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Knowledge and adoption of pearl millet recommended technologies between two districts in Haryana

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Abstract
The advert of settled life happened with the beginning of agriculture when people started cultivating food for their livelihood. Agriculture is the vertical backbone of the country. Major part of country's population earns its livelihood from agriculture. Our country has a wide and very old setting of agriculture of about 10 thousand years. Agriculture, with its allied sectors, is the largest source of livelihoods in India. Haryana is a primarily an agriculture state. About 70 percent residences are engaged in agriculture. There are two main types of crop in Haryana: *Rabi* and *Kharif.* The major *Kharif* crops of Haryana are paddy, jwar, bajra, maize, cotton, jute, sugarcane, sesame and groundnut. In India, more than 70 percent of the pearl millet area is accounted by 3 states *viz*., Rajasthan, Maharashtra and Gujarat. In terms of production share, Rajasthan, UP and Gujarat accounts 77 percent of the total produce (Nagaraj, 2012). In india the production value of pearl millet (bajra) was 10.49 million metric tons in the financial year 2020-2021. There was an increase in production as compared to previous financial year 2018-2019 in which the production value was 8.66 million metric tons. The Study was conducted in Hisar and Charkhi Dadri district of Haryana state. Two blocks namely Hisar-2 and Badhra selected randomly. Total four villages i.e. two from each block namely Kharia and Dobhi from Hisar -2 block and Nandha and Kadma from Badhra were selected randomly. Total 240 respondents i. e. 60 respondents were selected from each village by covering 30 male and 30 female respondents from each village, thus comprising a sample of 240 respondents were selected randomly. In total pre production to post harvesting technologies found that majority of the respondents knowledge and adoption about seed rate, thining, interculture mechanical weed management, plant protection measures and appropriate harvesting technologies whereas less knowledge and adoption about varieties, seed treatment, direction of sowing, SSP fertilizers, weedicies, chemical doze and zinc nutrient deficiency. In Hisar District respondents had more knowledge and adoption of recommended technologies as compared to Charkhi Dadri district. And also found that majority of the male respondents had more knowledge and adoption as compared to female respondents.

Keywords: Agriculture, food, production, pearl millet, adoption

Introduction
The advert of settled life happened with the beginning of agriculture when people started cultivating food for their livelihood. Agriculture is the vertical backbone of the country. Major part of country's population earns its livelihood from agriculture. Our country has a wide and very old setting of agriculture of about 10 thousand years. Agriculture, with its allied sectors, is the largest source of livelihoods in India. 70 percent of its rural households still depend primarily on agriculture for their livelihood, with 82 percent of farmers being small and marginal. In Haryana majority of the farmers have less than two hectares which come under the category of small land holders. Small holdings also face new challenges on integration of value chains, liberalization and globalization effects, market volatility and other risks and vulnerability, adaptation of climate change etc. Small and marginal farmers are facing many problems to operate the high risk farming. These risk are related to weather uncertainties, uneven access to technologies and natural resources, unreliable input supplies, stressed infrastructure or irrigation, uncertain marketing arrangements, inefficient water management, lack of access to inputs, lack of timely support, lack of knowledge, lack of ability to diversify, lacking connectivity, lack of access to credit, etc. India seems to be a victim of thirty years of agricultural policy with an exclusive focus on spreading high yielding varieties (HYV) seed

fertilizer technology in a few potential regions for achieving food self sufficiency. Consequent to the adoption of this strategy India achieved self-sufficiency in food grains by the mid-seventies and is currently facing the problem of disposing off huge food grains stocks. At the current cereal intake of 143 kgs./per capital/annum, cereal requirement for household consumption will be around 192 million tons in 2020.

In India, more than 70 percent of the pearl millet area is accounted by 3 states *viz*., Rajasthan, Maharashtra and Gujarat. In terms of production share, Rajasthan, UP and Gujarat accounts 77 percent of the total produce (Nagaraj, 2012) [18]. In India the production value of pearl millet (bajra) was 10.49 million metric tons in the financial year 2020-2021. There was an increase in production as compared to previous financial year 2018-2019 in which the production value was 8.66 million metric tons. (Statista Research Department, 2022)Another one of the major *Kharif* crop of Haryana is pearl millet. Bajra (*Pennisetum typhoides* L.) belongs to *Gramineae* family and also known as pearl millet. Pearl millet is considered to be a poor man's food. Besides being a staple diet of about 10 percent population of our country. It is also an important fodder crop for animals. It is nutritionally better than many cereals. In India pearl millet is the important cereal crop next to rice and wheat. The major pearl millet growing states of the country are Rajasthan, Uttar Pradesh, Maharashtra, Gujrat and Haryana. State agriculture department of Haryana revealed that total 7.66 lakh million tone (MT) bajra was procured in 2020 *Kharif* season, about 1.50 lakh million tone (MT) was distribution through public distribution system. As farmers are complaining about fall in price, the government says bajra will be paid after verification of crops of registered farmers on the 'Meri Fasal, Mera Byora' portal. In Kharif season 2021, 2.71 lakh farmers have registered on the 'Meri Fasal, Mera Byora' portal for bajra. (Hindustan Times)

In India, more than 70 percent of the pearl millet area is accounted by 3 states *viz*., Rajasthan, Maharashtra and Gujarat. In terms of production share, Rajasthan, UP and Gujarat accounts 77 percent of the total produce (Nagaraj, 2012) [18]. In india the production value of pearl millet (bajra) was 10.49 million metric tons in the financial year 2020-2021. There was an increase in production as compared to previous financial year 2018-2019 in which the production value was 8.66 million metric tons. (Statista Research Department, 2022). One of the major *Kharif* crop of Haryana is pearl millet. Bajra (*Pennisetum typhoides* L.) belongs to *Gramineae* family and also known as pearl millet. Pearl millet is considered to be a poor man's food. Besides being a staple diet of about 10 percent population of our country. It is also an important fodder crop for animals. It is nutritionally better than many cereals. In India pearl millet is the important cereal crop next to rice and wheat. The major pearl millet growing states of the country are Rajasthan, Uttar Pradesh, Maharashtra, Gujrat and Haryana. State agriculture department of Haryana revealed that total 7.66 lakh million tone (MT) bajra was procured in 2020 *Kharif* season, about 1.50 lakh million tone (MT) was distribution through public distribution system. As farmers are complaining about fall in price, the government says bajra will be paid after verification of crops of registered farmers on the 'Meri Fasal, Mera Byora' portal. In Kharif season 2021, 2.71 lakh farmers have registered on the 'Meri Fasal, Mera Byora' portal for bajra. (Hindustan Times)

Objectives of the study

1. To explore the knowledge of recommended technologies in the pearl millet crop.
2. To assess the adoption in recommended technologies.

Methodology

The Study was conducted in Hisar and Charkhi Dadri district of Haryana state. Two blocks namely Hisar-2 and Badhra selected randomly. Total four villages i.e. two from each block namely Kharia and Dobhi from Hisar -2 block and Nandha and Kadma from Badhra were selected randomly. Total 240 respondents i. e. 60 respondents were selected from each village by covering 30 male and 30 female respondents from each village, thus comprising a sample of 240 respondents were selected randomly.

Results and Discussion

Table 1: Knowledge and Adoption of recommended varieties of pearl millet crop

Sr no	Varieties	Knowledge				Adoption			
		Hisar		Charkhi Dadri		Hisar		Charkhi Dadri	
		Yes f (%)	No f (%)	Yes f (%)	No f (%)	Yes f (%)	No f (%)	Yes f (%)	No f (%)
1.	HHB-67	52(43.3)	68(56.7)	40(33.3)	80(66.7)	34(28.3)	86(71.7)	30(25.0)	90(75.0)
2.	HHB-197	25(20.8)	95(79.2)	10(8.3)	110(91.7)	14(11.7)	106(88.3)	6(5.0)	114(95.0)
3.	HHB-223	5(4.2)	115(95.8)	4(3.3)	116(96.7)	3(2.5)	117(97.5)	3(2.5)	117(97.5)
4.	HHB-226	5(4.2)	115(95.8)	4(3.3)	116(96.7)	3(2.5)	117(97.5)	3(2.5)	117(97.5)
5.	Other varieties (HHB-299, HHB-197)	4(3.3)	116(96.7)	2(1.7)	118(98.3)	4(3.3)	116(96.7)	2(1.7)	118(98.3)

Table 1 depict out the varieties of recommended peal millet crop. From Hisar district majority of the respondents (43.3%) had knowledge about HHB-67 followed by HHB-197 (20.8%), HHB-223 and HHB-226 (4.2%) and other varieties (3.3%).

Data regarding adoption shows that majority of the respondents (28.3%) adopted HHB-67 followed by HHB-197 (11.7%), other varieties (3.3%), HHB-223 and HHB-226 (2.5%) respectively. Data show that in Charkhi Dadri district majority of the respondents (33.3%) had knowledge about HHB-67 followed by HHB-197 (8.3%), HHB-223, HHB-226 (3.3%) and other varieties (1.7%). Data regarding adoption observed that one fourth of the respondents (25.0%) adopted HHB-67 followed by HHB-197 (5.0%), HHB-223, HHB-226 (2.5%) and other varieties (1.7%).

Data shows in (Table 2) states that from, Hisar district, majority of the respondents (60.0%) had knowledge about seed rate and 56.7 percent adopted and 43.3 percent adoption gap. In Charkhi Dadri district, data shows that 44.2 percent of the respondent's knowledge, 41.7 percent adopted seed rate.

Data reveals that from Hisar district, less than one fourth of the respondents (16.7%) had knowledge about biomix and thirman (6.7%). Whereas only 7.5 percent biomix adopted. No knowledge and adoption in Charkhi Dadri district about seed treatment.

Table 2: Knowledge and Adoption of recommended seed rate and seed treatment of pearl millet crop

Sr no	Activities	Knowledge				Adoption			
		Hisar		Charkhi Dadri		Hisar		Charkhi Dadri	
		Yes f (%)	No f (%)	Yes f (%)	No f (%)	Yes f (%)	No f (%)	Yes f (%)	No f (%)
Seed rate									
1.	Seed rate	72(60.0)	48(40.0)	53(44.2)	67(55.8)	68(56.7)	52(43.3)	50(41.7)	70(58.3)
Seed treatment									
1.	Biomix	20(16.7)	100(83.3)	0(0.0)	120(100.0)	9(7.5)	111(92.5)	0(0.0)	120(100.0)
2.	Thirman	8(6.7)	112(93.3)	0(0.0)	120(100.0)	0(0.0)	120(100.0)	0(0.0)	120(100.0)
3.	Metalaxyl	0(0.0)	120(100.0)	0(0.0)	120(100.0)	0(0.0)	120(100.0)	0(0.0)	120(100.0)

Table 3: Knowledge and Adoption of recommended method of sowing and thining of pearl millet crop

Sr no	Activities	Knowledge				Adoption			
		Hisar		Charkhi Dadri		Hisar		Charkhi Dadri	
		Yes f (%)	No f (%)	Yes f (%)	No f (%)	Yes f (%)	No f (%)	Yes f (%)	No f (%)
Method of sowing									
1.	Depth of sowing	86(71.7)	34(28.3)	58(48.3)	62(51.7)	86(71.7)	34(28.3)	58(48.3)	62(51.7)
2.	Distance between row to row	63(52.5)	57(47.5)	16(13.3)	104(86.7)	52(43.3)	68(56.7)	15(12.5)	105(87.5)
3.	Distance between plant to plant	9(7.5)	111(92.5)	0(0.0)	120(100.0)	4(3.3)	116(96.7)	0(0.0)	120(100.0)
4.	Direction of sowing	0(0.0)	120(100.0)	0(0.0)	120(100.0)	0(0.0)	120(100.0)	0(0.0)	120(100.0)
Thining									
1.	Row to Row	120(100.0)	0(0.0)	120(100.0)	0(0.0)	76(63.3)	44(36.7)	79(65.8)	41(34.2)

Data presented in (Table 3) found that in Hisar district about method of sowing, majority of the respondents (71.7%) had knowledge about depth of sowing, followed by distance between row to row (52.5%) and distance between plant to plant (7.5%). Data regarding adoption observed that majority of the respondents (71.7%) adopted depth of sowing followed by distance between row to row (43.3%) and distance between plant to plant (3.3%). Data regarding adoption shows that less than half of the respondents 48.3 percent depth of sowing and 12.5 percent distance between row to row adopted. And no knowledge and adoption about direction of sowing in both districts.

Data highlights about thinning, 100.0 percent of the respondents knowledge about thinning in both districts but 63.3 percent adopted in Hisar district and 65.8 percent adopted in Charkhi Dadri district.

Table 4: Knowledge and Adoption of recommended nutrient requirement of pearl millet crop

Sr no	Recommended nutrients	Knowledge				Adoption			
		Hisar		Charkhi Dadri		Hisar		Charkhi Dadri	
		Yes f (%)	No f (%)	Yes f (%)	No f (%)	Yes f (%)	No f (%)	Yes f (%)	No f (%)
Irrigated									
1.	Nitrogen	77(64.2)	43(35.8)	42(35.0)	78(65.0)	54(45.0)	66(55.0)	34(28.3)	86(71.7)
2.	Phosphorus	0(0.0)	120(100.0)	0(0.0)	120(100.0)	0(0.0)	120(100.0)	0(0.0)	120(100.0)
3.	Potassium	0(0.0)	120(100.0)	0(0.0)	120(100.0)	0(0.0)	120(100.0)	0(0.0)	120(100.0)
Rainfed									
1.	Nitrogen	4(3.3)	116(96.7)	3(2.5)	117(97.5)	4(3.3)	116(96.7)	3(2.5)	117(97.5)
2.	Phosphorus	0(0.0)	120(100.0)	0(0.0)	120(100.0)	0(0.0)	120(100.0)	0(0.0)	120(100.0)
3.	Potassium	0(0.0)	120(100.0)	0(0.0)	120(100.0)	0(0.0)	120(100.0)	0(0.0)	120(100.0)

Data (Table 4) regarding recommended nutrient requirement that from Hisar district, majority of the respondents (64.2%) had knowledge about nitrogen requirement and 45.0 percent adopted. In Charkhi Dadri district data shows that only 35.0 percent of the respondents had knowledge about nitrogen and 28.3 percent adopted. Whereas in both irrigated and rainfed no knowledge and adoption about phosphorus and potassium in both districts. Only 3.3 percent respondents in Hisar district had knowledge and adopted nitrogen in rainfed. In Charkhi Dadri district only 2.5 percent of the respondents had knowledge and adopted nitrogen.

Table 5: Knowledge and Adoption of recommended fertilizers of pearl millet crop

Sr no	Recommended fertilizers	Knowledge				Adoption			
		Hisar		Charkhi Dadri		Hisar		Charkhi Dadri	
		Yes f (%)	No f (%)	Yes f (%)	No f (%)	Yes f (%)	No f (%)	Yes f (%)	No f (%)
Irrigated									
1.	Urea	77(64.2)	43(35.8)	42(35.0)	78(65.0)	54(45.0)	66(55.0)	34(28.3)	86(71.7)
2.	SSP	9(7.5)	111(92.5)	0(0.0)	120(100.0)	8(6.7)	112(93.3)	0(0.0)	120(100.0)
3.	MOP	0(0.0)	120(100.0)	0(0.0)	120(100.0)	0(0.0)	120(100.0)	0(0.0)	120(100.0)
Rainfed									
1.	Urea	10(8.3)	110(91.7)	0(0.0)	120(100.0)	4(3.3)	116(96.7)	0(0.0)	120(100.0)
2.	SSP	0(0.0)	120(100.0)	0(0.0)	120(100.0)	0(0.0)	120(100.0)	0(0.0)	120(100.0)

Data indicate (Table 5) that from, Hisar district more than half of the respondents (64.2%) had knowledge about recommended fertilizers urea and (7.5%) knowledge about SSP. Whereas 45.0 percent adopted urea and 6.7 percent SSP. In Charkhi Dadri district data shows that 35.0 percent of the respondents had knowledge about urea and 28.3 percent adopted. No knowledge and adoption about MOP and rainfed SSP in both districts. In Hisar district 8.3 percent of the respondents had knowledge about urea and only 3.3 percent adopted. And no knowledge and adoption about irrigated SSP and rainfed urea.

Table 6: Knowledge and Adoption of recommended Interculture & weed management practices of pearl millet crop

Sr no	Interculture & weed management	Knowledge				Adoption			
		Hisar		Charkhi Dadri		Hisar		Charkhi Dadri	
		Yes f (%)	No f (%)	Yes f (%)	No f (%)	Yes f (%)	No f (%)	Yes f (%)	No f (%)
Mechanical									
1.	Kasola	120(100.0)	0(0.0)	120(100.0)	0(0.0)	120(100.0)	0(0.0)	120(100.0)	0(0.0)
2.	Wheel hand hoe	116(96.7)	4(3.3)	109(90.8)	11(9.2)	64(53.3)	56(46.7)	22(18.3)	98(81.7)
3.	Bulock drawn blade hand hoe	120(100.0)	0(0.0)	120(100.0)	0(0.0)	1(0.8)	119(99.2)	11(9.2)	109(90.8)
Chemical (Weedicides)									
1.	Atrazine	42(35.0)	78(65.0)	10(8.3)	110(91.7)	23(19.2)	97(80.8)	4(3.3)	116(96.7)

Data (Table 6) reveals that all of respondents (100.0%) knowledge and adopted mechanical Interculture & weed management practices in both districts. In Hisar district data show that majority of the respondents (96.7%) had knowledge about wheel hand hoe and 100.0 percent knowledge about bulock drawn blade hand hoe but 53.3 percent wheel hand hoe adopted and only 0.8 percent bulock drawn blade hand adopted. In Charkhi Dadri district majority of the respondents (90.8%) had knowledge about wheel hand hoe and 100.0 percent knowledge about bulock drawn blade hand hoe whereas only 53.3 percent adopted wheel hand hoe and 0.8 percent adopted bulock drawn blade hand hoe.

Data indicate that only 35.0 percent of the respondents had knowledge about atrazine weedicide and 19.2 percent adopted. In Charkhi Dadri district 8.3 percent of the respondents' knowledge about atrazine and only 3.3 percent adopted.

Table 7: Knowledge and Adoption of recommended plant protection measures of pearl millet crop

Sr no	Plant protection measure	Knowledge				Adoption			
		Hisar		Charkhi Dadri		Hisar		Charkhi Dadri	
		Yes f (%)	No f (%)	Yes f (%)	No f (%)	Yes f (%)	No f (%)	Yes f (%)	No f (%)
Insects									
1.	White grub	5(4.2)	115(95.8)	2(1.7)	118(98.3)	0(0.0)	120(100.0)	0(0.0)	120(100.0)
2.	Hairy caterpillar	100(83.3)	20(16.7)	80(66.7)	40(33.3)	40(33.3)	80(66.7)	30(25.0)	90(75.0)
3.	Fallarmy warm	110(91.7)	10(8.3)	108(90.0)	12(10.0)	60(50.0)	60(50.0)	50(41.7)	70(58.3)
4.	Grey Weevil	3(2.5)	117(97.5)	0(0.0)	120(100.0)	0(0.0)	120(100.0)	0(0.0)	120(100.0)
Disease									
1.	Downy mildew	118(98.3)	2(1.7)	115(95.8)	5(4.2)	50(41.7)	70(58.3)	40(33.3)	80(66.7)
2.	Smut	60(50.0)	60(50.0)	30(25.0)	90(75.0)	8(6.7)	112(93.3)	6(5.0)	114(95.0)
3.	Ergot	60(50.0)	60(50.0)	50(41.7)	70(58.3)	10(8.3)	110(91.7)	7(5.8)	113(94.2)

Data (Table 7) reveals that from, Hisar district, majority of the respondents (91.7%) had knowledge about fallarmy warm followed by hairy caterpillar (83.3%), white grub (4.2%) and grey weevil (2.5%) respectively. Data regarding adoption shows that half of the respondents (50.0%) adopted fallarmy warm and 33.3 percent hairy caterpillar. In Charkhi Dadri district majority of the respondents (90.0%) had knowledge about fallarmy warm followed by hairy caterpillar (66.7%) and white grub (1.7%). Data indicated from Hisar district, that majority of the respondents (95.8%) had knowledge about disease downy mildew followed by ergot and smut (50.0%).

Table 8: Knowledge and Adoption of recommended chemical doze of pearl millet crop

Sr no	Chemicals doze	Knowledge				Adoption			
		Hisar		Charkhi Dadri		Hisar		Charkhi Dadri	
		Yes f (%)	No f (%)	Yes f (%)	No f (%)	Yes f (%)	No f (%)	Yes f (%)	No f (%)
Insects									
1.	Quinalphos	66(55.0)	54(45.0)	55(45.8)	65(54.2)	30(25.0)	90(75.0)	8(6.7)	112(93.3)
2.	Malathion	26(21.7)	94(78.3)	10(8.3)	110(91.7)	10(8.3)	110(91.7)	5(4.2)	115(95.8)
Disease									
1.	Mencozeb	79(65.8)	41(34.2)	50(41.7)	70(58.3)	40(33.3)	80(66.7)	10(8.3)	110(91.7)

Data (Table 8) presented in Hisar district, majority of the respondents (65.8%) had knowledge about mencozeb followed by quinalphos (55.0%) and malathion (21.75%). Whereas quinalphos adoption (25.0%) and malathion (8.3%). And the data regarding Charkhi Dadri district, majority of the respondents (45.8%) had knowledge about quinalphos followed by mencozeb (41.7) and malathion (8.3%).

Table 9: Knowledge and Adoption of recommended measures to combat the nutrients deficiency& appropriate harvesting time of pearl millet crop

Sr no	Activities	Knowledge				Adoption			
		Hisar		Charkhi Dadri		Hisar		Charkhi Dadri	
		Yes f (%)	No f (%)	Yes f (%)	No f (%)	Yes f (%)	No f (%)	Yes f (%)	No f (%)
Nutrients deficiency									
1.	Nitrogen	95(79.2)	25(20.8)	80(66.7)	40(33.3)	95(79.2)	25(20.8)	80(66.7)	40(33.3)
2.	Phosphorus	6(5.0)	114(95.0)	4(3.3)	116(96.7)	6(5.0)	114(95.0)	4(3.3)	116(96.7)
Appropriate harvesting time									
1.	Harvesting	120(100.0)	0(0.0)	120(100.0)	0(0.0)	120(100.0)	0(0.0)	120(100.0)	0(0.0)

Data observed in (Table 9) found about nutrient deficiency symptoms in Hisar district, majority of the respondents (79.2%) knowledge and adopted nitrogen. Whereas phosphorus knowledge and adoption (5.0%). In Charkhi Dadri district, data shows that majority of the respondents (66.7%) knowledge and adopted nitrogen followed by phosphorus (3.3%). Data indicated in both district 100.0 percent knowledge and adopted appropriate harvesting time.

Table 10: Relationship between independent & dependent variables in Pearl millet crop

Independent variable	Hisar		Charkhi Dadri	
	Knowledge	Adoption	Knowledge	Adoption
Age	0.122 *	0.115*	0.116*	0.111*
Caste	0.151*	0.124*	0.161*	0.118*
Education	0.178*	0.111*	0.115*	0.098
Occupation	0.172*	0.162*	0.154*	0.142*
Land holding	0.055	0.112	0.085	0.047
Type of land	0.064	0.091	0.078	0.062
Irrigation source availability	0.073	0.042	0.095	0.098
Annual Income	0.175*	0.172*	0.162*	0.132*
Type of family	0.062	0.122	0.040	0.024
Size of family	0.021	0.020	0.022	0.027
Material possession	0.168*	0.152*	0.122*	0.146*
Crops grown	0.153*	0.148*	0.143*	0.126*
Credit acquisition	0.082	0.070	0.065	0.063
Communication source	0.138*	0.120*	0.126*	0.125*
Psychological variable	0.179*	0.162*	0.172*	0.168*
Mechanization	0.148*	0.121*	0.136*	0.118*
Labour use pattern	0.146*	0.119*	0.142*	0.126*

It is evident from table 10 that age(r = 0.122), (r = 0.116), caste (r = 0.151) (r = 0.161), education (r = 0.178) (r = 0.115), occupation (r = 0.172), (r = 0.154), annual income (r = 0.175), (r = 0.162), material possession(r = 0.168) (r = 0.122), crops grown (r = 0.153) (r = 0.143), communication source(r = 0.138), (r = 0.126), psychological variable (r = 0.179), (r = 0.172), mechanization (r = 0.148), (r = 0.136) and labour use pattern (r = 0.146), (r = 0.142) had positive & significant correlation with knowledge of Hisar and Charkhi Dadri respondents at 5% level of significance. Further, it is evident from table 10 that age(r = 0.115), (r = 0.111), caste (r = 0.124) (r = 0.118), education (r = 0.111), occupation (r = 0.162) (r = 0.142), annual income (r = 0.172), (r = 0.132), material possession(r = 0.152) (r = 0.146), crops grown (r = 0.148) (r = 0.126), communication source(r = 0.120), (r = 0.125), psychological variable (r = 0.162), (r = 0.168), mechanization (r = 0.121), (r = 0.118) and labour use pattern (r = 0.119), (r = 0.126) were found to be positively significant and correlated with adoption of Hisar and Charkhi Dadri respondents at 0.05% level of significance. Adeniji *et al* (2007) [1], Pandey and Dash (2013) [14] and Ramani (2018) [15] supported this study.

Conclusion

Haryana is a primarily an agriculture state. About 70 percent residences are engaged in agriculture. There are two main types of crop in Haryana: *Rabi* and *Kharif*. The major *Kharif* crops of Haryana are paddy, jwar, bajra, maize, cotton, jute, sugarcane, sesame and groundnut. In India, more than 70 percent of the pearl millet area is accounted by 3 states *viz*., Rajasthan, Maharashtra and Gujarat. In terms of production share, Rajasthan, UP and Gujarat accounts 77 percent of the total produce (Nagaraj, 2012) [18]. In india the production value of pearl millet (bajra) was 10.49 million metric tons in the financial year 2020-2021. There was an increase in production as compared to previous financial year 2018-2019 in which the production value was 8.66 million metric tons. In total pre production to post harvesting technologies found that majority of the respondents knowledge and adoption about seed rate, thining, interculture mechanical weed management, plant protection measures and appropriate harvesting technologies whereas less knowledge and adoption about varieties, seed treatment, direction of sowing, SSP fertilizers, weedicies, chemical doze and zinc nutrient deficiency. In Hisar District respondents had more knowledge and adoption of recommended technologies as compared to Charkhi Dadri district. And also found that majority of the male respondents had more knowledge and adoption as compared to female respondents.

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