)	40 (11.11)	28 (7.78)	84.44
4.	Composting paddy straw is not an economical viable option for the farmers	100 (27.77)	134 (37.23)	34 (9.45)	72 (20.00)	20 (5.55)	71.22
5.	Burning of straw depletes the important soil nutrients	60 (16.67)	96 (26.66)	18 (5.00)	136 (37.78)	50 (13.89)	58.78
6.	Usage of paddy straw is limited to certain uses only	148 (41.11)	164 (45.55)	40 (11.11)	8 (2.22)	4 (1.11)	64.11
7.	Stubble burning is the leading cause that results decline in soil fertility	30 (8.34)	54 (15.00)	50 (13.89)	140 (38.88)	86 (23.89)	49.11
8.	Intercropping is a valuable alternative for effective crop residual management.	130 (36.12)	116 (32.22)	58 (16.11)	40 (11.11)	16 (4.44)	76.78
9.	Crop residue burning in Punjab and Haryana is often blamed for worsening air quality in the Delhi National Capital Region	86 (23.89)	254 (70.56)	20 (5.55)	0 (0.00)	0 (0.00)	83.67

SA= Strongly Agree, A= Agree, U=Undecided, D= Disagree, SD= Strongly Disagree

Table 4. Perception level of farmer regarding crop residual burning

Category	Frequency(F)	Percentage(%)
Low (<46.92)	82	22.77
Medium (46.92-51.35)	108	30.00
High (>51.35)	170	47.23

Table 5. Major issue Perceived by the respondent with crop residue burning

Sr. No.	Items	Positive effects	No effects	Negative effects
1.	Plant Health related issues	00 (00.00)	24 (6.66)	336 (93.33)
2.	Air quality related issues	00 (00.00)	20 (5.65)	340 (94.45)
3.	Human Health related issues	00 (00.00)	66(18.33)	294(81.66)
4.	Animal Health related issues	00(00.00)	112(31.11)	248(68.89)
5.	Biodiversity related issues	00(00.00)	102(28.33)	258(71.67)
6.	Vehicular Traffic related issues	00(00.00)	110(30.56)	250(69.44)
7.	Soil Health and productivity related issues	00(00.00)	94(26.11)	266(73.89)

Figures in parenthesis indicated percentage

3.3 Perception of Farmers Regarding Crop Residue Burning Issue

The percentage and frequencies of each statement regarding the perception of respondents towards crop residue burning and weighted mean percentage of each statement presented in Table 3. The study indicated that Bailing is the most common practice followed by the farmers for efficient straw management statement had the highest weighted mean percentage followed by every farmer is not able to use happy seeders because it requires very high-capacity tractors for functioning with comprising of 89.33 per cent and 85.89 per cent respectively, Subbaiah et.al. [12] also reported that using of baler, storage and transportation becomes easy. Paddy straw can be used as an alternative fuel option to meet local energy demands statement had the lowest level of weighted mean percentage followed by Stubble burning is the leading cause that results decline in soil fertility with comprising of 38.22 per cent and 49.11 per cent, respectively. Anuradha et.al. [13] reported that major problems in in mitigation crop residue burning in Haryana were less time availability between the harvesting of rice and showing of wheat crop, followed by cost of cultivation increases, if machinery is used, and lack of cost-effective & viable technologies.

3.4 Perception Level of Farmer Respondents Regarding Crop Residue Burning

A perusal of Table 4 reveals that less than half (47.23%) of the respondent had high level of perception. Out of 360 respondents only 22.77 per cent of the farmers had low perception about crop residual burning.

3.5 Major Issue Perceived by the Respondent with Crop Residue Burning

The data in Table 5 depicted that majority of the extension personnel and farmer respondents perceived that crop residue burning has a negative effect on plant health, air, human health, animal health, biodiversity, vehicular traffic and soil health. The respondents explained that crop residue burning had no positive effect along with this it revealed that the negative effect of the crop residue burning was not constant which usually last only for a few days after rice harvesting. The results were similar to Roy (2015). Singh et. al. [14]. Observed that hiring-in farm machinery services rather than owning the same led to substantial economic benefit to farmers. The farmers owning farm machinery had invested almost two and half times more on this account when compared to the farmers who took the benefits of custom hire services of farm machinery.

4. CONCLUSION

The study indicated that majority (68.33%) of the respondents had favorable attitude towards CHCs, followed by 22.78 per cent of respondents having neutral attitude towards CHC and only 8.89 per cent of respondents has unfavorable attitude towards CHCs. The respondents perceived that CHCs are not sufficient so they should be increased in number also farmers perceived that machine having high demand during the peak seasons should be more in number in the societies. Those machines which are of least demand should be replaced by machines with high demand. Respondent were perceiving many issues related with crop residue burning such as agricultural, environmental,

health and other issues. All of the respondents were perceived that burning of straw decreases the productivity of the soil in long term. It was found that less than half (47.23%) of the respondent had high level of perception. In order to combat crop residue burning, coordination among various stakeholders in straw management should be improve, straw management should be carried out at community level and machinery should be available at panchayat level. Majority of the respondents perceived that crop residue burning has a negative effect on plant health, air, human health, animal health, biodiversity, vehicular traffic and soil health.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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