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Progress Report
2017-18

अखिल भारतीय समन्वित गेहूँ एवं जौ अनुसंधान परियोजना

AICRP on Wheat and Barley

उन्नत तकनीकियों द्वारा किसानों की अधिक आय

Improved Technologies for Higher Income of Farmers

सामाजिक विज्ञान

SOCIAL SCIENCES

भा.कृ.अनु.प. - भारतीय गेहूँ एवं जौ अनुसंधान संस्थान, करनाल

ICAR – Indian Institute of Wheat and Barley Research, Karnal

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AICRP on Wheat and Barley

PROGRESS REPORT
2017-18

SOCIAL SCIENCES

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In the end, it is stated that although utmost care has been taken to avoid any error in presentation of the results in this report, any error/omission is unintended and may please be brought to the notice of the undersigned.

Satyavir Singh

(Satyavir Singh)
Principal Investigator
(Social Sciences)

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Front Line Demonstrations (2017-2018)

Globally, wheat and barley occupies respectively the first and fourth position in terms of acreage, altogether hovering around 267 million hectares (mha) with an annual production of 902 million tonnes (mt). In India, these *Rabi* cereals altogether cultivated in around 31 million hectares (mha) area accounting for about 37 per cent of the total foodgrains produced during 2017-2018. Wheat has been under cultivation in 29.72 mha and barley covered 0.68 mha during 2017-2018 (Source: III Advance Estimates, Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare, India). The current year wheat production has touched an all-time record of 98.61 mt with a record national average productivity of 3318 kg/ha. The incremental production of wheat over the previous season, *i.*e 2016-17, has been estimated at 0.10 mt (+0.10%). Similarly, barley registered 1.79 million tonnes production during 2017-2018 from 0.68 mha area with an average national productivity of 2641 kg/ha.

Frontline demonstrations (FLDs) conducted across regions also witnessed a similar kind of trend. The improved varieties and technologies demonstrated at farmers field through the FLD programme showed that yield registered in FLDs is significantly higher than check plots. However, there existed yield gaps across regions which should be bridged through need based interventions by identifying the locations specific constraints. The ICAR-IIWBR strives to make continuous efforts to popularize the regions specific superior varieites as well as micro level strategies to enhance the wheat and barley productivity. Despite several outreach programmes, there exists the need for increasing the productivity of wheat and barley through different scientist-farmer interface activities with more emphasis on seed as well as variety replacement, integrated nutrient management (INM), efficient water management, integrated crop management (ICM) integrated pest management (IPM), weed management, incorporation/ retention of crop residues and soil health management. The farm advisory services through WhatsApp group, MANAGE portal and rigorous training of field level extension functionaries or subject matter specialists by the institute has also played a key role in taking contingent management measures, particularly against yellow rust. Several other programmes have been initiated as well at the institute level to transfer the efficient technologies to farmers' fields.

Creation of awareness through mass and print media on seed treatment, seed and variety replacement, and disease management helped to increase the farmers' livelihood and welfare. Procurement by different authorized agencies has also motivated the farmers to retain the same or allot more area under the respective

crop. Developing storage facilities both at farm level and national level is the need of the hour and it warrants for some policy interventions. The report highlights the outcome of wheat and barley FLDs, yield gain due to FLDs, costs and returns as well as constraints in wheat and barley production.

Wheat Front Line Demonstrations (2017-18)

During the wheat crop season 2017-18, 1500 Wheat Front Line Demonstrations (WFLDs) of one acre each were allotted to 80 cooperating centres across the country of which 1388 were conducted through 75 cooperating centers. The technologies such as improved wheat (*T.aestivum, T.durum and T. dicoccum*) varieties with complete package of practices, rotavator, zero tillage/Happy Seeder, bio-fertilizer and drip/sprinkler irrigation were demonstrated in the selected farmers fields. These WFLDs covered 1411.45 hectares area of 1529 farmers in 19 states. The maximum number of WFLDs were conducted in UP (174) followed by Bihar (130), MP (117), HP (99), Maharashtra (99), Haryana (89), Assam (88), Rajasthan (84), Punjab (73), Karnataka (68), Jharkhand (65), J&K (51), West Bengal (50), Tamil Nadu (44), Chhattisgarh (43), Uttarakhand (38), Delhi (36), Gujarat (35) and Manipur (5). The details of centre wise and state wise WFLDs are given in Tables 1a, Ib, 2a and 2b.

Table 1a: Centre wise distribution of wheat front line demonstrations during *rabi* 2017-18 (Acres)

S.No.	Name of Centre	WFLDs Allotted (1WFLD = 1Acre)	WFLDs Conducted (1 Acre basis)	Area Sown (Acres)	No. of Farmers/ Locations
	NHZ				
1.	VPKAS, Almora (Uttarakhand)	20	20	20	130
2.	CSKHPKV, HAREC, Bajaura, Kullu (HP)	12	12	12	15
3.	CSKHPKV, RWRC, Malan, Kangra (HP)	15	15	15	32
4.	CSKHPKV,PCRS, Berthin, Bilaspur (HP)	12	12	12	12
5.	CSKHPKV, HAREC, Dhaulakuan, Sirmour (HP)	12	12	12.5*	9
6.	IARI, RS, Amartara Cottage, Shimla (HP)	12	12	12	12
7.	ICAR-IIWBR, RS, Flowerdale, Shimla (HP)	12	12	11.6	11
8.	RR&RS, SKUAST-K, Khudwani, Anantnag (J&K)	14	14	14	14
9.	RARS, SKUAST-Jammu, Tandwal, Rajouri (J&K)	12	12	12	12
10.	KVK (CSKHPKV), Bara, Hamirpur (HP)	12	12	12	18
11.	AICW&BIP Sub-Centre, CAU, Imphal (Manipur)	05	5	5	2
	NEPZ				
12.	NDUA&T, Faizabad (UP)	18	18	18	16
13.	CSAUA&T, Kanpur (UP)	25	25	25	25
14.	BHU, Varanasi (UP)	25	25	25	25
15.	KVK, Sohna, Sidharthnagar (UP)	25	25	25	25
16.	KVK, Sultanpur (UP)	12	12	12	12
17.	BCKV, Kalyani, Nadia (West Bengal)	25	25	25	38
18.	UBKVV, Pundibari, Coochbehar (West Bengal)	25	25	42*	41

S.No.	Name of Centre	WFLDs Allotted (1WFLD = 1Acre)	WFLDs Conducted (1 Acre basis)	Area Sown (Acres)	No. of Farmers/ Locations
19.	RARS, AAU, Shillongani, Nagaon (Assam)	25	25	25	25
20.	KVK (AAU), Chirakuta, (Revenue village Jamduar Pt.II) Dhubri (Assam)	24	24	25*	65
21.	KVK (AAU), Napam, Tejpur, Sonitpur (Assam)	18	15	14.85	13
22.	KVK (AAU), Kajalgaon, Chirang (Assam)	24	24	24	30
23.	IARI, RS, Pusa, Samastipur (Bihar)	25	25	25	16
24.	KVK, Sokhodeora, Nawadah (Bihar)	15	15	15	6
25.	KVK, RAU, Hariharpur, Vaishali (Bihar)	24	24	24	13
26.	KVK, Adhaura, Kaimur, Bhabua (Bihar)	18	18	18	18
27.	KVK, Chanpura-Basaith, Madhubani (Bihar)	12	12	12	12
28.	KVK (RAU), Pipra Kothi, East Champaran (Bihar)	18	18	18	18
29.	KVK (RAU), Madhopur, West Champaran (Bihar)	18	18	18	23
30.	BAU, Kanke, Ranchi (Jharkhand)	20	20	20	20
31.	KVK, Morabadi, Ranchi (Jharkhand)	25	25	25	25
32.	KVK, BAU, West Singhbhum (Jharkhand)	20	20	20	20
	NWPZ				
33.	KVK (CSKHPKV), Una (HP)	12	12	12	10
34.	KVK (SKUAST-Jammu), Rajhani, Kathua, Jammu (J&K)	25	25	25	25
35.	PAU, Ludhiana (Punjab)	25	25	25	25
36.	PAU, RRS, Gurdaspur (Punjab)	18	18	18	18
37.	KVK, Haveli Kalan, Rupnagar (Punjab)	15	15	15	12
38.	KVK, Usman, Amritsar (Punjab)	15	15	15	13
39.	RBS College, Bichpuri, Agra (UP)	15	15	15	15
40.	KVK, Baghara, Muzaffarnagar (UP)	15	15	15	15
41.	ZARS, Nagina, Bijnor (UP)	12	12	12	12
42.	KVK, Khajuri Bagh, New Gopal Nagar, Saharanpur,UP	12	12	12	12
43.	ICAR-IIFSR, Modipuram, Meerut (UP)	18	Not conducted	-	-
44.	Amity Centre for Extension Services, Noida (UP)	15	15	15	15
45.	GBPUA&T, Pantnagar, USNagar (Uttarakhand)	18	18	18	18
46.	CATAT, IARI, New Delhi	18	18	18	18
47.	KVK (NHRDF), Ujwa, New Delhi	18	18	18	18
48.	ICAR-IIWBR, Karnal (Haryana)	20	20	20	20
49.	ICAR-CSSRI, Karnal (Haryana)	18	18	18	18
50.	CCSHAU, Hisar (Haryana)	15	15	15	15
51.	KVK, Bhiwani (Haryana)	12	12	12	12
52.	KVK, Tepla, Ambala (Haryana)	12	12	12	12
53.	KVK, Peoda Road, Kaithal (Haryana)	12	12	12	12
54.	RARI, SKNAU, Durgapura, Jaipur (Rajasthan)	14	14	14	14
55.	KVK, Ajmer (Rajasthan)	12	12	12	12
56.	KVK, Banasthali Vidyapeeth, District-Tonk (Rajasthan)	12	12	12	12
57.	ARS (RAU), Sriganganagar (Rajasthan)	12	12	12	12
	CZ				
58.	RCOA (MPUA&T), Udaipur (Rajasthan)	18	18	18	18
59.	ARS, MPUA&T, Banswara (Rajasthan)	16	16	16	16
60.	ARS, MPUA&T, Kota (Rajasthan)	18	Not conducted	-	-

S.No.	Name of Centre	WFLDs Allotted (1WFLD = 1Acre)	WFLDs Conducted (1 Acre basis)	Area Sown (Acres)	No. of Farmers/ Locations
61.	KVK, Sawai Madhopur (Rajasthan)	12	Not conducted	-	-
62.	WRS, JAU, Junagarh (Gujarat)	25	15	15	15
63.	MWRS, SDAU, Vijapur, Mehsana (Gujarat)	25	20	20	20
64.	JNKVV, Jabalpur (MP)	25	25	25	10
65.	IARI, RWRS, Indore (MP)	25	25	29.5*	26
66.	KVK (JNKVV), Purushottampur, Panna (MP)	18	18	18	14
67.	KVK, Kalukhera Shiksha Samiti, Kalukhera, Ratlam (MP)	25	25	25	25
68.	KVK (RVSKVV), Pipersama, Neemuch(MP)	12	12	12	12
69.	KVK (RVSKVV),COH, Mandsour (MP)	12	12	13*	13
70.	KVK (RVSKVV), MLNagar, Ujjain (MP)	20	Not conducted	-	-
71.	KVK (RVSKVV), Budhapura, Lahar, Bhind(MP)	12	Not conducted	-	-
72.	KVK, RRS, IGKVV, Jagdalpur, Bastar (CG)	18	18	18	18
73.	IGAU, RARS, Sarkanda, Bilaspur (CG)	25	25	25	25
	PZ				
74.	PDKV, Akola (Maharashtra)	25	25	25	25
75.	ARS, Niphad, Nasik (Maharashtra)	25	25	25	25
76.	MAU, Parbhani (Maharashtra)	25	24	24	24
77.	ARI, MACS, Pune (Maharashtra)	25	25	25	25
78.	UAS, Dharwad (Karnataka)	50	43	43	43
79.	BIRDS KVK, Tukkanatti, Gokak, Belagavi (Karnataka)	25	25	25	25
	SHZ				
80.	IARI, RS, Wellington (Tamil Nadu)	50	44	44	32
	Total	**1500**	**1388**	**1411.45**	**1529**

** Area covered more than allotted which is restricted to area equal to allotted FLDs.*

Table 1b: Centre wise distribution of Wheat Front Line Demonstrations during *Rabi* 2017-18 (Hectares)

S.No.	Name of Centre	WFLDs Allotted (1WFLD = 1Ha)	WFLDs Conducted (1 Ha basis)	Area Sown (Ha)	No. of Farmers/ Locations
	NHZ				
1.	VPKAS, Almora (Uttarakhand)	8	8	8	130
2.	CSKHPKV, HAREC, Bajaura, Kullu (HP)	4.8	4.8	4.8	15
3.	CSKHPKV, RWRC, Malan, Kangra (HP)	6	6	6	32
4.	CSKHPKV,PCRS, Berthin, Bilaspur (HP)	4.8	4.8	4.8	12
5.	CSKHPKV, HAREC, Dhaulakuan, Sirmour (HP)	4.8	4.8	5	9
6.	IARI, RS, Amartara Cottage, Shimla (HP)	4.8	4.8	4.8	12
7.	ICAR-IIWBR, RS, Flowerdale, Shimla (HP)	4.8	4.8	4.64	11
8.	RR&RS, SKUAST-K, Khudwani, Anantnag (J&K)	5.6	5.6	5.6	14
9.	RARS, SKUAST-Jammu, Tandwal, Rajouri (J&K)	4.8	4.8	4.8	12
10.	KVK (CSKHPKV), Bara, Hamirpur (HP)	4.8	4.8	4.8	18
11.	AICW&BIP Sub-Centre, CAU, Imphal (Manipur)	2	2	2	2
	NEPZ				
12.	NDUA&T, Faizabad (UP)	7.2	7.2	7.2	16
13.	CSAUA&T, Kanpur (UP)	10	10	10	25
14.	BHU, Varanasi (UP)	10	10	10	25
15.	KVK, Sohna, Sidharthnagar (UP)	10	10	10	25

S.No.	Name of Centre	WFLDs Allotted (1WFLD = 1Ha)	WFLDs Conducted (1 Ha basis)	Area Sown (Ha)	No. of Farmers/ Locations
16.	KVK, Sultanpur (UP)	4.8	4.8	4.8	12
17.	BCKV, Kalyani, Nadia (West Bengal)	10	10	10	38
18.	UBKVV, Pundibari, Coochbehar (West Bengal)	10	10	16.8	41
19.	RARS, AAU, Shillongani, Nagaon (Assam)	10	10	10	25
20.	KVK (AAU), Chirakuta, (Revenue village Jamduar Pt.II) Dhubri (Assam)	9.6	9.6	10	65
21.	KVK (AAU), Napam, Tejpur, Sonitpur (Assam)	7.2	6	5.94	13
22.	KVK (AAU), Kajalgaon, Chirang (Assam)	9.6	9.6	9.6	30
23.	IARI, RS, Pusa, Samastipur (Bihar)	10	10	10	16
24.	KVK, Sokhodeora, Nawadah (Bihar)	6	6	6	6
25.	KVK, RAU, Hariharpur, Vaishali (Bihar)	9.6	9.6	9.6	13
26.	KVK, Adhaura, Kaimur, Bhabua (Bihar)	7.2	7.2	7.2	18
27.	KVK, Chanpura-Basaith, Madhubani (Bihar)	4.8	4.8	4.8	12
28.	KVK (RAU), Pipra Kothi, East Champaran (Bihar)	7.2	7.2	7.2	18
29.	KVK (RAU), Madhopur, West Champaran (Bihar)	7.2	7.2	7.2	23
30.	BAU, Kanke, Ranchi (Jharkhand)	8	8	8	20
31.	KVK, Morabadi, Ranchi (Jharkhand)	10	10	10	25
32.	KVK, BAU, West Singhbhum (Jharkhand)	8	8	8	20
	NWPZ				
33.	KVK (CSKHPKV), Una (HP)	4.8	4.8	4.8	10
34.	KVK (SKUAST-Jammu), Rajhani, Kathua, Jammu (J&K)	10	10	10	25
35.	PAU, Ludhiana (Punjab)	10	10	10	25
36.	PAU, RRS, Gurdaspur (Punjab)	7.2	7.2	7.2	18
37.	KVK, Haveli Kalan, Rupnagar (Punjab)	6	6	6	12
38.	KVK, Usman, Amritsar (Punjab)	6	6	6	13
39.	RBS College, Bichpuri, Agra (UP)	6	6	6	15
40.	KVK, Baghara, Muzaffarnagar (UP)	6	6	6	15
41.	ZARS, Nagina, Bijnor (UP)	4.8	4.8	4.8	12
42.	KVK, Khajuri Bagh, New Gopal Nagar, Saharanpur,UP	4.8	4.8	4.8	12
43.	ICAR-IIFSR, Modipuram, Meerut (UP)	7.2	Not conducted	-	-
44.	Amity Centre for Extension Services, Noida (UP)	6	6	6	15
45.	GBPUA&T, Pantnagar, USNagar (Uttarakhand)	7.2	7.2	7.2	18
46.	CATAT, IARI, New Delhi	7.2	7.2	7.2	18
47.	KVK (NHRDF), Ujwa, New Delhi	7.2	7.2	7.2	18
48.	ICAR-IIWBR, Karnal (Haryana)	8	8	8	20
49.	ICAR-CSSRI, Karnal (Haryana)	7.2	7.2	7.2	18
50.	CCSHAU, Hisar (Haryana)	6	6	6	15
51.	KVK, Bhiwani (Haryana)	4.8	4.8	4.8	12
52.	KVK, Tepla, Ambala (Haryana)	4.8	4.8	4.8	12
53.	KVK, Peoda Road, Kaithal (Haryana)	4.8	4.8	4.8	12
54.	RARI, SKNAU, Durgapura, Jaipur (Rajasthan)	5.6	5.6	5.6	14
55.	KVK, Ajmer (Rajasthan)	4.8	4.8	4.8	12
56.	KVK, Banasthali Vidyapeeth, District-Tonk (Rajasthan)	4.8	4.8	4.8	12
57.	ARS (RAU), Sriganganagar (Rajasthan)	4.8	4.8	4.8	12
	CZ				
58.	RCOA (MPUA&T), Udaipur (Rajasthan)	7.2	7.2	7.2	18

S.No.	Name of Centre	WFLDs Allotted (1WFLD = 1Ha)	WFLDs Conducted (1 Ha basis)	Area Sown (Ha)	No. of Farmers/ Locations
59.	ARS, MPUA&T, Banswara (Rajasthan)	6.4	6.4	6.4	16
60.	ARS, MPUA&T, Kota (Rajasthan)	7.2	Not conducted	-	-
61.	KVK, Sawai Madhopur (Rajasthan)	4.8	Not conducted	-	-
62.	WRS, JAU, Junagarh (Gujarat)	10	6	6	15
63.	MWRS, SDAU, Vijapur, Mehsana (Gujarat)	10	8	8	20
64.	JNKVV, Jabalpur (MP)	10	10	10	10
65.	IARI, RWRS, Indore (MP)	10	10	11.8	26
66.	KVK (JNKVV), Purushottampur, Panna (MP)	7.2	7.2	7.2	14
67.	KVK, Kalukhera Shiksha Samiti, Kalukhera, Ratlam (MP)	10	10	10	25
68.	KVK (RVSKVV), Pipersama, Neemuch(MP)	4.8	4.8	4.8	12
69.	KVK (RVSKVV),COH, Mandsour (MP)	4.8	4.8	5.2	13
70.	KVK (RVSKVV), MLNagar, Ujjain (MP)	8	Not conducted	-	-
71.	KVK (RVSKVV), Budhapura, Lahar, Bhind(MP)	4.8	Not conducted	-	-
72.	KVK, RRS, IGKVV, Jagdalpur, Bastar (CG)	7.2	7.2	7.2	18
73.	IGAU, RARS, Sarkanda, Bilaspur (CG)	10	10	10	25
	PZ				
74.	PDKV, Akola (Maharashtra)	10	10	10	25
75.	ARS, Niphad, Nasik (Maharashtra)	10	10	10	25
76.	MAU, Parbhani (Maharashtra)	10	9.6	9.6	24
77.	ARI, MACS, Pune (Maharashtra)	10	10	10	25
78.	UAS, Dharwad (Karnataka)	20	17.2	17.2	43
79.	BIRDS KVK, Tukkanatti, Belagavi (Karnataka)	10	10	10	25
	SHZ				
80.	IARI, RS, Wellington (Tamil Nadu)	20	17.6	17.6	32
Total		**600**	**555.2**	**564.58**	**1529**

** Area covered more than allotted which is restricted to area equal to allotted FLDs.*

The reasons for not achieving the target were non-availability of newly released wheat varieties (NRWVs) (3-5 years old) seed at local level and non-availability of NRWVs seed in time with the National Seeds Corporation (NSC) recommended for CZ. The wheat FLDs data received from the cooperating centers which were not reported properly as per FLDs guidelines were not included for analysis.

Table 2a: State wise distribution of wheat FLDs during *rabi* 2017-18 (Acres)

State	Allotted (1WFLD=1Acre)	Conducted (1 Acres basis)	Area sown (Acres)	No. of farmers/ locations
Uttarakhand	38	38	38	148
HP	99	99	99.1	119
J&K	51	51	51	51
Manipur	5	5	5	2
UP	192	174	174	172
West Bengal	50	50	67	79
Assam	91	88	88.85	133
Bihar	130	130	130	106
Jharkhand	65	65	65	65
Punjab	73	73	73	68

State	Allotted (1WFLD=1Acre)	Conducted (1 Acres basis)	Area sown (Acres)	No. of farmers/ locations
New Delhi	36	36	36	36
Haryana	89	89	89	89
Rajasthan	114	84	84	84
Gujarat	50	35	35	35
MP	149	117	122.5	100
Chhattisgarh	43	43	43	43
Maharashtra	100	99	99	99
Karnataka	75	68	68	68
Tamil Nadu	50	44	44	32
Total	**1500**	**1388**	**1411.45**	**1529**

Table 2b: State wise distribution of Wheat FLDs during Rabi 2017-18 (Hectares)

S.N.	State	WFLDs Allotted (1WFLD = 1Ha)	WFLDs Conducted (1 Ha basis)	Area Sown (Ha)	No. of Farmers/ Locations
1.	Uttarakhand	15.2	15.2	15.2	148
2.	HP	39.6	39.6	39.64	119
3.	J&K	20.4	20.4	20.4	51
4.	Manipur	2	2	2	2
5.	UP	76.8	69.6	69.6	172
6.	West Bengal	20	20	26.8	79
7.	Assam	36.4	35.2	35.54	133
8.	Bihar	52	52	52	106
9.	Jharkhand	26	26	26	65
10.	Punjab	29.2	29.2	29.2	68
11.	New Delhi	14.4	14.4	14.4	36
12.	Haryana	35.6	35.6	35.6	89
13.	Rajasthan	45.6	33.6	33.6	84
14.	Gujarat	20	14	14	35
15.	MP	59.6	46.8	49	100
16.	Chhattisgarh	17.2	17.2	17.2	43
17.	Maharashtra	40	39.6	39.6	99
18.	Karnataka	30	27.2	27.2	68
19.	Tamil Nadu	20	17.6	17.6	32
	Total	**600**	**555.2**	**564.58**	**1529**

Table 3a: Zonewise distribution of wheat FLDs during *rabi* 2017-18 (Acres)

S. N.	Zone	WFLDs allotted (1 WFLD = 1Acre)	WFLDs conducted (1 Acre basis)	Area sown (Acre)	No. of farmers/ locations
1.	NHZ	138	138	138.1	267
2.	NEPZ	441	438	455.85	486
3.	NWPZ	390	372	372	365
4.	CZ	306	229	234.5	212
5.	PZ	175	167	167	167
6.	SHZ	50	44	44	32
Total		**1500**	**1388**	**1411.45**	**1529**

Table 3b:Zone wise distribution of Wheat FLDs during Rabi 2017-18 (Hectares)

S.N.	Zone	WFLDs Allotted (1WFLD = 1Ha)	WFLDs Conducted (1 Ha basis)	Area Sown (Ha)	No. of Farmers/ Locations
1.	**NHZ**	55.2	55.2	55.24	267
2.	**NEPZ**	176.4	175.2	182.34	486
3.	**NWPZ**	156	148.8	148.8	365
4.	**CZ**	122.4	91.6	93.8	212
5.	**PZ**	70	66.8	66.8	167
6.	**SHZ**	20	17.6	17.6	32
	Total	**600**	**555.2**	**564.58**	**1529**

Table 4: Centre wise performance of improved wheat varieties during *rabi* 2017-18

Zone & Centre	Improved varieties/FLD Mean yield (q/ha)	Check varieties Mean yield (q/ha)	% Gain
NHZ			
Almora	31.28	22.25	40.58***
Bajaura, Kullu	32.99	27.47	20.09 NS
Malan, Kangra	35.22	30.72	14.65***
Dhaulakuan, Sirmour	36.89	31.44	17.33***
Tutikandi, Shimla	35.58	32.00	11.19 NS
Khudwani, Anantnag	31.50	25.14	25.30***
Hamirpur	34.30	26.77	28.13***
Bilaspur	28.46	19.43	46.47***
ICAR-IIWBR, Shimla	29.80	24.60	21.14***
Tandwal-Rajouri	27.93	22.57	23.75***
NEPZ			
Faizabad	49.31	41.44	18.99***
Kanpur	41.12	39.36	04.47**
Varanasi	42.28	31.72	33.29***
Sohna, Sidharthnagar	47.12	42.72	10.30***
Sultanpur	47.96	40.08	19.66***
Kalyani, Nadia	41.06	27.40	49.85***
Pundibari, Coochbehar	33.86	28.90	17.16***
Shillongani	25.46	20.51	24.13***
Dhubri	25.92	19.54	32.65***
Sonitpur	19.90	11.50	73.04 NS
Chirang	22.31	17.31	28.89***
Pusa, Samastipur	46.37	38.53	20.35***
Nawada	45.92	43.00	06.79***
Vaishali	46.50	35.60	30.62 NS
Kaimur, Bhabua	39.18	31.56	24.14***
Madhubani	32.20	25.57	25.93***
East Champaran	43.59	34.20	27.46***
West Champaran	41.39	39.39	05.08**
Kanke, Ranchi	34.77	20.13	72.73***
Morabadi, Ranchi	40.52	31.72	27.74***
West Singhbhum	30.15	31.72	-04.95**
Imphal-Manipur	17.50	-	-
NWPZ			
Una	40.65	34.15	19.03***
Kathua-Jammu	51.63	37.53	37.57***
Ludhiana	56.84	55.39	02.62***
Gurdaspur	51.14	48.24	06.01***
Ropar	52.25	51.82	00.83 NS
Amritsar	44.18	49.80	-11.29***
Agra	46.80	45.88	02.01 NS
Muzaffarnagar	45.10	39.97	12.83***
Bijnor	50.18	38.95	28.83***
Saharanpur	54.56	43.78	24.62***
Noida	50.96	47.45	07.40***
Pantnagar	55.15	55.89	-01.32
IARI, New Delhi	47.25	44.26	06.76 NS
KVK, Ujwa, Delhi	48.34	44.20	09.37***
IIWBR, Karnal	53.85	52.77	02.05***
CSSRI, Karnal	40.05	38.14	05.01**
Hisar	48.20	47.47	01.54 NS
Bhiwani	52.58	46.65	12.71***
Ambala	45.17	49.38	-08.53**
Kaithal	54.13	52.33	03.44***

Zone & Centre	Improved varieties/FLD Mean yield (q/ha)	Check varieties Mean yield (q/ha)	% Gain
Durgapura, Jaipur	56.04	49.25	13.79***
Ajmer	59.88	50.83	17.80***
Banasthali Tonk	51.17	49.42	03.54 NS
Sriganganagar	47.22	44.59	05.90 NS
CZ			
Udaipur	43.50	40.78	06.67***
Banswara	44.13	40.38	09.29***
Junagarh	54.08	48.08	12.48***
Vijapur, Mehsana	47.01	40.93	14.85***
Jabalpur	51.70	48.80	05.94 NS
Indore	56.29	41.57	35.41***
Panna	41.80	33.71	24.00***
Ratlam	44.02	35.30	24.70***
Neemuch	65.06	50.70	28.32***
Mandsaur	48.62	35.23	38.01***
Jagdalpur, Bastar	32.16	25.37	26.76***
Sarkanda, Bilaspur	39.88	35.21	13.26***
PZ			
Akola	28.66	23.38	22.58***
Niphad, Nashik	45.04	38.91	15.75***
Parbhani	43.55	34.71	25.47***
Pune	42.16	36.45	15.67***
Dharwad	27.08	22.52	20.25**
Belagavi	27.08	22.16	22.20***
SHZ			
Wellington	36.18	-	-

*** Significant at 1 percent level, ** Significant at 5 percent level, * Significant at 10 percent level, NS– Non-significant

Centre wise yield gain over check at different centres in different wheat growing zones is given in Table 4. The significant yield gain in NHZ was 46.47% per cent at Bilaspur centre followed by Almora (40.58%), Hamirpur (28.13%), Khudwani Anantnag (25.30%), Tandwal Rajouri (23.75%), ICAR-IIWBR Shimla (21.14%), Dhaulakuan Sirmour (17.33 %), and Malan Kangra (14.65%). In NEPZ, the yield gain varied from 04.47 per cent at Kanpur to 72.73 per cent at Kanke Ranchi. The maximum yield gain due to improved wheat varieties was 72.73 % at Kanke Ranchi followed by 49.85 % at Kalyani, 33.29% at Varanasi, 32.65% at Dhubri, 28.89% at Chirang, 27.74% at Morabadi Ranchi, 27.46% at East Champaran, 25.93% at Madhubani, 24.14% at Kaimur Bhabhua, 24.13% at Shillongani and 20.35% at Pusa Samastipur. In NWPZ, the significant highest yield gain was at Kathua Jammu (37.57 %) followed by Bijnor (28.83%), Saharanpur (24.62%), Una (19.03%), Ajmer (17.80 %), Durgapura Jaipur (13.79 %) and Muzaffarnagar (12.83%). In CZ, the highest significant yield gain was recorded at Mandsaur (38.01 %), followed by Indore (35.41%), Neemach (28.32%), Jagdalpur Bastar (26.76 %), Ratlam (24.70 %), Panna (24.00 %) and Vijapur (14.85%). In PZ, the highest significant yield gain of 25.47, 22.58, 22.20, 20.25, 15.75 and 15.67 per cent was recorded at Parbhani, Akola, Belagavi, Dharwad, Niphad Nasik and Pune centers, respectively. In SHZ, the average yield of improved varieties under WFLDs was 36.18 q/ha at Wellington center.

Table 5: State wise performance of improved wheat varieties during *rabi* 2017-18

State	Mean yield (q/ha)		% Gain
	Improved	Check	
Uttarakhand	34.18	26.34	29.76***
HP	34.60	28.79	20.18***
J&K	39.05	29.69	31.53***
UP	46.67	40.59	14.98***
West Bengal	38.20	28.00	36.43***
Assam	24.88	19.12	30.13***
Bihar	41.21	33.58	22.72***
Jharkhand	35.46	27.18	30.46***
Punjab	51.89	51.74	00.29NS
Delhi	47.79	44.23	08.05***
Haryana	48.22	46.95	02.71NS
Rajasthan	49.67	45.33	09.57***
Gujarat	50.04	43.99	13.75***
MP	49.13	39.00	25.97***
Chhattisgarh	37.24	31.84	16.96***
Maharashtra	39.81	33.35	19.37***
Karnataka	27.61	22.23	24.20***
Tamil Nadu	36.18	-	-
Manipur	17.50	-	-

*** Significant at 1 percent level, ** Significant at 5 percent level, * Significant at 10 percent level, NS–Non-significant

Statewise yield gain over check in different states is given in Table 5. All the improved varieties for different production conditions (timely sown, late sown, rainfed) have been included while calculating the yield gain over check/regional yield). The maximum yield gain was observed in West Bengal (36.43%) followed by J&K (31.53%), Jharkhand (30.46%), Assam (30.13%), Uttarakhand (29.76%), MP (25.97%), Karnataka (24.20%), Bihar (22.72%), HP (20.18%), Maharashtra (19.37%), Chhattisgarh (16.96%), UP (14.98%), Gujarat (13.75%), Rajasthan (09.57%) and Delhi (08.05%).

Table 6: Performance of improved timely sown wheat varieties during *rabi* 2017-18

Zone & Centre	Improved varieties	Mean yield (q/ha)	Check varieties	Mean yield (q/ha)	% Gain
NHZ					
Almora	VL 953	31.28	Local	22.25	40.58***
Bajaura	HS 562	36.15	HPW 155	30.32	19.23 NS
Bajaura	HS 562	26.67	HS 507	21.76	22.56 NS
Malan Kangra	HS 562	33.08	HPW 155	29.08	13.76***
Malan Kangra	HS 562	36.68	HPW 349	31.84	15.20***
Bilaspur	HS 562	28.46	HPW 155	19.43	46.47***
Dhaulakuan Sirmour	HS 562	37.75	HD 2380	31.50	19.84**
Dhaulakuan Sirmour	HS 562	37.00	HPW 236	33.00	12.12 NS
Dhaulakuan Sirmour	HS 562	35.67	Sonalika	30.33	17.61*
Tutikandi Shimla	HS 562	33.20	HPW 155	29.00	14.48***
Tutikandi Shimla	HS 562	25.50	VL 907	24.00	06.25 NS
Tutikandi Shimla	HS 562	42.00	WH 1080	38.20	09.95 NS
IIWBR, Shimla	HS 562	29.80	Local	24.60	21.14***
Khudwani Anantnag	HS 562	31.50	SW 2	25.14	25.30***

Zone & Centre	Improved varieties	Mean yield (q/ha)	Check varieties	Mean yield (q/ha)	% Gain
Tandwal Rajouri	HS 562	26.84	Raj 3077	19.92	34.74***
Tandwal Rajouri	HS 562	31.22	VL 907	30.53	02.26 NS
Hamirpur	HS 562	34.30	VL 907	26.77	28.13***
Imphal	HS 562	17.50	Local	-	
NEPZ					
Faizabad	HD 2967	48.25	PBW 343	39.50	22.15***
Varanasi	HD 2967	42.28	HUW 468	31.72	33.29***
Siddharthnagar	HD 2967	47.13	PBW 343	43.12	09.30***
Siddharthnagar	HD 2967	47.10	PBW 343	41.88	12.46***
Sultanpur	HD 2967	47.96	PBW 343	40.08	19.66***
Kalyani	HD 2967	40.44	PBW 343	27.89	45.00***
Kalyani	HD 2967	41.91	UP 262	26.73	56.79***
Shillongani	HD 2967	26.22	Sonalika	20.32	29.04***
Dhubri	HD 2967	25.92	Sonalika	19.54	32.65***
Sonitpur	HD 2967	19.90	Sonalika	11.50	73.04 NS
Chirang	HD 2967	22.31	Sonalika	17.31	28.89***
Pusa, Samastipur	HD 2967	46.34	HD 2733	38.36	20.80***
Pusa, Samastipur	HD 2967	46.42	PBW 343	38.79	19.67**
Nawada	HD 2967	45.92	HD 2733	43.00	06.79***
Vaishali	HD 2967	46.50	Lok-1	35.60	30.62 NS
Kaimur, Bhabua	HD 2967	39.18	PBW 502	31.56	24.14***
Madhubani	HD 2967	32.20	PBW 343	25.57	25.93***
Kanke, Ranchi	HD 2967	34.77	Sonalika	20.13	72.73***
Morabadi	HD 2967	40.52	UP 262	31.72	27.74***
West Singhbhum	HD 2967	30.15	K 9107	27.13	11.13***
Piprakothi	HD 2967	43.59	UP 262	34.00	28.21***
NWPZ					
Una	WB 2	41.00	HD 3086	35.20	16.48***
Una	HPBW 01	40.30	HD 2967	33.10	21.75***
Kathua	HPBW 01	51.63	HD 2967	37.33	38.31***
Gurdaspur	HPBW 01	50.75	HD 2967	45.88	10.61*
Gurdaspur	HPBW 01	51.67	HD 3086	48.33	06.91 NS
Gurdaspur	HPBW 01	51.33	PBW 723	49.33	04.05**
Gurdaspur	HPBW 01	51.00	HD 3086	50.00	02.00 NS
Gurdaspur	WB 2	51.00	PBW 725	52.00	-01.92 NS
Amritsar	HPBW 01	44.73	HD 3086	50.00	-10.54***
Amritsar	WB 2	44.51	HD 3086	49.50	-10.08***
Agra	HPBW 01	49.00	HD 2967	49.75	-01.51 NS
Agra	HPBW 01	49.00	PBW 502	45.00	08.89 NS
Agra	WB 2	50.00	HD 2967	50.00	00.00 NS
Agra	WB 2	48.00	PBW 502	44.00	09.09 NS
Muzaffarnagar	WB 2	47.90	PBW 502	41.20	16.26***
Muzaffarnagar	HPBW 01	47.75	PBW 502	40.98	16.52***
Nagina Bijnor	WB 2	49.48	PBW 226	39.21	26.19***
Nagina Bijnor	HPBW 01	40.67	PBW 226	38.76	04.93***
Saharanpur	HPBW 01	54.76	PBW 226	44.61	22.75***
Saharanpur	WB 2	54.32	PBW 226	42.60	27.51***
Noida	HD 3086	49.98	HD 2967	46.15	08.30***
Noida	WB 2	50.92	HD 2967	48.30	05.42**
Noida	HPBW 01	51.98	HD 2967	47.90	08.52**
Pantnagar	HPBW 01	60.63	HD 3086	59.75	01.47 NS
Ujwa, New Delhi	HPBW 01	48.02	WH 711	44.20	08.64***
Ujwa, New Delhi	WB 2	49.18	WH 711	44.20	11.27***
Ambala	HPBW 01	46.17	HD 2967	48.96	-05.70NS
Ambala	WB 2	44.17	HD 2967	49.79	-11.29*
Kaithal	HPBW 01	54.00	HD 2967	52.33	03.19*

Zone & Centre	Improved varieties	Mean yield (q/ha)	Check varieties	Mean yield (q/ha)	% Gain
Kaithal	WB 2	54.25	HD 2967	52.33	03.67**
Durgapura	HPBW 01	57.10	Raj 4079	50.10	13.97***
Durgapura	HD 3086	54.88	Raj 4079	48.88	12.27***
Durgapura	WB 2	55.90	Raj 4079	48.70	14.78***
Ajmer	HD 3086	64.63	Raj 3077	51.50	25.50***
Ajmer	HPBW 01	63.63	Raj 4037	52.50	21.20***
Ajmer	WB 2	51.38	Raj 4079	48.50	05.94***
Tonk	HD 3086	52.33	Raj 4120	50.67	03.28NS
Tonk	HPBW 01	49.75	Raj 3077	49.75	00.00NS
Tonk	WB 2	49.33	Raj 1482	46.00	07.24**
Tonk	WB 2	55.00	Raj 3077	52.00	05.77 NS
Sriganganagar	HD 3086	55.00	HD 2967	52.00	05.77 NS
Sriganganagar	HD 3086	43.40	Raj 3077	40.05	08.36 NS
Sriganganagar	HPBW 01	51.50	HD 2967	47.25	08.99 NS
Sriganganagar	WB 2	40.95	HD 2967	40.50	01.11 NS
CZ					
Vijapur	GDW 1255 (d)	42.46	GW 496	39.17	08.40**
Junagarh	GW 463	54.08	Lok-1	48.08	12.48***
Vijapur	GW 451	46.29	GW 496	39.95	15.87***
Jabalpur	MP 3382	51.70	GW 322	48.80	05.94 NS
Indore	HD 4728 (d)	66.00	HI 8498	47.50	38.95 NS
Indore	HI 8713 (d)	63.50	HI 8498(d)	48.00	32.29 NS
Indore	HI 8737 (d)	72.50	HI 8498(d)	52.00	39.42**
Indore	HI 8759 (d)	68.00	HI 8498 (d)	44.00	54.55 NS
Indore	HI 8777 (d)	42.00	HI 8498(d)	35.00	20.00 NS
Panna	HI 8759 (d)	40.99	Sujata	31.98	28.17***
Neemach	DBW 110	65.06	WH 147	50.70	28.32***
Mandsour	HI 8737 (d)	48.62	Lok-1	35.23	38.01***
Jagdalpur Bastar	HI 8713 (d)	30.49	GW 273	22.14	37.71***
Bilaspur	DBW 110	40.40	HI 1500	36.42	10.93**
Bilaspur	DBW 110	39.77	HW 2004	34.91	13.92***
Bilaspur	DBW 110	39.56	Sujata	34.46	14.80***
PZ					
Akola	MACS 3949 (d)	28.47	Lok-1	22.50	26.53***
Akola	HI 1605	28.95	Lok-1	24.70	17.21***
Niphad	HI 1605	44.39	Ajay 72	39.09	13.56***
Niphad	MACS 3949 (d)	44.03	GW 496	38.34	14.84***
Parbhani	HI 1605	43.54	HD 2189	34.43	26.46***
Parbhani	HI 1605	46.06	Lok-1	34.40	33.90***
Parbhani	HI 1605	44.50	NIAW 301	34.75	28.06***
Parbhani	NIAW 1994	41.50	Lok-1	35.13	18.13***
Pune	HI 1605	38.86	MACS 6222	34.17	13.73***
Pune	MACS 6478	50.65	MACS 6222	40.50	25.06***
Pune	HW 1098 (dic.)	47.50	MACS 2971 (dic.)	45.00	05.56 NS
Pune	MACS 3949 (d)	40.98	MACS 3125(d)	35.90	14.15***
Dharwad	HI 1605	22.25	DWR 162	19.61	13.46***
Dharwad	UAS 304	40.34	DWR 162	35.64	13.19***
Dharwad	UAS 347	17.52	Local	14.02	24.96***
Dharwad	MACS 3949 (d)	41.25	UAS 415(d)	32.00	28.91**
Dharwad	UAS 446 (d)	16.11	B. Yellow (d)	13.80	16.74**
Dharwad	UAS 446 (d)	39.10	DWR 162	32.20	21.43 NS
Belagavi	HI 1605	27.08	DWR 162	22.16	22.20***
SHZ					
Wellington	HW 1098 (dic.)	35.69	-	-	-
Wellington	HW 5207 (CoW 3)	38.00	-	-	-

*** Significant at 1 percent level, ** Significant at 5 percent level, * Significant at 10 percent level, NS– Non-significant

The variety wise mean yield data has revealed that variety HS 562 gave significantly higher yield (37.75 q/ha) at Dhaulakuan Sirmour center in NHZ (Table 6). In NEPZ, the highest significant average yield was recorded by HD 2967 at Faizabad (48.25 q/ha) followed by the same variety at Sultanpur (47.96 q/ha) and Sidharthnagar (47.13 q/ha) centres. In NWPZ, the highest significant average yield was recorded by HD 3086 at Ajmer (64.63 q/ha) followed by HPBW 01 (63.63 q/ha) at the same centre. HPBW 01 yielded 60.63 q/ha at Pantnagar centre. In CZ, HI 8737 (d) gave highest significant average yield of 72.5 q/ha at Indore centre followed by HI 8759 (d) (68.00 q/ha) at the same centre. DBW 110 gave significantly higher yield (65.06 q/ha) at Neemach center. In PZ, MACS 6478 gave highest significant yield (50.65 q/ha) at Pune centre followed by 47.50 q/ha by HW 1098 (dic.) at the same centre. At Wellington centre of SHZ, HW 5207 (CoW3) variety recorded the average yield of 38.0 q/ha followed by HW 1098 (dic.) (35.69 q/ha).

Table 7: Performance of improved late sown wheat varieties during *rabi* 2017-18

Zone & Centre	Improved varieties	Mean yield (q/ha)	Check varieties	Mean yield (q/ha)	% Gain
NWPZ					
Muzaffarnagar	DBW 71	41.02	PBW 590	38.31	07.07**
CZ					
Udaipur	Raj 4238	43.42	Lok-1	40.67	06.76***
Udaipur	Raj 4238	43.67	Raj 3765	41.00	06.51**
Banswara	Raj 4238	44.13	Raj 4037	40.38	09.29***
Panna	RVW 4106	42.13	Lok-1	34.40	22.47***
Ratlam	Raj 4238	44.02	Lok-1	35.30	24.70***
PZ					
Niphad	NIAW 1994	41.20	GW 496	33.80	21.89***
Niphad	NIAW 1994	49.19	Green Gold 71	40.27	22.15***
Niphad	NIAW 1994	46.39	Ajay 72	40.38	14.88*
Pune	HD 3090	37.00	NIAW 34	34.08	08.57 NS

The late sown varieties mean yield data revealed that variety DBW 71 gave significantly higher yield (41.02 q/ha) at Muzaffarnagar center in NWPZ (Table 7). In CZ, the significant average yield was recorded by Raj 4238 (44.13 q/ha) at Banswara, 44.02 q/ha at Ratlam and 43.67 q/ha at Udaipur center. In PZ, NIAW 1994 gave significant higher yield (49.19 q/ha) at Niphad center.

Table 8a: Zone wise productivity under FLDs over regional during *rabi* 2017-18

Zone	Mean yield (q/ha)		% Gain
	WFLDs	Regional	
NHZ	32.02	23.95	33.70***
NEPZ	36.39	27.33	33.15***
NWPZ	50.13	43.85	14.32***
CZ	45.97	33.34	37.88***
PZ	34.63	25.38	36.45***
SHZ	36.18	-	

*** Significant at 1 percent level

The yield gain due to improved varieties over regional mean yield was highest in CZ (37.88 %) followed by PZ (36.45%), NHZ (33.70%), NEPZ (33.15 %) and NWPZ (14.32 %) (Table 8a). It is clear from table 8a that there was a significant yield gain in all the zones under wheat FLDs, which ranged from 14.32% in north western plains zone to 37.88% in central zone.

Table 8b: Zone wise productivity under FLDs over check during *rabi* 2017-18

Zone	Mean yield(q/ha)		% Gain
	WFLDs	Check	
NHZ	32.02	24.67	29.79***
NEPZ	36.39	29.36	23.94***
NWPZ	50.13	46.78	07.16***
CZ	45.97	38.77	18.57***
PZ	34.63	28.88	19.91***
SHZ	36.18	-	

*** Significant at 1 percent level

The yield gain due to improved varieties over check was highest in NHZ (29.79%) followed by NEPZ (23.94 %), PZ (19.91%), CZ (18.57%) and NWPZ (07.16 %) (Table 8b). Yield gap in the NEPZ and CZ need to be bridged if India has to meet its ever increasing food requirements. The concerted efforts made by the developmental agencies in NEPZ will help in bridging the yield gap and increasing wheat productivity to meet the ever increasing requirement. Across all zones demonstrated varieties has shown yield superiority over check varieties and it ranged from 07.16% in NWPZ to 29.79% in NHZ.

Table 9: Highest yield attained by wheat variety in various zones during rabi 2017-18

Zone	Centre	Variety	Yield (q/ha)
NHZ	Tutikandi Shimla	HS 562	45.00
NEPZ	Siddharthnagar	HD 2967	56.80
NWPZ	Ajmer	HD 3086	70.00
CZ	Indore	HI 8759 (d)	76.00
PZ	Niphad Nashik	NIAW 1994	53.85
SHZ	Wellington	HW 1098 (dicoccum)	46.00

The location specific highest varietal yield (Table 9) attained in a zone were; HI 8759 (d) (76.00 q/ha) at Indore centre in CZ, HD 3086 (70.00 q/ha) at Ajmer in NWPZ, HD 2967 (56.80 q/ha) at Siddharthnagar in NEPZ, NIAW 1994 (53.85 q/ha) at Niphad Nashik in PZ, HW 1098 (dic.) (46.00 q/ha) in SHZ and HS 562 (45.00 q/ha) at Tutikandi Shimla in NHZ (Table 9).

Table 10: Yield gain through bio-fertilizer during *rabi* 2017-18

Zone & Centre	100 % Inorganic + Bio-fertilizer (Azotobactor+PSB)		100 % Inorganic fertilizer		% Gain
	Variety	Mean yield (q/ha)	Variety	Mean yield (q/ha)	
NEPZ					
Faizabad	HD 2967	53.43	HD 2967	42.00	27.21***
Faizabad	HD 2967	46.00	HD 2967	40.00	15.00 NS
Shillongani	HD 2967	23.93	HD 2967	20.68	15.72***
NWPZ					
Agra	HD 3086	46.40	HD 3086	44.60	04.04**
Pantnagar	HD 3086	63.38	HD 3086	62.43	01.52 NS
IARI, New Delhi	HD 3086	54.05	HD 3086	51.43	05.09 NS
IARI, New Delhi	HD 3086	44.89	HD 3086	41.60	07.91 NS
IARI, New Delhi	WB 2	47.88	WB 2	45.50	05.23*
IIWBR, Karnal	HPBW 01	52.50	HPBW 01	51.50	01.94 NS
Hisar	HPBW 01	48.50	HPBW 01	47.00	03.19 NS
Hisar	WB 2	47.25	WB 2	45.50	03.85**
Bhiwani	HPBW 01	53.60	HPBW 01	46.10	16.27***
Bhiwani	WB 2	54.00	WB 2	47.30	14.16**
CZ					
Vijapur	GDW 1255 (d)	41.50	GDW 1255 (d)	37.50	10.67 NS
Vijapur	GW 451	51.96	GW 451	46.04	12.86 NS
Jagdalpur Bastar	HI 8713 (d)	34.85	HI 8713 (d)	30.54	14.11***

*** Significant at 1 percent level, ** Significant at 5 percent level, * Significant at 10 percent level, NS– Non-significant

FLDs on bio-fertilizer (Azotobactor & PSB) along with 100 % inorganic fertilizer as compared to check (100% recommended dose of inorganic fertilizer) showed that the significant yield gain was 27.21% at Faizabad and 15.72% at Shillongani in NEPZ. In NWPZ, 16.27% yield gain at Bhiwani centre was recorded. In CZ 14.11% yield gain was recroded at Jagdalpur, Bastar.

Table 11: Performance of improved durum/dicoccum varieties during *rabi* 2017-18

Zone & Center	Improved variety	Mean yield (q/ha)	Check variety	Mean yield (q/ha)	% Gain
CZ					
Vijapur	GDW 1255 (d)	42.46	GW 496	39.17	08.40**
Indore	HD 4728 (d)	66.00	HI 8498	47.50	38.95 NS
Indore	HI 8713 (d)	63.50	HI 8498(d)	48.00	32.29 NS
Indore	HI 8737 (d)	72.50	HI 8498(d)	52.00	39.42**
Indore	HI 8759 (d)	68.00	HI 8498 (d)	44.00	54.55 NS
Indore	HI 8777 (d)	42.00	HI 8498(d)	35.00	20.00 NS
Panna	HI 8759 (d)	40.99	Sujata	31.98	28.17***
Mandsour	HI 8737 (d)	48.62	Lok-1	35.23	38.01***
Jagdalpur Bastar	HI 8713 (d)	30.49	GW 273	22.14	37.71***
PZ					
Akola	MACS 3949 (d)	28.47	Lok-1	22.50	26.53***
Niphad	MACS 3949 (d)	44.03	GW 496	38.34	14.84***
Pune	HW 1098 (dic.)	47.50	MACS 2971 (dic.)	45.00	05.56 NS
Pune	MACS 3949 (d)	40.98	MACS 3125(d)	35.90	14.15***
Dharwad	MACS 3949 (d)	41.25	UAS 415(d)	32.00	28.91**
Dharwad	UAS 446 (d)	16.11	B. Yellow (d)	13.80	16.74**
Dharwad	UAS 446 (d)	39.10	DWR 162	32.20	21.43 NS
SHZ					
Wellington	HW 1098 (dic.)	35.69	-	-	-

*** Significant at 1 percent level, ** Significant at 5 percent level, * Significant at 10 percent level, NS– Non-significant

In case of improved durum varieties, the variety HD 8737 (d) gave a significant average yield of 72.50 q/ha followed by HI 8759 (d) (68.00 q/ha) at Indore centre in CZ. In PZ, the variety HW 1098 (*dic.*) gave an average yield of 47.50 q/ha at Pune center, though it was non-significant (Table 11).

Table 12: Performance of improved varieties under rainfed/restricted irrigation conditions

Zone & Center	Improved variety	Mean yield (q/ha)	Check variety	Mean yield (q/ha)	% Gain
NHZ					
Almora	VL 953	31.28	Local	22.25	40.58***
Bajaura	HS 562	36.15	HPW 155	30.32	19.23 NS
Bajaura	HS 562	26.67	HS 507	21.76	22.56 NS
Malan Kangra	HS 562	33.08	HPW 155	29.08	13.76***
Malan Kangra	HS 562	36.68	HPW 349	31.84	15.20***
Tutikandi Shimla	HS 562	33.20	HPW 155	29.00	14.48***
Tutikandi Shimla	HS 562	25.50	VL 907	24.00	06.25 NS
Tutikandi Shimla	HS 562	42.00	WH 1080	38.20	09.95 NS
Khudwani Anantnag	HS 562	31.50	SW 2	25.14	25.30***
Tandwal Rajouri	HS 562	26.84	Raj 3077	19.92	34.74***
Tandwal Rajouri	HS 562	31.22	VL 907	30.53	02.26 NS
Hamirpur	HS 562	34.30	VL 907	26.77	28.13***
CZ					
Neemuch	DBW 110	65.06	WH 147	50.70	28.32***
Bilaspur	DBW 110	40.40	HI 1500	36.42	10.93**
Bilaspur	DBW 110	39.77	HW 2004	34.91	13.92***
Bilaspur	DBW 110	39.56	Sujata	34.46	14.80***

Zone & Center	Improved variety	Mean yield (q/ha)	Check variety	Mean yield (q/ha)	% Gain
PZ					
Dharwad	UAS 446 (d)	16.11	B. Yellow (d)	13.80	16.74**
Dharwad	UAS 446 (d)	39.10	DWR 162	32.20	21.43 NS
SHZ					
Wellington	HW 5207 (CoW 3)	38.00	-	-	-

*** Significant at 1 percent level, ** Significant at 5 percent level, * Significant at 10 percent level, NS– Non-significant

In NHZ, at Malan Kangra, improved rainfed variety HS 562 yielded 36.68 q/ha which was significantly higher than the check varieties. The same variety gave significantly higher yield of 34.30 q/ha, 33.20 q/ha, 31.50 q/ha and 26.84 q/ha at Hamirpur, Tutikandi Shimla, Khudwani Anantnag and Tandwal Rajouri centres, respectively. VL 953 gave 31.28 q/ha at Almora centre. In CZ, DBW 110 gave yield of 65.06 q/ha at Neemach center which was significantly higher than the check variety followed by the same variety (40.40 q/ha) at Bilaspur center. In SHZ, HW 5207(CoW 3) yielded 38.0 q/ha at Wellington center (Table 12).

Table 13: Performance of zero tillage/happy seeder during *rabi* 2017-18

Zone & Centre	Technology	Improved varieties	Zero Tillage/ Happy Seeder mean yield (q/ha)	Check varieties	Conventional tillage mean yield (q/ha)	% Gain
NEPZ						
Faizabad	ZeroTillage	HD 2967	44.00	HD 2967	42.75	2.92 NS
Coochbehar	ZeroTillage	HD 2967	33.86	HD 2967	28.90	17.16***
Shillongani	ZeroTillage	HD 2967	24.50	HD 2967	21.17	15.73 NS
Madhopur	ZeroTillage	HD 2967	41.39	HD 2967	39.39	05.08**
NWPZ						
Ludhiana	ZeroTillage	PBW 677	57.67	PBW 677	56.47	02.13***
Ludhiana	Happy Seeder	PBW 725	56.75	PBW 725	55.70	01.89**
Rupnagar	Happy Seeder	HPBW 01	52.50	HPBW 01	51.98	01.00 NS
Rupnagar	Happy Seeder	WB 2	51.25	WB 2	51.17	00.16 NS
Agra	ZeroTillage	HPBW 01	43.50	HPBW 01	44.00	-01.14 NS
Agra	ZeroTillage	WB 2	46.00	WB 2	46.25	-00.54 NS
Pantnagar	ZeroTillage	HD 3086	54.90	HD 3086	56.81	-03.36***
Pantnagar	ZeroTillage	WB 2	44.75	WB 2	46.40	-03.56 NS
IARI, N. Delhi	ZeroTillage	HD 3086	52.60	HD 3086	49.75	05.73 NS
IARI, N.Delhi	ZeroTillage	HPBW 01	41.58	HPBW 01	39.30	05.80 NS
IARI, N.Delhi	ZeroTillage	WB 2	42.66	WB 2	38.89	09.69 NS
IIWBR, Karnal	Happy Seeder	HPBW 01	53.50	HPBW 01	52.38	02.14 NS
IIWBR, Karnal	Happy Seeder	WB 2	54.35	WB 2	53.29	01.99**
CSSRI, Karnal	Happy Seeder	KRL 210	40.05	KRL 210	38.14	05.01**
Hisar	ZeroTillage	HPBW 01	48.60	HPBW 01	48.40	00.41 NS
Hisar	Happy Seeder	HPBW 01	49.17	HPBW 01	48.33	01.74 NS
Hisar	Happy Seeder	WB 2	47.50	WB 2	48.00	-01.04 NS

*** Significant at 1 percent level, ** Significant at 5 percent level, * Significant at 10 percent level, NS– Non-significant

There was a significant yield gain of 17.16% at Coochbehar and 5.08% at Madhopur centres in NEPZ under zero tillage of wheat sowing. In NWPZ, FLD on zero tillage at Ludhiana gave a yield advantage of 2.13% under zero tillage technology. Demonstrations on Turbo Happy seeder gave 5.01% more yield at CSSRI Karnal and 1.99% more yield at IIWBR, Karnal centers in NWPZ. At majority of the centres the yield gain under zero tillage technology was non significant.

Table 14: Performance of rotavator during *rabi* 2017-18

Zone & Centre	Improved varieties	Rotavator mean yield (q/ha)	Conventional tillage mean yield (q/ha)	% Gain
NWPZ				
Ludhiana	PBW 677	56.50	54.15	04.34*
Pantnagar	HD 3086	63.00	62.65	00.56 NS
Pantnagar	HPBW 01	60.25	60.13	00.20 NS

** - Significant at 5 percent level, * Significant at 10 percent level, NS– Non-significant

The results presented in table 14 revealed that yield gain (4.34%) under rotavator technogy was significant at Ludhiana centre whereas it was non significant at Pantnagar centre.

Performance of salt tolerant varieties

The salt tolerant variety KRL 210 has shown its superiority in terms of yield over KRL 19 under wheat FLDs at CSSRI Karnal center (Table 15).

Table 15: Performance of salt tolerant varieties in NWPZ during *rabi* 2017-18

Zone & Center	Improved variety	Mean yield (q/ha)	Check variety	Mean yield (q/ha)	% Gain
CSSRI- Karnal (FLDs in Kaithal district)	KRL 210	40.05	KRL 19	38.14	05.01**

For effective and efficient use of water, demonstrations on sprinkler/drip irrigation were organized at Bhiwani and Vijapur centers. There was significant yield gain due to sprinkler irrigation at Bhiwani center. There was a significant yield gain due to drip irrigation at Vijapur centre. It is visible that we can produce similar yield with less water. Therefore, such technologies have great future in view of the declining water table across the country.

The aim of ***'Per drop more crop'*** can be realised by demonstrating the micro irrigation technologies at farmers' fields. The main limitation with this technology is that many centers does not possess the required infrastructure to demonstrate micro irrigation technologies.

Table 16a : Performance under sprinkler/drip irrigation during *rabi* 2017-18

Zone & Center	Improved varieties	Drip irrigation mean yield (q/ha)	Flood irrigation mean yield (q/ha)	% Gain
Bhiwani (sprinkler)	WB 2	51.00	46.94	08.65***
Vijapur, Mehsana (drip)	GDW 1255-d	43.75	38.88	12.53 NS
Vijapur, Mehsana (drip)	GW 451	51.67	42.33	22.06*

Suggestions by the cooperating centers of different zones for the smooth conduct of wheat FLDs

Suggestions	Zone					
	NHZ	NEPZ	NWPZ	CZ	PZ	SHZ
Budget of FLDs should be increased	√	√				
Timely/ early release of funds should be ensured	√	√	√	√		√
Timely supply of inputs to the farmers		√	√	√		
Supply of quality seed of newly released high yielding variety should be continued		√				
Budget pertaining to POL/hiring of vehicle for monitoring of FLDs, organizing field day should be increased		√	√			
Timely supply of seeds along with seed treatment chemical to ensure timely conduct of demonstrations		√	√	√		√
Late sown variety with low water requirement/limited irrigation should be promoted through FLDs		√				
Short duration, less water requiring and heat tolerant variety is required.			√			
Centers should be allowed to conduct FLDs to individual farmers not in cluster approach			√			
Number of demonstrations should be increased			√	√	√	
Training on latest technologies should be organised before start of FLDs programme					√	
The Budget for complete package i.e. seed, fertilizer and plant protection chemicals should be provided				√		
More than one variety should be provided to a centre under FLD. Variety of local ceter should be preferred.		√		√		
FLD Programme should be continued				√		
Release the high yielding variety of wheat for semi-irrigated conditions				√		
Additional fund is required for holding the field day.	√	√	√			

Suggestions by the cooperating centers of different zones for the smooth conduct of barley FLDs

Suggestions	Zone		
	NEPZ	NWPZ	CZ
Timely/ early release of funds should be ensured		√	√
Additional fund for organizing field day and POL under FLDs		√	
Increase budget for POL/hiring of vehicle for monitoring of FLD sites and organizing field day	√	√	
Number of demonstrations should be increased			√
The FLDs allotment should be continued in future also.			√
Release the high yielding variety of barley suitable for semi-irrigated conditions			√
The variety for timely sown irrigated condition should be provided instead of variety for Alkaline/Saline soils.	√		
The funds for training and extension literature should be provided.			√

Farmers' perception about FLDs

- The farmers appreciated the new wheat production technologies demonstrated under FLDs. Improved varieties performed better, gave more yields than the check varieties. New varieties have good grain/seed quality, disease resistance, uniform and good crop growth and crop stand, lodging resistance, long compact ear head, high grain and straw yield which provided good returns to the farmers. There was negligible weed infestation and no serious disease was observed.
- The zero tillage technology in wheat saves time, labour, money and energy.
- Bio-fertilizers (Azotobactor and Phosphorus Solubilizing Bacteria) are free living organisms which fix atmospheric nitrogen and improve the solubility of phosphorus in soil by saving fertilizer.
- Neighboring farmers responded positively about FLDs and would like to grow the improved variety and they have asked for improved varieties seed from the FLD farmer.
- More financial support is to be provided under the FLD programme.
- FLD is an effective method of transfer of technology. Regular availability of improved varieties will certainly enhance wheat productivity along with farmers' income.

Monitoring of Front Line Demonstrations (FLDs)

The ICAR-IIWBR team accompanied by the experts from the Ministry of Agriculture & Farmers Welfare and the concerned centres, monitored the following FLDs centres during the crop season 2017-18.

Monitoring Team Leader	Centres Monitored	Dates of Monitoring
Dr. Rinki	Pantnagar and Almora	22-23 February, 2018
Dr. Satyavir Singh	Parbhani, Niphad and Pune	4-6 March, 2018
Dr. Anuj Kumar	Ambala, Ropar and Ludhiana	26-27 March, 2018
Dr. Sendhil R.	Shimla, Bilaspur, Malan, Hamirpur, Una	26-29 April, 2018

Front Line Demonstrations (FLDs) Monitoring Report of ICAR-VPKAS, Almora and GBPUA&T, Pantnagar centers during wheat crop season 2017-18.

Monitoring Center : ICAR- VPKAS, Almora (Uttarakhand)
Monitoring Date : 22.02.2018
Monitoring Team :

1. Dr.Rinki, Scientist (Plant Physiology), ICAR-IIWBR, Karnal
2. Dr.Sumit Mishra, Joint Director, Directorate of Sugarcane Development, Lucknow (UP)
3. Dr.Lakshmi Kant, Head and PS & Zonal Coordinator (NHZ), ICAR-VPKAS, Almora.
4. Dr.Renu Jethi, Sr. Scientist (Social Science), ICAR-VPKAS, Almora (Uttarakhand)

The team visited Basbhida, Pechuni, Baral Gaon, Amshyari villages in Chuakutia block of Almora district on 22nd Feb, 2018 for monitoring of Wheat FLDs conducted by VPKAS, Almora during *Rabi* 2017-18. The centre conducted 20 FLDs of wheat over 20 acres area at 130 farmers' fields. The seed of improved wheat variety VL Gehun 953 was distributed among the beneficiary farmers and demonstrated with complete package of practices at farmers' field. The check variety of wheat was a local check. At some places wheat crop was found at late jointing stage and at some places at heading stage in demonstrated fields. Display board was found at all FLDs sites.

Observations / Farmers Feedback during FLDs field visit

- The sowing of wheat crop was done between 27th October to 3rd November 2017 at the visited FLDs fields. Sowing was done with both broadcasting and line sowing method in demonstrated plots. Toria (*Brassica napus*) was used as a mixed crop in the wheat crop.
- Display board was found at all the visited sites.
- The performance of FLDs was very good especially where farmers could be able to manage 2-3 irrigations. But mostly the crop is rainfed.
- Wheat crop was at jointing to heading stage.
- No incidence of insect-pest and disease was observed in the FLDs farmers' fields. Weed infestation was found negligible in the FLDs fields.
- In the demonstration fields, better crop stand was observed due to good canopy cover, no lodging, compact, long ear head and more tillers.
- The farmers were facing the problem of wild boar (wild pig) and monkeys.
- The farmers appreciated the performance of new variety of wheat (VL Gehun 953) in comparison to local varieties grown by them. However, the actual benefits or yield advantage would be realized on harvesting of the crop.
- In some pockets in the vicinity, where FLDs were demonstrated, the early symptoms of yellow rust were observed in the farmers' fields. However, the FLDs were not affected.
- Further, the farmers informed that they will continue to grow the new varieties. The farmers expected more yield from the improved varieties of wheat than the check variety. Neighboring farmers were also impressed with the performance of new wheat variety.
- The farmers appreciated the work done by the cooperating centre.

Monitoring Center : GBPUAT, Pantnagar, District Udham Singh Nagar (Uttarakhand)
Monitoring Date : 23.02.2018
Monitoring Team :
Dr. Rinki, Scientist (Plant Physiology), ICAR-IIWBR, Karnal
Dr. Sumit Mishra, Joint Director, Directorate of Sugarcane Development, Lucknow (UP)
Dr. J.P.Jaiswal, Professor & Principal Wheat Breeder, GBPUAT,Pantnagar (Uttarakhand)

The team visited Aadarsh Nagar and Deoria villages in Kiccha tehsil of Udham Singh Nagar district of Uttarakhand on 23rd February, 2018 for monitoring of Wheat FLDs conducted by GBPUAT, Pantnagar (Uttarakhand) during *Rabi* 2017-18. The centre conducted 18 FLDs of wheat over 18 acres area at 18 farmers' fields. The seed of new released wheat varieties HD 3086, HPBW 01 and WB 2 were distributed among the beneficiary farmers and demonstrated with complete package of practices at farmers' fields. The technology demonstrated were zero tillage, use of rotavator and use of Bio-fertilizer (PSB and Azotobactor) with recommended dose of fertilizer. The check variety of wheat was a local check. At some places wheat crop was found at heading stage while at some places at anthesis and post –anthesis stage in demonstrated fields. Display board was found at FLDs sites.

Observations / Farmers Feedback during FLDs field visit

- The sowing of wheat crop was done between 7th to 27th November 2017 at the visited FLDs sites.
- It was observed that seed was provided to the FLDs beneficiaries by the GBPUAT, Pantnagar and farmers have used FYM, NPK (12:32:16) mixture and urea application at their own level. However, in some demonstrations the farmers have been found to use PSB + Azotobactor culture. Majority of the visited demonstrations were on zero tillage methods.
- Display board was found at all the visited sites.
- No incidence of insect-pest and disease was observed in the visited FLDs fields. Weed infestation was negligible in the FLDs fields.
- The condition of wheat crop was very good. Wheat crop was at heading to post anthesis stage.
- In the visited FLDs fields, better crop stand was observed under zero tillage due to good canopy cover and conserved moisture, long earhead (especially in HD 3086) and more number of tillers.
- The farmers appreciated the performance of new varieties of wheat (HD 3086, HPBW 01 and WB 2) in comparison to local varieties and others wheat varieties (PBW 343, DBW 17, UP 2628) earlier grown by them.
- Further, the farmers informed that they will continue to grow the new varieties. The farmers expected more yield from the improved varieties of wheat than the check variety.
- The farmers also appreciated the work done by the cooperating centre.

Front Line Demonstrations (FLDs) Monitoring Report of VNMKV-Parbhani (Maharashtra), ARS-Niphad, Nashik (Maharashtra) and ARI, Pune (Maharashtra) centers during wheat crop season 2017-18.

Monitoring Centre: VNMKV, Parbhani (Maharashtra)
Monitoring Date: 04.03.2018
Monitoring Team :
Dr. Satyavir Singh, Principal Scientist & PI (SS), ICAR-IIWBR, Karnal (Haryana)
Dr. Vinay Kumar, STA, Directorate of Cotton Development, Nagpur (Maharashtra)
Mr. Anil Munde, RA, VNMKV, Parbhani (Maharashtra)
Mr. Sachin Gadamwar, CO, VNMKV, Parbhani (Maharashtra)

The team visited the wheat FLDs on 4th March, 2018 conducted by VNMKV, Parbhani at village Dhangaon using variety HI 1605 in district Aurangabad. The technology i.e. improved or newly released wheat variety (NRWV) with complete package of practices was demonstrated at farmers' fields.

Monitoring Centre: ARS, MPKV, Niphad, Nashik (Maharashtra)
Monitoring Date: 05.03.2018
Monitoring Team :
Dr. Satyavir Singh, Principal Scientist & PI (SS), ICAR-IIWBR, Karnal (Haryana)
Dr. Vinay Kumar, STA, Directorate of Cotton Development, Nagpur (Maharashtra)
Dr. Avinash Gosavi, AP (Soil Science), ARS, MPKV, Niphad, Nashik (Maharashtra)
Dr. B.S. Raskar, Wheat Agronomist, ARS, MPKV, Niphad, Nashik (Maharashtra)
Dr. S.S. Dodke, Wheat Specialist, ARS, MPKV, Niphad, Nashik (Maharashtra)

The team visited the wheat FLDs on 5th March, 2018 conducted by ARS, MPKV, Niphad, Nashik at villages Chasnali and Sangvi Bhusar in district Ahmednagar using variety NIAW 1994. The technology i.e. improved or newly released wheat variety (NRWV) with complete package of practices was demonstrated at farmers' fields.

Monitoring Centre: MACS-ARI, Pune (Maharashtra)
Monitoring Date: 05.03.2018
Monitoring Team :
Dr. Satyavir Singh, Principal Scientist & PI (SS), ICAR-IIWBR, Karnal (Haryana)
Dr. Vinay Kumar, STA, Directorate of Cotton Development, Nagpur (Maharashtra)

Dr. B.K. Honrao, Scientist-E (Pathology) and Incharge Wheat Scheme, MACS-ARI, Pune (Maharashtra)
Dr. Yashwant, Wheat Breeder, MACS-ARI, Pune (Maharashtra)
Dr. V.S. Baviskar, Scientist-B (Agronomy), MACS-ARI, Pune (Maharashtra)
Mr. A.M. Chavhan, Scientist-B (Breeding), MACS-ARI, Pune (Maharashtra)

The team visited the wheat FLDs on 6th March, 2018 conducted by MACS-ARI, Pune at villages Songaon and Gunawadi in district Pune using varieties HI 1605, MACS 6478, HD 3090 and MACS 3949 (d). The technology i.e. improved or newly released wheat variety (NRWV) with complete package of practices was demonstrated at farmers' fields.

Observations / Farmers Feedback :
The weeds infestation in FLDs was negligible. The wheat FLDs crop was free from diseases. New wheat varieties have good tillering good crop stand, long earhead, more number of grains per earhead and bold grains. Wheat straw is good for domestic animals. The improved wheat varieties being popularized were HI 1605, NIAW 1994, MACS 6478, HD 3090 and MACS 3949 (d). The check varieties being used were HD 2189, NIAW 301, Green Gold-71, Ajit-72, NIAW 34, MACS 3125 (d), Raj 4037 and MACS 6222. The neighbour farmers of the wheat FLDs were impressed by the performance of new varieties. No lodging was seen in new varieties fields. Farmers expected more yield from the new varieties than the old varieties. FLD is good source of Transfer of Technology. The farmers appreciated the work done by FLDs cooperators.

Front Line Demonstrations (FLDs) Monitoring Report of KVK-Tepla-Ambala, KVK-Roopnagar and PAU-Ludhiana centers during wheat crop season 2017-18.

Monitoring Centre: KVK, Tepla, Ambala (Haryana)
Monitoring Date: 26.03.2018
Monitoring Team :
1. Dr. Anuj Kumar, Principal Scientist, ICAR-IIWBR, Karnal (Haryana)
2. Dr. Vikrant Singh, Assistant Director, DWD, Ghaziabad (UP)
3. Er. Guru Prem, KVK, Tepla, Ambala (Haryana)

The team visited demonstration plots of Sh. Vijay Pal and Sh. Prince at village Khudda Kalan, Block Saha, Ambala. The wheat varieties HPBW 01 and WB 2 were demonstrated under FLD. The sowing was done with zero tillage machine. The control plot was on HD 2967. The performance of both the varieties was excellent and farmers were expecting good yield. The crop was at dough stage. The farmers have displayed the name of variety and date of sowing on a display board.

Observations :
The FLD plots were free from any weed.
Fields were free from insect, pest and disease.
Crop stand was good and good harvest was expected.
Farmers were impressed with both the quality wheat varieties and were planning to store seed for next season.
Farmers were satisfied with the services provided by KVK, Tepla, Ambala

Monitoring Centre: KVK, Roopnagar (Punjab)
Monitoring Date: 26.03.2018
Monitoring Team :
1. Dr. Anuj Kumar, Principal Scientist, ICAR-IIWBR, Karnal
2. Dr. Vikrant Singh, Assistant Director, DWD, Ghaziabad (UP)
3. Dr. Sanjeev Grower, KVK, Roopnagar (Punjab)

The team visited demonstration plots of Sh. Jaswinder Singh, Village Mahlan, Ropar and Sh. Gyan Singh, Village Jhallian Khurd, Roopnagar. The wheat variety HPBW 01 was demonstrated in both the villages. Sowing of wheat was done with Turbo happy seeder machine to show the benefits of this technology among the farmers. The variety used under control plot was PBW 725. The performance of HPBW 01 was excellent and farmers were expecting good yield. The crop was about to mature. The farmers have displayed the name of variety and date of sowing on a display board in the field.

Observations :
The FLD plots were free from any weed.
Fields were free from insect, pest and diseases.
Crop stand was good and good harvest was expected.
Farmers were impressed with both the quality wheat varieties and were planning to store seed for next season.
Farmers were satisfied with the services provided by KVK, Roopnagar (Punjab).

Monitoring Centre: PAU, Ludhiana (Punjab)
Monitoring Date: 27.03.2018
Monitoring Team :
1. Dr. Anuj Kumar, Principal Scientist, ICAR-IIWBr, Karnal
2. Dr. Vikrant Singh, Assistant Director, DWD, Ghaziabad, UP.
3. Dr. Sanjeev Grower, KVK, Roopnagar, Punjab

The team visited demonstration plots of Sh. Joginder Singh and Smt. Gagandeep Kaur, Village Bazurg, Jagraon, Ludhiana. The wheat variety PBW 1Zn was demonstrated in both the plots. The technology such as rotavator and zero tillage along with new variety was demonstrated to show the benefit of both the technologies to the farmers. The variety used under control plot was on PBW 725. The performance of PBW 1Zn was extremely good and farmers were expecting better yield. The crop was about to mature in few days. The farmers have displayed the name of variety and date of sowing and other date on a display board in the field.

Observations :
The FLD plots were free from any weed.
Fields were free from insect, pest and disease.
Crop stand was good and good harvest was expected.
Farmers were impressed with both the quality wheat varieties and were planning to store seed for next season.
Farmers were satisfied with the services provided PAU, Ludhiana

Front Line Demonstrations (FLDs) Monitoring Report of IARI-RS Tutikandi Shimla, IIWBR-RS Flowedale Shimla, KVK Bilaspur, KVK Hamirpur, RWRC Malan Kangra and KVK Una Centers during wheat crop season 2017-18.

Monitoring Center : : IARI, Regional Station, Tutikandi, Shimla (HP)
Monitoring Date : 26.04.2018
Monitoring Team :
Dr.Sendhil R., Scientist, Social Sciences, ICAR-IIWBR, Karnal (Haryana)
Dr.Dharam Pal, PS and In-Charge, IARI, RS, Tutikandi, Shimla (HP)
Dr.Vikrant Singh, Assistant Director, DWD, Ghaziabad (UP)
Dr.O.P. Gangwar, Scientist, ICAR-IIWBR, RS, Shimla (HP)

Improved or newly released wheat variety *viz.,* HS 562 and barley variety namely BHS 380 was demonstrated in 12 acres of land at various farmers' fields against the check varieties (Wheat: WH 1080, HPW 155 and VL 907, and Barley: Local) across three districts namely Bilaspur, Shimla and Mandi (Himachal Pradesh). The following observations were made during the overall monitoring and discussion with the beneficiaries' of FLD conducted by the IARI, Regional Station, Tutikandi Centre.

- As per the site visit of the farmers' field, a majority of the crop was at the harvesting stage with good crop canopy.
- Higher seed rate was used for sowing being rainfed condition.
- Fertilizers were not applied and farmers preferred to use only FYM owing to home consumption purpose.
- All the farmers reported lack of sufficient irrigation water was the major problem during the crop season which might reflect in the yield.
- Some reported that only single irrigation was given in the hill region and two irrigations under plain conditions.
- Visited fields were infested with wild oats in hilly region and in plains (Bilaspur) higher weed infestation was found indicating the need for proper management practices.
- The monitored plots were not infested with any insect-pests and diseases.

- The crop growth was good in the region and harvesting by employing manual labour is expected to be done in a couple of days in the monitored plots.
- Farmers valued the demonstrations of new production technologies via FLDs as the improved varieties perform better and expected to give more yield than the local or check varieties. They highly appreciated the technical assistance and advisory offered by the ICAR-IARI RS Tutikandi centre. The beneficiaries are interested to continue with the improved varieties even if the assistance under FLD programme is stopped.

Monitoring Centre : ICAR-IIWBR, Regional Station, Flowerdale, Shimla (HP)
Monitoring Date : 26.04.2018
Monitoring Team :
Dr.Sendhil R., Scientist, Social Sciences, ICAR-IIWBR, Karnal (Haryana)
Dr.O.P. Gangwar, Scientist, ICAR-IIWBR, RS, Shimla (HP)
Dr.Dharam Pal, PS and In-Charge, IARI, RS, Tutikandi, Shimla (HP)
Dr.Vikrant Singh, Assistant Director, DWD, Ghaziabad (UP)

Improved and newly released wheat variety *viz.,* HS 562 was demonstrated in 11.6 acres of farmers' field at two villages (Larech and Sai) in Solan district by the IIWBR, Regional Station, Flowerdale, Shimla against local check. The following observations were made during the overall monitoring and discussion with the FLD beneficiaries'.

- Line sowing was practiced with the recommended seed rate.
- Only single irrigation was given to the crop due to scarcity of water.
- FYM and recommended level of urea was applied.
- The crop stand was good with more tillers per plant. A portion of the visited FLD site has been harvested already.
- There was no incidence of pests and diseases in the monitored plot(s).
- From FLDs, farmers expect yield around 32 Quintals/ha which is higher than the check varieties by 10-20 per cent.
- Technical assistance and advisory offered by the IIWBR, Regional Station, Flowerdale, Shimla was much appreciated by the beneficiaries and they are interested to continue with the improved varieties in the coming years even if the assistance from FLD programme is discontinued.

Monitoring Centre : KVK, Bilaspur (HP)
Monitoring Date : 27.04.2018
Monitoring Team :
Dr.Sendhil R., Scientist, Social Sciences, ICAR-IIWBR, Karnal (Haryana)
Sh.Balak Ram, Technical Assistant, KVK, Bilaspur (HP)
Dr.Vikrant Singh, Assistant Director, DWD, Ghaziabad (UP)

Improved and newly released wheat variety *viz.,* HS 562 was demonstrated in 12 acres of farmers' fields at nine villages in Bilaspur district of Himachal Pradesh by the KVK Bilaspur against HPW 155 as a check variety. The following observations were made during the overall monitoring and discussion with the FLD beneficiaries'.

- As per the discussion and site visit, it was informed that few demonstrations were done jointly by the beneficiaries in a pooled area.
- Seeds were sown at the rate of 40-50 kg/acre depending on the availability of irrigation facility.
- Broadcasting was practiced against the recommended line sowing which led to poor tillering.
- Two irrigations were given by the beneficiary farmers and they reported lack of sufficient rainfall in the current crop season.
- FYM was applied and a majority had not applied fertilizers owing to home consumption. Some of the farmers practiced single foliar spray (18:18:18) at 32-35 days after sowing.
- The monitored fields were infested with a few weeds and manual weeding is under practice.
- Harvesting is expected to commence in a couple of weeks in the monitored plots and around 30-35 quintals/ha was their yield expectation.
- Farmers valued the demonstrations of new wheat production technologies via FLDs as the improved wheat varieties perform better and expected to give more yield than the check varieties. Farmers much appreciated the technical assistance and advisory offered by the KVK Bilaspur centre and they are interested to continue wheat cultivation even if the assistance from FLD programme is stopped.

Monitoring Centre : KVK, Hamirpur (HP)
Monitoring Date : 27.04.2018
Monitoring Team :
Dr.Sendhil R., Scientist, Social Sciences, ICAR-IIWBR, Karnal (Haryana)
Dr. Dhanbir Singh, Extension Specialist, KVK, Hamirpur (HP)
Dr.Vikrant Singh, Assistant Director, DWD, Ghaziabad (UP)

Improved and newly released wheat variety *viz.,* HS 562 was demonstrated in 18 farmers' fields (11 acres) at 11 villages of Hamirpur district of Himachal Pradesh by the CSKHPKV KVK Hamirpur against HPW 349 as a check variety. The following observations were made during the overall monitoring and discussion with the FLD beneficiaries'.

- As per the discussion and site visit, it was informed that few demonstrations were done jointly by the beneficiaries in a pooled area.
- Recommended seed rate was followed in the FLD site(s).
- Broadcasting was practiced by some farmers against the recommended line sowing which led to poor tillering.
- Two irrigations were given by the beneficiary farmers and they reported lack of sufficient rainfall in the current crop season.
- Wheat in some of the monitored fields was in harvesting stage and found with good crop stand, minimum weeds coupled with pests & disease free situation.
- Farmers expected the improved demonstrated variety to yield around 15-16 quintals/ac.
- Beneficiaries highly appreciated the technical assistance and advisories offered by the CSKHPKV KVK Hamirpur Centre and the FLD farmers are interested to continue their wheat production with the improved varieties in the forthcoming years without any monetary assistance.

Monitoring Centre : CSKHPKV, RWRC, Malan, Kangra (HP)
Monitoring Date : 28.04.2018
Monitoring Team :
Dr.Sendhil R., Scientist, Social Sciences, ICAR-IIWBR, Karnal (Haryana)
Dr.Vijay Rana, PS, CSKHPKV, RWRC, Malan, Kangra (HP)
Dr.Bindra, PS & Incharge, CSKHPKV, RWRC, Malan, Kangra (HP)
Dr.Sachin, Scientist, CSKHPKV, RWRC, Malan, Kangra (HP)
Dr.Vikrant Singh, Assistant Director, DWD, Ghaziabad (UP)

Improved and newly released wheat variety *viz.,* HS 562 was demonstrated by the CSKHPKV Rice and Wheat Research Center (RWRC) in 32 farmers' fields against the check varieties namely HPW 349 and HPW 155. The following observations were made during the overall monitoring and discussion with the FLD beneficiaries'.

- As per the discussion and site visit, it was informed that a few demonstrations were done jointly by the beneficiaries in a pooled area at Sidhpur village.
- Recommended seed rate was used for sowing by the beneficiaries.
- Two irrigations were given by the farmers. In the visited sites, flood irrigation by channels has been a common practice.
- FYM application was done followed by urea (foliar spray) application.
- The crop stand was good with less or no weed infestation.
- However, the monitored plots in Sidhpur village were heavily infested with *H. armigera* which needs immediate attention for maintaining the expected yield level.
- Harvesting is expected to commence in a couple of weeks in the monitored plots and around 40-42 quintals/ha was their yield expectation.
- The beneficiaries of the FLDs expected that the new variety to give higher yield in comparison to the existing check varieties. Further, the assistance and advisories offered by the CSKHPKV Rice and Wheat Research Center (RWRC) was highly appreciated by the FLD farmers. The farmers were also interested to continue wheat cultivation with improved varieties in the subsequent years.

Monitoring Centre : KVK, Una (HP)
Monitoring Date : 29.04.2018
Monitoring Team :
Dr.Sendhil R., Scientist, Social Sciences, ICAR-IIWBR, Karnal (Haryana)
Dr.Sanjay Kumar Sharma, Extension Specialist, KVK, Una (HP)
Dr.Vikrant Singh, Assistant Director, DWD, Ghaziabad (UP)

Improved and newly released bio-fortified wheat varieties namely WB 02 and HPBW 01 was demonstrated by the KVK Una center in 10 farmers' fields against the check varieties HD 3086 and WH 1105. The following observations were made during the overall discussion with the FLD beneficiaries'.

- As per the discussion with the FLD beneficiaries, it was informed that the crop has been harvested being a plain region falling in the north western plains zone.
- Seeds were sown at the rate of 40kg/acre using seed drill.
- Number of irrigation varied from farmer to farmer and it ranged from 3 and upto 6.
- Recommended level of fertilizers was used including urea foliar spray followed by complex nutrients supplied by the IFFCO (12:32:16).
- Yield level also varied among the discussed beneficiaries that ranged from 17 q/ha to 37 q/ha.
- Blue bulls (Neelgaye) and monkey menace at wheat fields were reported as major problems in this region.
- Beneficiaries much appreciated the technical assistance by the KVK Una Centre and the FLD farmers are interested to continue their wheat production with the improved varieties in the forthcoming years without any monetary/input assistance.

Suggestions for betterment of the FLD programme

- The FLD coordinating centers should strictly follow the guidelines as recommended by the MoA&FW including the selection of site and beneficiary. Every year, it is recommended to change the block for wide spread of technologies.
- The demonstration site selection should be near to the road and each FLD plot should have a banner/board right from the sowing operation with the details of demonstrated and check varieties like name of the variety, year of release & released by, seed rate, fertilizer dose etc.. for creating awareness on technology transfer among the public. The cost incurred on this item can be claimed in component 3 of FLD budget (Display boards and publicity materials). In hilly regions, the FLD site has to be selected where there is more access to the public. Secluded area has to be avoided strictly.
- Selection of FLD sites shall be combined with other state or central government programmes like Mera Gaon Mera Gaurav so that frequent visit and monitoring can be made.
- There should be a clear-cut boundary distinction between the demonstrated and check plot.
- It is always suggested for soil test based fertilizer and micro-nutrient application. This information can also be incorporated in the display board.
- Beneficiaries should be guided to strictly follow the scientific package of practices as recommended by the FLD coordinating centres. To facilitate this action, while giving the seeds to the beneficiary farmers, it is strongly suggested to provide the literature containing the complete information on package of practices in regional languages by the concerned coordinating center. In such case, the coordinating centers shall avail the expertise (if not available within the centre) of SAUs and ICAR-IIWBR for translating the latest technologies to print media.
- Field days has to be organised by the concerned centre for popularizing the demonstrated technology to masses.
- Early allotment of FLDs for better conduct following the sowing window period.
- Further, funds and/or seeds of demonstrated varieties should reach the concerned FLD center before the start of the crop season so that FLDs can be planned and organised in time and efficient way.
- Seeds of the newly released varieties shall be purchased from the State Seed Corporation or nearby Government authorized seed production farm or research centres for timely delivery to the FLD beneficiaries.
- Provision to demonstrate Conservation Agriculture (CA) technology e.g. distribution of water carrying pipes and sprinklers should be made under FLDs.
- Small equipments for seed sowing in hilly areas should be provided through the Implementing Centers on hire basis under the FLD programme.
- Quality of seed supplied for demonstration should be certified only and use of non-certified seeds should be restricted under the FLD programme.
- The MoA&FW shall create a digital database (FLD atlas) and mobile app (tracked through GPS) for effective implementation and monitoring of FLDs.
- The MoA&FW can also identify a "Role Model" centre in such extension programmes and their approach can be replicated by the other centers.
- For effective monitoring of the crop situation, the team also suggests for planning and scheduling the monitoring before harvest time.

Table 17: Improved and check wheat varieties at farmers' field in various zones during *rabi* 2017-18

Zone	Improved Varieties	Check Varieties
NHZ	VL 953, HS 562	HPW 155, HD 2380, HPW 236, HS 507, Local, Raj 3077, WH 1080, SW 2, HPW 349, Sonalika, VL 907
NEPZ	HD 2967	HD 2967, PBW 343, HD 2733, HUW 468, UP 262, Sonalika, Lok 1, Local, PBW 502, K 9107
NWPZ	WB2, HPBW 01, PBW 677, PBW 725, PBW1Zn, HD 3086, DBW 71, KRL 210	HD 2967, WH 1105, HD 3086, PBW 502, PBW 590, PBW 226, Raj 4037, Raj 4079, Raj 3077, Raj 1482, PBW 677, PBW 723, PBW 725, PBW1Zn, WB2, HPBW 01, Raj 4120, KRL 210, WH 711
CZ	DBW 110, GJW 463, Raj 4238, GW 451, MP 3382, RVW 4106, HI 8737 (d), GDW 1255 (d), HI 8759 (d), HI 8713 (d), HD 4728 (d), HI 8777(d)	Lok 1, Raj 4037, GW 322, GW 496, GW 451, GDW 1255 (d), HI 8498 (d), HI 8713 (d), Sujata, HI 1531, GW 273, HI 1500, RAJ 3765, HI 8427 (d), WH 147, Ajay 72
PZ	HI 1605, HD 3090, NIAW 1994, MACS 6478, MACS 3949 (d), HW 1098 (dic.), UAS 446 (d), UAS 347	GW 496, Ajay 72, HD 2189, MACS 6222, MACS 3125 (d), MACS 2971 (dic.), NIAW 34, DWR 162, B.Yellow, Local, Lok 1, NIAW 301, UAS 415 (d), Green Gold 71
SHZ	HW 1098 (dic.), HW 5207 (CoW 3)	-

Table 18: Zone wise distribution of popular wheat varieties during *rabi* 2017-18

Zone	Popular Wheat Varieties
NHZ	Local, VL 616, VL 829, HPW 155, HPW 349, DPW 621-50, HD 2967, HS 507, HPW 368, HPW 236, VL 907, Raj 3765, Sonalika, PBW 343, WH 1080, HD 2380, VL 892, SW 1 (SKW 196), PBW 175
NEPZ	PBW 343, K 0307, K 9107 (Dewa), Halna, PBW 373, K 0402, HUW 234, HD 2733, PBW 550, UP 262, HD 2967, Local, Sonalika, PBW 154, HD 2985, PBW 502, DBW 39, PBW 443
NWPZ	HD 2967, PBW 621, DBW 17, DPW 621-50, DBW 88, Raj 3077, Raj 3765, PBW 725, PBW 677, PBW 550, HD 3086, WH 1105, PBW 343, DBW 16, PBW 590, PBW 226, UP 2628, WH 711, Raj 4037, Raj 4079, HD 2851, KRL 210, KRL 213, Raj 4238, Raj 4120, Raj 3077, WH 283
CZ	Raj 4037, Raj 3765, HI 1544, GW 366, HI 8498 (d), GW 322, GW 273, Raj 1482, GW 496, WH 147, Sujata, JW 3211, Ratan, Lok 1, HI 8663 (d)
PZ	Lok 1, Ajit 102, Ajay 72, GW 496, HD 2189, NIAW 301, MACS 2971 (dic.), DWR 162, NIAW 1415, DWR 2006, MACS 6222
SHZ	HW 1098 (dic.), HW 5207 (CoW 3)

Conducting wheat FLDs at ICAR-IIWBR, Karnal centre during *rabi* 2017-18

During *rabi* 2017-18, 20 acres (8 hectares) WFLDs were conducted at twenty farmers' fields in the villages namely Rasina and Hajwana in Kaithal district of Haryana state using varieties WB 2 and HPBW 01. The demonstrations were conducted using Happy Seeder and Bio-fertilizer technology with complete package of practices and farmers were provided with the improved varieties seeds as per provision under the programme.

Constraints analysis in different wheat producing zones of India (2017-18)

India witnessed a continuous increase in wheat production in the recent years. The current year production has reached an all-time record of 98.61 million tonnes with an average productivity of 3318 kg/ha. Variation in yield levels exists among different states, farmers and farms leading to yield gap in different states and different zones. Several reasons shall be attributed to this yield gap which needs to be addressed for sustainable wheat production. Through constraint analysis, an effort has been made to identify constraints impeding wheat production in different parts of the country.

Methodology

An inventory of constraints impeding wheat production in the country has been developed after thorough review of literature and taking experts' opinion. Data were collected on a well designed pre-structured questionnaire mailed to all the cooperating centres conducting wheat FLDs. The responses were collected on a three point continuum *viz;* most serious, serious and not serious. The scores were assigned as 3, 2, 1 for the most serious, serious and not serious constraints, respectively. Based on the total score for each constraint, the final rank was calculated to ascertain the level of seriousness in the wheat and barley production zone.

Northern Hills Zone (NHZ)

In NHZ (Table 19), non-availability of seed of newly released wheat variety*, Phalaris minor*, untimely rain, high cost of inputs, small land holding, rodents, lack of land leveling, faulty irrigation method, poor quality of agro chemicals and non availability of farm machinery were perceived as ten major constraints.

Table 19: Constraints in NHZ (n=247)

Constraints	Score	Rank
Non availability of seed of newly released variety	427	I
Phalaris minor	406	II
Untimely rain	400	III
High cost of inputs	400	III
Small land holding	399	IV
Rodents	399	IV
Lack of land leveling	373	V
Faulty irrigation method	350	VI
Poor quality of herbicides/pesticides	349	VII
Non-availability of farm machinery	345	VIII

North Eastern Plains Zone (NEPZ)

Realizing the potential of north eastern plains zone, all constraints need to be addressed immediately for achieving the targets of second green revolution. Among major constraints of this zone, high cost of inputs, erratic power supply, non availability of labour, low organic matter in soil, untimely rain, high temperature at the time of maturity, temperature fluctuation during crop season, problem in marketing, lack of knowledge among the farmers about recent technologies, poor information delivery system and decline in water table were major constraints in NEPZ (Table 20). Farmers need to be educated and trained on recent wheat production technologies to harvest potential yield in their fields.

Table 20: Constraints in NEPZ (n=437)

Constraints	Score	Rank
High cost of inputs	143	I
Erratic power supply	143	I
Non availability of labour	126	II
Low organic matter in soil	118	III
Untimely rain	115	IV
High temperature at the time of maturity	115	IV
Temperature fluctuation during crop season	115	IV
Problem in marketing	111	V
Lack of knowledge among farmers about recent technologies	110	VI
Poor information delivery by state extension machinery	110	VI
Decline in water table	110	VI

North Western Plains Zone (NWPZ)

Phalaris minor was perceived as the most serious constraint in NWPZ and during the crop season large numbers of complaints from the farmers were received on this issue. The other constraints such as high cost of inputs, decline in water table, low price of wheat, small land holding, non availability of seeds of newly released varieties were perceived as major constraints in this mega zone (Table 21).

Table 21: Constraints in NWPZ (n= 372)

Constraints	Score	Rank
Phalaris minor	435	I
High cost of inputs	426	II
Declining water table	395	III
Low price of wheat	376	IV
Small land holding	370	V
Non availability of seed of newly released variety	353	VI
Lack of facility of canal irrigation	345	VII
Low organic matter	336	VIII
Erratic power supply	294	IX
Non availability of labour	273	X

Central Zone (CZ)

In central zone, non availability of labour, declining water table, small land holdings, high cost of inputs, imbalanced use of fertilizers, etc. were major constraints as perceived by the farmers (Table 22).

Table 22: Constraints in CZ (n=190)

Constraints	Score	Rank
Non availability of labour	238	I
Declining water table	225	II
Small land holding	214	III
High cost of inputs	208	IV
Imbalanced use of fertilizers	186	V
Lack of facility of canal irrigation water	180	VI
Chenopodium album	161	VII
Non availability of seed of newly released variety	154	VIII
Lack of irrigation facilities	154	VIII
Rodents	152	IX

Peninsular Zone (PZ)

In peninsular zone, low price of wheat, poor quality seed, non availability of labour, erratic power supply, non availability of seeds of newly released variety, higher custom hiring rates, high cost of inputs, problem in marketing of wheat and low organic matter in the soil were perceived as the major constraints faced by the wheat growers (Table 23).

Table 23: Constraints in PZ (n= 167)

Constraints	Score	Rank
Low price of wheat	232	I
Poor quality seed	200	II
Non-availability of labour	193	III
Erratic power supply	192	IV
Non availability of seed of newly released variety	190	V
High custom hiring rates	178	VI
High cost of inputs	175	VII
Problem in marketing of wheat	173	VIII
Low organic matter in the soil	159	IX

Southern Hills Zone (SHZ)

In southern hills zone, untimely rain, low price of wheat, non availability of labour, small land holding, high custom hiring rates, erratic power supply, high temperature at maturity, declining water table and problem in marketing of wheat were perceived as the major constraints faced by the wheat growers (Table 23).

Table 23: Constraints in SHZ (n= 33)

Constraints	Score	Rank
Untimely rain	30	I
Low price of wheat	19	II
Non availability of labour	16	III
Small land holding	16	III
High custom hiring rates	15	IV
Erratic power supply	12	V
High temperature at maturity	7	VI
Declining water table	7	VI
Problem in marketing of wheat	7	VI

Overall Constraints

The overall analysis across zones revealed that high cost of inputs, small land holding, non availability of seeds of newly released varieties, non availability of labour, high custom hiring rate, *Phalaris minor,* untimely rain, declining water table, lack of knowledge among farmers about recent technologies and low price of wheat were perceived as major constraints in wheat production in the country (Table 24).

Farmers need to be educated and trained on recent wheat production technologies, complete package of practices and soil health management. There is a need of government intervention to ensure quality seeds of newly released varieties at the time of sowing. Farmers need to be updated on impact of climate change on wheat cultivation and what are the coping strategies they can adopt to mitigate it. The concept of conservation agriculture and adoption of resource conservation technologies at farmers' field can be propagated at a larger scale. To ensure better price, farmers have to go for quality wheat production. All the constraints need immediate attention in order to increase wheat production in all major wheat producing zones of the country.

Table 24: Overall constraints impeding wheat production in the country (n=1446)

Constraints	Score	Rank
High cost of inputs	1844	I
Small land holding	1722	II
Non availability of seed of newly released variety	1691	III
Non availability of labour	1475	IV
High custom hiring rate	1348	V
Phalaris minor	1329	VI
Untimely rain	1311	VII
Declining water table	1304	VIII
Lack of knowledge among farmers about recent technologies	1285	IX
Low price of wheat	1289	X

Barley Front Line Demonstrations (BFLDs) during 2017-18

During the *rabi* crop season 2017-18, 250 Barley Front Line Demonstrations (BFLDs) of one acre each were allotted to 21 different cooperating centers all over India in six states namely, HP, UP, Punjab, Haryana, Rajasthan and MP of which 228 were conducted by 21 centers, covering 244.4 acres area of 238 farmers (Table 25a). Improved barley varieties with complete package of practices (irrigation management, fertilizer dose and method of application, weed control, seed treatment etc.) were demonstrated.

Table 25a : Centre wise distribution of Barley FLDs during *rabi* 2017-18

S.No.	Zone and Centre	Allotted (1 BFLD=1 Acre)	Conducted (1 Acre basis)	Area sown (Acre)	No. of farmers/ locations
	Northern Hills Zone (NHZ)				
1.	CSKHPKV, HAREC, Bajaura, Kullu (HP)	12	5	5	8
2.	IARI, RS, Amartara Cottage, Shimla (HP)	12	4	4	4
	North Eastern Plains Zone (NEPZ)				
3.	NDUA&T, Narendranagar, Kumarganj, Faizabad (UP)	12	12	12	14
4.	KVK (IAS-BHU), Barkachha, Mirzapur (UP)	12	12	14.4*	9
5.	CSAUA&T, Kanpur (UP)	12	12	12	12
6.	BHU, Varanasi (UP)	12	5	5	5
	North Western Plains Zone (NWPZ)				
7.	ICAR-IIFSR, Modipuram, Meerut (UP)	12	12	16*	16
8.	PAU, Ludhiana (Punjab)	8	8	8	8
9.	KVK, Mansa (Punjab)	12	12	12	12
10.	CCSHAU, Hisar (Haryana)	12	12	12	12
11.	KVK, Rampura, Rewari (Haryana)	12	12	12	12
12.	KVK (CCSHAU), Bhiwani (Haryana)	12	12	12	12
13.	RARI (SKNAU), Durgapura, Jaipur (Rajasthan)	16	16	16	11
14.	KVK, Tankarda, Chomu, Jaipur (Rajasthan)	10	10	10	7
	Central Zone (CZ)				
15.	RCOA, MPUA&T, Udaipur (Rajasthan)	12	12	12	12
16.	KVK (MPUA&T), Dhoinda, Rajasmand (Rajasthan)	12	12	12	12
17.	ZARP, COA, JNKVV, Kuthulia Farm, Rewa (MP)	12	12	12	12
18.	KVK (JNKVV), Purushottampur, Panna (MP)	12	12	12	14
19.	KVK (JNKVV), Nowgaon, Chhattarpur (MP)	12	12	16*	16
20.	KVK (RVSKVV), Juara Khurd, AB Road, Morena (MP)	12	12	15*	15
21.	KVK (RVSKVV), Lahar, Bhind (MP)	12	12	15*	15
Total		**250**	**228**	**244.4**	**238**

** Area covered more than allotted which is restricted equal to allotted FLDs.*

Table 25b : Centre wise distribution of Barley FLDs during *Rabi* 2017-18 (Hectares)

S.No.	Zone and Centre	BFLDs Allotted (1BFLD = 1Ha)	BFLDs Conducted (1 Ha basis)	Area Sown (Ha)	No. of farmers/ locations
	NHZ				
1.	CSKHPKV, HAREC, Bajaura, Kullu (HP)	4.8	2	2	8
2.	IARI, RS, Amartara Cottage, Shimla (HP)	4.8	1.6	1.6	4
	NEPZ				
3.	NDUA&T, Narendranagar, Kumarganj, Faizabad (UP)	4.8	4.8	4.8	14
4.	KVK (IAS-BHU), Barkachha, Mirzapur (UP)	4.8	4.8	5.76	9
5.	CSAUA&T, Kanpur (UP)	4.8	4.8	4.8	12
6.	BHU, Varanasi (UP)	4.8	2	2	5
	NWPZ				

S.No.	Zone and Centre	BFLDs Allotted (1BFLD = 1Ha)	BFLDs Conducted (1 Ha basis)	Area Sown (Ha)	No. of farmers/ locations
7.	ICAR-IIFSR, Modipuram, Meerut (UP)	4.8	4.8	6.4	16
8.	PAU, Ludhiana (Punjab)	3.2	3.2	3.2	8
9.	KVK, Mansa (Punjab)	4.8	4.8	4.8	12
10.	CCSHAU, Hisar (Haryana)	4.8	4.8	4.8	12
11.	KVK, Rampura, Rewari (Haryana)	4.8	4.8	4.8	12
12.	KVK (CCSHAU), Bhiwani (Haryana)	4.8	4.8	4.8	12
13.	RARI (SKNAU), Durgapura, Jaipur (Rajasthan)	6.4	6.4	6.4	11
14.	KVK, Tankarda, Chomu, Jaipur (Rajasthan)	4	4	4	7
	CZ				
15.	RCOA, MPUA&T, Udaipur (Rajasthan)	4.8	4.8	4.8	12
16.	KVK (MPUA&T), Dhoinda, Rajasmand (Rajasthan)	4.8	4.8	4.8	12
17.	ZARP, COA, JNKVV, Kuthulia Farm, Rewa (MP)	4.8	4.8	4.8	12
18.	KVK (JNKVV), Purushottampur, Panna (MP)	4.8	4.8	4.8	14
19.	KVK (JNKVV), Nowgaon, Chhattarpur (MP)	4.8	4.8	6.4	16
20.	KVK (RVSKVV), Juara Khurd, Morena (MP)	4.8	4.8	6	15
21.	KVK (RVSKVV), Lahar, Bhind (MP)	4.8	4.8	6	15
Total		**100**	**91.2**	**97.76**	**238**

** Area covered more than allotted which is restricted equal to allotted FLDs.*

Table 26a State wise distribution of Barley FLDs during *rabi* 2017-18 (Acres)

S.N.	State	BFLDs Allotted (1BFLD = 1Acre)	BFLDs Conducted (1 Acre basis)	Area Sown (Acres)	No. of farmers/ locations
1.	HP	24	9	9	12
2.	UP	60	53	59.4*	56
3.	Punjab	20	20	20	20
4.	Haryana	36	36	36	36
5.	Rajasthan	50	50	50	42
6.	MP	60	60	70*	72
	Total	**250**	**228**	**244.4**	**238**

** Area covered more than allotted which is restricted to area equal to allotted FLDs.*

Table 26b: State wise distribution of Barley FLDs during Rabi 2017-18 (Hectares)

S.N.	State	BFLDs Allotted (1BFLD = 1Ha)	BFLDs Conducted (1 Ha basis)	Area Sown (Ha)	No. of Farmers/ Locations
1.	HP	9.6	3.6	3.6	12
2.	UP	24	21.2	23.76	56
3.	Punjab	8	8	8	20
4.	Haryana	14.4	14.4	14.4	36
5.	Rajasthan	20	20	20	42
6.	MP	24	24	28	72
	Total	**100**	**91.2**	**97.76**	**238**

Table 27a: Zone wise distribution of BFLDs conducted during *rabi* 2017-18

Zone	Allotted	Conducted	Area sown (ha)	No. of farmers/ locations
NHZ	24	9	9	12
NEPZ	48	41	43.4*	40
NWPZ	94	94	98*	90
CZ	84	84	94*	96
Total	**250**	**228**	**244.4**	**238**

** Area covered more than allotted which is restricted to area equal to allotted FLDs.*

Table 27b : Zone wise distribution of Barley during Rabi 2017-18

S.N.	Zone	BFLDs Allotted (1BFLD = 1Ha)	BFLDs Conducted (1 Ha basis)	Area Sown (Ha)	No. of Farmers/ Locations
1.	**NHZ**	9.6	3.6	3.6	12
2.	**NEPZ**	19.2	16.4	17.36	40
3.	**NWPZ**	37.6	37.6	39.2	90
4.	**CZ**	33.6	33.6	37.6	96
	Total	**100**	**91.2**	**97.76**	**238**

Table 28 : State wise yield gain during *rabi* 2017-18

State	BFLDs yield (q/ha)	Check yield (q/ha)	% increase
HP	25.62	23.00	11.39 NS
UP	41.50	34.20	21.35***
Punjab	46.50	42.42	09.62***
Haryana	48.72	43.79	11.26***
Rajasthan	46.84	40.29	16.26***
MP	37.81	32.76	15.42***

*** Significant at 1 percent level, NS– Non-significant

The highest increase in barley yield was recorded in UP (21.35 %) followed by Rajasthan (16.26 %), MP (15.42 %), HP (11.39 %) and Haryana (11.26 %). The lowest increase in yield was reported in Punjab (09.62 %) (Table 28).

Table 29 : Zone wise productivity over regional during *rabi* 2017-18

Zone	BFLDs yield (q/ha)	Regional mean yield (q/ha)	% Increase
NHZ	25.62	20.43	25.40**
NEPZ	38.04	27.63	37.68***
NWPZ	49.27	40.96	20.29***
CZ	38.91	30.15	29.05***

*** -Significant at 1 per cent level, ** - Significant at 5 percent level

The yield gain due to improved varieties over regional mean yield was highest in NEPZ (37.68 %) followed by CZ (29.05 %), NHZ (25.40 %) and NWPZ (20.29 %) (Table 29).

Table 30 : Zone wise productivity over check during *rabi* 2017-18

Zone	BFLDs yield (q/ha)	Check mean yield (q/ha)	% Increase
NHZ	25.62	23.00	11.39 NS
NEPZ	38.04	29.92	27.14***
NWPZ	49.27	43.92	12.18***
CZ	38.91	33.74	15.32***

***- Significant at 1 per cent level, NS– Non-significant

The yield gain due to improved varieties over check mean yield was highest in NEPZ (27.14 %) followed by CZ (15.32 %), NWPZ (12.18 %) and NHZ (11.39 %) (Table 30).

Therefore, efforts should be made to increase barley yield in the NEPZ and CZ in collaboration with the state department of agriculture.

Table 31 : Centre wise performance of improved barley varieties during *rabi* 2017-18

Zone	Centre	BFLDs yield (q/ha)	Check yield (q/ha)	% increase
NHZ	Bajaura	29.11	25.68	13.36 NS
	Tutikandi Shimla	23.00	21.00	09.52**
NEPZ	Faizabad	33.79	25.43	32.87***
	Mirzapur	42.67	31.56	35.20***
	Kanpur	37.58	32.00	17.44***
	Varanasi	42.73	34.59	23.53***
NWPZ	Meerut	50.14	44.89	11.70***
	Ludhiana	48.38	45.63	06.03 NS
	Mansa	45.56	40.81	11.64***
	Hisar	45.50	41.25	10.30***
	Rewari	51.17	45.00	13.71***
	Bhiwani	49.49	45.13	09.66***
	Durgapura Jaipur	53.41	45.65	17.00***
	Chomu Jaipur	53.07	44.84	18.35**
CZ	Udaipur	41.00	37.67	08.84***
	Rajsamand	43.03	35.36	21.69***
	Rewa	32.39	25.33	27.87***
	Panna	34.51	28.49	21.13***
	Chhattarpur	23.55	20.45	15.16***
	Morena	49.93	44.15	13.09***
	Bhind	42.75	39.55	08.09***

*** -Significant at 1 percent level, ** - Significant at 5 percent level, NS– Non-Significant

The yield gain at Mirzapur (35.20%) centre was highest followed by Faizabad (32.87%), Rewa (27.87%), Rajsamand (21.69%), Panna (21.13%), Chomu-Jaipur (18.35%), Kanpur (17.44%) and Durgapura-Jaipur (17.00%) centers across the zones. The increase in improved varietys' yield at Ludhiana over check variety was the lowest (06.03%) but non-significant (Table 31).

Table 32 : Variety wise performance of improved barley varieties during *rabi* 2017-18

Zone and Centre	Improved variety	Average yield (q/ha)	Check variety	Average yield (q/ha)	% Increase over check
NHZ					
Bajaura	HBL 713	29.11	HBL 113	25.68	13.36 NS
IARI, RS, Shimla	BHS 400	24.00	Local	22.00	9.09 NS
	BHS 380	22.67	Local	20.67	9.68*
NEPZ					
Faizabad	RD 2794	33.79	Faizabad Local	25.43	32.87***
Mirzapur	RD 2794	42.67	Amber	31.56	35.20***
Kanpur	RD 2794	37.58	Azad	32.00	17.44***
Varanasi	HUB 113	42.59	Jyoti	34.27	24.28***
	HUB 113	42.94	RD 2552	35.07	22.44 NS
NWPZ					
Meerut	BH 946	50.14	Local	44.89	11.70***

Zone and Centre	Improved variety	Average yield (q/ha)	Check variety	Average yield (q/ha)	% Increase over check
Ludhiana	BH 946	45.88	PL 807	42.75	7.32***
	DWRB 123	50.88	DWRUB 52	48.50	4.91 NS
Mansa	BH 946	45.56	PL 807	40.81	11.64***
Hisar	BH 946	45.50	BH 393	41.25	10.30***
Rewari	BH 946	48.75	BH 393	45.00	8.33***
	DWRB 123	56.00	BH 393	45.00	24.44**
Bhiwani	BH 946	49.49	BH 393	45.13	9.66***
Durgapura-Jaipur	BH 946	53.41	Local	45.65	17.00***
Chomu-Jaipur	BH 946	53.07	RD 2035	44.84	18.35**
CZ					
Udaipur	BH 959	41.00	RD 2035	37.67	8.84***
Rajsamand	BH 959	43.03	Local	35.36	21.69***
Rewa	BH 959	32.39	JB 58	25.33	27.87***
Panna	BH 959	34.51	Munda Jawa	28.49	21.13***
Chhattarpur	BH 959	23.67	JB 58	20.00	18.35*
Chhattarpur	BH 959	23.50	JB1	20.63	13.91*
Morena	BH 959	49.93	Jyoti	44.15	13.09***
Bhind	BH 959	42.75	Local	39.55	8.09***

***-Significant at 1 percent level, ** - Significant at 5 percent level, * Significant at 10 percent level, NS– Non-significant

In NHZ, HBL 713 was the highest average yielding (25.68 q/ha) variety at Bajaura centre. In NEPZ, HUB 113 at Varanasi (42.94 q/ha), DWRB 123 at Rewari (56.00 q/ha) in NWPZ and BH 959 at Morena (49.93 q/ha) in CZ were the highest average yielding varieties (Table 32).

Table 33 : Yield potential of barley varieties in different zones during *rabi* 2017-18

Zone	Centre	Variety	Yield(q/ha)
NHZ	Bajaura	HBL 713	32.37
NEPZ	Varanasi	HUB 113	44.27
NWPZ	Rewari	DWRB 123	60.00
CZ	Morena	BH 959	53.50

At particular farmers' field as well as on average basis HBL 713 (32.37 q/ha), HUB 113 (44.27 q/ha), DWRB 123 (60.00 q/ha) and BH 959 (53.50 q/ha) performed better than other varieties at Bajaura, Varanasi, Rewari and Morena centres in the NHZ, NEPZ, NWPZ and CZ, respectively (Table 33).

Table 34 : Barley varieties grown in different zones during *rabi* 2017-18

Zone	Improved varieties	Check varieties	Popular varieties in the region
NHZ	BHS 400, BHS 380, HBL 713	HBL 113, Local	Sonu, Dolma, HBL 276, Local
NEPZ	RD 2794, HUB 113	Faizabad Local, Azad, Jyoti, Amber, RD 2552	Faizabad Local, Azad, Jyoti, Amber, Geetanjali, RD 2552
NWPZ	BH 946, DWRB 123	PL 807, DWRUB 52, BH 393, RD 2035, Local	PL 807, DWRUB 52, BH 393, RD 2035, RD 2052, RD 2715, RD 2794, Local
CZ	BH 959	RD 2035, RD 2552, JB 1, JB 58, Munda Jawa, Local	RD 2035, RD 2552, RD 2715, RD 2660, RD 2786, JB 1, JB 58, Munda Jawa, Jyoti, Local

Constraints analysis in different barley producing zones during *rabi* 2017-18

Variation in yield levels among different states, farmers and farms leads to yield gap in different states and different zones. There are many reasons of this yield gap which need to be addressed for sustainable barley production. Through constraint analysis an effort has been made to identify the factors impeding barley production in different parts of the country. An inventory of constraints impeding barley production in the country was developed after thorough review of literature and taking experts' opinion. Data were collected on a well designed pre-structured questionnaire mailed to all the cooperating centres conducting barley FLDs. The responses were collected on a three point continuum *viz;* Most Serious, Serious and Not Serious constraints. The scores were assigned as 3, 2, 1 for the most serious, serious and not serious constraints, respectively. Based on the total score, the level of seriousness for each constraint has been calculated and finally ranking was done.

NHZ : In northern hills zone, yellow rust, lack of knowledge among farmers about recent technologies, small land holding, late sowing, lack of irrigation facilities, lack of knowledge about appropriate dose of herbicide, water stress, non availability of seed of newly released variety, lack of training facility, poor quality seed and jangali jai (*Avena ludoviciana*) were major constraints (Table 35).

Table 35: Constraints in NHZ **(n=7)**

Constraints	Score	Rank
Yellow rust	14	I
Lack of knowledge among farmers about recent technologies	14	I
Small land holding	12	II
Late sowing	12	II
Lack of irrigation facility	11	III
Lack of knowledge about appropriate dose of herbicide	11	III
Water Stress	11	III
Non availability of seed of newly released variety	10	IV
Lack of training facility	08	V
Poor quality of seed	07	VI
Jangali Jai (*Avena ludoviciana*)	07	VI

NEPZ : In north eastern plains zone, high cost of inputs was the most serious constraint followed by untimely rain, decline in water table, *Phalaris minor* infestation in barley fields, temperature fluctuation during the crop season, erratic power supply, low organic matter in soil, poor soil fertility status, non availability of farm machinery, lack of knowledge among farmers about recent barley production technologies, non availability of seeds of newly released varieties and high custom hire rate (Table 36).

Table 36: Constraints in NEPZ (n=40)

Constraints	Score	Rank
High cost of inputs	70	I
Untimely rain	68	II
Decline in water table	63	III
Phalaris minor	60	IV
Temperature fluctuation during crop season	54	V
Erratic power supply	54	V
Poor soil fertility status	49	VI
Low organic matter	49	VI
Non availability of farm machinery	47	VII
Lack of knowledge among farmers about recent barley production technologies	47	VII
non availability of seeds of newly released varieties	47	VII
High custom hire rate	47	VII

NWPZ : Being the most productive and potential zone for barley cultivation, the constraints which were most serious in nature need to be addressed. Among major constraints, decline in water table, lack of canal irrigation facilities, low price of barley, poor soil fertility status, small land holding, erratic power supply, high temperature, non availability of labour and heavy infestation of barley fields with bathua were perceived serious by majority of the FLD farmers of NWPZ (Table 37).

Table 37: Constraints in NWPZ (n=89)

Constraints	Score	Rank
Decline in water table	100	I
Lack of facility of canal irrigation	84	II
Low price of barley	81	III
Poor soil fertility status	74	IV
Small land holding	72	V
Erratic power supply	71	VI
High temperature	68	VII
Non availability of labour	66	VIII
Infestation of Bathua *(Chenopodium album)* in barley fields	66	VIII

CZ : In central zone, high cost of inputs was perceived as the most serious constraint followed by low price of barley, high temperature at maturity, untimely rain, temperature fluctuation, imbalanced use of fertilizers, non availability of seeds of newly released varieties of barley, decline in water table, lack of knowledge about recent barley production technologies and higher rate of custom hiring of farm machinery/implements (Table 38).

Table 38: Constraints in CZ (n=38)

Constraints	Score	Rank
High cost of inputs	105	I
Low price of barley	98	II
High temperature at maturity	90	III
Untimely rain	85	IV
Temperature fluctuation	83	V
Imbalanced use of fertilizers	81	VI
Non availability of seeds of newly released varieties	79	VII
Decline in water table	79	VII
Lack of knowledge among farmers about recent barley production technologies	78	VIII
High custom hiring rate	78	VIII

Most serious constraints impeding barley production in the country

Overall analysis of constraints in different zones clearly indicated that high cost of inputs was the most serious constraint in the country regarding barley cultivation as perceived by the farmers. It is followed by declining water table, low price of barley, low organic matter in the soil, high temperature at maturity, small land holding, untimely rain, lack of knowledge among farmers about recent barley production technologies, lack of canal irrigation facility, and erratic power supply which were also perceived serious affecting barley production and productivity of the country (Table 39).

Table 39: Major constraints impeding barley production in the country (n=206)

Constraints	Score	Rank
High cost of inputs	253	I
Declining water table	245	II
Low price of barley	226	III
Low organic matter in soil	206	IV
High temperature at maturity	203	V
Small land holding	197	VI
Untimely rain	196	VII
Lack of knowledge among farmers about recent barley production technologies	195	VIII
Lack of facility of canal irrigation	193	IX
Erratic power supply	192	X

Costs and Returns for Wheat and Barley FLDs vis-à-vis Check Plots

Profitability on investment is one of major deciding factors for adoption of any crop production technology. In this section, costs and returns analysis for wheat and barley FLDs have been attempted across regions for the improved production technologies that were tested in farmers' fields during 2017-18.

Generally in any economic study, total costs are discussed under two categories *viz.,* variable costs and fixed costs, the widely adopted norm. Nevertheless, variable costs alone are reckoned to be the cost incurred by the farmers ignoring the fixed costs. The profit and loss are estimated accordingly. But in any economic analysis of farm business, the fixed costs should also be taken into consideration to arrive at total costs for computing the net income. However, in the present analysis only operational or variable costs were considered to know the profitability of technology adoption. Operational costs include expenses on labour employed to perform different cultural operations and expenses incurred on material inputs *viz.,* seeds, FYM, fertilizers, plant protection chemicals *etc*. The returns over variable costs give an idea of profitability accrued to the farmer after meeting all the working expenses. Profits were worked out for FLDs and Check plots for a better comparison. Cost of production was also estimated to know the cost incurred in producing a unit quantity of wheat and barley output. Returns per rupee of investment were also worked out to know the comparative profitability between wheat and barley.

Data Collection

Primary data were collected by the cooperating centres from the selected farmers who were allotted with the FLDs. Personal interview and discussion method was adopted with the aid of pre-tested schedules designed exclusively for the purpose evaluating the technologies disseminated through FLDs. The data collected pertained to the *Rabi* season 2017-2018. The communicated data were compiled and processed at the ICAR-Indian Institute of Wheat and Barley Research for further analysis and reporting. Every genuine effort was made by the FLD coordinators to collect realistic data from the FLD beneficiaries and inappropriate data reported from the cooperating centres/ delayed reporting were not included for the costs and returns analysis.

Costs and Returns for Wheat (FLDs vis-à-vis Check Plot)

Perusal of Table 40 indicates that on an average, wheat varieties or technologies demonstrated in FLDs gave `2.70 per rupee of investment in comparison to the check varieties (`2.33). A significant difference in returns per rupee of investment was noticed between the FLD and check plots across states, zones and technologies. The returns per rupee of investment from FLDs ranged from `5.05 (Punjab) to `1.45 (West Bengal) across states, `3.52 (NWPZ) to `2.07 (NEPZ) across zones and `6.17 (Dicoccum) to `1.82 (Zero tillage) across technologies. Punjab registered the highest returns per rupee of investment owing to the low operational costs. On the contrary, West Bengal registered lowest returns per rupee of investment due to higher operational costs per unit area (`48773/ha).

The profit per hectare in FLDs was highest in Punjab (`90551), followed by Madhya Pradesh (`77689) and Rajasthan (`73436). The difference in profit between FLDs and check plots ranged from `28893 in Madhya Pradesh to `884 in Haryana. Interestingly, operational costs in Bihar, Maharashtra and Punjab were lower in FLDs than the check plots. The probable reason for Punjab might be demonstration of resource efficient zero tillage and rotavator techniques which reduces the operational costs. Estimates of cost of production indicated that the operational cost incurred in producing a unit quantity of output was least in Punjab (`437 per quintal) owing to less operational costs and the likelihood of getting more yield being a progressive state. Among wheat growing zones, the cost of production in the NWPZ due to relatively less operational costs in raising the crop and realized yield levels was more than other zones. NWPZ also realized a good return per rupee of investment (`3.52) which is mainly due to the higher productivity.

Among the wheat production technologies demonstrated at farmers field, dicoccum gave the highest profit per hectare (`150000) and the least profit was observed for the zero tillage (`35752). However, the results were not consistent across sites owing to testing of particular technology in different locations of diverse soil properties. Overall, on an average, an Indian farmer by adopting a new wheat variety or production technology will earn `54622 per hectare at his/her farm. Further, `852 have to be spent to produce a quintal of wheat through adoption of a new wheat variety or production technology against `1010 (check varieties).

Table 40: Costs and returns from wheat during 2017-18

Particulars	Cost of Cultivation (`/ha)						Returns per ` invested		Cost of Production (`/Qtl)	
	Operational Costs		Gross Returns		Profit					
	FLD	Check	FLD	Check	FLD	Check	FLD	Check	FLD	Check
State										
Assam	25944	23771	46287	35848	20343	12077	1.78	1.51	1053	1257
Bihar	30843	31137	80286	66000	49443	34863	2.60	2.12	758	945
Chhattisgarh	28378	27243	95107	72804	66729	45561	3.35	2.67	783	913
Gujarat	40108	39898	107900	94693	67792	54795	2.69	2.37	825	938
Haryana	28265	26611	100890	98352	72625	71742	3.57	3.70	588	577
Himachal Pradesh	31330	31268	84308	70295	52978	39028	2.69	2.25	919	1115
Jammu & Kashmir	23990	23857	86880	64304	62890	40447	3.62	2.70	661	854
Jharkhand	32931	32774	62770	47168	29839	14393	1.91	1.44	961	1290
Karnataka	40197	37641	62542	51618	22345	13978	1.56	1.37	1600	1874
Madhya Pradesh	31329	30803	109018	79599	77689	48796	3.48	2.58	662	822
Maharashtra	28982	29005	88596	69704	59614	40698	3.06	2.40	733	871
New Delhi	43426	43320	101273	94287	57847	50967	2.33	2.18	919	991
Punjab	22351	22955	112902	114875	90551	91920	5.05	5.00	437	446
Rajasthan	37915	37745	111351	101813	73436	64068	2.94	2.70	786	851
Uttar Pradesh	34424	33395	98418	86152	63994	52757	2.86	2.58	748	828
Uttarakhand	27131	24293	78436	59411	51305	35119	2.89	2.45	836	1037
West Bengal	48773	48735	70516	49677	21743	942	1.45	1.02	1342	1743
Zone										
CZ	34665	34080	102552	81487	67887	47407	2.96	2.39	779	907
NEPZ	34109	33876	70772	57921	36663	24044	2.07	1.71	977	1184
NHZ	29025	27055	78114	59757	49089	32702	2.69	2.21	908	1121
NWPZ	29892	29399	105331	97770	75439	68370	3.52	3.33	618	688
PZ	33548	32522	77987	62339	44439	29818	2.32	1.92	1086	1279
Technology										
Bio-fertilizer	39224	36699	102573	92551	63349	55852	2.62	2.52	865	916
Dicoccum	29000	29000	179000	163500	150000	134500	6.17	5.64	611	644
Drip Irrigation	48592	48484	100269	83818	51677	35334	2.06	1.73	987	1172
Durum	30762	30537	95673	66909	64911	36372	3.11	2.19	919	1189
Happy Seeder	20916	22298	102969	100810	82053	78512	4.92	4.52	451	494
Rotavator	24175	25214	112268	110298	88093	85085	4.64	4.37	410	435
Sprinkler	60863	42803	120655	111671	59792	68868	1.98	2.61	1195	913
Variety	31249	30275	83811	69532	52561	39257	2.68	2.30	853	1019
Variety (late sown)	38349	37798	90283	77434	51934	39636	2.35	2.05	882	995
Zero Tillage	43682	47729	79433	74831	35752	27102	1.82	1.57	1144	1363
All Categories										
India	**32061**	**31311**	**86683**	**72896**	**54622**	**41585**	**2.70**	**2.33**	**852**	**1010**

Costs and Returns for Barley (FLDs vis-à-vis Check Plot)

Table 41 indicates that on an average, improved barley varieties demonstrated in FLDs gave around 28 per cent better returns in comparison to the check. A significant difference in returns per rupee of investment was noticed between the FLD and check plots across states and zones. Punjab registered the highest returns per rupee of investment (`6.73) through demonstrations, followed by Rajasthan (`5.58) and Uttar Pradesh (`4.05). However, the difference in the returns per rupee of investment between FLDs and checks was highest in Rajasthan. The profit per hectare in FLDs was highest in Rajasthan (`104228), followed by Punjab (`65512) and Uttar Pradesh (`57469). The difference in profit between FLDs and check ranged from `54336 in Rajasthan to `6141 in Punjab. Interestingly, operational costs in Madhya Pradesh, and Uttar Pradesh were lower in FLDs than check plots. The valid reason might be reduction in the use of inputs based on the recommendation. The returns per rupee of investment across barley growing zones were highest in the NWPZ (`5.44), followed by NEPZ (`3.58) and CZ (`3.09). Estimates of cost of production indicated that the cost incurred in producing a unit quantity of output was least (`246) in Punjab (NWPZ) owing to less operational costs and relatively higher yield.

Table 41: Costs and returns from barley during 2017-18

Particulars	Cost of Cultivation (`/ha)						Returns per ` invested		Cost of Production (`/Qtl)	
	Operational Costs		Gross Returns		Profit					
	FLD	Check	FLD	Check	FLD	Check	FLD	Check	FLD	Check
State										
Haryana	26608	25992	83050	74642	56442	48650	3.12	2.87	541	589
Himachal Pradesh	24271	22943	56999	48391	32728	25448	2.35	2.11	960	1012
Madhya Pradesh	21563	23050	68643	59607	47080	36556	3.18	2.59	581	719
Punjab	11436	11089	76948	70460	65512	59370	6.73	6.35	246	262
Rajasthan	22736	21095	126963	70986	104228	49891	5.58	3.37	507	540
Uttar Pradesh	18833	19276	76302	63807	57469	44531	4.05	3.31	482	614
Zone										
CZ	22700	23664	70220	60988	47520	37324	3.09	2.58	593	711
NEPZ	21616	22766	77469	61811	55853	39045	3.58	2.72	580	766
NHZ	24271	22943	56999	48391	32728	25448	2.35	2.11	960	1012
NWPZ	18672	17520	101603	73432	82931	55912	5.44	4.19	377	398
Technology										
Improved Variety	20936	21010	83728	65771	62792	44762	4.00	3.13	515	603
All Categories										
India	**20936**	**21010**	**83728**	**65771**	**62792**	**44762**	**4.00**	**3.13**	**515**	**603**

Overall, the costs and returns analysis on wheat and barley indicated that profit per hectare from FLDs was more than the check varieties by `13037 and `18031 respectively establishing the fact that FLDs carry the successful technologies from lab to land. For some beneficiaries it was found that the operational costs under check varieties were more than the FLDs. However, the present estimates are only the indicators for comparison within the current year and may not have a complete inter-year relevance as the demonstrations were conducted in different sites. Further, the difference in profit earned from wheat/barley cultivation is subject to farm-farmer-region specific conditions as it varies from case to case.

Technology Outreach Programme

'Mera Gaon Mera Gaurav' Scheme at ICAR-IIWBR, Karnal

The activities of the governments flagship programme towards doubling of farmers' income, 'Mera Gaon Mera Gaurav' scheme were carried out on a large scale during the current crop season and all the teams visited their adopted villages and created awareness among the farmers on advanced practices of crop cultivation and supplied mini kits on DWRB 123 barley variety. Timely reports of monthly and quarterly activities were compiled at IIWBR and submitted to the Zonal Nodal Officer & Director, ICAR- Agricultural Technology Application Research Institute (ATARI), Zone-2, Jodhpur (Rajasthan) regularly. All the fourteen teams have provided detailed information about their various activities in the villages. Farmers of many villages were invited on different occasions in the institute premises. One training programme on 'Increasing Farm Income of the Lahaul Valley Farmers' was organised for farmers during December 4-5, 2017.

Training programmes organised/conducted at ICAR – IIWBR, Karnal

S. N.	Date	Duration (days)	No. of Trainees	Subject	From
1.	May 10, 2017	1	40 farmers	Udhmita Vikas	Rastriya Kisan Sanganthan (RKS) with ICAR-IIWBR, Karnal, Haryana
2.	November 21, 2017	1	40 Farmers	Improved Wheat Cultivation	IFFCO, Rewari Haryana
3.	November 27, 2017	1	22 Farmers	Weed Management	Krishi Vistar Samiti, Karnal, Haryana
4.	November 28, 2017	3		Kushal Sahayak Karamchari ki Karyakshamta evam vyakatitav vikas	ICAR-IIWBR, Karnal
5.	December 4-5, 2017	2	43 farmers	Increasing farm income of the Lahaul Valley farmers under TSP Programme	ICAR-IIWBR, Karnal
6.	22-25 January, 2018	4	42 farmers	Banaskantha Gujarat mein vaigyanik kheti dwara gehoonke utpadak kisanon ki aaye mein vridhi	Banaskantha, Gujarat
7.	26 February, 2018	1	35 farmers	Pashchimi Uttar Pradesh mein Gehoon ki Unnat Prodyagiki	DDA, Muzaffarnagar, UP
8.	27 February, 2018	1	52 farmers	Gehoon ki Unnat Kheti.	DDA, Baghpat, UP
9.	7-9 March, 2018	3	55 farmers	Uttarakhand mein Gehoon evam Jau ki unnat kheti dwara kisanon ki Aaye ko doguna karna.	Dehradoon, Uttarakhand
10.	15 March, 2018	3	8 farmers	Bihar mein gehoon ki unnat kheti	Piprakothi, Motihari, Bihar
11.	26-28 March, 2018	3	35 farmers	Haridwar Uttarakhand mein Gehoon ki unnat kheti.	Haridwar, Uttarakhand

Awareness programmes organised/conducted at / by ICAR – IIWBR, Karnal

S. N.	Date	No. of participants	Subject	Organised by
1.	June 05, 2017	150 participants	World Environment Day programme at village Raisan, Nilokheri	NABARD and ICAR-IIWBR, Karnal
2.	December 03, 2017	100 students from different schools of Karnal	Agricultural Education Day	ICAR-IIWBR, Karnal
3.	December 05, 2017	290 farmers	World Soil Health day at village Rasina (Kaithal)	ICAR-IIWBR, Karnal
4.	March 17, 2018	200 farmers	Webcast of Honourable Prime Minister address from Krishi Unnati Mela, Pusa was organised	ICAR-IIWBR, Karnal
5.	October 30, 2017	25 participants	Awareness programme to stop stubble bouring	ICAR-IIWBR, Karnal and Dainik Jagran

Organization/Participation in Exhibition/Agricultural Awareness Programmes

S.N.	Program	Date	Duration (days)	Organized by
1.	Krishi Kalyan Mela at Motihari, Bihar	April 15-19, 2017	5	ICAR Complex for Eastern Region, Patna
2.	World Environment Day programme at village Raisan, Nilokheri	June 05, 2017	1	NABARD and ICAR-IIWBR, Karnal
3.	Kisan Mela at Rakhra Farm, Patiala	September 16, 2017	1	Young Farmers' Association, Rakhra Farm, Patiala
4.	Pt. Deendayal Upadhyay Krishi Mela, Mathura	September 22-24, 2017	3	ICAR-CIRG, Makhdum, Mathura
5.	Beej Diwas avam Rabi Karyashala : Badalte Jalwayu Parivesh mein Krishi ke Naye Aayaam	October 10, 2017	1	ICAR-IIWBR, Karnal
6.	Exhibition during 'World Food India-2017' at C-Hexagon Park, India Gate, New Delhi.	November 3-5, 2017	3	Ministry of Food Processing Industries, GOI, New Delhi.
7.	Exhibition during National Dairy Mela-2017 at ICAR-NDRI, Karnal	November 23-25, 2017	3	ICAR-NDRI, Karnal
8.	Exhibition during National Seminar at NHRDF, Salaru, Karnal	November 29-30, 2017	2	NHRDF, Salaru, Karnal.
9.	Agricultural Education Day	December 03, 2017	1	ICAR-IIWBR, Karnal
10.	World Soil Health Day at village Rasina, Kaithal	December 05, 2017	1	ICAR-IIWBR, Karnal.
11.	Foundation Day	February 9, 2018	1	ICAR-IIWBR, Karnal
12.	Ganna Mela at ICAR- SBI, RS, Karnal	February 17, 2018	1	ICAR- SBI, RS, Karnal
13.	North Zone Regional Farmers' Fair	February 23-25, 2018	3	IIVR, Varanasi
14.	Rabi Kisan Mela at ICAR-CSSRI, Karnal.	March 10, 2018	1	CSSRI, Karnal
15.	Exhibition during Krishi Unnati Mela at ICAR-IARI, New Delhi.	March 16-19, 2018	3	CSSRI, Karnal.
16.	Exhibition during AB InBev's Growers Day at Farukhnagar, Haryana.	March 21, 2018	1	AB InBev, Bar Malt, Gurgaon, Haryana

Kisan Mela/ Farmers day/Field day

S.No.	Programme	Date	Organised by	Number of participants
1	Beej Diwas avam Rabi Karyashala " Badalte Jalwayu parivesh me krishi ken aye Ayam	October 10, 2017	ICAR-IIWBR, Karnal	2000 farmers
2	World Soil Health Day at village Rasina, Kaithal	December 05, 2017	ICAR-IIWBR, Karnal	290 farmers
3	Field Day at Wheat FLD site in village Hajwana, district Kaithal.	April 02, 2018	ICAR-IIWBR, Karnal	100 farmers

Capacity building programmes for different stakeholders during 2017-18

For students

Dr. Sendhil R. is associated with the ICAR-National Dairy Research Institute, Karnal in teaching 'Advanced Agricultural Marketing and Price Analysis (3+0)' for Ph.D. Scholars and 'Agricultural Development and Policy Analysis (2+0) for M.Sc. Scholars.

Farm advisory services

The farmers were advised on various aspects of wheat and barley cultivation. More than 1000 farmers/entrepreneurs/ other stakeholders were provided replies to their queries through letters, phone calls, emails, SMS and WhatsApp.

Regular weekly advisories were issued on the web page of ICAR-IIWBR for the farmers on weather and cultural practices during the crop season.

Wheather Update: Regular weather updates were uploaded on the webpage to provide weather based advisory to the farmers.

WhatsApp group: Farm Advisories_IIWBR

The Farm Advisories on wheat and barley crops were sent through the WhatsApp group.

Toll Free Phone Number : Through toll free phone number of institute (18001801891) a large number of farmers were updated on wheat and barley cultivation and their querries were well addressed.

Advisories Linkage to MANAGE Portal

The advisories issued on different aspects of wheat and barley crop were linked / uploaded on the MANAGE Portal for wide circulation and use.

Lectures delivered

Date	Topic
September 21, 2017	"Bio fortified wheat for ensuring nutritional security" during 21 days training programme on "Extension Strategies for Nutrition Sensitive Agriculture to Address Sustainable Development Goals" during 2-22 Sept., 2017 at Division of Agricultural Extension, IARI, New Delhi.
October 06, 2017	Soft Skill in Policing at Madhuban Police Academy for trainees on traffic
November 7, 2017	(1) Soft Skills for Agril. Students and (2) Positive Motivation During 14 days training programme for B.Sc (Ag) students on personality development at College of Agriculture, CCSHAU, Kaul on.
November 28, 2017	"Hindi Bhasha Ka Prachar Avam Prasar Tatha Karya Sthal Par Hindi Bhasha Ka Upyog" during 3 days training programme organized during 28-30 November, 2018 at ICAR-IIWBR on" Kushal Sahayak Karmachari ki Karyakshamta avam Vyaktitva Vikas.
December 3, 2017	"Agricultural Education: Scope and Career Opportunities" to 100 students from different schools of Karnal on the occasion of Agricultural Education Day.
December 4, 2017	Lecture on 'Introduction of TSP Programme' to 43 farmers of 15 villages of Lahaul Valley (HP) in two days Training Programme under TSP project on 'Increasing farm income of the Lahaul Valley Farmers'.
December 6, 2017	Delivered a lecture on on "Vaigyanik Aur Takniki Anuvaad Ki Vyavaharik Samasyayen Avam Unka Samadhan" during 5 days training programme organized at ICAR-CSSRI, Karnal during 4-8 December, 2017 on" Vishesh takniki Prashikshan Karyakram of Kendriya Anuvaad Bureau.
January 23, 2018	"Krishi Me Udhyamita Vikas" during training programme for farmers on "Banaskantha me Vaigyanik Kheti Dwara Gehoon ke Utpadan tatha Kisano ki aay me Vriddhi during 22-25 January, 2017.
March 08, 2017	"Krishi Me Udyamita Ka Vikas" during training programme for farmers on Uttarakhand me gehoon avam jau ki unnat khet tatha kisano ki aay ko doguna karna" during 7-9 March, 2018
March 13, 2018	(1) Soft Skills for Agril. Students and (2) Positive Motivation on during 14 days training programme for B.Sc (Ag) students on personality development at College of Agriculture, CCSHAU, Kaul.
March 14, 2018	"Designing Training Programme" at EEI, Nilokheri during 16-19 March, 2018 on Training Management
March 15, 2018	"Role of Extension Agencies in Characterization and Conservation of Plant Resources in India" in 10 days short course during 12-21 March, 2018 at ICAR-IIWBR, Karnal.
March 28, 2018	"Haridwar me Gehoon avam jau ki Unnat Kheti avam Katai Uprant Prabandhan" Vishay pa vyakhyan diya during training programme for Uttarakhand farmers during 26-28 March, 2018
March 13, 2018	Sendhil R delivered a lecture on "Indigenous Technical Knowledge (ITK) and Geographical Indications (GIs) in Agriculture and Protection Status" in the Short Course organised at ICAR-IIWBR, Karnal.

TV programmes on DD National and DD Kisan Channels

Date	Topic
24.10.2017	Shooting for Prashnottari programme on Wheat and Barley Cultivation, Krishi Darshan, DD National on 24.10.2017 and was telecast on 06.11.2017
09.11.2017	1. Shooting for DD Kisan "*Vichar-Vimarsh*" programme at Delhi 2. Live phone in programme on wheat cultivation in Krishi Darshan, DD National
12.11.2017	Visit of DD National Krishi Darshan Team to ICAR-IIWBR, Karnal to document success stories of progressive farmers of Karnal district
27.02.2018	Shooting for "*Vichar-Vimarsh*" Programme of DD Kisan was done on 27.02.2018 at Delhi

Seminars/Conferences/Symposia/Workshops/Meetings/Trainings attended

Title	Duration
Meeting to review the Progress of Wheat and Barley FLDs 2016-17 under NFSM held at Krishi Bhawan New Delhi on 28.04.207 under the Chairmanship of Agriculture Commissioner, DoAC&FW, MoA&FW, Krishi Bhawan, New Delhi.	28.04.2018
56th All India Wheat & Barley Research Workers Meet held at BHU, Varanasi during 25-28 August, 2017	25-28.08.2017
Institute Management Committee (IMC) Meeting of ICAR-IIWBR, Karnal.	27.09.2017
Institute Research Council (IRC) Meeting of ICAR-IIWBR, Karnal.	16-17.10.2017
Research Advisory Committee (RAC) Meeting of ICAR-IIWBR, Karnal.	26-27.10.2017
First Quarterly Meeting (April-June, 2017) of Rajbhasha Kaaryanavayan Samiti at ICAR-IIWBR, Karnal.	24.05.2017
Fourth Quarterly Meeting (January-March, 2018) of Rajbhasha Kaaryanavayan Samiti at ICAR-IIWBR, Karnal.	23.03.2018
One day workshop on 'Thos evam Taral Kachra Prabandhan' at ICAR-IIWBR, Karnal.	29.05.2017
Attended workshop on "Extension Strategy for Strengthening Agri-Nutri Linkages" at Division of Agril. Extension, IARI, New Delhi	21.09.2017
Attended panel discussion on Stubble Burning: Options to address it at NDRI, Karnal	31.10.2017
Attended inception workshop of the project "Value chain and policy interventions to accelerate adoption of Happy Seeder zero tillage in rice-wheat farming system across the Gangetic plains" at Panchkula	18.12.2017
4th National Sewminar on Doubling of Indian Farmer's Income by 2020: Opportunities and Challenges at PAU, Ludhiana	07.04.2017

Special Assignment

External Examiner for 3 M.Sc. students (Agricultural Extension) at NDRI on 10.07.2017.
Member of the Best Master's and Doctoral Thesis presentation award committee on 6-7 March, 2018 at NDRI, Karnal.

Production of Video Film

Video film on "Gehoon Ka Peela Ratua" in Hindi was produced and uploaded on website.

Coordination of visits at ICAR-IIWBR, Karnal during 2017-18

Date	Number of Visitors	From
April 06, 2017	25 Students	DAV, School, Gannaur, Sonipat (Haryana)
April 12, 2017	87 Students	SKNAU, Jobner , Jaipur (Rajasthan)
April 27, 2017	106 Students	Khalsa College, Patiala (Punjab)
May 19, 2017	13 Farmers	DDA, Bhind (MP)
June 23, 2017	38 Farmers	Project Director (PD), ATMA Shamli (UP)
June 27, 2017	16 Farmers	Department of Agriculture Saharanpur (UP)
June 28, 2017	44 Farmers	Bijnor (UP)
July 01, 2017	29 Students	B.Sc.(Hons.) Agri. Final year , COA, Bharatpur (Rajasthan)
July 14, 2017	27 Farmers	Churu (Rajasthan)
July 15, 2017	47 Farmers	Kota (Rajasthan)
July 16, 2017	45 Farmers	Alwar (Rajasthan)
July 16, 2017	36 Farmers	Jalore (Rajasthan)
August 22, 2017	13 Farmers	Gyaraspur
August 22, 2017	13 Farmers	Kurwai
September 18, 2017	98 Students	Agri. College & Research Institute, TNAU,
September 19, 2017	52 Students	Agri. College & Research Institute, TNAU,
September 20, 2017	46 Students	DBCA, TNAU Affiliated, Sagayathottam, Vellore (Tamil Nadu)
September 20, 2017	113 Students	Agri. College and Research Institute, Coimbatore ,Tamilnadu,
September 22, 2017	19 Farmers	Gorkha Rifles

Date	Number of Visitors	From
September 28, 2017	24 Farmers	GPS, Model Town, Karnal
October 09, 2017	39 Farmers	Female farmers from Rajkot (Gujarat)
October 10, 2017	47 Students	School of Agriculture, ITM University, Gwalior (MP)
October 11, 2017	40 Farmers	Chamba (HP)
October 28, 2017	12 Farmers	Morena (MP)
November 07, 2017	40 Farmers	Jam Nagar (Gujarat)
November 09, 2017	46 Farmers	Sriganganagar (Rajasthan)
November 09, 2017	22 Officers	DDMs from NABARD, Punjab Region
November 14, 2017	47 Officers	Gariyaband (Chhattisgarh)
November 14, 2017	105 Students	Chandigarh University
November 20, 2017	75 Students	Idhipalaraletti Agri. College, Kalavai, Vellore (Tamilnadu)
November 21, 2017	40 Farmers	IFFCO, Gurgaon
November 24, 2017	88 Students	APAC, Kalavai, Vellore (Tamilnadu)
November 25, 2017	18 Farmers	Sri Ganganagar (Rajasthan)
November 25, 2017	24 Farmers	Sonbhadra
November 27, 2017	99 Students	TRIARD, Perambalur, Tamilnadu Agriculture University
November 27, 2017	24 Farmers	Krishi Vistar Samiti, Karnal
December 02, 2017	51 Farmers	Department of Agriculture Valia
December 13, 2017	26 Farmers	Vidisha (MP)
December 26, 2017	106 Students	Tamil Nadu Agriculture University
December 30, 2017	8 Farmers	Kalapipal, Shajoypur (MP)
December 30, 2017	60 Farmers	Jammu & Kashmir
January 02, 2018	28 Officers	Officers of SDA & H, Karnal Zone , Haryana
January 17, 2018	30 Farmers	Jhunjhunu (Rajasthan)
January 24, 2018	50 Farmers	Hisar (Haryana)
January 25, 2018	38 Farmers	Hisar (Haryana)
January 29, 2018	40 Farmers	IWMP, Hisar
January 30, 2018	50 Farmers	Datia (MP)
February 03, 2018	52 Farmers	Hansi-I Block, Hisar (Haryana)
February 03, 2018	52 Farmers	Hansi-II Block, Hisar (Haryana)
February 05, 2018	50 Farmers	Water Sector Restructuring, Fatehpur (UP)
February 05, 2018	10 Farmers	Bhind (MP)
February 06, 2018	10 Farmers	Bhind (MP)
February 12, 2018	65 Farmers	Female farmers from Narnaund,Hisar (Haryana)
February 16, 2018	18 Farmers	Datia (MP)
February 17, 2018	34 Farmers	Himmat Nagar (Gujarat)
February 23, 2018	50 Farmers	KVK, Saharanpur (UP)
February 23, 2018	100 Farmers	Block Nissing, Karnal (Haryana)
February 25, 2018	10 Farmers	Bhind (MP)
February 26, 2018	10 Farmers	Morena (MP)
February 26, 2018	35 Farmers	KVK, Shamli (UP)
February 27, 2018	52 Farmers	Baghpat (UP)
February 27, 2018	37 Farmers	Muzaffarnagar (UP)
March 07, 2018	41 Farmers	Balasore (Odisha)
March 12, 2018	47 Students	College of Horticulture, Mandsour, RVSKVV, Gwalior (MP)
March 13, 2018	50 Agri. Officers	Chhattisgarh
March 17, 2018	31 Farmers	Hamirpur (UP)
March 19, 2018	22 Farmers	Datia (MP)
March 19, 2018	40 Farmers	Jalore (Rajasthan)
March 19, 2018	45 Farmers	Bharatpur (Rajasthan)
March 19, 2018	40 Farmers	Sonbhadra (Bihar)
March 19, 2018	48 Farmers	Bhadohi
March 20, 2018	05 Farmers	Rajkot (Gujarat)
March 20, 2018	45 Officers	Chhattisgarh
March 23, 2018	40 Students	B.Sc. Agri., Guru Nanak Collage, Budhwala, Mansa (Punjab)
March 23, 2018	27 Farmers	Mandi (HP)

Annexure – I : Category wise number of wheat FLDs farmers during 2017-18

S.N.	Name of Centre	Allocation		Achievement		Achievement Men, Area in ha, (No. of Farmers)				Achievement Women, Area in ha, (No. of Farmers)				Men	Women	Total
		No. of FLDs	Area under FLDs (ha)	No. of FLDs	Area under FLDs (ha)	SC	ST	OBC	Gen	SC	ST	OBC	Gen	Area(ha) (No. of Farmers)	Area(ha) (No. of Farmers)	Area(ha) (No. of Farmers)
	NHZ															
1.	VPKAS, Almora (Uttarakhand)	8	8	8	8.0	1.34	-	-	5.08	0.06			1.52	6.42 (110)	1.58 (20)	8.0 (130)
2.	CSKHPKV, HAREC, Bajaura, Kullu (HP)	4.8	4.8	4.8	4.8	--	-	-	4.0	-	-	-	0.4	4.4 (14)	0.4 (1)	4.8 (15)
3.	CSKHPKV, RWRC, Malan, Kangra (HP)	6	6	6	6.0	0.8	0.12	1.24	2.36	-	-	1.20	0.12	4.68 (23)	1.32 (9)	6.0 (32)
4.	CSKHPKV,PCRS, Berthin, Bilaspur (HP)	4.8	4.8	4.8	4.8	0.8	-	-	3.24	-	-	-	0.8	4.0 (10)	0.8 (2)	4.8 (12)
5.	CSKHPKV, HAREC, Dhaulakuan, Sirmour (HP)	4.8	4.8	4.8	5.0	-	-	3.0	2.0	-	-	-	-	5.0 (09)	-	5.0 (09)
6.	IARI, RS, Amartara Cottage, Shimla (HP)	4.8	4.8	4.8	4.8	-	-	-	4.8	-	-	-	-	4.8 (12)	-	4.8 (12)
7.	ICAR-IIWBR, RS, Flowerdale, Shimla (HP)	4.8	4.8	4.8	4.64	2.22	-	0.2	2.22	-	-	-	-	4.64 (11)	-	4.64 (11)
8.	RR&RS, SKUAST-K, Khudwani, Anantnag (J&K)	5.6	5.6	5.6	5.6	-	4.0	-	1.6	-	-	-	-	5.6 (14)	-	5.6 (14)
9.	RARS, SKUAST-Jammu, Tandwal, Rajouri (J&K)	4.8	4.8	4.8	4.8	0.8	0.8	-	2.4	-	-	-	0.8	4.0 (10)	0.8 (2)	4.8 (12)
10.	KVK (CSKHPKV), Bara, Hamirpur (HP)	4.8	4.8	4.8	4.8	-	-	0.8	4.0	-	-	-	-	4.8 (18)	-	4.8 (18)
11.	AICW&BIP Sub-Centre, CAU, Imphal (Manipur)	2	2	2	2	-	-	-	2.0	-	-	-	-	2.0 (02)	-	2.0 (02)
	NEPZ															
12.	NDUA&T, Faizabad (UP)	7.2	7.2	7.2	7.2	1.6	-	1.2	3.2	-	-	0.4	0.4	6.4 (14)	0.8 (2)	7.2 (16)
13.	CSAUA&T, Kanpur (UP)	10	10	10	10.0	1.2	-	3.2	5.6	-	-	-	-	10.0 (25)	-	10.0 (25)
14.	BHU, Varanasi (UP)	10	10	10	10.0	-	-	-	10.0	-	-	-	-	10.0 (25)	-	10.0 (25)
15.	KVK, Sohna, Sidharthnagar (UP)	10	10	10	10.0	2.4	-	6.8	0.8	-	-	-	-	10.0 (25)	-	10.0 (25)

S.N.	Name of Centre	Allocation		Achievement		Achievement Men, Area in ha, (No. of Farmers)				Achievement Women, Area in ha, (No. of Farmers)				Men	Women	Total
		No. of FLDs	Area under FLDs (ha)	No. of FLDs	Area under FLDs (ha)	SC	ST	OBC	Gen	SC	ST	OBC	Gen	Area(ha) (No. of Farmers)	Area(ha) (No. of Farmers)	Area(ha) (No. of Farmers)
16.	KVK, Sultanpur (UP)	4.8	4.8	4.8	4.8	0.4	-	0.8	3.6	-	-	-	-	4.8 (12)	-	4.8 (12)
17.	BCKV, Kalyani, Nadia (West Bengal)	10	10	10	10.0	5.46	2.71	-	1.83	-	-	-	-	10.0 (38)	-	10.0 (38)
18.	UBKVV, Pundibari, Coochbehar (West Bengal)	10	10	10	17.0	6.2	-	5.2	-	3.2	-	1.6	0.4	11.4 (27)	5.6 (14)	17.0 (41)
19.	RARS, AAU, Shillongani, Nagaon (Assam)	10	10	10	10	-	1.6	0.8	7.6	-	-	-	-	10.0 (25)	-	10.0 (25)
20.	KVK (AAU), Chirakuta, (Revenue village Jamduar Pt.II) Dhubri (Assam)	9.6	9.6	9.6	9.6	-	-	6.4	3.2	-	-	-	-	9.6 (65)	-	9.6 (65)
21.	KVK (AAU), Napam, Tejpur, Sonitpur (Assam)	7.2	7.2	6	5.94	-	-	2.22	3.72	-	-	-	-	5.94 (13)	-	5.94 (13)
22.	KVK (AAU), Kajalgaon, Chirang (Assam)	9.6	9.6	9.6	9.6	-	0.4	3.6	5.6	-	-	-	-	9.6 (30)	-	9.6 (30)
23.	IARI, RS, Pusa, Samastipur (Bihar)	10	10	10	10	-	-	6.0	4.0	-	-	-	-	10.0 (16)	-	10.0 (16)
24.	KVK, Sokhodeora, Nawadah (Bihar)	6	6	6	6	-	-	-	6.0	-	-	-	-	6.0 (6)	-	6.0 (6)
25.	KVK, RAU, Hariharpur,Vaishali (Bihar)	9.6	9.6	9.6	9.6	1.2	-	3.2	4.8	0.4	-	-	-	9.2 (12)	0.4 (01)	9.6 (13)
26.	KVK, Adhaura, Kaimur, Bhabua (Bihar)	7.2	7.2	7.2	7.2	-	-	4.4	1.6	-	-	1.2	-	6.0 (15)	1.2 (03)	7.2 (18)
27.	KVK, Chanpura-Basaith, Madhubani (Bihar)	4.8	4.8	4.8	4.8	-	1.2	1.6	2.0	-	-	-	-	4.8 (12)	-	4.8 (12)
28.	KVK (RAU), Pipra Kothi, East Champaran (Bihar)	7.2	7.2	7.2	7.2	0.8	-	2.8	3.6	-	-	-	-	7.2 (18)		7.2 (18)

S.N.	Name of Centre	Allocation		Achievement		Achievement Men, Area in ha, (No. of Farmers)				Achievement Women, Area in ha, (No. of Farmers)				Men	Women	Total
		No. of FLDs	Area under FLDs (ha)	No. of FLDs	Area under FLDs (ha)	SC	ST	OBC	Gen	SC	ST	OBC	Gen	Area(ha) (No. of Farmers)	Area(ha) (No. of Farmers)	Area(ha) (No. of Farmers)
29.	KVK (RAU), Madhopur, West Champaran (Bihar)	7.2	7.2	7.2	7.2	0.6	0.4	3.6	1.2	-	0.4	0.6	0.4	5.8 (19)	1.4 (04)	7.2 (23)
30.	BAU, Kanke, Ranchi (Jharkhand)	8	8	8	8	-	-	2.5	3.6	-	-	2.6	0.8	4.6 (09)	3.4 (11)	8.0 (20)
31.	KVK, Morabadi, Ranchi (Jharkhand)	10	10	10	10	-	6.	2.4	-	-	1.6	-	-	8.4 (21)	1.6 (04)	10 (25)
32.	KVK, BAU, West Singhbhum (Jharkhand)	8	8	8	8	-	2.0	-	-	-	2.0	4.0	-	2.0 (05)	6.0 (15)	8.0 (20)
	NWPZ															
33.	KVK (CSKHPKV), Una (HP)	4.8	4.8	4.8	4.8	0.8	-	0.4	2.8	0.4	-	-	0.4	4.0 (08)	0.8 (02)	4.8 (10)
34.	KVK (SKUAST-Jammu), Rajhani, Kathua, Jammu (J&K)	10	10	10	10	-	-	-	10.0	-		-		10.0 (25)	-	10.0 (25)
35.	PAU, Ludhiana (Punjab)	10	10	10	10	**1.6**	-	0.4	7.2	0.8	-	-	-	9.2 (23)	0.8 (02)	10 (25)
36.	PAU, RRS, Gurdaspur (Punjab)	7.2	7.2	7.2	7.2	-	-	-	7.2	-	-	-	-	7.2 (18)	-	7.2 (18)
37.	KVK, Haveli Kalan, Rupnagar (Punjab)	6	6	6	6	-	-	-	6.0	-	-	-	-	6.0 (12)	-	6.0 (12)
38.	KVK, Usman, Amritsar (Punjab)	6	6	6	6	-	-	-	6.0	-	-	-	-	6.0 (13)	-	6.0 (13)
39.	RBS College, Bichpuri, Agra (UP)	6	6	6	6	-	-	1.2	4.8	-	-		-	6.0 (15)	-	6.0 (15)
40.	KVK, Baghara, Muzaffarnagar (UP)	6	6	6	6	-	-	0.8	4.4	-	-	-	0.8	5.2 (13)	0.8 (02)	6.0 (15)
41.	ZARS, Nagina, Bijnor (UP)	4.8	4.8	4.8	4.8	0.4	-	2.4	2.0	-	-	-	-	4.8 (12)	-	4.8 (12)

S.N.	Name of Centre	Allocation		Achievement		Achievement Men, Area in ha, (No. of Farmers)				Achievement Women, Area in ha, (No. of Farmers)				Men	Women	Total
		No. of FLDs	Area under FLDs (ha)	No. of FLDs	Area under FLDs (ha)	SC	ST	OBC	Gen	SC	ST	OBC	Gen	Area(ha) (No. of Farmers)	Area(ha) (No. of Farmers)	Area(ha) (No. of Farmers)
42.	KVK, Khajuri Bagh, New Gopal Nagar, Saharanpur,UP	4.8	4.8	4.8	4.8	-	-	-	4.4	-	-	-	0.4	4.4 (11)	0.4 (01)	4.8 (12)
43.	ICAR-IIFSR, Modipuram, Meerut (UP)	7.2	7.2	Not conduc ted	-	-	-	-	-	-	-	-	-	-	-	-
44.	Amity Centre for Extension Services, Noida (UP)	6	6	6	6	1.2	-	4.0	0.8	-	-	-	-	6.0 (15)	-	6.0 (15)
45.	GBPUA&T, Pantnagar, USNagar (Uttarakhand)	7.2	7.2	7.2	7.2	-	-	3.4	2.4	-	-	0.4	1.2	5.8 (14)	1.4 (04)	7.2 (18)
46.	CATAT, IARI, New Delhi	7.2	7.2	7.2	7.2	-	-	6.4	-	-	0.8	--	-	6.4 (16)	0.8 (02)	7.2 (18)
47.	KVK (NHRDF), Ujwa, New Delhi	7.2	7.2	7.2	7.2	-	-	6.0	-	-		1.2	-	6.0 (15)	1.2 (03)	7.2 (18)
48.	ICAR-IIWBR, Karnal (Haryana)	8	8	8	8	-	-	8.0	-	-	-	-	-	8.0 (20)	-	8.0 (20)
49.	ICAR-CSSRI, Karnal (Haryana)	7.2	7.2	7.2	7.2	-	-	7.2	-	-	-	-	-	7.2 (18)	-	7.2 (18)
50.	CCSHAU, Hisar (Haryana)	6	6	6	6	-	-	2.8	3.2	-	-	-	-	6.0 (15)	-	6.0 (15)
51.	KVK, Bhiwani (Haryana)	4.8	4.8	4.8	4.8	-	-	-	4.8	-	-	-	-	4.8 (12)	-	4.8 (12)
52.	KVK, Tepla, Ambala (Haryana)	4.8	4.8	4.8	4.8	-	-	-	4.8	-	-	-	-	4.8 (12)	-	4.8 (12)
53.	KVK, Peoda Road, Kaithal (Haryana)	4.8	4.8	4.8	4.8	0.8	-	-	4.0	-	-	-	-	4.8 (12)	-	4.8 (12)
54.	RARI, SKNAU, Durgapura, Jaipur (Rajasthan)	5.6	5.6	5.6	5.6	-	-	5.2	0.4	-	-	-	-	5.6 (14)	-	5.6 (14)
55.	KVK, Ajmer (Rajasthan)	4.8	4.8	4.8	4.8	0.4	-	3.6	0.8	-	-	-	-	4.8 (12)	-	4.8 (12)
56.	KVK, Banasthali Vidyapeeth, District-Tonk (Rajasthan)	4.8	4.8	4.8	4.8	0.8	-	-	4.0	-	-	-	-	4.8 (12)	-	4.8 (12)

S.N.	Name of Centre	Allocation		Achievement		Achievement Men, Area in ha, (No. of Farmers)				Achievement Women, Area in ha, (No. of Farmers)				Men	Women	Total
		No. of FLDs	Area under FLDs (ha)	No. of FLDs	Area under FLDs (ha)	SC	ST	OBC	Gen	SC	ST	OBC	Gen	Area(ha) (No. of Farmers)	Area(ha) (No. of Farmers)	Area(ha) (No. of Farmers)
57.	ARS (RAU), Sriganganagar (Rajasthan)	4.8	4.8	4.8	4.8	-	-	4.8	-	-	-	-	-	4.8 (12)	-	4.8 (12)
	CZ															
58.	RCOA (MPUA&T), Udaipur (Rajasthan)	7.2	7.2	7.2	7.2	1.6	-	4.8	-	0.4	-	0.4	-	6.4 (16)	0.8 (02)	7.2 (18)
59.	ARS, MPUA&T, Banswara (Rajasthan)	6.4	6.4	6.4	6.4	-	4.4	-	-	-	2.0	-	-	4.4 (11)	2.0 (05)	6.4 (16)
60.	ARS, MPUA&T, Kota (Rajasthan)	7.2	7.2	Not conducted	-	-	-	-	-	-	-	-	-	-	-	-
61.	KVK, Sawai Madhopur (Rajasthan)	4.8	4.8	Not conducted	-	-	-	-	-	-	-	-	-	-	-	-
62.	WRS, JAU, Junagarh (Gujarat)	10	6	6	6	-	-	0.4	5.2	-	-	-	0.4	5.6 (14)	0.4 (01)	6.0 (15)
63.	MWRS, SDAU, Vijapur, Mehsana (Gujarat)	10	8	8	8	--	-	2.0	6.0	-	-	-	-	8.0 (20)	-	8.0 (20)
64.	JNKVV, Jabalpur (MP)	10	10	10	10	-	-	7.0	1.0	-	-	-	2.0	8.0 (08)	2.0 (02)	10.0 (10)
65.	IARI, RWRS, Indore (MP)	10	10	10	11.8	-	-	8.3	3.5	-	-	-	-	11.8 (26)	-	11.8 (26)
66.	KVK (JNKVV), Purushottampur, Panna (MP)	7.2	7.2	7.2	7.2	-	-	2.8	4.4	-	-	-	-	7.2 (14)	-	7.2 (14)
67.	KVK, Kalukhera Shiksha Samiti, Kalukhera, Ratlam (MP)	10	10	10	10	0.8	0.4	5.2	3.6	-		-	-	10.0 (25)	-	10.0 (25)
68.	KVK (RVSKVV), Pipersama, Neemuch(MP)	4.8	4.8	4.8	4.8	0.8	-	0.8	3.2	-	-	-	-	4.8 (12)	-	4.8 (12)
69.	KVK (RVSKVV),COH, Mandsour (MP)	4.8	4.8	5.2	5.2	-	-	4.4	0.8	-	-	-	-	5.2 (13)	-	5.2 (13)

S.N.	Name of Centre	Allocation		Achievement		Achievement Men, Area in ha, (No. of Farmers)				Achievement Women, Area in ha, (No. of Farmers)				Men	Women	Total
		No. of FLDs	Area under FLDs (ha)	No. of FLDs	Area under FLDs (ha)	SC	ST	OBC	Gen	SC	ST	OBC	Gen	Area(ha) (No. of Farmers)	Area(ha) (No. of Farmers)	Area(ha) (No. of Farmers)
70.	KVK (RVSKVV), MLNagar, Ujjain (MP)	8	8	Not conducted	-	-	-	-	-	-	-	-	-	-	-	-
71.	KVK (RVSKVV), Budhapura, Lahar, Bhind(MP)	4.8	4.8	Not conducted	-	-	-	-	-	-	-	-	-	-	-	-
72.	KVK, RRS, IGKVV, Jagdalpur, Bastar (CG)	7.2	7.2	7.2	7.2	-	3.6	2.8	0.8	-	-	-	-	7.2 (18)	-	7.2 (18)
73.	IGAU, RARS, Sarkanda, Bilaspur (CG)	10	10	10	10	3.6	6.0	-	-	0.4	-	-	-	9.6 (24)	0.4 (01)	10.0 (25)
	PZ															
74.	PDKV, Akola (Maharashtra)	10	10	10	10	0.8	0.4	8.4	-	-	-	0.4	-	9.6 (24)	0.4 (01)	10.0 (25)
75.	ARS, Niphad, Nasik (Maharashtra)	10	10	10	10	-	-	3.6	5.6	-	-	0.4	0.4	9.2 (23)	0.8 (02)	10.0 (25)
76.	MAU, Parbhani (Maharashtra)	10	10	9.6	9.6	-	-	0.4	6.8	-	-	0.8	1.6	7.2 (18)	2.4 (06)	9.6 (24)
77.	ARI, MACS, Pune (Maharashtra)	10	10	10	10	-	-	2.8	7.2	-	-	-	-	10.0 (25)	-	10.0 (25)
78.	UAS, Dharwad (Karnataka)	20	20	17.2	17.2	0.8	-	-	16.4	-	-		-	16.4 (41)	0.8 (02)	17.2 (43)
79.	BIRDS KVK, Tukkanatti, Belagavi (Karnataka)	10	10	10	10	-	-	-	10.0	-	-	-	-	10.0 (25)	-	10.0 (25)
	SHZ															
80.	IARI, RS, Wellington (Tamil Nadu)	20	20	17.6	17.6	-	-	10.6	7.0	-	-	-	-	17.6 (32)	-	17.6 (32)
	Total	**600**	**600**	**555.2**	**564.58**	**40.22**	**34.04**	**182.9**	**266.3**	**5.66**	**6.8**	**15.2**	**13.45**	**523.46 (1403)**	**41.12 (126)**	**564.58 (1529)**

Annexure - II : Category wise number of barley FLDs farmers during 2017-18

S.N.	Name of Centre	Allocation		Achievement		Achievement Men, Area in ha, (No. of Farmers)				Achievement Women, Area in ha, (No. of Farmers)				Men	Women	Total
		No. of FLDs	Area under FLDs (ha)	No. of FLDs	Area under FLDs (ha)	SC	ST	OBC	Gen	SC	ST	OBC	Gen	Area(ha) (No. of Farmers)	Area(ha) (No. of Farmers)	Area(ha) (No. of Farmers)
	NHZ															
1.	CSKHPKV, HAREC, Bajaura, Kullu (HP)	4.8	2	2	2	0.30	-	-	1.75	-	-	-	0.25	1.75 (07)	0.25 (01)	2.0 (08)
2.	IARI, RS, Amartara Cottage, Shimla (HP)	4.8	1.6	1.6	1.6	-	-	-	-	-	-	-	-	1.6 (4)	-	1.6 (4)
	NEPZ															
3.	NDUA&T, Narendranagar, Kumarganj, Faizabad (UP)	4.8	4.8	4.8	4.8	0.9	-	1.5	2.4	-	-	-	-	4.8 (14)	-	4.8 (14)
4.	KVK (IAS-BHU), Barkachha, Mirzapur (UP)	4.8	4.8	5.76	5.76	-	-	5.2	1.6	-	-	-	-	5.8 (09)	-	5.8 (09)
5.	CSAUA&T, Kanpur (UP)	4.8	4.8	4.8	4.8	-	-	1.6	3.2	-	-	-	-	4.8 (12)	-	4.8 (12
6.	BHU, Varanasi (UP)	4.8	2	2	2	-	-	1.2	0.8	-	-	-	-	2.0 (05)	-	2.0 (05)
	NWPZ														-	
7.	ICAR-IIFSR, Modipuram, Meerut (UP)	4.8	4.8	6.4	6.4	0.4	-	5.2	0.8	-	-	-	-	6.4 (16)	-	6.4 (16)
8.	PAU, Ludhiana (Punjab)	3.2	3.2	3.2	3.2	0.4	-	-	2.8	-	-	-	-	3.2 (08)	-	3.2 (08)
9.	KVK, Mansa (Punjab)	4.8	4.8	4.8	4.8	-	-	-	4.8	-	-	-	-	4.8 (12)	-	4.8 (12)
10.	CCSHAU, Hisar (Haryana)	4.8	4.8	4.8	4.8	-	-	-	4.8	-	-	-	-	4.8 (12)	-	4.8 (12)
11.	KVK, Rampura, Rewari (Haryana)	4.8	4.8	4.8	4.8	-	-	-	4.8	-	-	-	-	4.8 (12)	-	4.8 (12)
12.	KVK (CCSHAU), Bhiwani (Haryana)	4.8	4.8	4.8	4.8	-	-	-	4.8	-	-	-	-	4.8 (12)	-	4.8 (12)

S.N.	Name of Centre	No. of FLDs	Area under FLDs (ha)	No. of FLDs	Area under FLDs (ha)	SC	ST	OBC	Gen	SC	ST	OBC	Gen	Area(ha) (No. of Farmers)	Area(ha) (No. of Farmers)	Area(ha) (No. of Farmers)
13.	RARI (SKNAU), Durgapura, Jaipur (Rajasthan)	6.4	6.4	6.4	6.4	1.2	0.6	4.0	0.6	-	-	.	-	6.4 (11)	-	6.4 (11)
14.	KVK, Tankarda, Chomu, Jaipur (Rajasthan)	4.0	4.0	4.0	4.0	-	-	3.0	1.0	-	-	-	-	4.0 (07)	-	4.0 (07)
	CZ															
15.	RCOA, MPUA&T, Udaipur (Rajasthan)	4.8	4.8	4.8	4.8	2.0	-	2.8		-	-	-	-	4.8 (12)	-	4.8 (12)
16.	KVK (MPUA&T), Dhoinda, Rajasmand (Rajasthan)	4.8	4.8	4.8	4.8	-	-	2.0	-	-	-	2.8	-	2.0 (05)	2.8 (07)	4.8 (12)
17.	ZARP, COA, JNKVV, Kuthulia Farm, Rewa (MP)	4.8	4.8	4.8	4.8	-	-	0.4	4.4	-	-	-	-	4.8 (12)	-	4.8 (12)
18.	KVK (JNKVV), Purushottampur, Panna (MP)	4.8	4.8	4.8	4.8	-	-	1.8	3.0	-	-	-		4.8 (14)	-	4.8 (14)
19.	KVK (JNKVV), Nowgaon, Chhattarpur (MP)	4.8	4.8	6.4	6.4	1.6	-	3.2	1.6	-	-	-	-	6.4 (16)	-	6.4 (16)
20.	KVK (RVSKVV), Juara Khurd, Morena (MP)	4.8	4.8	6.0	6.0	-	-	-	-	-	-	-	-	6.0 (15)	-	6.0 (15)
21.	KVK (RVSKVV), Lahar, Bhind (MP)	4.8	4.8	6.0	6.0	0.8	-	1.2	3.2	0.4	-	-	-	5.4 (14)	0.4 (01)	6.0 (15)
	Total	**100**	**100**	**91.20**	**97.76**	**7.6**	**0.6**	**33.1**	**46.35**	**0.4**	**-**	**2.8**	**0.25**	**94.26 (229)**	**3.5 (9)**	**97.76 (238)**

Note : The figures in brackets indicate the number of farmers. ** Area covered more than allotted which is restricted equal to allotted FLDs.*

Annexure-III : Information on wheat varieties demonstrated in Front Line Demonstrations (FLDs) during 2017-18

Name of Variety	**HS 562**
Zone/State	Northern Hill Zone
Production condition	Timely sown
Year of release	2016
Released by CVRC/SVRC	CVRC
Developed by	ICAR-IARI, New Delhi
Plant height (cm)	Rainfed: 97cm Irrigated: 101cm
Days to maturity (days)	Rainfed: 183 Irrigated: 175
1000-grain weight (g)	43
Average yield (q/ha)	Rainfed: 36 Irrigated: 52.7
Potential yield (q/ha)	Rainfed: 58.8 Irrigated: 62.2
Special Feature: It has tapering ear shape, waxy peduncle and leaf sheath.	
Name of Variety	**VL 953**
Zone/State	Uttarakhand Hills and Uttarakhand Plains
Production condition	Timely sown irrigated organic conditions of hills Timely sown irrigated conditions of Plains
Year of release	2016
Released by CVRC/SVRC	SVRC
Developed by	ICAR-VPKAS, Almora
Plant height (cm)	85-90 cm (hills) 95-100 cm (Plains)
Days to maturity (days)	160-165 (hills) 135-137 days (Plains)
1000-grain weight (g)	46-48 gm
Average yield (q/ha)	30-35 q/ha (hills), 40-45 q/ha (Plains)
Potential yield (q/ha)	41.16 q/ha(hills) ,65.22 q/ha (Plains)
Special Feature: Recommended for Hills as well as Plains both	
Name of Variety	**HD 2967**
Zone/State	NWPZ & NEPZ
Production condition	Timely sown, Irrigated
Year of release	2011
Released by CVRC/SVRC	CVRC
Developed by	IARI, New- Delhi
Plant height (cm)	98
Days to maturity (days)	143
1000-grain weight (g)	42.1
Average yield (q/ha)	50.4
Potential yield (q/ha)	66.1
Special Feature: Recommended for two mega zones (NWPZ & NEPZ). This genotype has adult plant resistant to yellow and brown rusts. It has high zinc, copper and iron thereby securing nutritional security.	
Name of Variety	**HD 3086**
Zone/State	NWPZ
Production condition	Timely sown, Irrigated
Year of release	2014
Released by CVRC/SVRC	CVRC
Developed by	IARI, New Delhi
Plant height (cm)	98
Days to maturity (days)	143
1000-grain weight (g)	39
Average yield (q/ha)	54.6
Potential yield (q/ha)	71.1
Special Feature: The variety has higher yield, resistant to yellow and brown rust.	

Name of Wheat Variety	**PBW 677**
Zone/State	State
Production condition	Timely sown irrigated conditions
Year of release	2016
Released by CVRC/SVRC	SVRC
Developed by	PAU, Ludhiana
Plant height (cm)	107 cm
Days to maturity (days)	157 days
1000-grain weight (g)	41 g
Average yield (q/ha)	60.8
Potential yield (q/ha)	78.2
Special Feature: Green foliage with semi-erect growth habit, Parallel ear shape with medium ear density.PBW 677 takes about 106 days (range 98-114 days) from seeding to heading and 157 days (150-167 days) for maturity seed to seed.PBW 677 possesses resistance to yellow and brown rusts both under natural and artificial conditions.	
Name of Wheat Variety	**PBW 725**
Zone/State	State
Production condition	Timely sown irrigated conditions
Year of release	2016
Released by CVRC/SVRC	SVRC
Developed by	PAU, Ludhiana
Plant height (cm)	105 cm
Days to maturity (days)	154 days
1000-grain weight (g)	43g
Average yield (q/ha)	61.7
Potential yield (q/ha)	81.5
Significantly out yielded the check varieties DPW 621-50, HD 2967 and WH 1105 by 7.7, 7.6 & 1.9 percent, respectively in research and adaptive trials conducted in the Punjab state.High degree of resistance to yellow rust & brown rust. Glume shoulder shape sloping with short glume beak length and straight peduncle attitude, Parallel ear shape and medium ear density.	
Name of Wheat Variety	**PBW1Zn**
Zone/State	NWPZ
Production condition	Timely sown irrigated conditions
Year of release	2017
Released by CVRC/SVRC	CVRC
Developed by	PAU, Ludhiana
Plant height (cm)	103
Days to maturity (days)	151
1000-grain weight (g)	47
Average yield (q/ha)	59.3
Potential yield (q/ha)	70.8
Special Feature: Dark green foliage; semi-erect growth habit, ear bearing tapering shape with intermediate density.Based on three years of testing in coordinated trials in NWPZ, PBW 1 Zn possessed higher (14.7%) grain zinc concentration (40.6 ppm) compared to the check PBW 621 (35.4 ppm) along with higher grain iron (5.0%) concentration, with other quality parameters almost comparable to check varieties.PBW 1 Zn possessed low ACI (average coefficient of infection) for yellow rust under natural and artificial conditions over the years in comparison with the check. PBW 1 Zn possessed very high level of resistance to brown rust under natural and artificial conditions over the years.	
Name of Wheat Variety	**WB 2**
Zone/State	NWPZ
Production condition	Irrigated timely sown
Year of release	2017
Released by CVRC/SVRC	CVRC
Developed by	ICAR-IIWBR, Karnal
Plant height (cms)	100
Days to maturity (days)	142
1000-grain weight (g)	39
Average yield (q/ha)	51.6
Potential yield (q/ha)	58.9
Special Feature: High Zinc content (42.0 ppm), high iron content (40.0 ppm), resistant to yellow rust and brown rust.	

Name of Variety	**DBW 71**
Zone/State	NWPZ
Production condition	Late sown, Irrigated
Year of release	2013
Released by CVRC/SVRC	CVRC
Developed by	IIWBR, Karnal
Plant height (cm)	90
Days to maturity (days)	119
1000-grain weight (g)	37.1
Average yield (q/ha)	42.7
Potential yield (q/ha)	68.9
Special Feature: The high yield potential of DBW 71 under irrigated late sown condition of NWPZ possess disease resistance and heat tolerance. The genotype has high protein, chapatti score, yellow pigment and micro nutrients.	
Name of Variety	**KRL 210**
Zone/State	Northern Plains Zone
Production condition	Timely sown, Irrigated, saline soils
Year of release	2012
Released by CVRC/SVRC	CVRC
Developed by	CSSRI, KARNAL
Plant height (cm)	99
Days to maturity (days)	143
1000-grain weight (g)	40.1
Average yield (q/ha)	33.7
Potential yield (q/ha)	49.3
Special Feature: KRL 210 has shown high yielding ability along with salt tolerance over years and locations. This variety is lodging resistance, possessing resistance to yellow and brown rust along with good quality parameters.	
Name of Variety	**HI 8737(d)**
Zone/State	CZ
Production condition	Timely sown, Irrigated
Year of release	2014
Released by CVRC/SVRC	CVRC
Developed by	IARI, Indore
Plant height (cm)	85
Days to maturity (days)	124
1000-grain weight (g)	51
Average yield (q/ha)	53.4
Potential yield (q/ha)	81.0
Special Feature: HI 8737 is a widely adopted high yielding durum genotype that has shown yield stability under timely and late sown conditions. The variety has good levels of resistance against leaf and stem rust seedling resistance test indicated presence of diverse genes for resistance. The variety is good for chapatti making and also for pasta preparations and essential micro-nutrients like iron and zinc.	
Name of Variety	**DBW 110**
Zone/State	CZ
Production condition	Timely sown, Restricted Irrigation
Year of release	2015
Released by CVRC/SVRC	CVRC
Developed by	IIWBR, Karnal
Plant height (cm)	89
Days to maturity (days)	124
1000-grain weight (g)	43
Average yield (q/ha)	39.2
Potential yield (q/ha)	50.1
Special Feature: DBW 110 has high yield potential under timely sown restricted irrigation condition in central zone. This genotype is resistance to brown and black rust. It is also resistance to Karnal bunt. This genotype has shown promise for better yield with two irrigations. It has good protein, test weight and good chapatti/bread making score.	

Name of Variety	**HI 8713 (d)**
Zone/State	Central Zone
Production condition	Timely sown, Irrigated conditions
Year of release	2013
Released by CVRC/SVRC	CVRC
Developed by	ICAR-IARI Regional Station, Indore (MP)
Plant height (cm)	90-95
Days to maturity (days)	120-125
1000-grain weight (g)	45
Average yield (q/ha)	52.5
Potential yield (q/ha)	68.2
Special Feature: It can contribute to "nutritional security" in central India, because of its high protein content (~12.0 %), high yellow pigment (~7.16 ppm) and good levels of essential micronutrients like iron, zinc, copper and manganese.	
Name of Variety	**HI 8759 (d)**
Zone/State	Central Zone
Production condition	Timely sown, Irrigated conditions
Year of release	2016
Released by CVRC/SVRC	CVRC
Developed by	ICAR-IARI Regional Station, Indore (MP)
Plant height (cm)	80-85
Days to maturity (days)	115-120
1000-grain weight (g)	50-55
Average yield (q/ha)	56.9
Potential yield (q/ha)	75.5
Special Feature: It can serve as a "dual purpose" variety suitable both for making chapati and for pasta preparations due to its moderate SDS-sedimentation value (~35 ml) and high protein content (~12.0 %), good levels of yellow pigment (~5.7 ppm), and essential micronutrients like iron (42.1 ppm) and zinc (42.8 ppm).	
Name of Variety	**Raj 4238**
Zone/State	CZ
Production condition	Late sown, Irrigated
Year of release	2016
Released by CVRC/SVRC	CVRC
Developed by	RS, RAU, Durgapura
Plant height (cm)	84
Days to maturity (days)	114
1000-grain weight (g)	40
Average yield (q/ha)	45.5
Potential yield (q/ha)	62.8
Special Feature: Good for chapatti (score 8.0)	
Name of Variety	**GJW 463**
Zone/State	Gujarat
Production condition	Early sown, irrigated condition of Saurashtra region and Timely sown, irrigated condition of Gujarat
Year of release	2016
Released by CVRC/SVRC	SVRC
Developed by	WRS, JAU, Junagadh (Gujarat)
Plant height (cm)	80-86 cm
Days to maturity (days)	103-118 days
1000-grain weight (g)	42-46 gm
Average yield (q/ha)	55.75 ES, 50.91 TS
Potential yield (q/ha)	75.90 (NIVT-II Powarkheda centre)
Special Feature: Heat tolerance (HSI-0.48)	

Name of Variety	**GW 451**
Zone/State	Gujarat
Production condition	Timely sown, Irrigated
Year of release	2016
Released by CVRC/SVRC	SVRC
Developed by	Vijapur
Plant height (cm)	76 (68-88)
Days to maturity (days)	105 (95-113)
1000-grain weight (g)	45.8 (37-48)
Average yield (q/ha)	53.9
Potential yield (q/ha)	66.0
Name of Variety	**GDW 1255 (d)**
Zone/State	Gujarat (excluding South Gujarat)
Production condition	Timely sown, Irrigated
Year of release	2013
Released by CVRC/SVRC	SVRC
Developed by	Vijapur
Average yield (q/ha)	47.6
Potential yield (q/ha)	66.1
Name of Wheat Variety	**RVW 4106**
Zone/State	Madhya Pradesh
Production condition	Irrigated late sown
Year of release	2010-11
Released by CVRC/SVRC	SVRC
Developed by	RVSKVV, Gwalior, MP
Plant height (cm)	95
Days to maturity (days)	105-110
1000-grain weight (g)	33.8
Average yield (q/ha)	50.35
Potential yield (q/ha)	-
Special Feature: Recommended for Late Sown Irrigated Condition of Madhya Pradesh. It is resistant against Black & Brown Rust diseases.	
Name of Variety	**MP 3382**
Zone/State	MP
Production condition	Irrigated timely sown (High fertility timely sown)
Year of release	2015-16
Released by CVRC/SVRC	SVRC
Developed by	JNKVV, Jabalpur (MP)
Plant height (cm)	85-90
Days to maturity (days)	115-120
1000-grain weight (g)	44-46
Average yield (q/ha)	52-55
Potential yield (q/ha)	60-65
Special Feature: Semi erect flag leaves, thick stem, waxiness is present on peduncle, leaf sheath and ear, early maturing, dwarf, non-lodging with rich in protein and other quality attributes, resistance to the black and leaf rusts, high protein, good grain appearance and hectoliters weight with high Glu-1 score, better chapatti making quality, bread loaf volume, wet dry gluten content, gluten index and zinc.	
Name of Variety	**HD3090**
Zone/State	PZ
Production condition	Late sown, Irrigated
Year of release	2014
Released by CVRC/SVRC	CVRC
Developed by	IARI, New Delhi
Plant height (cm)	80
Days to maturity (days)	101
1000-grain weight (g)	37.2
Average yield (q/ha)	41.4
Potential yield (q/ha)	63.1
Special Feature: This genotype is an early maturity semi dwarf with high yield potential under timely irrigation late sown conditions. It has high degree of resistance against leaf and stem rusts. The variety has high protein content, high biscuit spread factor and also good for chapatti making.	

Name of Variety	**NIAW 1994 (*Phule Samadhan*)**
Zone/State	Maharashtra state
Production condition	Late sown irrigated and Timely sown irrigated
Year of release	2014
Released by CVRC/SVRC	SVRC
Developed by	ARS, Niphad, MPKV, Rahuri, Ahmednagar, (Maharashtra)
Plant height (cm)	Timely sown irrigated: 73-87 cm Late sown irrigated : 67-84 cm
Days to maturity (days)	Timely sown irrigated: 108(95-118) days Late sown irrigated: 97 (91-102) days
1000-grain weight (g)	Timely sown irrigated: Large 43g (42-44g) Late sown irrigated: Medium 39g (36g-42g)
Average yield (q/ha)	Timely sown irrigated: 46.12 q/ha Late sown irrigated: 44.23 q/ha
Special Feature: NIAW 1994 is a thermo-tolerant variety which suits both the sowing conditions viz., Late sown irrigated and Timely sown irrigated. *chapati* quality of NIAW 1994 is superior than the checks *viz.* MACS 6222, NIAW 34 and NIAW 917 . Grain protein content in NIAW 1994 varies between 12.5 to13.8 % under different conditions. Under late sown condition NIAW 1994 is superior in hectoliter weight (81.1) against HD 2392 (80.0), similarly under timely sown condition NIAW 1994 (81.5) showed higher test weight than MACS 6222 (81.1).	

Name of Variety	**MACS 6478**
Zone/State	PZ
Production condition	Timely sown, Irrigated
Year of release	2014
Released by CVRC/SVRC	CVRC
Developed by	ARI, Pune
Plant height (cm)	78
Days to maturity (days)	105
1000-grain weight (g)	45.1
Average yield (q/ha)	45
Potential yield (q/ha)	65.7
Special Feature: Variety MACS 6478 is highly resistant to both black and brown rust and carries adult plant resistant genes. This variety has high yield potential and thus can give better yield with matching agronomic practices. The variety has high protein content and better nutritional quality for zinc and iron thereby making it good for chapatti and bread quality.	

Name of Variety	**MACS 3949 (d)**
Zone/State	Peninsular Zone
Production condition	Irrigated timely sown condition
Year of release	2017
Released by CVRC/SVRC	CVRC
Developed by	Agharkar Research Institute (MACS), Pune
Plant height (cm)	81 cm (78 to 83 cm)
Days to maturity (days)	112 days (108 to 117)
1000-grain weight (g)	47 g
Average yield (q/ha)	43.9 q/ha
Potential yield (q/ha)	53.5 q/ha
Special Feature: MACS 3949 (d) has bold & lustrous grain with 47g 1000-grain weight with high protein content (12.9 %), better nutritional quality (Zinc 40.6 ppm, Iron 38.6 ppm) with good milling quality (Test weight 81.4 kg/hl) and highest overall acceptability 7.25 (best cooking quality for pasta product out of 9). It has also shown resistance against stem and leaf rusts under both natural and artificial screening conditions. MACS 3949 (d) also showed resistance against leaf blight, powdery mildew, flag smut and Karnal bunts. It has also shown good level of resistance to insect pests than checks.	

Name of Variety	**UAS 446 (d)**
Zone/State	PZ
Production condition	Timely sown, Rainfed
Year of release	2015
Released by CVRC/SVRC	CVRC
Developed by	UAS Dharwad
Plant height (cm)	66
Days to maturity (days)	96
1000-grain weight (g)	44
Average yield (q/ha)	18.3
Potential yield (q/ha)	24.4
Special Feature: UAS 446 is a high yielding durum wheat genotype suitable for rainfed condition and responded well to different doses of fertilizers. It is resistant to black and brown rusts.	
Name of Variety	**UAS 347**
Zone/State	PZ
Production condition	Timely sown, Rainfed
Year of release	2015
Released by CVRC/SVRC	CVRC
Developed by	UAS, Dharwad
Average yield (q/ha)	18.4
Potential yield (q/ha)	24.6
Special Feature: Good for biscuit quality (score 8.47)	
Name of Variety	**HI 1605**
Zone/State	Peninsular Zone
Production condition	Timely sown, Restricted Irrigation Conditions
Year of release	2016
Released by CVRC/SVRC	CVRC
Developed by	ICAR-IARI Regional Station, Indore (MP)
Plant height (cm)	80-85
Days to maturity (days)	105-110
1000-grain weight (g)	35 - 40
Average yield (q/ha)	29.1
Potential yield (q/ha)	44.0
Special Feature: HI 1605 is a good quality wheat genotype with high protein content (~13%), good grain appearance (~6.5), high sedimentation value (~55 ml), high extraction rate (~74%), good bread, chapatti and biscuit quality with good levels of micronutrients like iron (43.0 ppm) and zinc (35.0 ppm).	
Name of Variety	**HW 5207 as COW3**
Zone/State	Tamil Nadu including hilly regions
Production condition	Restricted irrigated, medium fertility, timely sown conditions in Tamil Nadu including hills
Year of release	2017 by CVRC
Released by CVRC/SVRC	2017 by CVRC and 2015 by SVRC
Developed by	IARI, Regional Station, Wellington, Tamil Nadu
Plant height (cm)	90 cms
Days to maturity (days)	95-100 Days
1000-grain weight (g)	40.5gm
Average yield (q/ha)	40.70q/ha
Potential yield (q/ha)	59.60q/ha
Special Feature: HW 5207(COW3) has recorded the highest mean grain yield (4076 kg/ha) which is 12 per cent increase over the check COW (W) 1 (3641 kg/ha) in a total of 131 trials. The variety mature in about 100 days still yielding over 40 q/ha and the per day productivity is much higher. It has the ideal plant height (90 cm) with erect plant type, strong and resilient stem providing resistance to lodging. It produces very nutritious grain, registering a mean test weight of 40.5g with more than 11 per cent protein, and high level of Iron (53.1ppm), Zinc (46.3ppm), Copper (5.33ppm) and Manganese (47.5ppm) indicating excellent grain nutritional quality. In addition, this variety has high scores for bread making quality (7.0 out of 10), *chapathi* quality (7.4 out of 10) with Glu-1 score of 8 out 10 and mean sedimentation value of 45.5, high Hectolitre weight of 78.3. The variety HW 5207(COW3) showed high degree of resistance to stem, leaf and stripe rusts under both artificial and natural epiphytotic conditions against all the pathotypes occurring in the Nilgiris which is a hot spot for rust incidence.	

Name of Variety	**HW 1098 (Dicoccum)**
Zone/State	SHZ
Production condition	Timely sown, Irrigated
Year of release	2015
Released by CVRC/SVRC	CVRC
Developed by	IARI-RS, Wellington
Plant height (cm)	85
Days to maturity (days)	106
1000-grain weight (g)	40.3
Average yield (q/ha)	45.5
Potential yield (q/ha)	59.0
Special Feature: Dicoccum variety HW1098 has high yield potential and showed wider adaptability for planting under normal and late sown conditions. This is a semi dwarf variety that has required level of resistance, medium bold grains, early maturing and good protein content.	

Annexure-IV : Information on barley varieties demonstrated in Front Line Demonstrations (FLDs) during 2017-18

Variety	Zone	Production condition	Year	Developed by	Height (cm)	Days to maturity	TGW (gm)	Average Yield (q/ha)	Pot. Yield (q/ha)
HBL 713 (Him Palam Jau 1)	Low and Mid Hills of Himachal Pradesh	Rainfed/Irrigated	2016	CSKHPKV, HAREC, Bajaura, Kullu (HP)	70-90	170-180	40.30	30-35	51.00
BHS 400	NHZ	Rainfed, Timely sown	2014	IARI, Regional Station, Shimla, HP	83	168	39.13	32.71	58.70
BHS 380	NHZ	Rainfed, Timely sown	2010	IARI, Regional Station, Shimla, HP	60	182	35.00	Grain=21.00 Forage=59.4	Grain=29.80 Forage=89.7
RD 2794	NWPZ NEPZ	Saline/Alkaline soils	2016	RARI, Durgapura, Jaipur, Rajasthan	69	121	41.45	29.90	49.60
HUB 113	NEPZ	Irrigated, Timely sown	2014	Institute of Agricultural Sciences, Banaras Hindu University, Varanasi, UP	101.5	120	45.98	43.20	63.40
BH 946	NWPZ	Irrigated, Timely sown	2014	Department of Genetics and Plant Breeding , CCS HAU, Hisar, Haryana	103	131	40.86	51.96	66.30
DWRB 123	NWPZ	Irrigated, Timely sown, Malt barley	2017	ICAR-IIWBR, Karnal, Haryana	93	130	48.7	48.7	67.26
BH 959	CZ	Irrigated, Timely sown	2015	Department of Genetics and Plant Breeding , CCS HAU, Hisar, Haryana	71.5	109	36.75	49.90	67.50

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