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Randhir Singh
Satyavir Singh
Anuj Kumar
Sendhil R
Indu Sharma

ICAR- INDIAN INSTITUTE OF WHEAT & BARLEY RESEARCH
PO BOX - 158, AGRASAIN MARG, KARNAL - 132001

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Authors

CONTENTS

Wheat Front Line Demonstrations

FRONT LINE DEMONSTRATIONS

Wheat Front Line Demonstrations (WFLDs) 2014-15

Introduction

Globally, wheat and barley, the nutritious cereals occupies respectively first and fourth positions among the cereals cultivated across countries. In India, these *Rabi* cereals were cultivated in about 31 million hecatres and contributed around 37 per cent of total foodgrains production (2014-15). Wheat has been under cultivation in 30.37 million hectares and barley covered 0.67 million hecatres during the 2014-15 *Rabi* season as per the recent Third Advance Estimates from the Directorate of Economics and Statistics (DES), Ministry of Agriculture (MoA), India. Despite the record foodgrains production (265.02 million tonnes) during 2013-14, the current year estimates showed a drastic reduction of 13.93 million tonnes. Among the two seasons, *Rabi* crops registered the maximum decline of 9.84 million tonnes owing to the unseasonal rainfall and hailstorms during the harvest season made the standing crops to lodge causing massive yield reduction particularly in the NWPZ. Wheat production registered 90.78 million tonnes from an area of 30.37 million hectares with an average national yield of 2989 kg/ha. The current year wheat production has witnessed a quantum fall of 5.07 million tonnes (2.29%). Similarly, barley observed a quantum fall of 2.04 lakh tonnes registering 1.63 million tonnes in 2014-15 from an area of 6.72 lakh hectares with an average national yield of 2422 kg/ha.

Front Line Demonstrations (FLDs) carried across different regions also witnessed similar kind of trend and it was more evident in Haryana. Yet, the superior genotypes and technologies demonstrated through the FLD programme showed that yield registered in FLDs are significantly higher than check plots. However, there existed yield gaps across regions which should be bridged through need based interventions by identifying the location specific constraints. The ICAR-Indian Institue of Wheat and Barley Research makes continous efforts to popularize the region specific superior genotypes as well as micro level strategies to enhance the wheat and barley productivity. Despite this outreach, there exists the need for increasing the profitability of wheat and barley production through different farmer-centric programmes with more emphasis on seed 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 like SMS through IFFCO and C-DAC, and rigorous training of field level extension functionaries by the Institue has also played a key role in taking contingent management measures, particularly against yellow rust. Awareness created through mass media on seed treatment, seed replacement, disease management and timely procurement of harvested produce 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. However, developing storage facilities both at farm level and national level is the need of the hour and it warrants for some policy actions. The report highlights the coordination in conducting wheat and barley FLDs, yield gain due to FLDs, costs and returns and constraints in implementation of the programme.

Allocation of Wheat Front Line Demonstrations

During the wheat crop season 2014-15, 510 Wheat Front Line Demonstrations (WFLDs) of one hectare each were allotted to 69 cooperating centres of which 448.4 were conducted through 68 cooperating centers. The technologies on improved wheat (*T.aestivum, T.durum and T. dicoccum*) varieties with complete package of practices, rotavator, zero tillage/rotary disc drill, bio-fertilizer and drip irrigation were demonstrated. These WFLDs covered 458.39 hectares area of 1036 farmers in 19 states. The maximum number of WFLDs were conducted in UP (57) followed by Rajasthan (43), Haryana (41), MP (32), Maharashtra (31), HP (29.6), Punjab (29), Bihar (28), Karnataka (21), J&K (20.4), Chhattisgarh (17), Jharkhand (15), Uttarakhand (15), Tamil Nadu (15), West Bengal (14), Delhi (14), Assam (12), Gujarat (10.4) and Nagaland (4). The detail of centre wise and state wise WFLDs is given in Tables 1 & 2.

Table 1 : Centre wise Distribution of Wheat Front Line Demonstrations (WFLDs) during Rabi 2014-15

S. N.	Zone/Name of Centre	WFLDs Allotted (1 WFLD = 1ha)	WFLDs Conducted (1 ha basis)	Area Sown (ha)	No. of Farmers/ Locations
	NHZ				
1.	VPKAS, Almora (Uttarakhand)	8	8	8.0	39
2.	CSKHPKV, HAREC, Bajaura, Kullu (HP)	5	5	5.0	32
3.	CSKHPKV, RWRC, Malan, Kangra (HP)	7	7	7.0	25
4.	CSKHPKV,PCRS, Berthin, Bilaspur (HP)	5	5	5.0	7
5.	CSKHPKV, HAREC, Dhaulakuan, Sirmour (HP)	5	5	5.0	20
6.	IARI, RS, Tutikandi, Shimla (HP)	5	5	5.0	6
7.	RR&RS, SKUAST-K, Khudwani, Anantnag (J&K)	5	5	5.0	12
8.	RARS, SKUAST-Jammu, Tandwal, Rajouri (J&K)	5	5	5.0	10
9.	KVK, Hengbung, Senapati (Manipur)	5	not conducted	-	-
	NEPZ				
10.	NDUA&T, Faizabad (UP)	7	7	7.0	24
11.	CSAUA&T, Kanpur (UP)	7	7	7.0	18
12.	BHU, Varanasi (UP)	7	7	7.0	9
13.	KVK, Sohna, Sidharthnagar (UP)	7	4	4.0	7
14.	BCKV, Kalyani, Nadia (West Bengal)	10	4	4.0	22
15.	UBKVV, Pundibari, Coochbehar (West Bengal)	10	10	17.75*	111
16.	KVK-Dimapur, Jharnapani, MEDZIPHEMA (Nagaland)	5	4	4.0	10
17.	RARS, AAU, Shillongani, Nagaon (Assam)	10	4	4.0	7
18.	KVK (AAU)-Darrang , Mangaldai, Darrang (Assam)	5	2	2.0	6
19.	KVK (AAU), Chirakuta, (Revenue village Jamduar Pt.II) Dhubri (Assam)	5	2	2.0	6
20.	KVK (AAU), Citrus Research station, Gellapukhuri, Tinsukia (Assam)	5	2	2.0	5
21.	KVK (AAU), Napam, Tejpur, Sonitpur (Assam)	5	2	1.64	7
22.	IARI, RS, Pusa, Samastipur (Bihar)	7	7	7.0	14
23.	KVK, Sokhodeora, Nawadah (Bihar)	7	4	4.0	4
24.	KVK, RAU, Hariharpur,Vaishali (Bihar)	7	3	3.0	7
25.	KVK, Adhaura, Kaimur, Bhabua (Bihar)	7	7	7.0	12
26.	KVK, Chanpura-Basaith, Madhubani (Bihar)	7	7	7.0	16
27.	BAU, Kanke, Ranchi (Jharkhand)	7	3	3.0	5
28.	KVK, Morabadi, Ranchi (Jharkhand)	10	10	10.0	25
29.	KVK, BAU, West Singhbhum (Jharkhand)	5	2	2.0	5
	NWPZ				
30.	KVK (SKUAST-Jammu), Rajhani, Kathua, Jammu(J&K)	10	10	10.0	28
31.	PAU, Ludhiana (Punjab)	10	10	10.0	10
32.	PAU, RRS, Gurdaspur (Punjab)	7	7	7.0	7
33.	KVK, Haveli Kalan, Rupnagar (Punjab)	6	6	6.0	19
34.	KVK, Usman, Amritsar (Punjab)	6	6	6.0	12
35.	RBS College, Bichpuri, Agra (UP)	7	7	7.0	7

S. N.	Zone/Name of Centre	WFLDs Allotted (1 WFLD = 1ha)	WFLDs Conducted (1 ha basis)	Area Sown (ha)	No. of Farmers/ Locations
	NWPZ				
36.	KVK, Baghara, Muzaffarnagar (UP)	6	6	6.0	15
37.	ZARS, Nagina, Bijnor (UP)	6	6	6.0	6
38.	KVK, Khajuri Bagh, New Gopal Nagar, Saharanpur (UP)	6	6	6.0	14
39.	GBPUA&T, Pantnagar, Udham Singh Nagar (Uttarakhand)	7	7	7.0	7
40.	CATAT, IARI, New Delhi	7	7	7.0	12
41.	KVK (NHRDF), Ujwa, New Delhi	7	7	6.8	17
42.	DWR, Karnal (Haryana)	20	20	20.0	29
43.	CSSRI, Karnal (Haryana)	10	10	10.0	25
44.	Amity Centre for Extension Services, AUUP Campus, Sector-125, Noida (UP)	7	7	7.2*	18
45.	CCSHAU, Hisar (Haryana)	5	5	5.0	5
46.	KVK, Bhiwani (Haryana)	6	6	6.0	15
47.	ARS, SKRAU, Durgapura (Rajasthan)	7	7	7.0	11
48.	KVK, Ajmer (Rajasthan)	5	5	5.0	10
49.	KVK, Banasthali Vidyapeeth, District-Tonk (Rajasthan)	5	5	5.0	10
	CZ				
50.	RCOA (MPUA&T), Udaipur (Rajasthan)	7	7	7.0	14
51.	ARS, MPUA&T, Banswara (Rajasthan)	7	7	6.8	17
52.	ARS, MPUA&T, Kota (Rajasthan)	7	7	7.0	7
53.	KVK, Sawai Madhopur (Rajasthan)	5	5	5.2*	13
54.	WRS, JAU, Junagarh (Gujarat)	5	5	5.0	5
55.	MWRS, SDAU, Vijapur, Mehsana (Gujarat)	10	5.4	5.4	14
56.	JNKVV, Jabalpur (MP)	10	10	10.0	6
57.	IARI, RWRS, Indore (MP)	10	10	12.4*	19
58.	KVK (JNKVV), Purushottampur, Panna (MP)	7	7	7.0	18
59.	KVK, Kalukhera Shiksha Samiti, Kalukhera, Ratlam (MP)	5	5	4.8	12
60.	KVK, RRS, IGKVV, Jagdalpur, Bastar (CG)	7	7	7.0	11
61.	IGAU, RARS, Sarkanda, Bilaspur (CG)	10	10	10.0	10
	PZ				
62.	PDKV, Akola (Maharashtra)	7	7	7.0	7
63.	ARS, Niphad, Nasik (Maharashtra)	10	10	10.0	16
64.	MAU, Parbhani (Maharashtra)	7	7	7.0	14
65.	ARI, MACS, Pune (Maharashtra)	7	7	7.0	7
66.	UAS, Dharwad (Karnataka)	10	10	10.0	10
67.	BIRDS KVK, Tukkanatti, Gokak, Belgaum (Karnataka)	7	7	7.0	14
68.	KVK, Badami Road, Bagalkot (Karnataka)	7	4	4.0	10
	SHZ				
69.	IARI, RS, Wellington (Tamil Nadu)	15	15	15.4*	40
	Very High Altitude Areas of NHZ				
	DWR, Karnal : Ten ha special wheat varietal FLDs for ***Summer Sowing*** in very high altitude areas of J&K and HP states using HS 375 (Himgiri) released in the year 2003 for *Summer Sowing in* NHZ.	10	3	3.0	20
	Total	**510**	**448.4**	**458.39**	**1036**

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

The reasons for not achieving the target are non-availability of newly released wheat varieties (NRWVs) (3-5 years old) seed at local level and non-availability of NRWVs seed in time. Due to the above reasons, one centre could not conduct the FLDs and fourteen centers conducted less than the allotment.

The target could not be achieved in high altitude area because the private companies offered high rental value of land to the farmers to grow vegetable crops or produce seed during this season. Therefore wheat was not considered remunerative crop.

The wheat FLDs data received from the cooperating centers which were not reported properly as per FLDs guidelines were not included for analysis.

Table 2 : State wise Distribution of WFLDs during Rabi 2014-15

State	Allotted	Conducted	Area sown (ha)	No. of Farmers/ Locations
Uttarakhand	15	15	15.00	46
HP	32	29.6	29.60	110
J&K	25	20.4	20.40	54
Manipur	5	-	-	-
Nagaland	5	4	4.00	10
UP	60	57	57.20*	118
West Bengal	20	14	21.75*	133
Assam	30	12	11.64	31
Bihar	35	28	28.00	53
Jharkhand	22	15	15.00	35
Punjab	29	29	29.00	48
Delhi	14	14	13.80	29
Haryana	41	41	41.00	74
Rajasthan	43	43	43.00	82
Gujarat	15	10.4	10.40	19
MP	32	32	34.20*	55
Chattisgarh	17	17	17.00	21
Maharashtra	31	31	31.00	44
Karnataka	24	21	21.00	34
Tamil Nadu	15	15	15.40*	40
Total	**510**	**448.4**	**458.39**	**1036**

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

Table 3: Zone wise Distribution of WFLDs during Rabi 2014-15

Zone	Allotted	Conducted	Area sown (ha)	No. of Farmers/ Locations
NHZ	60	48	48.00	175
NEPZ	140	98	105.39*	320
NWPZ	150	150	150.00	277
CZ	90	85.4	87.60*	146
PZ	55	52	52.00	78
SHZ	15	15	15.40*	40
Total	**510**	**448.4**	**458.39**	**1036**

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

Table 4 : Centre wise Performance of Improved Wheat Varieties 2014-15

Zone & Centre	Mean yield (q/ha)		% Gain
	Improved varieties	Check varieties	
NHZ			
Almora	27.42	17.81	53.96***
Bajaura	35.30	28.29	24.78***
Malan, Kangra	28.27	25.44	11.12***
Berthin, Bilaspur	23.80	18.11	31.42***
Dhaulakuan	28.30	24.47	15.65***
Shimla	31.33	26.00	20.50**
Khudwani, Anantnag	21.08	18.46	14.19***
Tandwal, Rajouri	34.55	27.80	24.28**
NEPZ			
Faizabad	28.45	22.90	24.24***
Kanpur	37.75	34.72	08.73***
Varanasi	23.55	21.33	10.41 NS
Sohna, Sidharthnagar	35.36	31.93	10.74***
Kalyani, Nadia	34.22	31.38	09.05***
Pundibari, Coochbehar	40.17	37.44	07.29**
Dimapur	12.60	11.92	05.70*
Shillongani	26.86	21.66	24.01**
Darrang, Mangaldai	26.41	19.80	33.38***
Dhubri	36.50	31.00	17.74***
Tinsukia	14.95	12.64	18.28***
Sonitpur	26.68	18.13	47.16***
IARI, Pusa	49.21	38.07	29.26***
Nawada	43.20	38.10	13.39***
Vaishali	24.57	20.57	19.45*
Kaimur, Bhabua	50.50	34.67	45.66***
Madhubani	32.34	28.89	11.94***
Kanke, Ranchi	34.30	19.50	75.90***
Morabadi, Ranchi	32.78	24.17	35.62***
West Singhbhum	31.10	23.00	35.22***
NWPZ			
Kathua-Jammu	35.64	26.25	35.77***
Ludhiana	45.12	44.61	01.14 NS
Gurdaspur	36.25	35.18	03.04*
Ropar	42.77	37.62	13.69***
Amritsar	44.98	42.92	04.80**
Agra	43.28	41.86	03.39**
Muzaffarnagar	41.74	35.46	17.71**
Bijnor	47.07	44.43	05.94***
Saharanpur	50.36	41.73	20.68***
Pantnagar	40.37	39.48	02.25 NS
IARI, New Delhi	41.77	39.75	05.08 NS
KVK, Ujwa, Delhi	43.26	37.40	15.67***
DWR, Karnal (FLDs at Karnal)	46.87	44.55	05.21*
DWR, Karnal (FLDs at Muzaffarnagar)	29.87	23.89	25.03***
CSSRI Karnal	44.38	42.38	04.72 NS
ACES, Noida	48.45	40.21	20.49***
Hisar	55.40	54.39	01.86 NS
Bhiwani	52.60	49.73	05.77***
Durgapura, Jaipur	52.64	50.64	03.95**
Ajmer	57.59	52.63	09.42*
Banasthali Tonk	47.90	45.20	05.97**
CZ			
Udaipur	51.71	47.50	08.86***
Banswara	41.03	34.69	18.28***
Kota	52.71	47.78	10.32***
Sawai Madhopur	52.55	46.65	12.65**
Junagarh	41.53	37.25	11.49 NS
Vijapur, Mehsana	49.02	44.64	09.81**
Jabalpur	39.67	35.17	12.79**
Indore	57.71	32.57	77.19***
Panna	29.40	24.60	19.51***
Ratlam	41.42	31.83	30.13***
Jagdalpur, Bastar	29.26	21.78	34.34***

Zone & Centre	Improved varieties	Check varieties	% Gain
CZ			
Sarkanda, Bilaspur	33.40	29.31	13.95***
PZ			
Akola	38.71	27.64	40.05***
Niphad, Nasik	39.20	33.84	15.84***
Parbhani	35.86	29.04	23.48***
Pune	42.14	35.71	18.01*
Dharwad	38.06	33.12	14.92**
Belgaum	23.02	19.69	16.91***
Bagalkot	37.10	33.00	12.42***
SHZ			
Wellington	23.46	-	-

*** 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 53.96 per cent at Almora centre followed by Berthin Bilaspur (31.42%), Bajaura (24.78 %), Tandwal Rajouri (24.28 %), Shimla (20.50%), Dhaulakuan (15.65 %), Khudwan Anantnag (14.19 %) and Malan Kangra (11.12 %). In NEPZ, the yield gain varied from 5.70 per cent at Dimapur to 75.90 per cent at Kanke Ranchi. The improved wheat varieties yield gain was 47.16 % at Sonitpur, 45.66 % at Kaimur Bhabua, 35.62 % at Morabadi Ranchi,35.22% at West Singhbhum, 33.38 % at Darrang Mangaldai, 29.26 % at IARI Pusa, 24.24 % a Faizabad, 24.01 % at Shillongani and 18.28 % at Tinsukia. In NWPZ, the significant yield gain was highest at Kathua Jammu (35.77 %) followed by DWR Karnal for FLDs at Muzaffarnagar (25.03 %), Saharanpur (20.68 %) and Noida (20.49 %). In CZ, there was significant yield gain at Indore (77.19 %), followed by Jagdalpur Baster (34.34 %), Ratlam (30.13 %), Panna (19.51 %), Banswara (18.28 %), Sarkanda Bilaspur (13.95 %), Jabalpur (12.79 %) and Sawai Madhopur (12.65 %). In PZ, the significant yield gain was 40.05, 23.48, 18.01, 16.91, 15.84, 14.92 and 12.42 per cent at Akola, Parbhani, Belgaum, Niphad Nasik, Dharwad and Bagalkot centers, respectively. In SHZ the average yield of improved varieties under WFLDs was 23.46 q/ha at Wellington center.

Table 5 : State wise Performance of Improved Wheat Varieties under WFLDs during 2014-15

State	Mean yield (q/ha)		% Gain
	Improved	Check	
UP	36.97	31.54	17.22***
HP	29.12	24.87	17.09***
J&K	31.93	24.69	29.32***
Nagaland	12.60	11.92	05.70*
Bihar	40.70	32.22	26.32***
Jharkhand	32.75	23.33	40.38***
Punjab	42.82	38.97	09.88***
Haryana	49.01	46.75	04.83**
Uttarakhand	30.66	23.23	31.98***
Delhi	42.64	38.37	11.13***
Gujarat	47.04	42.70	10.16**
MP	38.79	29.39	31.98***
Chhattisgarh	30.79	24.97	23.31***
Maharashtra	38.59	31.69	21.77***
Karnataka	30.19	26.36	14.53*
West Bengal	36.81	34.11	07.92***
Assam	26.68	20.85	27.96***
Rajasthan	49.98	45.37	10.16***
Tamil Nadu	23.46	-	-

*** 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 Jharkhand (40.38 %) followed by MP (31.98%), Uttarkahand (31.98 %), J&K (29.32 %), Assam (27.96 %), Bihar (26.32 %), Chattisgarh (23.31 %), Maharashtra (21.77 %), UP (17.22 %), HP (17.09 %), Karnataka (14.53 %), Delhi (11.13 %), Rajasthan (10.16 %), Gujarat (10.16 %), Punjab (09.88 %), West Bengal (07.92 %), Nagaland (05.70 %) and Haryana (04.83 %).

Table 6: Performance of Improved Timely Sown Wheat Varieties under WFLDs during 2014-15

Zone & Centre	Improved varieties	Mean yield (q/ha)	Check varieties	Mean yield (q/ha)	% Gain
NHZ					
Almora	VL 907	27.42	Daulatkhani	17.81	53.96***
Bajaura	VL 907	35.81	Raj 3077	28.70	24.77***
	VL 907	33.25	VL 616	26.65	24.77*
Berthin Bilaspur	VL 907	23.80	HPW 236	18.11	31.42***
Tutikandi Shimla	HS 542	31.33	HS 277	26.00	20.50**
Rajouri	VL 907	36.08	HS 240	28.05	28.63*
	VL 907	33.89	PBW 175	27.70	22.35***
Malan Kangra	VL 907	28.45	HPW 155	25.88	09.93**
	HS 507	27.88	HPW 155	24.88	12.06 NS
	HPW 349	28.83	HPW 155	26.33	09.49*
	VL 907	27.33	Sonalika	23.00	18.83***
	HS 507	28.50	Sonalika	26.00	09.62 NS
Dhaulakuan	VL 907	30.50	HD 2967	26.33	15.84**
	VL 907	27.36	Sonalika	23.68	15.54***
Khudwani	VL 907	21.08	SW 1	18.46	14.19***
NEPZ					
Faizabad	NW 5054	26.00	PBW 154	17.00	52.94 NS
	K 1006	24.53	PBW 154	19.15	28.09**
	NW 5054	28.08	PBW 343	22.96	22.30**
	K 1006	32.63	PBW 343	27.33	19.39***
Kanpur	NW 5054	36.70	PBW 343	32.00	14.69***
	K 1006	39.06	K 9107	38.13	02.44 NS
Varanasi	K 1006	22.50	DBW 39	20.17	11.55*
	K 1006	25.67	HUW 468	23.67	08.45 NS
Sohna Sidharthnagar	K 1006	35.36	HD 2733	31.93	10.74***
Kalyani	K 1006	34.22	UP 262	31.38	09.05***
Coochbehar	K 1006	40.63	PBW 343	38.25	06.22**
	K 1006	36.50	UP 262	31.00	17.74 NS
Shillongani	K 1006	27.00	K 307	23.53	14.75 NS
	K 1006	26.67	Sonalika	19.17	39.12***
Darrang	K 1006	26.41	Sonalika	19.80	33.38***
Dhubri	K 1006	36.50	Molla	31.00	17.74***
Tinsukia	K 1006	14.95	Sonalika	12.64	18.28***
Sonitpur	K 1006	26.68	Kalyan Sona	18.13	47.16***
Pusa Bihar	HD 2967	52.50	HD 2733	40.00	31.25***
	K 1006	45.75	HD 2733	37.50	22.00***
	HD 2967	50.00	PBW 343	38.00	31.58***
	K 1006	48.00	PBW 343	35.50	35.21**
Nawada	K 1006	43.20	PBW 154	38.10	13.39***
Vaishali	K 1006	24.57	PBW 343	20.57	19.45*
Adhaura Bhabua	DBW 39	51.21	HUW 234	35.14	45.73***
	K 1006	49.50	HUW 234	34.00	45.59***
Madhubani	K 1006	33.55	UP 262	28.85	16.29***
	HD 2985	31.62	UP 262	28.92	09.34***
Kanke Ranchi	K 1006	34.30	Sonalika	19.50	75.90***
Morabadi Ranchi	K 1006	33.40	UP 262	22.54	48.18***

Zone & Centre	Improved varieties	Mean yield (q/ha)	Check varieties	Mean yield (q/ha)	% Gain
NEPZ					
Morabadi Ranchi	DBW 39	32.36	UP 262	25.25	28.16***
West Singhbhum	K 1006	31.10	Sonalika	23.00	35.22***
NWPZ					
Kathua , Jammu	DBW 88	35.80	HD 2967	26.90	33.09***
	WH 1105	35.56	HD2967	26.31	35.16***
	HD 3086	35.55	HD 2967	25.55	39.14***
Ludhiana	HD 3086	44.87	HD 2967	44.13	01.68^{NS}
Gurdaspur	DBW 88	36.33	HD 2967	35.83	01.40^{NS}
	HD 3086	36.75	HD 2967	34.38	06.89^{NS}
	WH 1105	35.63	HD 2967	35.00	01.80^{NS}
Ropar	DBW 88	41.81	HD 2967	37.62	11.14***
	HD 3086	43.50	HD 2967	37.62	15.63***
	WH 1105	43.01	HD 2967	37.62	14.33***
Amritsar	WH 1105	43.40	HD 2967	41.75	03.95*
	HD 3086	47.44	HD 2967	44.94	05.56**
	DBW 88	44.33	HD 2967	42.17	05.12^{NS}
Agra	WH 1105	44.50	HD 2967	43.50	02.30^{NS}
Baghra	WH 1105	38.75	PBW 502	33.26	16.51***
	DBW 88	42.77	UP 2382	36.99	15.63**
	HD 3086	43.69	UP 2382	36.12	20.96***
Saharanpur	DBW 88	48.2	HD 2967	40.04	20.38***
	HD 3086	52.08	HD 2967	42.75	21.82***
	WH 1105	50.55	HD 2967	42.50	18.94***
IARI New Delhi	DBW 88	41.88	DBW 17	38.60	08.50^{NS}
	DBW 88	41.00	HD 2967	39.00	05.13^{NS}
Ujwa New Delhi	HD 3086	39.36	WH 711	37.42	05.18***
	WH 1105	49.10	WH 711	37.32	31.56***
	DBW 88	41.87	WH 711	37.44	11.83***
DWR Karnal (FLDs at Karnal)	DBW 88	46.68	HD 2967	43.73	06.75^{NS}
	WH 1105	46.50	HD 2967	43.47	06.97^{NS}
Noida	WH 1105	51.55	PBW 343	41.88	23.09^{NS}
	WH 1105	48.33	PBW 550	40.00	20.83**
	HD 3086	50.00	HD 2967	47.50	05.26^{NS}
	HD 3086	46.75	PBW 550	38.13	22.61***
	DBW 88	50.00	HD 2967	50.00	00.00^{NS}
	DBW 88	46.67	PBW 343	40.00	16.68*
	DBW 88	49.28	PBW 550	37.50	31.41***
Hisar	DBW 88	55.00	HD 2967	54.13	01.61^{NS}
	HD 3086	55.00	HD 2967	53.85	02.14**
	WH 1105	57.00	HD 2967	56.00	01.79^{NS}
Bhiwani	HD 3086	51.88	HD 2851	48.25	07.52**
	WH 1105	54.25	HD 2851	51.00	06.37^{NS}
	HD 3086	55.00	WH 711	51.00	07.84^{NS}
	WH 1105	50.33	WH 711	49.00	02.71^{NS}
Durgapura	HD 3086	52.88	Raj 3077	51.13	03.42^{NS}
	HD 3086	51.25	Raj 4079	48.75	05.13^{NS}
	WH 1105	53.50	Raj 3077	50.50	05.94^{NS}
Ajmer	DBW 88	56.40	Raj 3077	52.05	08.36^{NS}
	HD 3086	59.38	Raj 3077	53.50	10.99^{NS}
Bansthali	DBW 88	48.00	Raj 3077	45.50	05.49^{NS}
	HD 3086	47.50	Raj 3077	44.00	07.95^{NS}
CZ					
Udaipur	Raj 4079	52.20	Lok 1	48.40	07.85^{NS}
	Raj 4079	53.80	Raj 4037	49.60	08.47**
Banswara	Raj 4079	41.30	Raj 3077	34.46	19.85***
Kota	Raj 4079	53.30	Raj 4037	48.20	10.58***
	Raj 4238	51.25	Lok 1	46.75	09.63^{NS}
Sawai Madhopur	Raj 4079	52.55	Raj 4037	46.65	12.65**
Indore	DBW 110	59.00	Lok 1	32.00	84.38*

Zone & Centre	Improved varieties	Mean yield (q/ha)	Check varieties	Mean yield (q/ha)	% Gain
PZ					
Akola	MACS 6478	38.71	Lok 1	27.64	40.05***
Niphad	NIAW 1415	36.50	Ajit 102	31.25	16.80**
	NIAW 1415	38.13	Lok 1	33.25	14.68 ^{NS}
	MACS 6478	41.30	Ajit 102	36.20	14.09**
	MACS 6478	41.83	Lok 1	35.50	17.83*
Parbhani	MACS 6478	35.75	Lok 1	27.00	32.41***
	MACS 6478	36.00	HD 2189	29.50	22.03***
	MACS 6478	35.83	Lok 1	31.67	13.14**
Pune	MACS 6222	50.00	HD 2189	40.00	25.00 ^{NS}
	MACS 6478	42.50	HD 2189	36.25	17.24 ^{NS}
	MACS 6478	45.00	Gold 28	40.00	12.50 ^{NS}
Dharwad	UAS 304	38.06	DWR 162	33.13	14.88**
Belgaum	MACS 6478	23.02	DWR 162	19.69	16.91***
Bagalkot	MACS 6478	37.67	DWR 162	33.56	12.25***
SHZ					
Wellington	COW (W) 1	22.90	-	-	-
	HW 5216	24.00	-	-	-

*** 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 VL 907 gave significantly higher yield (36.08 q/ha) at Rajouri in NHZ (Table 6). In NEPZ, the highest significant average yield was recorded by HD 2967 at Pusa Bihar (52.50 q/ha) followed by DBW 39 (51.21 q/ha) at Adhaura Bhabua, HD 2967 (50.00 q/ha) at Pusa Bihar, K 1006 (49.50 q/ha) at Adhaura Bhabua centre. In NWPZ, the highest significant average yield was recorded by HD 3086 at Ajmer (59.38 q/ha) followed by WH 1105 (57.00 q/ha) at Hisar and DBW 88 (56.40 q/ha) at Ajmer. In CZ, DBW 110 gave highest significant average yield (59.00 q/ha) at Indore centre followed by Raj 4079 (53.80 q/ha) at Udaipur centre. In PZ, MACS 6222 gave highest but non-significant yield (50.00 q/ha) at Pune centre. At Wellington centre of SHZ, HW 5216 recorded the average yield of 24.00 q/ha followed by COW (W)-1 (22.90 q/ha).

Table 7 : Performance of Improved Late Sown Wheat Varieties under WFLDs during 2014-15

Centre	Improved varieties	Mean yield (q/ha)	Check varieties	Mean yield (q/ha)	% Gain
NWPZ					
DWR Karnal (FLDs at Muzaffarnagar)	DBW 71	29.98	Raj 3765	24.15	24.14***
	DBW 71	29.75	PBW 226	23.36	27.35***
	DBW 71	29.74	PBW 343	23.78	25.06***
	DBW 71	30.40	PBW 502	25.30	20.16 ^{NS}
	DBW 71	29.57	PBW 550	23.37	26.53***
CZ					
Udaipur	Raj 4238	50.50	Lok 1	45.00	12.22*
	Raj 4238	46.50	Raj 3765	42.50	09.41 ^{NS}
Banswara	Raj 4238	40.50	Raj 3077	35.17	15.15***
Junagadh	Raj 4238	41.53	Lok 1	37.25	11.49 ^{NS}
Vijapur	Raj 4238	47.92	GW 173	43.60	09.91***
Jabalpur	MP 3336	41.00	GW 173	38.00	07.89 ^{NS}
	Raj 4238	39.00	Lok 1	33.75	15.56**
Panna	Raj 4238	29.40	Lok 1	24.60	19.51**
Ratlam	Raj 4238	41.42	Lok 1	31.83	30.13***
Jagdalpur	Raj 4238	29.26	Ratan	21.78	34.34***
Sarkanda Bilaspur	Raj 4238	34.26	HD 2864	29.47	16.25*
	MP 1203	32.83	HD 2864	29.20	12.43***

The late sown varieties mean yield data has revealed that variety DBW 71 gave significantly higher yield (29.98 q/ha) in DWR Karnal FLDs at Muzaffarnagar in NWPZ (Table 7). In CZ, the highest significant average yield was recorded by Raj 4238 at Udaipur (50.50 q/ha).

Table 8a : Zone wise Productivity under WFLDs over Regional during 2014-15

Zone	Mean yield (q/ha)		% Gain
	WFLDs	Regional	
NHZ	28.42	21.26	33.68***
NEPZ	33.28	24.58	35.39***
NWPZ	43.22	35.41	22.06***
CZ	41.90	31.07	34.86***
PZ	35.28	28.05	25.78***
SHZ	23.46	-	-

*** Significant at 1 percent level

The yield gain due to improved varieties over regional mean yield was highest in NEPZ (35.39 %) followed by CZ (34.86 %), NHZ (33.68 %), PZ (25.78 %) and NWPZ (22.06 %) (Table 8a).

Table 8b : Zone wise Productivity under WFLDs over Check during 2014-15

Zone	Mean yield(q/ha)		% Gain
	WFLDs	Check	
NHZ	28.42	23.10	23.03***
NEPZ	33.28	27.51	20.97***
NWPZ	43.22	38.47	12.35***
CZ	41.90	35.24	18.90***
PZ	35.28	29.60	19.19***
SHZ	23.46	-	-

*** Significant at 1 percent level

The yield gain due to improved varieties over check was highest in NHZ (23.03 %) followed by NEPZ (20.97 %), PZ (19.19 %), CZ (18.90 %) and NWPZ (12.35 %) (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.

Table 9 : Highest Wheat Variety Yield attained in Various Zones during 2014-15

Zone	Centre	Variety	Yield (q/ha)
NHZ	Bajaura	VL 907	42.25
NEPZ	Pusa Samastipur	HD 2967	55.00
NWPZ	Ajmer	HD 3086	67.00
CZ	Indore	HI 8737 (d)	64.00
PZ	Pune	MACS 6222	50.00
SHZ	Wellington	HW 1098 (*dicoccum*)	42.50

The location specific highest varietal yield (Table 9) attained in a zone were HD 3086 (67.00 q/ha) at Ajmer centre in NWPZ, HI 8737 (d) (64.00 q/ha) at Indore in CZ, HD 2967 (55.00 q/ha) at Pusa Samastipur in NEPZ, MACS 6222 (50.00 q/ha) at Pune in PZ, VL 907 (42.25 q/ha) at Bajaura in NHZ and HW 1098 (*dicoccum*) (42.50 q/ha) at Wellington in SHZ.

Table 10 : Yield Gain through Bio-Fertilizer under WFLDs during 2014-15

Zone & Centre	100 % Inorganic + Bio-Fertilizer (Azotobactor+PSB)		100 % Inorganic Fertilizer		% Gain
	Variety	Mean yield (q/ha)	Variety	Mean yield (q/ha)	
NEPZ					
Dimapur	K 1006	12.60	K 1006	11.92	05.70*
NWPZ					
Agra	DBW 88	43.00	DBW 88	41.00	04.88*
Nagina	DBW 88	45.00	DBW 88	43.50	03.45 NS
Pantnagar	DBW 88	38.60	DBW 88	38.00	01.58 NS
	HD 3086	44.80	HD 3086	44.00	01.82 NS
IARI New Delhi	HD 3086	46.00	HD 3086	44.38	03.65 NS
	WH 1105	39.94	WH 1105	38.98	02.46 NS

* 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 yield gain was non-significant at most of the centers. In NEPZ, there was significant yield gain of 05.70 per cent at Dimapur center followed by 4.88 % at Agra center in NWPZ (Table 10).

Table 11 : Performance of Improved Durum/DicoccumVarieties under WFLDs during 2014-15

Zone & Center	Improved variety	Mean yield (q/ha)	Check variety	Mean yield (q/ha)	% Gain
CZ					
Vijapur	GDW 1255 (d)	47.76	GW 496	41.88	14.04 ^{NS}
Indore	HI 8713 (d)	46.00	Sujata	28.00	64.29 ^{NS}
	HI 8713 (d)	60.00	Lok 1	33.00	81.82*
	HI 8737 (d)	60.00	Lok 1	35.00	71.43*
PZ					
Bagalkot	WHD 948 (d)	32.00	DWR 162	28.00	14.29 ^{NS}
Pune	MACS 2971 (dic.)	35.00	Local Khapali (dic.)	27.50	27.27 ^{NS}
	HW 1098 (dic.)	35.00	DDK 1029 (dic.)	30.00	16.67 ^{NS}
Wellington	HW 1098 (dic.)	42.50	-	-	-

*** 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 varieties HI 8713 (d) and HI 8737 (d) each gave a significant average yield of 60.00 q/ha at Indore centre in CZ. The varieties MACS 2971 (dic.) and HW 1098 (dic.) each gave an average yield of 35.00 q/ha at Pune center, though it was non-significant (Table 11).

Table 12 : Performance of Improved Varieties under Rainfed/Restricted Irrigation Conditions under WFLDs during 2014-15

Zone & Center	Improved variety	Mean yield (q/ha)	Check variety	Mean yield (q/ha)	% Gain
NHZ					
Almora	VL 907	27.42	Daulatkhani	17.81	53.96***
Bajaura	VL 907	35.81	Raj 3077	28.70	24.77***
	VL 907	33.25	VL 616	26.65	24.77*
Berthin Bilaspur	VL 907	23.80	HPW 236	18.11	31.42***
Tutikandi Shimla	HS 542	31.33	HS 277	26.00	20.50**
Rajouri	VL 907	36.08	HS 240	28.05	28.63*
	VL 907	33.89	PBW 175	27.70	22.35***
Malan Kangra	VL 907	28.45	HPW 155	25.88	09.93**
	HS 507	27.88	HPW 155	24.88	12.06 ^{NS}
	HPW 349	28.83	HPW 155	26.33	09.49*
	VL 907	27.33	Sonalika	23.00	18.83***
	HS 507	28.50	Sonalika	26.00	09.62 ^{NS}
Dhaulakuan	VL 907	30.50	HD 2967	26.33	15.84**
	VL 907	27.36	Sonalika	23.68	15.54***
Khudwani	VL 907	21.08	SW 1	18.46	14.19***

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

In NHZ, at Rajouri center, improved rainfed variety VL 907 yielded 36.08 q/ha which was significantly higher than the check varieties, followed by same variety VL 907 (35.81 q/ha) at Bajaura, VL 907 (33.89 q/ha) at Rajouri, VL 907 (33.25 q/ha) at Bajaura, HS 542 (31.33 q/ha) at Shimla, VL 907 (30.50 q/ha) at Dhaulakuan and HPW 349 (28.83q/ha) at Malan Kangra centre (Table 12).

Table 13 : Performance of Zero Tillage/Rotary Disc Drill under WFLDs in NWPZ during 2014-15

Zone & Centre	Improved varieties	Zero Tillage Mean yield (q/ha)	Conventional Tillage Mean yield (q/ha)	% Gain
NWPZ				
Agra	HD 3086	42.50	41.50	2.41 NS
Pantnagar	DBW 88	37.00	36.00	2.78 NS
	HD 3086	35.20	34.00	3.53 NS
DWR Karnal (FLDs at Karnal)	HD 3086	48.43	46.96	3.13 NS
	WH 1105	42.50	41.50	2.41 NS
DWR Karnal (FLDs at Muzaffarnagar) (Rotary Disc Drill)	DBW 71	31.85	30.45	4.60 NS

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

There was increase in zero tillage yield under WFLDs over check at all the centers but it was non-significant. In case of rotary disc drill, the yield gain was positive and non-significant (Table 13).

Table 14 : Performance of Rotavator under WFLDs during 2014-15

Zone & Centre	Improved varieties	Rotavator Mean yield (q/ha)	Conventional Tillage Mean yield (q/ha)	% Gain
Ludhiana	DBW 88	45.25	44.85	0.89 NS
	WH 1105	47.20	46.90	0.64 NS
Nagina	HD 3086	47.00	45.00	4.44 NS
	DBW 88	48.00	46.00	4.35 NS
	WH 1105	47.80	46.00	3.91 NS
Pantnagar	WH 1105	44.00	43.10	2.09 NS
	DBW 88	39.00	38.20	2.09 NS

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

The performance of rotavator technology under WFLDs has shown positive and non significant impact at all the centers.

Chemical control of yellow rust

To test the alternate fungicides such as Bayleton and Triadimefon, WFLDs were organized at Karnal center. The yellow rust did not appear in the demonstrated field.

Performance of Salt Tolerant Varieties

Table 15 :Performance of Salt Tolerant Varieties under WFLDs in NWPZ during 2014-15

Zone & Center	Improved variety	Mean yield (q/ha)	Check variety	Mean yield (q/ha)	% Gain
NWPZ					
CSSRI Karnal (FLDs in Kaithal & Jind)	KRL 210	44.38	HD 2967	42.38	4.72 NS

NS - Non-significant

The performance of salt tolerant variety KRL 210 under WFLDs have shown positive and non-significant impact at CSSRI Karnal center.

Table 16 : Performance under Drip Irrigation under WFLDs during 2014-15

Zone & Center	Improved varieties	Drip Irrigation Mean yield (q/ha)	Flood Irrigation Mean yield (q/ha)	% Gain
Vijapur	Raj 4238	52.00	50.00	4.00 ^{NS}
Vijapur	GDW 1255 (d)	56.00	54.00	3.70 ^{NS}

For effective and efficient use of water, demonstration on drip irrigation was organized at Vijapur center. There was no significant yield gain due to drip irrigation, but it is visible that we can produce similar yield with less use of water. Therefore, such technologies have great future in view of the declining water table across the country.

'Per drop more crop' can be realised by demonstrating the micro irrigation technologies at farmers' fields. The limitation is that every center does not have the required infrastructure to demonstrate these technologies.

Zone wise coordinators' recommendations/suggestions for WFLDs

The zone specific suggestions are given below.

NHZ: The number of FLDs should be enhanced and budget for Front Line demonstrations should be increased. The inputs and funds should be released in time. Additional funds are required for organizing the field day. Chemical fertilizers and other inputs should be provided to the farmers.

NEPZ: Funds for conducting FLDs should be increased. FLDs should be allotted timely and the funds for FLDs should be released timely. Seed for FLDs should be supplied timely by ICAR-IIWBR (DWR), Karnal every year and should be continued. Late sown varieties with low water requirement and varieties with high yielding potential should be promoted under FLDs in West Singhbhum. Seed and other inputs like, fertilizer, plant protection chemical, herbicides, diesel for irrigation etc. should be given under FLD programme to cover the total demonstration cost. Funds for TA/DA should be given given for better monitoring of FLDs.

NWPZ: Number of FLDs should be increased and funds should be released in time. Funds under TA grant need to be increased. Demonstrations should be given alongwith full input package. Heat tolerant, short duration and less water requiring varieties are required to be demonstrated under FLDs.

CZ: The funds for wheat FLDs should be increased and released in time to meet the required expenditure, organize the farmers' day and perform the other activities timely. Due to the shortage of irrigation water and erratic power supply, the area under wheat FLDs need to be reduced from 1.0 hectare to 1.0 acre for the Junagarh area. The type of wheat FLDs should be finalized in accordance with suggestions of the cooperating center's scientists and regional requirement of newly released variety/technology. FLDs should be continued for replacement of old varieties. Increase the area under wheat FLDs

for Panna district. The high yielding varieties suitable for semi-irrigated/restricted irrigation conditions should be released. The wheat varieties tolerant to untimely rainfall/climate change regime should be developed and popularised to avoid yield loss.

PZ : More number of FLDs are required at Dharwad center. Timely supply of seed is very much essential as the sowing period is between second fortnight of October to first fortnight of November.

SHZ: The seed and funds for FLDs should be supplied early/timely.

Farmers' perception about WFLDs

- 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 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.
- Wheat FLD is an effective method of transfer of technology. Regular availability of improved varieties will certainly enhance wheat productivity along with farmers' profit.

Observations/Farmers' Feedback during Monitoring of Front Line Demonstrations (FLDs) at different Cooperating centers during wheat crop season 2014-15.

Front Line Demonstrations (FLDs) Monitoring Report of Dhaulakuan (Sirmour), Shimla, Bajaura (Kullu), Kathua and Ropar centers.

I. Monitoring Center : CSKHPKV, HAREC, Dhaulakuan, Sirmour (HP)
Monitoring Date : 09.03.2015
Monitoring Team

1. Dr. Satyavir Singh, Principal Scientist (Agricultural Extension), ICAR-IIWBR, Karnal
2. Dr. Mahesh Kumar, Assistant Director, MOA, Directorate of Wheat Development, Ghaziabad (UP).
3. Dr. Dhanbir Singh, Associate Director (Research & Extension), HAREC, Dhaulakuan, Sirmour (HP).
4. Dr. Ashwani Kumar, Principal Scientist (Plant Pathology), HAREC, Dhaulakuan, Sirmour (HP)

The team visited CSKHPKV, HAREC, Dhaulakuan, Sirmour center on 9th March, 2015. The technology i.e. improved or newly released wheat variety (NRWV) with complete package of practices was demonstrated at farmers' fields. Wheat variety VL 907 was

demonstrated and the check varieties were Raj 3765 and HD 2967. The following observations were made during visit of the wheat FLDs farmers' fields (village-Mughlawalan).

- The wheat crop of FLD improved wheat variety VL 907 was free from diseases.
- The weed infestation was negligible in FLDs fields.
- Improved wheat variety was having good crop stand, good crop health, compact earhead, more tillering, more number of grains per earhead, bold and lustrous grains.
- In a field near to FLD, in village Mughlawalan, variety Raj 3765 was infested with yellow rust (10S-20S). The farmers were advised to spray the infested crop with Propiconazole 25 EC.
- Line sowing was practiced in most of the visited wheat FLD fields.
- Infestation of *weeds* was more in the adjoining farmers' fields. The weeds observed were *Phalaris minor* (Mandusi), *Cyprus rotundus* (Motha), *Chenopodium album* (Bathua) and *Avena ludoviciana* (Jangali Jai).
- The farmers expected more yield from the demonstrated variety VL 907 than the old or check variety.
- FLD is recognized as an effective method of transfer of improved wheat production technology.
- The farmers appreciated the conduct and supervision of FLDs by cooperators.

II. Monitoring Center : IARI, Regional Station, Amartara Cottage, Shimla (HP).
Monitoring Date : 11.03.2015
Monitoring Team

1. Dr. Satyavir Singh, Principal Scientist (Agricultural Extension), ICAR-IIWBR, Karnal.
2. Dr. Mahesh Kumar, Assistant Director, MOA, Directorate of Wheat Development, Ghaziabad (UP).
3. Dr. D.P. Walia, Principal Scientist (Plant Breeding) & Incharge, IARI, Tutikandi Centre, Shimla (HP).
4. Dr. P.C. Saini, SMS, Development Block, Balh, Ner Chowk, District Mandi (HP)

The monitoring team visited wheat FLDs conducted by IARI, Regional Station, Amartara Cottage, Shimla (HP) center on 11th March, 2015. The technology demonstrated was improved or newly released wheat variety (NRWV) with complete package of practices at farmers' fields. Wheat variety HS 542 was demonstrated and the check variety was HS 277. The following observations were made during visit of the wheat FLDs farmers' fields (village-Kangru, district Mandi).

- The wheat crop of FLD variety HS 542 was free from diseases.
- The weed infestation was negligible in FLDs fields.
- Infestation of weeds was more in the adjoining farmers' fields. The weeds observed were *Phalaris minor* (Mandusi), *Chenopodium album* (Bathua), *Avena ludoviciana* (Jangali Jai) etc.
- The adjoining farmers fields of varieties HS 277 and PBW 621-50 were infested with yellow rust (20S to 30S). The farmers had sprayed the infested crop with Tilt 25 EC as advised by the State Department of Agriculture.
- The farmers were happy with the performance of HS 542 variety and expected more yield than the check variety.
- The farmers appreciated the conduct and supervision of FLDs by cooperators.

III. Monitoring Center : CSKHPKV, HAREC, Bajaura, Kullu (HP).
Monitoring Date : 12.03.2015
Monitoring Team

1. Dr. Satyavir Singh, Principal Scientist (Agricultural Extension), ICAR-IIWBR, Karnal.
2. Dr. Mahesh Kumar, Assistant Director, MOA, Directorate of Wheat Development, Ghaziabad (UP).
3. Dr. Gurudev Singh, Scientist (Agronomy), CSKHPKV, HAREC, Bajaura, Kullu (HP)

The team visited wheat and barley FLDs conducted by HAREC, Bajaura, Kullu center on 12th March, 2015. The technology i.e. improved or newly released wheat variety and newly released barley variety with complete package of practices was demonstrated at farmers' fields. Wheat variety VL 907 was demonstrated and the check variety was HPW 155. Barley variety BHS 400 was demonstrated and the check variety was Local. The following observations were made during visit of the wheat and barley FLDs farmers' fields (village-Takoli and Kabdiana on 12.03.2015).

- The wheat crop of FLD variety VL 907 was free from diseases.
- The barley crop of FLD variety BHS 400 was free from diseases. Weed infestation was negligible in the FLD fields.
- Infestation of weeds was more in the adjoining farmers' fields. The weeds observed were *Poa annua* (Midow grass), *Lolium temulentum* (Ubban), *Coronopus didymus* (Wild carrot), *Stelaria media* (Chickweed), *Fumaria parviflora* (Pit papra), *Cynodon dectylon* (Doob grass) and *Medicago denticulata* (Khukhni or Drodha) etc.
- The wheat FLD fields of VL 907 variety and barley fields of HS 400 variety were free from yellow rust. At the time of visit, the FLDs farmers' neighbouring field were also free from yellow rust.
- The land holdings were fragmented and very small. It is difficult to conduct FLDs at one place. The farmers appreciated the conduct and supervision of FLDs by cooperators.

IV. Monitoring Center : KVK, Kathua (Jammu)
Monitoring Dates : 13.03.2015 and 14.03.2015
Monitoring Team

1. Dr. Satyavir Singh, Principal Scientist (Agricultural Extension), ICAR-IIWBR, Karnal.
2. Dr. Mahesh Kumar, Assistant Director, MOA, Directorate of Wheat Development, Ghaziabad (UP).
3. Dr. Amrish Vaid, Programme Coordinator, KVK, Kathua (Jammu).
4. Dr. Berjesh Ajrawat, SMS (Extension), KVK, Kathua (Jammu).

The team visited wheat FLDs conducted by KVK, Kathua center on 13th and 14th March, 2015. The technology i.e. improved or newly released wheat variety with complete package of practices was demonstrated at farmers' fields. Wheat varieties WH 1105, HD 3086 and DBW 88 were demonstrated and the check variety was HD 2967. The following observations were made during visit of the wheat FLDs farmers' fields (villages-

Chainpura, Haripur Saini, Lakhari and Sultanpur on 13.03.2015 and villages-Sunjwan, Channgran and Rajbagh on 14.03.2015).

- The wheat crops of FLD improved varieties WH 1105, HD 3086 and DBW 88 were free from diseases.
- Weed infestation was negligible in the FLD fields.
- Improved wheat varieties have good crop stand, good crop health, compact earhead, more tillering, more number of grains per earhead, bold and lustrous grains.
- The farmers expected more yield from the demonstrated improved varieties than the old or check variety.
- FLD is recognized as an effective method of transfer of improved wheat production technology.
- The farmers appreciated the conduct and supervision of FLDs by cooperators.

V. Monitoring Center : KVK, Ropar (Punjab)
Monitoring Date : 14.03.2015
Monitoring Team

1. Dr. Satyavir Singh, Principal Scientist (Agricultural Extension), ICAR-IIWBR, Karnal.
2. Dr. Mahesh Kumar, Assistant Director, MOA, Directorate of Wheat Development, Ghaziabad (UP).
3. Dr. Harinder Singh, Programme Coordinator, KVK, Ropar (Punjab).

The team visited wheat FLDs conducted by KVK, Ropar center on 14th March, 2015. The technology i.e. improved or newly released wheat variety with complete package of practices was demonstrated at farmers' fields. Wheat varieties WH 1105, HD 3086 and DBW 88 were demonstrated and the check varieties were HD 2967 and DPW 621-50. The following observations were made during visit of the wheat FLDs farmers' fields (villages-Rasidpur and Fatehgarh Viran on 14.03.2015).

- The wheat crops of FLD variety WH 1105, HD 3086 and DBW 88 were free from diseases.
- Weed infestation was very less in FLD fields.
- Infestation of *weeds* was observed in the adjoining farmers' fields. The weeds observed were, *Phalaris minor* (Mandusi), *Cyprus rotundus* (Motha) and *Chenopodium album* (Bathua) etc.
- The farmers expected more yield from the demonstrated improved varieties than the old or check variety.
- FLD is recognized as an effective method of transfer of improved wheat production technology.
- The farmers appreciated the conduct and supervision of FLDs by cooperators.

Common Observations/Feedback at the farmers' fields at Dhaulakuan (Sirmour), Shimla, Bajaura (Kullu), Kathua and Ropar centers.

- Most of the FLD plots were located near the pucca road and a very few were located away from the Pucca road to enable the technology transfer to the farmers of remote villages.
- Weed infestation was negligible in the FLD fields.
- The demonstration of improved wheat varieties had good germination, more tillering, good crop stand and good crop health.

- The farmers expected more yield from the improved variety than the old or Local varieties.
- FLD is recognized as an effective method of transfer of improved wheat production technology.
- The farmers appreciated the advisory service and technical assistance given by the FLD cooperators.
- The neighbouring farmers of the FLD field asked for the seed of new varieties from FLD farmer for the next year.
- The FLD farmers and FLD cooperators requested that 'Chemical fertilizer should be allowed as input under FLDs programme'.
- More number of FLDs should be allotted and conduct of FLDs should be allowed at different places to enable the transfer of wheat and barley production technology at distant places.

Front Line Demonstrations (FLDs) Monitoring Report of SDAU, Vijapur, Mehsana and WRS, JAU, Junagarh Centers.
Monitoring Dates : 15.03.2015 to 18.03.2015

Monitoring Centre : SDAU, Vijapur, Mehsana (Gujarat)
Monitoring Team
1. Sh. Rajendra Singh, Senior Technical Officer, ICAR-Indian Institute of Wheat and Barley Research, Karnal (Haryana).
2. Dr. Subhash Chandra, Joint Director, Directorate of Millets Development, GOI, Jaipur (Rajasthan).
3. Dr. B.M. Patel, Associate Research Scientist, S.D. Agriculture University, Vijapur, district Mehsana (Gujarat).
4. Dr. K.I. Patel, Assistant Research Scientist, S.D. Agriculture University, Vijapur, district Mehsana (Gujarat).
No representative of State Department of Agriculture, Government of Gujarat joined for monitoring of wheat FLDs.

15th March 2015, SDAU, Vijapur, Mehsana (Gujarat)
On 15th March 2015, visited fields of different villages demonstrated by Centre of Excellence for Research on Wheat, S.D. Agriculture University, Vijapur, District Mehsana (Gujarat) centre. Technologies like improved or newly released wheat varieties (NRWV) of *T. aestivum* & *T. durum*, Drip irrigation, and Bio-fertilizer with complete package of practices were demonstrated at farmers' fields. We monitored wheat FLDs demonstrated by this centre using Raj 4238 (*T. aestivum*) late sown under irrigated conditions, GDW 1255 (*T. durum*) and check varieties were GW 496, GW 366 and GW 173, at villages Shahpur & Laverpur of taluka & district Gandhinagar, villages Katpur & Poglu of taluka Prantij of district Saberkantha, Bhavsar of taluka vijapur of district Mehsana, The following observations and suggestions were made through visit of wheat FLD's plots.

- The wheat FLD plots were located near the Pucca road and few were located away from the pucca road to enable the technology reaches the interior side farmers of the villages.
- The wheat FLD crop was free from all diseases.
- Line sowing was practiced in all the visited FLD fields except one farmers' field due to non availability of seed drill.
- Most of wheat FLD crop were free from any weeds.

- More weed infestation especially *Chinopodium album* (Bathua) was seen in adjoining farmers' fields.
- There were no display boards in FLD sites due to insufficient FLDs funds.
- Cluster village approach not followed in laying out demonstrations.
- The performances of demonstrated FLD plots were appreciable.
- Neighbouring farmers of wheat FLD plots and farmers of other villages were very much interested to grow improved varieties of wheat and to adopt drip irrigation and Bio-fertilizer technique in their fields and would like to have the seeds of improved varieties from the FLD farmers.
- Farmers were very happy to see the performance of the FLD plots. They showed their interest to grow new improved wheat varieties, *T.aestivum* and *T. durum* in their fields in future.
- Farmers were used to make Bhakhri (a kind of thick chapati), Halwa (from Suji), Laddu and Green Roasted wheat grains from *T. durum* varieties.
- The cooperation and coordination between wheat FLDs farmers and Dr. B.M. Patel, officer-in-charge of the demonstrations of wheat FLDs and other officers of this centre were very good and appreciable.
- The demonstrated improved new wheat varieties have very good germination, more tillering, uniform and very good crop stand, having negligible lodging damages in few plots due to rains, good crop health, disease resistance, compact ear head, more number of grains in each ear-head, bold grains, expected high grain and straw yield which will ensure good return to the farmers than the check varieties grown in adjoining fields.
- Drip irrigation technique was seen very success in farmers' fields in that area. It will not carry the extra cost because farmers already used this technique in previous cotton crop. It is very useful to save water and cost of cultivation resulting more net income per hectare area of wheat crop.
- The performance of Bio-fertiliser technique was seen success in farmers' fields it will definitely enhance the wheat yield.
- The farmers expected more yield from the improved varieties than the old or local varieties.
- The farmers appreciated the advisory service and technical assistance given by Dr. B.M. Patel, officer-in-charge of the demonstrations of FLDs and other officers of this centre.
- More number of FLDs should be allotted for awareness about new improved varieties among the farmers living in interior regions.
- The team observed poor coordination from the District Agriculture Office side for organisation of FLDs.
- Soil test was not performed before organisation of FLDs.

Monitoring Centre : WRS, JAU, Junagadh (Gujarat)
Monitoring Team

1. Sh. Rajendra Singh, Senior Technical Officer, ICAR-Indian Institute of Wheat and Barley Research, Karnal-132001 (Haryana)
2. Dr. Subhash Chandra, Joint Director, Directorate of Millets Development, GOI, Jaipur (Rajasthan)
3. Dr A.V. Khanpura, (Entomologist) Assistant Research Scientist and Scientist-In-Charge for Wheat FLDs, Wheat Research Station, Junagadh Agri. Univ., Junagadh (Gujarat).

No representative of State Department of Agriculture, Government of Gujarat joined for monitoring of wheat FLDs.

On 17th March, 2015, visited all demonstration plots located at Tithwa village, Taluka Vakaner, District Morbi (Gujarat) demonstrated by this centre. Technologies like improved or newly released wheat varieties (NRWV) with complete package of practices were demonstrated at farmers' fields. Improved wheat varieties Raj 4238 (*T.aestivum*) late sown, irrigated, under medium fertility conditions was demonstrated and the check variety was Lok-1. Lok-1 is a very popular variety among the farmers and they are hardly to agree replace this because of it's good chapatti making quality.

The following observations and suggestions were made through visit of all farmers' Wheat FLD's fields in Tithwa village of Vakaner Taluca, District Morbi (Gujarat).

- The wheat FLD plots were located near the pucca road.
- Tithwa village was situated in interior and demonstrations were given to this village to enable the technology to reach the interior side of the region.
- The wheat FLD crop was free from diseases.
- Line sowing was practiced in all the visited FLD fields.
- Weed infestation was not seen in the demonstrated wheat FLD fields while adjoining farmers' fields were infested with *Chinopodium album (bathua).*
- Cluster approach was followed in laying out demonstrations in Tithwa village.
- The performance of FLD plots was excellent.
- The cooperation and coordination between farmers and Dr. A.V. Khanpura, officer-in-charge of the demonstrations of wheat FLDs, Dr. K.H. Dabhi, Research Scientist and other officers of this centre were very good and appreciable.
- Neighbouring farmers of wheat FLD plots were much interested to grow improved varieties of wheat in their land and would like to have the seeds from the FLD farmers.
- The demonstrated improved new wheat varieties have very good germination, more tillering, uniform and good crop stand, no lodging, good crop health, disease resistance, compact ear- head, more number of grains per ear-head, bold grains, expected high grain and straw yield which provided good returns to the farmers than the check varieties grown in adjoining fields.
- The farmers expected more yield from the improved varieties than the old or local varieties.
- The farmers appreciated the advisory service and technical assistance given by Dr A.V. Khanpura, Dr. K.H. Dabhi and other officers of this centre.
- Display boards were very beautifully displayed in FLDs sites.
- Both the centres asked to include chemical fertilizers as input for better performance of demonstration of FLDs.
- A number of farmers assembled in the field of the FLD farmer and queries of the farmers were replied on the spot. Farmers were very happy to see the performance of the FLD plots. They showed their interest to grow new improved wheat varieties in their fields in future.
- On 18th March 2015, monitoring team members visited fields of Wheat Research Station, Junagadh Agriculture University, Junagadh (Gujarat).
- The team observed poor coordination from the District Agriculture Office side for organisation of FLDs.
- Soil test was not performed before organisation of FLDs.

Front Line Demonstrations (FLDs) Monitoring Report of IARI, Regional Station, Indore and JNKVV, Jabalpur.

Monitoring Centre: IARI, Regional Station, Indore (MP)

Dates of monitoring: 16.03.2015 and 17.03.2015

Monitoring Team :

1. Sh. J.K. Pandey, Assistant Chief Technical Officer, ICAR-IIWBR, Karnal (Haryana)

2. Dr. A.L. Waghmare, STA, Directorate of Sugarcane Development, Bhopal (MP)
3. Dr. A.K. Singh, Pr. Scientist (Agri. Extension), IARI, Regional Station, Indore (MP)

The team visited the Centre and Wheat FLDs fields. The technologies i.e. improved wheat varieties for assured irrigation (*durum*), improved wheat varieties for limited irrigation (*durum*), improved wheat varieties for assured irrigation & limited irrigation (*aestivum*) with complete package of practices were demonstrated at farmer's field. Wheat (*aestivum* & *durum*) varieties like HI 8663,HD2987,HI 1544, HI 1531, HI 8713, HI 8737, HI 8627,HI 1500, DBW 110, HD 2932 was demonstrated and check varieties was Lok 1, Sujata, HI 8498 & HI 1544 .
The following observations and suggestions were made through visit of the wheat FLDs farmer's field of the centre.

- The wheat crop of FLDs were free from disease.
- Almost all the fields were free from weeds.
- The crop stand & health was very good.
- In Sol Sindha village (Tehsil : Sanwer), little lodging was observed in one field.
- The demonstrated sites were easily approachable.
- Neighbouring farmer's demanded to increase the numbers of beneficiaries of FLD (wheat).
- The farmers were very happy with this variety/ technology and showed interest for further sowing of the variety.
- During the visit we asked about the benefit of the technology/ variety & the farmers very much happy & explained it very nicely.
- In this area a maximum number of farmers applied over dose of nitrogen in wheat and other crops but the beneficiary farmers of FLDs applied fertilizers at recommended dose.
- Good linkage between cooperating centre and farmers.
- We advised to Farmers to share seed & experiences about seed & technology to other farmers.

Monitoring Centre : JNKVV, Jabalpur (MP)
Dates of monitoring : 18.03.2014 and 19.03.2015
Monitoring Team :
1. Sh. J.K. Pandey, Assistant Chief Technical Officer, ICAR-IIWBR, Karnal (Haryana)
2. Dr. A.L. Waghmare, STA, Directorate of Sugarcane Development, Bhopal (MP)
3. Dr. R.S. Shukla, Wheat Breeder & Incharge WIP, JNKVV, Jabalpur (MP)

The team visited to the centre and Farmer's field of FLDs (Wheat). At this monitoring centre, the only improved variety technology (NRWV) for irrigated late sown with complete package of practices were demonstrated in all the farmers field (FLDs). The wheat varieties were MP 3336 & RAJ 4238 and check varieties was GW 173 & Lok 1.
The following observations and suggestions were made through visit of the wheat FLDs farmers field of the centre.

- The crop stand & health was very good.
- The wheat crop of FLDs was free from disease.
- Almost all the fields are free from weeds.
- Adjoining farmer's fields infested with *Phalaris minor* (Mandusi).
- The demonstrated sites were easily approachable and on the side of pucca road.
- Neighbouring farmer's demand to increase the nos. of beneficiaries of FLD (wheat).
- The farmers were very happy with the test variety (MP 3336 & RAJ 4238) & showed interest for further sowing of the variety.
- The farmers were requested to share seed of the test variety & experiences about it to other farmers.
- The farmers appreciated advisory services & technical guidance rendered by the programme coordinator.

Front Line Demonstrations (FLDs) Monitoring Report of ACAES, Amity University, Noida and CATAT, IARI, New Delhi centers.
Monitoring Dates : 18.03.2015 and 19.03.2015

Monitoring Centre : ACAES, Amity University, Noida (UP)
Monitoring Team
1. Dr. R. Sendhil, Scientist, Social Sciences, ICAR-Indian Institute of Wheat and Barley Research, Karnal (Haryana).
2. Dr. N.P. Singh, Director, FLD Coordinator, Amity Centre for Agricultural Extension Services (ACAES), Amity University, Noida (Uttar Pradesh).
3. Dr. P.P. Singh, Technical Officer, Directorate of wheat Development, Ghaziabad (UP)
4. Sh.Amba Prakash Sharma, Block Development Agriculture Officer, Dadri Block, Gautam Budh Nagar (Uttar Pradesh).
5. Sh.Satish Kumar, Technical Officer, ACAES, Amity University, Noida (Uttar Pradesh).
6. Sh.Roshan Lal, Technical Officer, ACAES, Amity University, Noida (Uttar Pradesh).

Improved or newly released wheat varieties *viz.*, WH 1105, HD 3086 and DBW 88 were demonstrated in 7.20 hectares of land at farmers' field in Virpura village of Dadri block. WH 1105 was demonstrated against PBW 550, PBW 343 and HD 2733. HD 3086 was demonstrated against PBW 550, PBW 226, PBW 343, PBW 502 and HD 2967. Similarly, DBW 88 was demonstrated against PBW 502, HD 2733, PBW 226, PBW 343, PBW 711 and HD 2967. Field Day has been organised at the demonstrated village on 19.03.2015 wherein around 30 farmers comprising male and female participated including seven beneficiaries of FLDs. The following observations were made during the overall monitoring and discussion with FLD farmers' *viz.*, Shri. Baldaan Singh, Shri. Kuldeep Singh, Shri. Sanjay Singh, Shri. Billu Singh, Smt. Manisha, Shri. Mahesh Singh and Shri. Sunder Singh by the Amity University centre monitoring team.

- FLD plots (18 nos.) were selected across the Virpura village. Monitored plots were closer to the road and it carried board so that the technology demonstrated shall be visible to other farmers of the village.
- As per the discussion with the farmers it was known that broadcasting was practiced in all the fields. Around 40kg of seeds per acre was used for sowing. They feel seed drill holes were blocked during sowing if opted for line sowing. Owing to this, they have to go for gap filling which force them to choose broadcasting instead of line sowing.
- Farmers said that the test varieties resulted in good germination and uniform crop growth with more tillers and grains per spike. Despite this PBW 343 occupies more area in that village.
- Harvesting yet to be done in the monitored plots. FLD farmers expect yield around 20 qunitals/acre and believe they will harvest around 5 quintals/acre more than the check varieties.
- Despite several efforts by the extension agents/agencies and subject matter specialists farmers said that they have not done the seed treatment. They also replace seeds once in three years due to non-availability of their preference. None of the farmers tested their soils and a majority had not applied fertilizers as per the recommended dose.
- Almost all the FLD farmers applied zinc.
- *Phlaris minor* was seen in the monitored fields. Sulfosulfuron has been used by the farmers in general to protect the crop.

- They also reported Neelgai problem in the village.
- Three irrigations were given by tubewell. Despite the recent showers, WH 1105 didn't lodge in the demonstrated field owned by Smt. Manisha.
- In general, they market the produce in local mandi (INR 10-20 less than the support price)
- 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 local check varieties. They appreciated the technical assistance and advisory offered by the ACES, Amity University, Noida. They are interested to continue wheat cultivation even if the assistance from FLDs is stopped.

Monitoring Centre : CATAT, IARI, New Delhi
Monitoring Team
1. Dr. R. Sendhil, Scientist, Social Sciences, ICAR-Indian Institute of Wheat and Barley Research, Karnal (Haryana).
2. Dr. P.P. Singh, Technical Officer, Directorate of wheat Development, Ghaziabad (UP)
3. Sh.Kishan Singh, Technical Officer, Centre for Agricultural Technology Assessment and Transfer (CATAT), Indian Agricultural Research Institute (IARI), New Delhi.
4. Sh. Ajay Singh, Technical Officer, CATAT, IARI, New Delhi.

Newly released wheat varieties *viz.*, WH 1105, HD 3086 and DBW 88 were demonstrated in 7 hectares of land at farmers' field in Khera Kishan village of Tappal block. HD 3086 and WH 1105 was demonstrated against their own check for the bio-fertilizer application. DBW 88 was demonstrated against DBW 17, HD 2967, PBW 550, PBW 502 and DBW 17. The following observations were made during the overall monitoring and discussion with Sh.Tej Vir Singh, Sh.Vijay Pal Singh, Smt. Dropa Devi and Sh. Sukhvir Singh from Khera Kishan village.

- Twelve FLD plots were selected across Khera Kishan village in Aligarh district of Uttar Pradesh. The monitored plot was bit away from the main road and because of heavy hailstorms, a substantial portion of his filed lodged wherein HD 3086 was demonstrated.
- The crop in the monitored field is almost matured and nearing the harvest.
- Few off-type plants were also noticed in the field.
- As per the discussion with the farmers from Khera Kishan it was known that 40kg/acre was used as a seed rate and used seed drill for sowing.
- Sh. Tejvir Singh and Sh. Sukhvir Singh used seed drill to sow 100 kg of seeds per hectare and 40kg per acre respectively. Sh. Tej Vir Singh applied Sulfosulfuron (12 packets) and three irrigations.
- Fertilizer was not applied as per the recommended dose.
- Smt. Dropa Devi applied 1 packet of bio-fertilizer per hectare to the demonstrated variety.
- Almost all the farmers reported a yield loss around 50 per cent due to lodging of the crop owing to hailstorm.
- Technical assistance and advisory offered by CTAT, New Delhi was appreciated and the farmers are interested to continue wheat cultivation in the coming years.

Suggestions for betterment of the programme
- Dr. PP Singh suggested for soil test based fertilizer application. He also advised for line sowing against broadcasting.
- Zinc should be applied (either in one season for Kharif/Rabi as per the recommended dose) wherever the soils are deficient.
- Early allotment of FLDs and release of fund for better conduct of FLDs.
- Further, funds should reach the operation center before the start of the crop season so that FLDs can be planned and organised in time and efficient way.
- Seeds should be timely supplied and sown for getting better yield.

- More grants may be allotted for travel/monitoring as the places/FLD sites are far off from the main FLD centres.
- The grant per FLD has to be increased. The guidelines should state clearly the meaning of critical inputs as it is perceived differently by the FLD coordinators.

Front Line Demonstrations (FLDs) Monitoring Report of Hisar and Bhiwani (Haryana) centers.

Monitoring Date : 30.03.2015
Monitoring Team

1. Dr. Randhir Singh, Principal Scientist & PI (Social Sciences), ICAR-IIWBR, Karnal
2. Dr. PP Singh, Technical Officer, MOA, Directorate of Wheat Development, Ghaziabad (UP).
3. Dr. IS Panwar, Senior Wheat Breeder, CCSHAU, Hisar (Haryana).
4. Dr. Bhagat Singh, Agronomist (Wheat & Barley), CCSHAU, Hisar (Haryana).
5. Dr. Vinod Kumar, DES (Agronomy), KVK, Bhiwani (Haryana).

- Most of the FLD plots were located near the pucca road so that the other farmers can also benefit.
- Weed infestation was negligible in the FLD fields.
- The crop stand was good. There was slight lodging in parts of the fields otherwise the crop was good. No disease was observed in the crop.
- The farmers who gathered at the sites had positive remarks about the demonstrations and they desired to grow the varieties being demonstrated in the field.
- The FLD farmer had promised during the farmers meet to distribute the seed to other farmers so that maximum area could be covered.
- The farmers desired to have more such demonstrations.

Front Line Demonstrations (FLDs) Monitoring Report of ARS Durgapura, Jaipur and KVK Banasthali Vidyapeeth Centers.

Monitoring Center : KVK, Banasthali Vidyapeeth
Monitoring Date : 01.04.2015
Monitoring Team

1. Dr. Anuj Kumar, Senior Scientist (Agricultural Extension), ICAR-IIWBR, Karnal
2. Dr. Hoshiar Singh, Wheat Breeder, ARS Durgapura, Jaipur, Rajasthan
3. Sh. Banshidhar, SMS (Agronomy), KVK Banasthali Vidyapeeth, Tonk, Rajasthan

The team visited KVK, Banasthali center on 1st April, 2015. The technology i.e. improved wheat varieties such as DBW 88, HD 3086 and WH 1105 were demonstrated with complete package of practices at farmers' fields. The check varieties were RD 3765 and Raj 3077. The same package of practices were followed by the farmers in demonstration as well as check plots.

The following observations were recorded during the visit of the wheat FLDs sites in villages; Barauni, Chhan and Talibpura of Tonk district.

- The varietal demonstration plots were free from insects, pests and diseases.
- The FLDs fields were weed free.
- In demonstration plots there was better crop stand, good crop health, compact and long earhead, more tillers, more number of grains per earhead as well and the grains were bold and lustrous.
- Line sowing was practiced in most of the visited wheat FLD sites.
- In some of the fields sprinkler method of irrigation was used and the crop stand was very good.

- The farmers were expecting more yield from all the demonstrated varieties (DBW 88, WH 1105 and HD 3086) as compared to old or check varieties (Raj 3765 and Raj 3077).
- Farmers perceived that FLD is an effective method to popularize newly developed wheat production technologies.
- The FLD farmers were satisfied with the conduct, supervision and technical guidance rendered by the cooperating centres.

II. Monitoring Center : ARS Durgapura

Monitoring Date : 01.04.2015

Monitoring Team

1. Dr. Anuj Kumar, Senior Scientist (Agricultural Extension), ICAR-IIWBR, Karnal
2. Dr. Hoshiar Singh, Wheat Breeder, ARS Durgapura, Jaipur, Rajasthan
3. Sh. Banshidhar, SMS (Agronomy), KVK Banasthali Vidyapeeth, Tonk, Rajasthan
4. Dr. Lalit Sharma, Assistant Director, DMD, Jaipur

The team visited ARS Durgapura Center on 1st April, 2015. The technology i.e. improved wheat varieties such as DBW 88, HD 3086 and WH 1105 were demonstrated with complete package of practices at farmers' fields. The check varieties were RD 3765 and Raj 3077. The same package of practices were followed by the farmers in demonstration as well as check plots.

The following observations were recorded during the visit of the wheat FLDs sites in villages; Sonthalia Bawari and Sri Madhopur of Sikar district.

- The varietal demonstration plots were free from insects, pests and diseases.
- The FLDs fields were weed free.
- In demonstration plots there was better crop stand, good crop health, compact and long earhead, more tillers, more number of grains per earhead as well and the grains were bold and lustrous.
- Line sowing was practiced in most of the visited wheat FLD sites.
- In some of the fields sprinkler method of irrigation was used and the crop stand was very good.
- The farmers were expecting more yield from all the demonstrated varieties (DBW 88, WH 1105 and HD 3086) as compared to old or check varieties (Raj 3077 and Raj 4037, Raj 3765 and Raj 4079).
- Farmers perceived that FLD is an effective method to popularize newly developed wheat production technologies.
- The FLD farmers were satisfied with the conduct, supervision and technical guidance rendered by the cooperating centres.

Table 17 : Improved and check wheat varieties at farmers' field in various zones

Zone	Improved Varieties	Check Varieties
NHZ	HPW 349, VL 907, HS 507, HPW 349, HS 542	Daulatkhani, Raj 3077, VL 616, HPW 236, HPW 155, HS 277, HS 240, PBW 175, Sonalika, SW 1, HD 2967
NEPZ	DBW 39, CBW 38, KRL 213, NW 5054, K 1006, HD 2967, HD 2985 (Pusa Basant)	PBW 154, PBW 343, K 9107, DBW 39, HUW 234, HUW 468, HD 2733, UP 262, K 307, Sonalika, Kalyan Sona, Molla
NWPZ	WH 1105, HD 3086, DBW 88, KRL 210, DBW 71	HD 2967, DBW 17, PBW 502, UP 2382, PBW 343, PBW 550, WH 711, HD 2851, Raj 3077, Raj 4079, Raj 3765, PBW 226
CZ	Raj 4238, MP 3336, Raj 4079, MP1203, DBW 110, GDW 1255 (d), HI 8713 (d), HI 8737 (d)	Lok 1, Raj 4037, Raj 3765, Raj 3077, GW 173, Ratan, HD 2864, GW 496, Sujata
PZ	MACS 6222, NIAW 1415, MACS 6478, UAS 304, WHD 948 (d), HW 1098 (dicoccum), MACS 2971 (dicoccum)	Lok 1, Ajit 102, HD 2189, Gold 28, DWR 162, Local Khapali (dicoccum), DDK 1029 (dicoccum)
SHZ	COW (W)-1, HW 5216	-

Table 18: Zone wise distribution of popular wheat varieties

Zone	Popular Wheat Varieties
NHZ	HPW 155, HPW 184, Raj 3765, Raj 3777, PBW 550, PBW 502, HS 240, HS 295, VL 616, VL 892, VL 829, HPW 236, HPW 249, SKW 355, S 502, PBW 175, UP 2572, VL Gehun 618, HPW 349, Sher-E-Punjab, HS 507, SW 1, Sonalika, DPW 621-50, HD 2967, Local
NEPZ	PBW 154, PBW 373, PBW 343, HD 2733, PBW 502, NW 2036, NW 1014, NW 1067, PBW 550,UP 2338, NW 5056, HD 2285, Kundan, DBW 39
NWPZ	PBW 343, Raj 3765, Raj 3077, DBW 17, PBW 550, Raj 3777, UP 2382, UP 2572, PBW 502,WH 711, HD 2967, DPW 621-50, HD 2851, WH 542, DBW 16, WH 283, WH 1105, DPW 621, PBW 373, Raj 4079, Raj 4037, PBW 226, PBW 590, UP 2565, UP 2338, Raj 4120, Raj 4083
CZ	Lok 1, Raj 3765, Raj 4037, Raj 3077, GW 322, GW 273, GW 496, Sujata, WH 147, HI 1544, GW 366, HI 1500, HI 8498 (d),Raj 1482, GW 173, Ratan
PZ	Lok 1, HD 2189, DWR 162, Mohan Wonder, Ajit 302,NIAW 301, WR 185
SHZ	COW (W)-1

Wheat and Barley FLDs at DWR, Karnal Centre

During rabi 2014-15, twenty (20 hectares) wheat front line demonstrations (FLDs) were conducted at thirty farmers' fields in the villages namely Jadoli Khurd and Jadoli Kalan in district Karnal of Haryana using varieties DBW 88, HD 3086 and WH 1105; and village Rasulpur in Muzaffarnagar district of UP using variety DBW 71. The demonstrations were conducted with complete package of practices. Farmers were provided the critical inputs as per provision under the programme.

During rabi 2014-15, five (5 hectares) barley front line demonstrations (FLDs) were conducted at five farmers' fields in the village Malkana in district Bathinda of Punjab state using variety DWRB 92 in collaboration with United Breweries Limited (UBL), Patiala (Punjab). The demonstrations were conducted with complete package of practices. Farmers were provided the critical inputs as per provision under the programme.

Conducting Special Wheat FLDs in High Altitude area of HP during Summer-2014

During Summer-2014, 2.6 hectares special wheat front line demonstrations (FLDs) were conducted at twenty farmers' fields in the villages namely Khangsar, Nukar, Jagla, Bargul, Raling, Shipting, Angroop and Teeling in Lahaul & Spiti district of Himachal Pradesh using HS 375 variety. Varietal demonstrations were conducted. Farmers were provided the critical inputs as per provision under the programme. Special wheat FLDs were also conducted in 0.4 hectare area in village Chhumathang of Leh district of Jammu & Kashmir.

Constraints analysis in different wheat producing zones of India during 2014-15

There has been continuous increase in wheat production in recent years, and during last crop season 2014-15 it has declined to 90.78 million tons (Third advance estimate). There is a variation in yield levels among different states, farmers and farms leading to yield gap in different states and different zones. There are many reasons of this yield gap which need to be addressed for sustainable wheat production. Through constraint analysis 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 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 coordinating centres conducting wheat Front Line Demonstrations. 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 total score the average score for each constraint was calculated to ascertain seriousness of each constraint and finally ranking was done.

Northern Hills Zone (NHZ)

In northern hills zone (Table 19) yellow rust, small land holdings, high cost of inputs, non availability of seeds of newly released varieties, poor information delivery by state department extension machinery, low price of wheat, *Phalaris minor*, rodents, lack of knowledge among the farmers about recent technologies, untimely rain, non availability of labour and imbalanced use of fertilizers were some of the major constraints perceived by the farmers.

Table 19 : Constraints of NHZ **n=100**

Constraints	Score	Rank
Yellow rust	199	I
Small land holdings	176	II
High cost of inputs	173	III
Non availability of seed of newly released variety	136	IV
Poor information delivery by state department extension machinery	127	V
Low price of wheat	124	VI
Phalaris minor	116	VII
Rodents	110	VIII
Lack of knowledge among the farmers about recent technologies	104	IX
Untimely rain	101	X
Non availability of labour	100	XI
Imbalanced use of fertilizer	100	XI

North Eastern Plains Zone (NEPZ)

Realizing the potential of north eastern plains zone, all categories of constraints need to be addressed immediately for achieving the targets of second green revolution. Among constraints of this zone, non availability of seed of newly released variety was ranked first followed by small landholding, high cost of inputs, untimely rain, erratic power supply, *Chenopodium album*, poor quality of seeds, lack of irrigation facility, lack of facility of canal irrigation, high custom hiring rate of land levelling, low micro nutrient level in the soil, non availability of crop loan, lack of knowledge among the farmers about recent technologies and low price of wheat were also perceived as major constraints (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=227**

Constraints	Score	Rank
Non availability of seed of newly released variety	344	I
Small holding	293	II
High cost of inputs	268	III
Untimely rain	265	IV
Erratic power supply	261	V
Chenopodium album	247	VI
Poor quality of seeds	246	VII
Lack of irrigation facility	236	VIII
Lack of facility of canal irrigation	231	IX
High custom hiring rate of land leveling	230	X
Low micro nutrient level in the soil	228	X
Non availability of crop loan	219	XI
Lack of knowledge among the farmers about recent technologies	213	XII
Low price of wheat	212	XII
Lack of land levelling	211	XIV
Temperature fluctuations during growth period	210	XV
Late sowing	209	XVI
Low organic matter in the soil	208	XVII
High temperature at maturity	203	XVIII
Imbalanced use of fertilizer	203	XVIII
Water stress	196	XIX

North Western Plains Zone (NWPZ)

In NWPZ, high cost of inputs, erratic power supply, low price of wheat, untimely rain, small land holding, *Phalaris minor*, lack of knowledge among the farmers about recent technologies, Low organic matter in the soil, non availability of electricity, poor quality of seeds, temperature fluctuation and decline in water table were perceived as major constraints in this zone (Table 21).

Table 21 : Constraints of NWPZ **n= 315**

Constraints	Score	Rank
High cost of inputs	400	I
Erratic power supply	341	II
Low price of wheat	321	III
Untimely rain	313	IV
Small land holding	304	V
Phalaris minor	282	VI
Lack of knowledge among the farmers about recent technologies	261	VII
Low organic matter in the soil	260	VIII
Non availability of electricity	239	IX
Poor quality of seeds	228	X
Temperature fluctuation	227	XI
Decline in water table	221	XII

Central Zone (CZ)

In central zone, imbalanced fertilizer use, faulty irrigation method, small land holding, non availability of laser land leveler, untimely rain, high cost of inputs, non availability of seed of newly released variety, lack of irrigation facility, non availability of farm machines, low organic matter in soil, lack of knowledge among the farmers about recent technologies, high temperature at maturity, rodents, poor participation in exposure visits arranged by various departments, low micronutrients in soil and lack of facility of canal irrigation were major constraints (Table 22).

Table 22: Constraints in CZ **n=148**

Constraints	Score	Rank
Imbalanced fertilizer use	134	I
Faulty irrigation method	132	II
Small land holding	130	III
Non availability of laser land leveler	127	IV
Untimely rain	122	V
High cost of inputs	116	VI
Non availability of seed of newly released variety	115	VII
Lack of irrigation facility	108	VIII
Non availability of farm machines	107	IX
Low organic matter in soil	104	X
Lack of knowledge among the farmers about recent technologies	103	XI
High temperature at maturity	99	XII
Rodents	97	XIII
Poor participation in exposure visits arranged by various departments	93	XIV
Low micronutrients in soil	92	XV
Lack of facility of canal irrigation	92	XVI

Peninsular Zone (PZ)

In peninsular zone, erratic power supply, high custom hiring rate, low price of wheat, non availability of labour, non availability of electricity, non availability of seed of newly released variety, imbalanced use of fertilizer, high cost of inputs, faulty irrigation method,

Barley Front Line Demonstrations

non availability of crop loan, untimely rain and lack of irrigation facilities were the major constraints faced by wheat growers (Table 23).

Table 23: Constraints in PZ **n= 71**

Constraints	Score	Rank
Erratic power supply	90	I
High custom hiring rate	88	II
Low price of wheat	88	II
Non availability of labour	84	III
Non availability of electricity	84	III
Non availability of seed of newly released variety	81	IV
Imbalanced use of fertilizer	81	IV
High cost of inputs	80	V
Faulty irrigation method	77	VI
Non availability of crop loan	74	VII
Untimely rain	73	VIII
Lack of irrigation facilities	72	IX

Overall Constraints

The overall constraints analysis across zones revealed that high cost of inputs was the most serious constraint faced by farming community in the country. The other constraints which were also perceived most serious in nature were non availability of seeds of newly released varieties, erratic power supply, low price of wheat, untimely rain, small land holdings, *Phalaris minor,* lack of knowledge among the farmers about recent technologies, low organic matter in the soil, *Chenopodium album* and poor quality of seeds (Table 24).

Table 24: Overall constraints impeding wheat production in the country

Constraints	Score	Rank
High cost of inputs	400	I
Non availability of seed of newly released variety	344	II
Erratic power supply	341	III
Low price of wheat	321	IV
Untimely rain	313	V
Small land holding	304	VI
Phalaris minor	282	VII
Lack of knowledge among the farmers about recent technologies	261	VIII
Low organic matter in the soil	260	IX
Chenopodium album	247	X
Poor quality of seeds	246	XI

Barley Front Line Demonstrations (BFLDs) 2014-15

During the rabi crop season 2014-15, 100 Barley Front Line Demonstrations (BFLDs) were allotted to 20 different cooperating centers all over India in six states namely, HP, UP, Punjab, Haryana, Rajasthan and MP of which 100 were conducted by 20 centers, covering 108.3 hectares area of 199 farmers (Table 25). Improved barley varieties with complete package of practices (irrigation management, fertilizer dose and method of application, weed control, seed treatment etc.) were demonstrated.

Table 25: Centrewise Distribution of Barley FLDs during Rabi 2014-15

S. No.	Zone and Centre	Allotted (1 BFLD=1 ha)	Conducted (1 ha basis)	Area sown (ha)	No. of farmers/ locations
	NHZ				
1.	CSKHPKV, HAREC, Bajaura, Kullu (HP)	5	5	5.0	20
2.	IARI, RS, Tutikandi, Shimla (HP)	5	5	5.0	6
	NEPZ				
3.	NDUA&T, Faizabad (UP)	5	5	5.0	9
4.	KVK (IAS-BHU), Barkachha, Mirzapur (UP)	5	5	10.0*	10
5.	CSAUA&T, Kanpur (UP)	5	5	6.4*	16
6.	BHU, Varanasi (UP)	5	5	4.5	4
	NWPZ				
7.	PAU, Ludhiana (Punjab)	5	5	5.0	8
8.	DWR, Karnal (Haryana)	5	5	5.0	5
9.	CCSHAU, Hisar (Haryana) – 125004	5	5	5.0	7
10.	KVK (CCSHAU), Fatehabad (Haryana)	5	5	5.0	13
11.	KVK (CCSHAU), Jhajjar (Haryana)	5	5	6.0*	15
12.	KVK, Shri BB Ashram, Rewari (Haryana)	5	5	5.0	7
13.	RARI, SKNAU, Durgapura, Jaipur (Rajasthan)	5	5	5.0	5
14.	KVK, Tankarda, Chomu, Jaipur (Rajasthan)	5	5	5.0	8
15.	KVK, SKNAU, Khedla Khurd, Dausa (Rajasthan)	5	5	5.0	11
	CZ				
16.	RCOA, MPUA&T, Udaipur (Rajasthan)	5	5	5.0	9
17.	KVK (MPUA&T), Dhoinda, Rajasmand (Rajasthan)	5	5	5.0	12
18.	ZARS, COA, JNKVV, Kuthulia Farm, Rewa (MP)	5	5	5.0	5
19.	KVK (JNKVV), Purushottampur, Panna (MP)	5	5	5.0	13
20.	KVK (RVSKVV), Juara Khurd, Morena (MP)	5	5	6.4*	16
	Total	**100**	**100**	**108.30**	**199**

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

Table 26 : Statewise Distribution of BFLDs during Rabi 2014-15

State	Allotted	Conducted	Area sown (ha)	No. of farmers/ locations
HP	10	10	10.00	26
UP	20	20	25.90*	39
Punjab	5	5	5.00	8
Haryana	25	25	26.00*	47
Rajasthan	25	25	25.00	45
MP	15	15	16.40*	34
Total	**100**	**100**	**108.30**	**199**

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

Table 27: Zone wise Distribution of BFLDs Conducted during Rabi 2014-15

Zone	Allotted	Conducted	Area sown (ha)	No. of Farmers/ Locations
NHZ	10	10	10.00	26
NEPZ	20	20	25.90*	39
NWPZ	45	45	46.00*	79
CZ	25	25	26.40*	55
Total	**100**	**100**	**108.30**	**199**

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

Table 28 : State wise yield gain under BFLDs during 2014-15

State	BFLDs Yield (q/ha)	Check Yield (q/ha)	% increase
HP	28.90	24.98	15.69***
UP	24.21	19.43	24.60***
Punjab	39.50	37.04	06.64*
Haryana	45.14	42.70	05.71 NS
Rajasthan	48.17	41.42	16.30***
MP	31.49	27.87	12.99**

*** Significant at 1 percent level, ** - Significant at 5 percent level.

The highest increase in barley yield was recorded in UP (24.60 %) followed by Rajasthan (16.30 %), Himachal Pradesh (15.69 %), MP (12.99 %) and Punjab (06.64 %). The lowest increase in yield was reported in Haryana (05.71 %) (Table 28).

Table 29a : Zone wise Productivity under BFLDs over Regional during 2014-15

Zone	BFLDs Yield (q/ha)	Regional Mean Yield (q/ha)	% Increase
NHZ	28.90	22.63	27.71***
NEPZ	24.21	19.48	24.28***
NWPZ	45.44	40.92	11.05***
CZ	37.49	29.65	26.44***

*** Significant at 1 per cent level .

The yield gain due to improved varieties over regional mean yield was highest in Northern Hills Zone (27.71%) followed by Central Zone (26.44 %), North Eastern Plains Zone (24.28 %) and North Western Plains Zone (11.05 %) (Table 29a).

Table 29b : Zone wise Productivity under BFLDs over Check during 2014-15

Zone	BFLDs Yield (q/ha)	Check Mean Yield (q/ha)	% Increase
NHZ	28.90	24.98	15.69***
NEPZ	24.21	19.43	24.60***
NWPZ	45.44	42.54	06.82***
CZ	37.49	31.34	19.62***

*** Significant at 1 per cent level .

The yield gain due to improved varieties over check mean yield was highest in North Eastern Plains Zone (24.60%) followed by Central Zone (19.62 %), Northern Hills Zone (15.69 %) and North Western Plains Zone (06.82 %) (Table 29b). Therefore, efforts should be made to increase barley yield in the North Eastern Plains Zone and Central Zone in collaboration with the State Department of Agriculture.

Table 30 : Centre wise Performance of Improved Barley Varieties during 2014-15

Zone	Centre	BFLDs yield (q/ha)	Check yield (q/ha)	% increase
NHZ	Bajaura	30.10	24.96	20.59***
	Shimla	26.92	25.00	07.68**
NEPZ	Faizabad	27.67	20.89	32.46***
	Mirzapur	23.25	19.82	17.31***
	Kanpur	20.08	16.12	24.57***
	Varanasi	37.99	27.29	39.21***
NWPZ	Ludhiana	36.84	35.50	03.77 NS
	DWR Karnal (UBL Patiala)	43.75	39.50	10.76**
	Hisar	53.29	49.00	08.76 **
	Fatehabad	39.15	37.89	03.33 NS
	Rewari	47.75	45.00	06.11*
	Durgapura-Jaipur	53.80	46.80	14.96***
	Chomu-Jaipur	50.53	49.98	01.10 NS
	Dausa	45.73	41.27	10.81***
CZ	Udaipur	53.00	46.11	14.94***
	Rajsamand	42.87	30.08	42.52***
	Rewa	43.08	41.52	03.76 NS
	Panna	28.40	22.20	27.93***
	Morena	30.38	28.21	07.69***

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

The yield gain at Rajsamand (42.52 %) centre was highest followed by Varanasi (39.21 %), Faizabad (32.46 %), Panna (27.93 %), Kanpur (24.57 %) and Bajaura (20.59%) centers across the zones. The increase in improved variety's yield at Rewari over check variety was the lowest (06.11 %) but significant (Table 30).

Table 31: Variety wise Performance of Improved Barley Varieties during 2014-15

Zone and Centre	Improved Variety	Average Yield (q/ha)	Check Variety	Average Yield (q/ha)	% increase Over Check
NHZ					
Bajaura	BHS 400	28.06	HBL 276	23.17	21.10***
	BHS 400	33.95	HBL 316	28.02	21.16 NS
	BHS 400	32.35	Sonu	27.10	19.37 NS
Shimla	BHS 400	26.92	BHS 352	25.00	7.68**
NEPZ					
Faizabad	RD 2794	27.67	Faizabad Local	20.89	32.46***
Mirzapur	HUB 113	23.45	Jagriti	19.90	17.84***
	JB 1	23.90	Manjula	20.33	17.56***
	JB 58	22.59	Jagriti	19.43	16.26***
Kanpur	RD 2794	19.27	Jyoti	15.00	28.47***
	HUB 113	21.45	K 508	18.00	19.17**
Varanasi	HUB 113	37.99	Jagriti	27.29	39.21***
NWPZ					
Ludhiana	DWRB 92	35.83	PL 807	34.67	3.35 NS
	BH 902	37.45	PL 807	36.00	4.03 NS
DWR Karnal (UBL Patiala)	DWRB 92	43.75	PL 426	39.50	10.76**
Hisar	BH 902	53.29	BH 393	49.00	8.76**
Fatehabad	DWRB 92	41.16	BH 393	39.66	3.78 NS
	BH 902	37.90	BH 393	36.79	3.02 NS
Rewari	BH 902	48.40	BH 393	45.50	6.37 NS

	DWRB 92	46.67	BH 393	44.17	5.66 NS
Durgapura-Jaipur	BH 902	53.80	RD 2052	46.80	14.96***
Chomu-Jaipur	BH 902	50.53	RD 2503	49.98	1.10 NS
Dausa	BH 902	45.73	RD 2052	41.27	10.81***
CZ					
Udaipur	RD 2786	51.60	RD 2035	45.20	14.16***
	RD 2786	54.75	RD 2552	47.25	15.87***
Rajsamand	RD 2786	42.58	RD 2035	30.39	40.11***
	RD 2786	43.28	RD 2552	29.65	45.97***
Rewa	RD 2786	43.08	JB 1	41.52	3.76 NS
Panna	RD 2786	28.40	Munda Jawa	22.20	27.93***
Morena	RD 2786	30.38	K 508	28.21	7.69***

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

In NHZ, BHS 400 was the highest average yielding (33.95 q/ha) variety at Bajaura centre. In NEPZ, HUB 113 at Varanasi (37.99 q/ha), BH 902 at Durgapura Jaipur (53.80 q/ha) in NWPZ and RD 2786 at Udaipur (54.75 q/ha) in Central Zone were the highest average yielding varieties (Table 31).

Table 32: Yield Potential of Barley Varieties in Different Zones during 2014-15

Zone	Centre	Variety	Yield(q/ha)
NHZ	Bajaura	BHS 400	35.40
NEPZ	Varanasi	HUB 113	41.38
NWPZ	Hisar	BH 902	58.00
CZ	Udaipur	RD 2786	58.00

At particular farmers' field as well as on average basis BHS 400 (35.40 q/ha), HUB 113 (41.38 q/ha), BH 902 (58.00 q/ha) and RD 2786 (58.00 q/ha) performed better than other varieties at Bajaura, Varanasi, Hisar and Udaipur centres in the NHZ, NEPZ, NWPZ and CZ, respectively (Table 32).

Table 33: Barley Varieties Grown in Different Zones during 2014-15

Zone	Improved varieties	Check varieties	Popular varieties in the region
NHZ	BHS 400	HBL 276, HBL 316, BHS 352, Sonu	HBL 276, BHS 352, Sonu, Dolma, Local
NEPZ	RD 2794, HUB 113, JB 58, JB 1	Faizabad Local, Jagriti, Manjula, Jyoti, K 508	Faizabad Local, Jagriti, Manjula, Azad, Amber, Jyoti
NWPZ	DWRB 92, BH 902	RD 2503, RD 2052, BH 393, PL 807, PL 426	DWRUB 52, BH 393, PL 426, PL 807, RD 2035, RD 2052, RD 2660, RD 2503, RD 2552, RD 2592
CZ	RD 2786	RD 2035, RD 2552, JB 1, Munda Jawa, K 508	RD 2715, RD 2035, RD 2552, RD 2660, JB 58, JB 1, Local, Munda Jawa

Constraints analysis in different barley producing zones of India during 2014-15

Northern Hills Zone (NHZ)

In northern hills zone yellow rust disease infestation was perceived as the most serious constraint during 2014-15. The other constraints perceived during 2014-15 rabi season were lack of knowledge among the farmers about recent technologies, small landholdings, non availability of seeds of newly released varieties of barley, lack of knowledge about dose and method of application of herbicides, untimely rain, high cost of inputs, late sowing, imbalanced use of fertilizers and lack of canal irrigation (Table 34).

Table 34: Constraints in NHZ **n=15**

Constraints	Score	Rank
Yellow Rust	32	I
Lack of knowledge among the farmers	32	I
Small land holdings	26	II
Non availability of seeds of newly released varieties of barley	26	II
Lack of knowledge about dose and method of application of herbicides	22	III
Untimely rain	22	III
High cost of inputs	20	IV
Late sowing	20	IV
Imbalanced use of fertilizers	20	IV
Lack of facilities of canal irrigation	20	IV

North Eastern Plains Zone (NEPZ)

During 2014-15 rabi season there was a lot of rain at the time of harvesting of barley and severe loss was observed in the country. In NEPZ, untimely rain was the most serious constraint affecting barley yield. The other constraints perceived were late sowing, temperature fluctuation during crop season, water stress, high custom hiring rate, low organic matter, non availability of labour, *Phalaris minor*, lack of irrigation facility, high temperature at maturity, high cost of inputs, low price of barley and problem in marketing of barley (Table 35).

Table 35 : Constraints in NEPZ **n=50**

Constraints	Score	Rank
Untimely Rain	94	I
Late sowing	92	II
Temperature fluctuation during crop season	92	II
Water stress	76	III
High custom hiring rate	76	III
Low organic matter	76	III
Non availability of labour	76	III
Phalaris minor	74	IV
Lack of irrigation facility	74	IV
High temperature at maturity	71	V
High cost of inputs	71	V
Low price of barley	71	V
Problem in marketing of barley	71	V

North Western Plains Zone (NWPZ)

In NWPZ, low price of barley, untimely rain, decline in water table, low organic matter in soil, lodging, non availability of seed of newly released varieties, high cost of inputs, *Phalaris minor, Avena ludoviciana,* problem in marketing of barley, non availability of labour and poor soil fertility (Table 36) were the constraints affecting barley production.

Table 36: Constraints in NWPZ **n=66**

Constraints	Score	Rank
Low price of barley	85	I
Untimely rain	80	II
Decline in water table	75	III
Low organic matter in soil	70	IV
Lodging	69	V
Non availability of seed of newly released varieties	68	VI
High cost of inputs	63	VII
Phalaris minor	62	VIII
Avena ludoviciana	57	IX
Problem in marketing of barley	56	X
Non availability of labour	56	X
Poor soil fertility	55	XI

Central Zone (CZ)

In Central India, the major constraints impeding barley production were untimely rain, high cost of inputs, decline in water table, low organic matter in the soil, temperature fluctuations during crop growth, low micro nutrients in the soil, lack of knowledge among the farmers about recent technologies, faulty tillage practices, *Avena ludoviciana,* lack of irrigation facility, faulty irrigation method and non availability of labour (Table 37).

Table 37: Constraints in CZ **n=55**

Constraints	Score	Rank
Untimely rain	58	I
High cost of inputs	57	II
Decline in water table	47	III
Low organic matter in the soil	39	IV
Temperature fluctuations during crop growth	38	V
Low micro nutrients in the soil	33	VI
Lack of knowledge among the farmers about recent technologies	32	VII
Faulty tillage practices	31	VIII
Avena ludoviciana	30	IX
Lack of irrigation facility	28	X
Faulty irrigation method	27	XI
Non availability of labour	26	XII

Overall constraints

The overall constraints analysis was done to identify the most serious constraints impeding barley production in the country. During 2014-15 rabi season untimely rain was second most serious constraint followed by late sowing, temperature fluctuation during crop season, low price of barley, water stress, high custom hiring rate, low organic matter, non availability of labour, decline in water table, *Phalaris minor,* lack of irrigation facility, high temperature at maturity, high cost of inputs and problem in marketing of barley (Table 38).

Table 38 : Overall constraints of barley production in the country

Constraints	Score	Rank
Untimely rain	94	I
Late sowing	92	II
Temperature fluctuation during crop season	92	II
Low price of barley	85	III
Water stress	76	IV
High custom hiring rate	76	IV
Low organic matter	76	IV
Non availability of labour	76	IV
Decline in water table	75	V
Phalaris minor	74	VI
Lack of irrigation facility	74	VI
High temperature at maturity	71	VII
High cost of inputs	71	VII
Problem in marketing of barley	71	VII

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

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

Profitability and returns on investment decides the adoption of any crop production technology. In this following section, costs and returns analyses of wheat and barley FLDs have been attempted for the improved production technologies that are tested in farmers' field during 2014-15. 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 output (wheat and barley). Returns per rupee of investment were also worked out to know the comparative profitability in cultivation of these two *rabi* crops.

Data Collection

Primary data were collected by the cooperating centres from the selected farmers who were allotted with 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 agricultural year 2014-2015. 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 sample farmers and unrealistic data reported from the cooperating centres were not included for the costs and returns analysis.

Estimation of Costs and Returns for Wheat

Perusal of Table 39 indicates that on an average, wheat varieties or technologies demonstrated in FLDs gave better returns in comparison to the

check varieties. In the case of Tamil Nadu (SHZ), the costs and returns from check were not estimated as wheat was not grown in the selected farm where the FLDs were conducted.

A significant difference in returns per rupee of investment was noticed between the FLD and check plots across states, zones and technologies. Tamil Nadu registered the highest returns per rupee of investment (₹8.30), followed by Punjab (₹4.04) and Jammu & Kashmir (₹3.96). The profit per hectare in FLDs was highest in Maharashtra (₹82428), followed by Gujarat (₹71816) and Punjab (₹63587). The difference in profit between FLDs and check ranged from ₹21617 in Maharashtra to ₹1753 in Nagaland. Interestingly, operational costs in Punjab, Haryana and Jammu & Kashmir were lower in FLDs than check plots. The valid reason was in Punjab and Haryana, demonstration of resource efficient improved varieties as well as RCTs reduced the operational costs. Similarly in the case of Jammu & Kashmir, demonstrations on varieties (rainfed/restricted irrigation) by SKUAST Khudwani-Anantnag and RARS Rajouri centers' played a major role in cost reduction. Estimates of cost of production indicated that the cost incurred in producing a unit quantity of output was least in Tamil Nadu owing to less operational costs and moderate in the traditional wheat growing states due to the likelihood of getting more yield. Among wheat growing zones, returns per rupee of investment was highest in SHZ due to less operational costs in raising the crop and high price (₹2500 per quintal). PZ also realized a good return per rupee of investment which is mainly due to the higher yield and grain price in Maharashtra.

Among wheat production technologies, drip irrigation in durum gave the highest profit per hectare (₹105063) and the least profit was observed for rotary disc drill (late sown). 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 get ₹2.62 per rupee of investment in his/her farm. Around ₹10685 difference has been noticed in the profit per hectare between FLD and check variety. Further, ₹820 have to be spent to produce a quintal of wheat through adoption of a new wheat variety or production technology against ₹ 970 (check varieties).

Table 39: Costs and Returns from Wheat during 2014-15

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	23434	22762	46739	36030	23305	13267	1.99	1.58	935	1191
Bihar	29518	29005	69304	59752	39786	30747	2.35	2.06	831	995
Chhattisgarh	32513	32469	61929	49292	29415	16823	1.90	1.52	1096	1454
Delhi	35508	34948	75654	67810	40145	32862	2.13	1.94	837	910
Gujarat	28525	28130	100340	87273	71816	59143	3.52	3.10	612	668
Haryana	31454	32278	89770	81298	58317	49020	2.85	2.52	644	715
Himachal Pradesh	35410	33009	72775	62299	37365	29291	2.06	1.89	1247	1337
Jammu & Kashmir	15533	15591	61489	47843	45956	32252	3.96	3.07	523	654
Jharkhand	29363	25842	70858	51132	41495	25290	2.41	1.98	902	1135
Karnataka	24234	23367	76963	67498	52729	44132	3.18	2.89	893	999
Madhya Pradesh	29319	27631	65462	47072	36143	19440	2.23	1.70	796	970
Maharashtra	29519	27968	111947	88779	82428	60811	3.79	3.17	770	883
Nagaland	15800	15610	35454	33511	19654	17901	2.24	2.15	1260	1314
Punjab	20903	21094	84490	76455	63587	55361	4.04	3.62	491	549
Rajasthan	40320	39254	96782	87491	56463	48237	2.40	2.23	819	880
Tamil Nadu	7721	NE	64064	NE	56343	NE	8.30	NE	333	NE
Uttar Pradesh	31840	31654	75847	66854	44007	35200	2.38	2.11	870	1003
Uttarakhand	20748	18531	54921	41075	34173	22544	2.65	2.22	722	926
West Bengal	33845	33295	67973	65590	34128	32294	2.01	1.97	931	989
Zone										
CZ	34240	33246	79482	65591	45242	32345	2.32	1.97	854	1014
NEPZ	29774	28471	66728	56876	36955	28405	2.24	2.00	956	1114
NHZ	29827	27741	64474	53141	34647	25400	2.16	1.92	1070	1203
NWPZ	28989	29089	81722	72545	52733	43457	2.82	2.49	678	775
PZ	27435	26154	98150	80387	70716	54233	3.58	3.07	818	929
SHZ	7721	NE	64064	NE	56343	NE	8.30	NE	333	NE
Technology										
Bio-fertilizer	25964	25583	57913	55413	31948	29830	2.23	2.17	1015	1047
Dicoccum	21983	28500	100150	83525	78167	55025	4.56	2.93	613	993
Drip Irrigation	30804	30637	118733	106673	87930	76036	3.85	3.48	579	598
Drip Irrigation (Durum)	31137	30637	136200	121320	105063	90683	4.37	3.96	556	567
Durum	31686	30809	110575	70253	78889	39444	3.49	2.28	630	865
Rotary Disc Drill (Late Sown)	29161	29345	58078	55833	28917	26488	1.99	1.90	916	964
Rotavator	21204	21335	78975	77786	57771	56451	3.72	3.65	467	480
Variety	28649	29290	79793	69786	51144	40496	2.79	2.38	767	911
Variety (Late Sown)	31225	30344	62828	52892	31603	22547	2.01	1.74	941	1130
Variety (Restricted Irrigation/Rainfed)	29827	27741	64474	53141	34647	25400	2.16	1.92	1070	1203
Variety (Salt Tolerant)	28950	28834	74263	72057	45312	43223	2.57	2.50	657	685
Zero Tillage	22173	25572	78451	75195	56278	49623	3.54	2.94	507	599
All Categories										
India	**29068**	**29190**	**76025**	**65461**	**46957**	**36271**	**2.62**	**2.24**	**820**	**970**

Note: NE indicates that check varieties were not grown and hence costs and returns were not estimated. Hisar centre data not included for the analysis due to non-reporting of operational costs data.

Estimation of Costs and Returns for Barley

Table 40 presents the costs and returns from barley FLDs. The results indicated clearly that FLDs increased the profitability in barley cultivation. Among states, Rajasthan (₹ 46986/ha) gained more profit followed by Punjab (₹ 41148/ha) and Himachal Pradesh (₹ 39054/ha). Among the barley growing zones, NHZ recorded the highest profit through FLDs (₹ 39054/ha) owing to the realized higher yield in comparison to the traditional barley growing zones which got affected by hailstorms and unexpected rainfall before harvest. Among states, the return per rupee of investment was more in Punjab (₹ 3.11). The cost of production analysis indicated that the cost incurred to produce a quintal of barley was less in states and zones that grow barley traditionally. On the whole, a superior variety in barley carried out by the FLD registered a return of ₹ 2.31 per rupee of investment against ₹ 2.14 (check variety).

Table 40: Costs and Returns from Barley during 2014-15

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	37594	37598	62671	59920	25077	22321	1.67	1.59	896	933
Himachal Pradesh	25388	23450	64442	53658	39054	30208	2.54	2.29	886	947
Madhya Pradesh	25199	23829	43994	39236	18795	15407	1.75	1.65	831	920
Punjab	19492	18983	60640	54194	41148	35212	3.11	2.85	493	512
Rajasthan	32039	30394	79025	69248	46986	38854	2.47	2.28	652	715
Uttar Pradesh	19495	17170	54848	44940	35353	27769	2.81	2.62	847	921
Zone										
CZ	26967	25844	57770	48873	30803	23029	2.14	1.89	744	849
NEPZ	19495	17170	54848	44940	35353	27769	2.81	2.62	847	921
NHZ	25388	23450	64442	53658	39054	30208	2.54	2.29	886	947
NWPZ	32038	30911	68604	64225	36566	33314	2.14	2.08	722	742
Variety										
Improved Variety	26382	24849	61061	53176	34679	28327	2.31	2.14	778	843
All Categories										
India	**26382**	**24849**	**61061**	**53176**	**34679**	**28327**	**2.31**	**2.14**	**778**	**843**

Note: Hisar centre data not included for the analysis due to non-reporting of operational costs data.

Overall the costs and returns analysis on wheat and barley indicated that profit per hectare from FLDs was more than the check varieties establishing the fact that FLDs carry the successful technologies from lab to land. In some cases, the

check varieties operational costs were more than FLDs. *Inter alia,* demonstration of RCTs and varieties with limited irrigation shall be the valid reasons for this cost difference. However, the present estimates are only the indicators for comparison for the current year without giving any room for concrete conclusions. It may not have a complete relevance to the previous year estimates as the demonstrations were conducted in different sites and mostly not repetitive in nature. Further, the difference in profit earned from wheat and barley cultivation is subject to farm-farmer-region specific conditions as it varies from one another.

Production Scenario of Wheat and Barley in India

Production Scenario of Wheat and Barley in India

Wheat

The current year production has witnessed a quantum fall of 5.07 mt registering 90.78 mt, against a record wheat production of 95.85 million tonnes (mt) in 2013-14 (III Advance Estimates, DES). The fall in the production is attributed to reduced yield followed by the decline in crop acreage. In spite of increase in the support price by ₹ 50 in comparison to the previous year and announced as ₹ 1450 per quintal of wheat, the current year acreage has reduced by 0.33 per cent and estimated at 30.37 mha. Around 157 kg/ha yield reduction has been noticed at the country level which is a major reason for the current year production decline. Unexpected hailstorms, erratic and unseasonal precipitation and lodging in the major wheat growing regions of the country during February-March 2015, hampered the wheat production by 5.29 per cent relative to the previous year record production.

Table 41: Quantum change in area, production and yield of wheat

State	2013-14			2014-15*			Quantum Change in		
	Area (000'ha)	Production (000't)	Yield (kg/ha)	Area (000'ha)	Production (000't)	Yield (kg/ha)	Area (000'ha)	Production (000't)	Yield (kg/ha)
Andhra Pradesh	8	4	500	5	6	1200	-3	2	700
Assam	31	40	1292	35	44	1257	4	4	-35
Bihar	2009	4738	2358	2188	4823	2204	179	85	-154
Chhattisgarh	103	134	1304	104	136	1307	1	2	4
Gujarat	1442	4694	3255	1146	2832	2471	-296	-1862	-784
Haryana	2499	11800	4722	2540	10739	4228	41	-1061	-494
Himachal Pradesh	358	671	1873	381	586	1537	23	-84	-336
Jammu & Kashmir	292	602	2061	291	582	2000	-1	-20	-61
Jharkhand	174	370	2123	170	336	1975	-4	-34	-148
Karnataka	209	210	1005	181	163	901	-28	-47	-104
Madhya Pradesh	5380	12937	2405	5560	13372	2405	180	435	0
Maharashtra	1097	1602	1460	895	1156	1292	-202	-446	-169
Odisha	1	1	1574	1	2	1600	1	1	26
Punjab	3512	17620	5017	3500	16548	4728	-12	-1072	-289
Rajasthan	2810	8663	3083	2800	7462	2665	-10	-1201	-418
Uttar Pradesh	9839	29891	3038	9863	30082	3050	24	191	12
Uttarakhand	348	842	2422	348	848	2437	0	6	15
West Bengal	332	928	2791	335	950	2836	3	22	45
Others	28	102	3586	28	110	3902	0	8	316
INDIA	30473	**95850**	**3145**	**30372**	**90776**	**2989**	**-101**	**-5074**	**-157**

*Note: * indicates the third advance estimates from the DES, MoA, India.*

Among states, Uttar Pradesh produced more wheat (30.08 mt), followed by Punjab (16.55 mt), Madhya Pradesh (13.37 mt), Haryana (10.74 mt), Rajasthan (7.46 mt) and Bihar (4.82 mt). These top six states together contributed about 91 per cent of the total country's production. Barring Bihar, Madhya Pradesh and Uttar Pradesh, the rest of the major producers showed a decline in production in comparison to 2013-14. The above three states together produced 7.11 lakh tonnes additional wheat in 2014-15 owing to acreage increase in the current year. The maximum quantum fall in

production has been noticed in Gujarat (1.86 mt), followed by Rajasthan (1.20 mt), Punjab (1.07 mt) and Haryana (1.06 mt).

State wise analysis on wheat acreage indicated that Gujarat and Maharashtra showed a major decline accounting for 0.5 mha. Uttar Pradesh has the maximum area (9.86 mha), followed by Madhya Pradesh (5.56 mha), Punjab (3.50 mha), Rajasthan (2.80 mha), Haryana (2.54 mha) and Bihar (2.19 mha). All these states together cover about 87 per cent of the total area in the country under wheat. Among major cultivators, states like Bihar, Haryana, Madhya Pradesh and Uttar Pradesh exhibited an increase in the crop acreage during 2014-15 against 2013-14. Madhya Pradesh showed the maximum increase (1.80 lakh ha). Acreage decline was seen in Gujarat, Karnataka, Punjab and Rajasthan. The percentage decline was highest in Andhra Pradesh, followed by Gujarat, Maharashtra and Karnataka. Gujarat, Jammu & Kashmir, Jharkhand, Karnataka, Maharashtra, Punjab and Rajasthan registered a decline in both area and yield which had a significant reduction in the national output.

Table 42: Contribution of yield and/or area to wheat production (2014-15)

State/Country	Change in production in 2014-15* over 2013-14		% contribution by	
	Quantity (in '000 tonnes)	Deviation (in %)	Area	Yield
Andhra Pradesh	2	50.00	-37.50	140.00
Assam	4	8.80	11.86	-2.73
Bihar	85	1.79	8.92	-6.55
Chhattisgarh	2	1.57	1.26	0.30
Gujarat	-1862	-39.67	-20.53	-24.09
Haryana	-1061	-8.99	1.64	-10.46
Himachal Pradesh	-84	-12.60	6.51	-17.94
Jammu & Kashmir	-20	-3.31	-0.37	-2.96
Jharkhand	-34	-9.30	-2.52	-6.96
Karnataka	-47	-22.38	-13.40	-10.37
Madhya Pradesh	435	3.36	3.35	0.01
Maharashtra	-446	-27.84	-18.41	-11.55
Odisha	1	79.44	76.47	1.68
Punjab	-1072	-6.08	-0.34	-5.76
Rajasthan	-1201	-13.87	-0.36	-13.56
Uttar Pradesh	191	0.64	0.24	0.39
Uttarakhand	6	0.66	0.05	0.62
West Bengal	22	2.39	0.76	1.62
Others	8	7.64	-1.08	8.80
INDIA	-5074	-5.29	-0.33	-4.98

*Note: * indicates the third advance estimates from the DES, MoA, India.*

The analysis on contribution of yield and/or area to wheat production indicated that yield decline by 4.98 per cent in 2014-15 has been the major reason for current year's decline in country's production (5.07 mt). However, state wise analysis shows the contribution in varying magnitudes. Increased production in Chhattisgarh, Madhya Pradesh, Odisha, Uttar Pradesh, Uttarakhand and West Bengal is attributed to the positive contribution by both area and yield. However, in a majority of the states yield decline has been noticed in 2014-15. Barring Haryana, Punjab and Uttar Pradesh, the rest of the states witnessed a decline in

yield over the national average (2989 kg/ha). The quantum of decline ranged from 2088 kg/ha in Karnataka to 153 kg/ha in West Bengal.

Barley

Barley also registered a similar production pattern as experienced by its competing crop, wheat. The current year production of barley has observed a quantum fall of 2.04 lakh tonnes registering 1.63 mt which is largely attributed to yield decline followed by marginal acreage reduction (III Advance Estimates, DES). The yield reduction was around 296 kg/ at the national level. The support price for barley has increased from ₹ 1100 to ₹ 1150 per quintal in 2014-15. However, the current year acreage witnessed a marginal reduction by 2000 hectares and has been estimated at 0.67 mha. Since the *Rabi* season (2014-15) has encountered heavy hailstorms and unexpected rainfall during the harvest stage in major cultivating regions, barley production was hampered to a large extent.

Table 43: Quantum change in area, production and yield of barley

State	2013-14			2014-15*			Quantum Change in		
	Area (000'ha)	Production (000't)	Yield (kg/ha)	Area (000'ha)	Production (000't)	Yield (kg/ha)	Area (000'ha)	Production (000't)	Yield (kg/ha)
Bihar	10	14	1398	10	15	1409	0	1	11
Chhattisgarh	3	4	1423	2	1	458	0	-3	-965
Haryana	39	153	3923	33	99	3000	-6	-54	-923
Himachal Pradesh	17	28	1626	20	30	1500	3	2	-126
Jammu & Kashmir	13	7	567	13	7	566	0	0	-1
Madhya Pradesh	87	150	1730	43	54	1256	-44	-96	-474
Punjab	12	46	3833	18	65	3611	6	19	-222
Rajasthan	309	942	3046	341	841	2468	31	-101	-578
Uttar Pradesh	157	450	2866	167	481	2880	10	31	14
Uttarakhand	23	31	1351	21	29	1381	-2	-2	30
West Bengal	2	4	1500	2	3	1500	0	-1	0
Others	1	1	1120	1	1	1026	0	0	-93

*Note: * indicates the third advance estimates from the DES, MoA, India*

Among states, Rajasthan leads in barley production (0.84 mt) followed by Uttar Pradesh and Haryana. These three states accounted for 87 per cent of total barley production in the country. Rajasthan had the maximum area under barley (0.34 mha) during 2014-15 holding a share of 51 per cent to the total area under the crop in India, a valid reason for its high production. Barley productivity in 2014-15 was highest in Punjab (3611 kg/ha) followed by Haryana (3000 kg/ha), Uttar Pradesh (2880 kg/ha) and Rajasthan (2468 kg/ha). These states with their consistent higher yield coupled with high area under barley cultivation helped to achieve 1.62 mt. However, in 2014-15 a wide range of yield reduction has been noticed across states. The decline was highest in Chhattisgarh (965 kg/ha), followed by Haryana (923 kg/ha) and Rajasthan (578 kg/ha). However, some states like Uttar Pradesh, Uttarakhand and Bihar have posted positive change in yield during

2014-15 relative to the last crop season. Uttar Pradesh is the only state that showed an increase in all the three variables *viz.*, area, production and yield.

Table 44: Contribution of yield and/or area to barley production (2014-15)

State/Country	Change in production in 2014-15* over 2013-14		% contribution by	
	Quantity (in '000 tonnes)	Deviation (in %)	Area	Yield
Bihar	1	3.65	2.85	0.78
Chhattisgarh	-3	-70.27	-7.69	-67.79
Haryana	-54	-35.29	-15.38	-23.53
Himachal Pradesh	2	6.86	15.80	-7.72
Jammu & Kashmir	0	0.85	0.96	-0.11
Madhya Pradesh	-96	-64.00	-50.40	-27.41
Punjab	19	41.30	50.00	-5.80
Rajasthan	-101	-10.74	10.15	-18.96
Uttar Pradesh	31	6.89	6.37	0.49
Uttarakhand	-2	-7.85	-9.87	2.24
West Bengal	-1	-16.67	-16.67	0.00
Others	0	-3.48	5.31	-8.35
INDIA	-204	-11.16	-0.30	-10.90

Technology Outreach Programme

Technology Outreach Programme

Training Programmes organized

- Dr CP Singh, Scientist, Lok Bharati "Training on Coordinated Wheat Program in India" 8-9 April 2014.
- Training cum awareness programme for barley extension personnel (80 participants) at Home Science College, CCSHAU, Hisar 30 April 2014.
- "Gujarat me Gehoon Ki Unnat Kheti" for the 50 farmers of Junagarh on 27 July, 2014 at ICAR-IIWBR, Karnal.
- "Gujarat me Gehoon Ki Adhunik Kheti" for the 52 farmers of Junagarh on 23 August, 2014 at ICAR-IIWBR, Karnal.
- Training-cum-visit programme on "Recent Wheat Production Technologies" for 52 farmers of Bharatpur, Rajasthan on 2 September, 2014 at ICAR-IIWBR, Karnal.
- "Unnat Gehoon Utpadan Prodyogiki" for 11 farmers from Bhopal, MP on 5-6 September, 2014.
- "Gehoon Utpadan ki Vaigyanik Vidhi" for 43 farmers of Anand, Gujarat on 18-19 September 2014 at ICAR-IIWBR, Karnal.
- "Gehoon ki Vaigyanik Kheti" for 43 farmers from Chhatisgarh 22.09.2014
- "Gehoon ki Vaigyanik Kheti" on 18.11.2014 for 20 farmers from Bhatinda, Punjab
- "Recent Wheat Production Technologies" on 26.11.2014 for 25 progressive farmers of Punjab National Bank, Karnal
- "Entrepreneurship Development in Wheat" on 28.11.2014 for 38 Agriclinic students from Western UP at IIWBR, Karnal.
- "Gehoon Ki Unnat Kheti" for the 43 farmers from Patan district of Gujarat on 15.12.2014 at ICAR-IIWBR, Karnal.
- "Recent Wheat Production Technologies for Gujarat" for the 43 farmers from Patan district of Gujarat on 22.12.2014 at ICAR-IIWBR, Karnal.
- " Gehoon ki Unnat Kheti" for 50 farmers from Kheda district of Gujarat.

Foundation Day

The Foundation Day was organized on 9 September, 2014 at ICAR-IIWBR, Karnal. An Exhibition was organized on this occasion. Dr. R.G. Saini, Coordinator, BioSciences Center, Central University of Punjab, Bathinda (Punjab) was the Chief Guest on this occasion. He delivered the Foundation Day Lecture. The farmers of the area and school students visited the exhibition.

Rabi Kisan Mela

A Rabi Kisan Mela was organized at ICAR-IIWBR, Karnal on 30 October, 2014. On this occasion, Professor R.C. Sharma, Professor & Coordinator, Center for Environmental Science & Technology, School of Environment and Earth Sciences, Central University of Punjab, Bathinda (Punjab) was the Chief Guest and Dr. A.K. Srivastava, Director, NDRI, Karnal was the Guest of Honour. A Kisan Goshthi was organized on this occasion. More than 1200 farmers participated in the Rabi Kisan Mela.

Farmer's day /Awareness Programme

- "Drought Management Advisory" to around 50 farmers of Sambhali and Brass village. Dr SS Atwal, Dr Randhir Singh, Dr Lathwal, Dr Ravinder and Dr Sheoran participated in the programme.

- Visit to Paliwas village, Hisar for "Drought Management Advisory". Dr B Meena, Dr MR Meena, Dr Ambast, Dr PB Singh, Dr Ramesh Chand participated in the awareness programme involving around 40 farmers.

- Visit to Gohana, Haryana for "Drought Management Advisory" alongwith Dr. SK Pandey, Dr. VK Pandita, Dr. SK Tomar, Dr. Gajendra, Dr. KS Kadian. Dr. Manjit Dahiya GM sugar mill, Gohana organised the meeting with 150 farmers.

- Organized awareness programme on "Yellow Rust Management" in Bakana village, Yamunanagar (Haryana) on 9 February 2015. Around 150 farmers participated.

- Organized farmers' awareness programme on PPV&FR at Agartala, Tripura on 23 December 2014. About 100 farmers participated.

- Organized farmers' awareness programme on PPV&FR at Nanihari, Saharanpur district (UP) on 29 March 2015. About 200 farmers participated.

- Organized farmers' awareness programme on PPV&FR at Niphad, Maharashtra on 2 March 2015. About 100 farmers participated

- Organized Barley Awareness programme in village Mundru, Sikar district, Rajasthan, 200 farmers participated on 8 March 2015.

- Organized Barley Awareness programme in village Etawa Bhopji, Chomu district, Rajasthan, in collaboration with SAB Millers, 200 farmers participated on 9 March 2015.

- Farmers' Day at wheat front line demonstration site in village Jadoli, Karnal on 22 February 2015. Nearly 100 farmers participated.

Lectures Delivered

Dr.Sendhil R delivered two lectures on December 03, 2014 at EEI Nilokheri on 'WTO - Genesis and Perspectives', and 'WTO vis-à-vis Indian Agricultural Economy'

Dr Randhir Singh delivered lectures on :

- "Extension skill for faster adoption of DSR and others CA based RCTs" at CCSHAU, Uchani on 25 September 2014 in the national training cum workshop on principles and practices of direct seeded rice" 22.09.2014 to 1.10.2014 at EEI, Nilokheri.
- "Wheat production technologies" in Kisan Pathsala organized by Haryana Gyan Vigyan Samiti in Furlak village on 16 October 2014. 50 farmers attended the programme.
- "Approaches to improve crop productivity and ensure livelihood security of farmers in salt affected areas" during 11.11.2014 to 1 December 2014 on 1 December 2014.
- "Wheat production technologies" in Awareness programme in village Kulwehri on 8.12.2014 organized by Kisan Club, The Karnal Central Cooperative Bank and NABARD.

Dr. Anuj Kumar delivered the following lectures at EEI, Nilokheri :

- Extension Methodology for Effective Transfer of Technology on 25.07.2014
- Training on Impact of WTO on Wheat Production on 13.11.2014
- Managerial Skills for Extension Personnel on 21.11.2014
- WTO and its Implications in Agriculture on 04.12.2014
- Motivational Skills for Forestry Extension on 06.01.2015
- ICT in Agriculture on 15.01.2015
- Managerial Skills for Extension Personnel on 20.02.2015
- Training on Impact of WTO on Wheat Production on 26.02.2015

SMS Service to Farmers

DWR collaborated with IFFCO to send messages to the farmers through mobile phone. The message on wheat varieties, yellow rust and weed control strategies in wheat and barley crops were sent to the farmers.

Advisory Service

The farmers were advised on various aspects of wheat and barley production technologies. About 450 farmers/entrepreneurs were provided replies to online queries and in person. A number of queries were received on how to manage excess water, lodging, water stagnation, weed control, yellow rust, yellowing of crop and their management.

TV/Radio Talk

Dr Randhir Singh delivered the TV Talks :

- "Improved wheat varieties" on Krishi Darshan, DD, New Delhi 20 October 2014.
- TV talk on "Yellow Rust Management" at Krishi Darshan, Delhi Doordarshan on 23 December 2014.
- Delivered a TV talk on Krishi Doordarshan "Grain Storage" 1 May, 2014

Organisation/Participation in Exhibitions/ Kisan Melas

Table 45 : Organisation/Participation in Exhibitions at different places.

S.N.	Date	Programme
1.	16.07.2014	ICAR Foundation Day celebrated with farmers at DWR, Karnal
2.	09.09.2014	Foundation day of the Directorate at DWR, Karnal
3.	18.10.2014	Exhibition at NDRI, Karnal
4.	30.10.2014	Rabi Kisan Mela, ICAR-IIWBR (DWR), Karnal
5.	12.11.2014	District level Kisan Mela, Sonepat
6.	27.11.2014	District level Kisan Mela, NDRI, Karnal
7.	13.12.2014	Village Rasulpur, Muzaffarnagar, UP
8.	14.12.2014	Village Barwala, Muzaffarnagar, UP
9.	03-06 Feb 2015	XII Agricultural Science Congress at NDRI, Karnal
10.	25-27 Feb., 2015	National Dairy Mela at NDRI, Karnal
11.	03.03.2015	Sabji Mandi, Gharaunda by Gyan Vigyan Samiti, Karnal
12.	09.03.2015	Rabi Kisan Mela at CSSRI, Karnal
13.	10-12 March 2015	Pusa Krishi Vigyan Mela at IARI, New Delhi
14.	18.03.2015	Buffalo Mela at CIRB, Hisar
15.	28.03.2015	Fasal Vichar Gosthi organized by IFFCO at Dabarki Kalan Karnal

Table 46 : Coordination of Visits at ICAR-IIWBR (DWR), Karnal

S.N.	Date	Visitors
1.	28.04.2014	38 students from college of Agriculture, Lalsot, Dausa, Rajasthan
2.	27.05.2014	23 Farmers from Bhavnagar, Gujarat
3.	11.06.2014	05 Dairy farming trainees from NDRI, Karnal
4.	24.07.2014	50 farmers from Gujarat
5.	08.08.2014	185+3 students of B.Sc.(Ag) from Anamalai University
6.	12.08.2014	146+3 students of B.Sc.(Ag) from Anamalai University
7.	16.08.2014	56 farmers from Bathinda
8.	20.08.2014	184+3 students of B.Sc.(Ag) from Anamalai University
9.	22.08.2014	107+2 students of B.Sc. (Ag) from TNAU
10.	23.08.2014	52 farmers from Junagarh, Gujarat
11.	02.09.2014	20 farmers from Bharatpur, Rajasthan
12.	05.09.2014	10 farmers from Bhopal, MP
13.	08.09.2014	146+2 students of B. Sc.(Ag) from Anamalai University, Tamil Nadu
14.	09.09.2014	11 farmers from Vidisha, MP
15.	16.09.2014	147+3 students of B. Sc.(Ag) from Anamalai University, Tamil Nadu
16.	20.09.2014	54 women farmers from Deesa, Gujarat
17.	20.09.2014	40 farmers from Ahmedabad, Gujarat

18.	26.09.2014	52 farmers from Mahisagar, Gujarat
19.	10.10.2014	148+3 students of B.Sc.(Ag) from Anamalai University, Tamil Nadu
20.	12.10.2014	44 farmers from Bilaspur, Chhattisgarh
21.	13.10.2014	15 students from Animal Nutrition Division of NDRI, Karnal
22.	16.10.2014	107 students from APAC, Kalarai village (TN)
23.	16.10.2014	50 students of various schools of Karnal
24.	16.10.2014	42 farmers from Chhatisgarh
25.	16.10.2014	6 farmers from Lucknow
26.	13.12.2014	30 farmers from Junagarh, Gujarat
27.	22.11.2014	42 farmers from Karauli, Rajasthan
28.	24.11.2014	8 farmers from Lucknow
29.	28.11.2014	50 students from CARD, New Delhi
30.	15.12.2014	43 farmers from Patan, Gujarat
31.	17.12.2014	30 farmers from Somnath, Gujarat
32.	17.12.2014	16 farmers from Sahja, MP
33.	17.12.2014	35 farmers from Jhunjhunu, Rajasthan
34.	17.12.2014	40 farmers from Alwar, Rajasthan
35.	26.12.2014	50 farmers from Sri Ganganagar, Rajasthan
36.	01.01.2015	40 farmers from Bharatpur, Rajasthan
37.	06.01.2015	32 farmers from Bidisha, MP
38.	07.01.2015	42 farmers from Sawai Madhopur, Rajasthan
39.	16.01.2015	6 agriculture and veterinary officers from EEI, Nilokheri
40.	19.01.2015	33 farmers from Bidisha, MP
41.	22.01.2015	35 farmers from Sri Ganganagar, Rajasthan
42.	22.01.2015	16 farmers from Una, HP
43.	12.02.2015	20 trainee farmers from UP From SBI, RS, Karnal
44.	12.02.2015	11 farmers from Koria, Chhatisgarh
45.	12.02.2015	20 farmers from Rasulpur Jatan, UP
46.	19.02.2015	50 farmers from Saharanpur UP Under ITC programme on zero tillage
47.	19.02.2015	22 farmers from Udham Singh Nagar, Uttarakhand
48.	19.02.2015	32 farmers from Agra region of UP
49.	19.02.2015	17 farmers from Pratapgarh, UP
50.	22.02.2015	20 farmers from Udham Singh Nagar, Uttarakhand
51.	23.02.2015	21 farmers from Ahemadabad, Gujarat
52.	23.02.2015	24 farmers from Dehradoon, Uttarakhand
53.	25.02.2015	21 farmers from Kisan Club, Karnal
54.	26.02.2015	24 farmers from Bidisha, MP
55.	28.02.2015	16 farmers from Bidisha, MP
56.	02.03.2015	51 farmers from Patan, Gujarat
57.	04.03.2015	6 ARS probationers from NAARM, Hyderabad
58.	10.03.2015	40 farmers from Nalkheda, Borod, MP
59.	12.03.2015	35 farmers from Rajgarh, MP
60.	13.03.2015	47 Students(B.Sc., Horticulture) from Mandsaur, MP
61.	14.03.2015	50 farmers from NFL, Kurukshetra
62.	16.03.2015	20 farmers from Datia, MP
63.	16.03.2015	10 farmers from Shajapur, MP
64.	21.03.2015	32 farmers from Shajapur, MP
65.	21.03.2015	06 farmers from Kinnaur, HP
66.	25.03.2015	40 Agricultural Extension officers from CARD, New Delhi
67.	31.03.2015	24 students of B.Sc. Biotech.from DAV College, Amritsar, Punjab

ANNEXURE-I

Category wise number of Wheat Front Line Demonstrations (FLDs) Farmers during 2014-15

Annexure-I : Categorywise Number of Wheat FLDs Farmers during 2014-15

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	2.44 (22)			5.22 (15)	0.04 (1)			0.3 (1)	6.22 (37)	0.34 (2)	8 (39)
2.	CSKHPKV, HAREC, Bajaura, Kullu (HP)	5	5	5	5.0	0.4 (2)			3.4 (20)	0.2 (1)			1 (9)	3.8 (22)	1.2 (10)	5 (32)
3.	CSKHPKV, RWRC, Malan, Kangra (HP)	7	7	7	7.0			5.6 (19)	0.48 (2)	0.48 (2)		0.44 (2)		6.08 (21)	0.92 (4)	7 (25)
4.	CSKHPKV.PCRS, Berthin, Bilaspur (HP)	5	5	5	5.0				5 (7)					5 (7)		5 (7)
5.	CSKHPKV, HAREC, Dhaulakuan, Sirmour (HP)	5	5	5	5.0			4.50 (18)				0.50 (2)		4.50 (18)	0.50 (2)	5 (20)
6.	IARI, RS, Tutikandi, Shimla (HP)	5	5	5	5.0	0.67 (2)		1 (2)	3.33 (2)					5 (6)		5 (6)
7.	RR&RS, SKUAST-K, Khudwani, Anantnag (J&K)	5	5	5	5.0				5 (12)					5 (12)		5 (12)
8.	RARS, SKUAST-Jammu, Tandwal, Rajouri (J&K)	5	5	5	5.0		0.5 (1)		3 (6)		0.5 (1)		1 (2)	3.5 (7)	1.5 (3)	5 (10)
9.	KVK, Hengbung, Senapati (Manipur)	5	5	not conducted	not conducted											not conducted
	NEPZ															
10.	NDUA&T, Faizabad (UP)	7	7	7	7.0	1.2 (6)		1.75 (6)	4.05 (12)					7 (24)		7 (24)
11.	CSAUA&T, Kanpur (UP)	7	7	7	7.0	0.4 (1)		3.2 (8)	3.4 (9)					7 (18)		7 (18)
12.	BHU, Varanasi (UP)	7	7	7	7.0	0.5 (1)		1.5 (2)	5 (6)					7 (9)		7 (9)

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)
	NEPZ															
13.	KVK, Sohna, Sidharthnagar (UP)	7	7	4	4.0	0.4 (1)		3.6 (6)						4 (7)		4 (7)
14.	BCKV, Kalyani, Nadia (West Bengal)	10	10	4	4.0	4 (22)								4 (22)		4 (22)
15.	UBKVV, Pundibari, C (West Bengal)	10	10	10	17.75*				17.75* (111)					17.75* (111)		17.75* (111)
16.	KVK-Dimapur, Jharnapani, MEDZIPHEMA (Nagaland)	5	5	4	4.0		3.2 (8)	0.4 (1)			0.4 (1)			3.6 (9)	0.4 (1)	4 (10)
17.	RARS, AAU, Shillongani, Nagaon (Assam)	10	10	4	4.0		2 (2)		2 (5)					4 (7)		4 (7)
18.	KVK (AAU)-Darrang Mangaldai, Darrang (Assam)	5	5	2	2.0				2 (6)					2 (6)		2 (6)
19.	KVK (AAU), Chirakuta, (Revenue village Jamduar Pt.II) Dhubri (Assam)	5	5	2	2.0				2 (6)					2 (6)		2 (6)
20.	KVK (AAU), Citrus Research statio Gellapukhuri, Tinsukia (Assam)	5	5	2	2.0				2 (5)					2 (5)		2 (5)
21.	KVK (AAU), Napam, Sonitpur (Assam)	5	5	2	1.64		0.33 (1)		1.31 (6)					1.64 (7)		1.64 (7)
22.	IARI, RS, Pusa, Samastipur (Bihar)	7	7	7	7.0	0.4 (1)		2.4 (5)	4.2 (8)					7 (14)		7 (14)
23.	KVK, Sokhodeora, Nawadah (Bihar)	7	7	4	4.0				4 (4)					4 (4)		4 (4)
24.	KVK, RAU, Hariharpur,Vaishali (Bihar)	7	7	3	3.0	0.4 (1)		1.2 (3)	1.4 (3)					3 (7)		3 (7)
25.	KVK, Adhaura, Kaimur, Bhabua (Bihar)	7	7	7	7.0				7 (12)					7 (12)		7 (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)
	NEPZ															
26.	KVK, Chanpura-Basaith, Madhubani (Bihar)	7	7	7	7.0	1.4 (3)		1.7 (4)	3.9 (9)					7 (16)		7 (16)
27.	BAU, Kanke, Ranchi (Jharkhand)	7	7	3	3.0		3 (5)							3 (5)		3 (5)
28.	KVK, Morabadi, Ranchi (Jharkhand)	10	10	10	10.0	8 (20)		2.0 (5)						10 (25)		10 (25)
29.	KVK, BAU, West Singhbhum (Jharkhand)	5	5	2	2.0	1.6 (4)		0.4 (1)						2 (5)	-	2 (5)
	NWPZ															
30.	KVK (SKUAST-Jammu), Rajhani, Kathua, Jammu(J&K)	10	10	10	10.0	1.2 (3)		1.35 (3)	7.45 (22)					10 (28)	-	10 (28)
31.	PAU, Ludhiana (Punjab)	10	10	10	10.0				6 (6)				4 (4)	6 (6)	4 (4)	10 (10)
32.	PAU, RRS, Gurdaspur (Punjab)	7	7	7	7.0				7 (7)					7 (7)		7 (7)
33.	KVK, Haveli Kalan, Rupnagar (Punjab)	6	6	6	6.0	0.3 (1)		4.2 (14)	1.5 (4)					6 (19)		6 (19)
34.	KVK, Usman, Amritsar (Punjab)	6	6	6	6.0				6 (12)					6 (12)		6 (12)
35.	RBS College, Bichpuri, Agra (UP)	7	7	7	7.0			6 (6)	1 (1)					7 (7)		7 (7)
36.	KVK, Baghara, Muzaffarnagar (UP)	6	6	6	6.0			5.2 (12)	0.8 (2)					6 (15)		6 (15)
37.	ZARS, Nagina, Bijnor (UP)	6	6	6	6.0	2 (2)		1 (1)	3 (3)					6 (6)		6 (6)
38.	KVK, Khajuri Bagh, New Gopal Nagar, Saharanpur (UP)	6	6	6	6.0			6 (14)						6 (14)		6 (14)
39.	GBPUA&T, Pantnagar, Udham Singh Nagar (Uttarakhand)	7	7	7	7.0			5 (5)	2 (2)					7 (7)		7 (7)

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)
	NWPZ															
40.	CATAT, IARI, New Delhi	7	7	7	7.0	4.8 (8)		0.8 (2)		1.4 (2)				5.6 (10)	1.4 (2)	7 (12)
41.	KVK (NHRDF), Ujwa, New Delhi	7	7	7	6.8	0.8 (2)		4.4 (11)	1.6 (4)					6.8 (17)		6.8 (17)
42.	DWR, Karnal (Haryana)	20	20	20	20.0	2.0 (1)		2.0 (1)	16 (31)					20 (33)		20 (33)
43.	CSSRI, Karnal (Haryana)	10	10	10	10				10 (25)					10 (25)		10 (25)
	NWPZ															
44.	Amity Centre for Extension Services, AUUP Campus, Sector-125, Noida (UP)	7	7	7	7.2*	0.8 (2)		5.2 (13)				1.2 (3)		6.0 (15)	1.2 (3)	7.2* (18)
45.	CCSHAU, Hisar (Haryana)	5	5	5	5.0				5 (5)					5 (5)		5 (5)
46.	KVK, Bhiwani (Haryana)	6	6	6	6.0	1.2 (3)		2 (5)	2.8 (7)					6.0 (15)		6.0 (15)
47.	ARS, SKRAU, Durgapura (Rajasthan)	7	7	7	7.0	1 (2)		3 (4)	2.5 (4)		0.5 (1)			6.5 (10)	0.5 (1)	7.0 (11)
48.	KVK, Ajmer (Rajasthan)	5	5	5	5.0			4.5 (9)				0.5 (1)		4.5 (9)	0.5 (1)	5 (10)
49.	KVK, Banasthali Vidyapeeth, District-Tonk (Rajasthan)	5	5	5	5.0	1.5 (3)	2.5 (5)	0.5 (1)	0.5 (1)					5 (10)		5 (10)
	CZ															
50.	RCOA (MPUA&T), Udaipur (Rajasthan)	7	7	7	7.0			2.5 (4)	1 (2)	1.5 (3)	0.5 (1)	2.0 (4)		3 (6)	4 (8)	7 (14)
51.	ARS, MPUA&T, Banswara (Rajasthan)	7	7	7	6.8				6.8 (17)					6.8 (17)		6.8 (17)
52.	ARS, MPUA&T, Kota (Rajasthan)	7	7	7	7.0		1 (1)	3 (3)	3 (3)					7 (7)		7 (7)

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)
	CZ															
53.	KVK, Sawai Madhopur (Rajasthan)	5	5	5	5.2*			4.8 (12)	0.4 (1)					5.2 (13)		5.2* (13)
54.	WRS, JAU, Junagarh (Gujarat)	5	5	5	5.0				5 (5)					5 (5)		5 (5)
55.	MWRS, SDAU, Vijapur, Mehsana (Gujarat)	10	10	5.4	5.4	0.8 (2)		1.2 (30	3.0 (8)				0.4 (1)	5 (13)	0.4 (1)	5.4 (14)
56.	JNKVV, Jabalpur (MP)	10	10	10	10.0			8 (5)	2 (1)					10 (6)		10 (6)
57.	IARI, RWRS, Indore (MP)	10	10	10	12.4*			9.2 (13)	3.2 (6)					12.4 (19)		12.4* (19)
58.	KVK (JNKVV), Purushottampur, Panna (MP)	7	7	7	7.0			5.4 (12)	0.8 (4)			0.8 (2)		6.2 (16)	0.8 (2)	7 (18)
59.	KVK, Kalukhera Shiksha Samiti, Kalukhera, Ratlam (MP)	5	5	5	4.8	0.4 (1)	0.4 (1)		3.6 (9)				0.4 (1)	4.4 (11)	0.4 (1)	4.8 (12)
60.	KVK, RRS, IGKVV, Jagdalpur, Bastar (CG)	7	7	7	7.0		5.8 (9)				0.8 (1)		0.4 (1)	5.8 (9)	1.2 (2)	7 (11)
61.	IGAU, RARS, Sarkanda, Bilaspur (CG)	10	10	10	10.0	1 (1)	2 (2)	1 (1)	4 (4)				2 (2)	8 (8)	2 (2)	10 (10)
	PZ															
62.	PDKV, Akola (Maharashtra)	7	7	7	7.0	1 (1)		3 (3)	3 (3)					7 (7)		7 (7)
63.	ARS, Niphad, Nasik (Maharashtra)	10	10	10	10.0	0.9 (2)		1.0 (2)	7.2 (9)	0.4 (1)		0.5 (2)		9.1 (13)	0.9 (3)	10 (16)
64.	MAU, Parbhani (Maharashtra)	7	7	7	7.0			0.5 (1)	6 (12)				0.5 (1)	6.5 (13)	0.5 (1)	7 (14)
65.	ARI, MACS, Pune (Maharashtra)	7	7	7	7.0	1 (1)			6 (6)					7 (7)		7 (7)
66.	UAS, Dharwad (Karnataka)	10	10	10	10.0			3 (3)	7 (7)					10 (10)		10 (10)

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)
	PZ															
67.	BIRDS KVK, Tukkanatti, Gokak, Belgaum (Karnataka)	7	7	7	7.0			4.0 (8)	3 (6)					7 (14)		7 (14)
68.	KVK, Badami Road, Bagalkot (Karnataka)	7	7	4	4.0		0.4 (1)	3.6 (9)						4 (10)		4 (10)
	SHZ															
69.	IARI, RS, Wellington (Tamil Nadu)	15	15	15	15.4*	3 (8)	1.2 (5)	7.2 (23)	4 (4)					15.4 (40)		15.4* (40)
	DWR, Karnal : Very High Altitude Areas of NHZ	10	10	3	3.0	3		3.0 (20)						3.0 (20)		3.0 (20)
		510	**510**	**448.4**	**458.39**	**45.51 (129)**	**25.33 (41)**	**137.3 (304)**	**227.59 (512)**	**4.02 (10)**	**2.7 (5)**	**5.94 (15)**	**14 (20)**	**435.73 (986)**	**22.66 (50)**	**458.39 (1036)**

Note : The figures in brackets indicate the number of farmers.

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

ANNEXURE-II

Category wise number of Barley Front Line Demonstrations (FLDs) Farmers during 2014-15

Annexure-II : Categorywise Number of Barley FLDs Farmers during 2014-15

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)	5	5	5	5.0	-	-	-	3.75 (15)	-	-	-	1.25 (5)	3.75 (15)	1.25 (5)	5.00 (20)
2.	IARI, RS, Tutikandi, Shimla (HP)	5	5	5	5.0	2.0 (3)	-	-	3.0 (30	-	-	-	-	5.0 (6)	-	5.0 (6)
	NEPZ															
3.	NDUA&T, Faizabad (UP)	5	5	5	5.0	-	-	-	5.0 (9)	-	-	-	-	5.0 (9)	-	5.0 (9)
4.	KVK (IAS-BHU), Barkachha, Mirzapur (UP)	5	5	5	10.0*	-	-	2.0 (2)	8.0 (8)	-	-	-	-	10.0 (10)	-	10.0 (10)
5.	CSAUA&T, Kanpur (UP)	5	5	5	6.4*	0.4 (1)		6.0 (15)	-	-	-	-	-	6.4 (16)	-	6.4 (16)
6.	BHU, Varanasi (UP)	5	5	5	4.5	0.5 (1)			2.0 (1)	0.5 (1)			1.5 (1)	2.5 (2)	2.0 (2)	4.5 (4)
	NWPZ															
7.	PAU, Ludhiana (Punjab)	5	5	5	5.0	1.2 (2)	-	-	3.8 (6)	-	-	-	-	5.0 (8)	-	5.0 (8)
8.	DWR, Karnal (Haryana)	5	5	5	5.0	-	-	-	5 (5)	-	-	-	-	5.0 (5)	-	5.0 (5)
9.	CCSHAU, Hisar (Haryana)	5	5	5	5.0	-	-	-	5.0 (7)	-	-	-	-	5.0 (7)	-	5.0 (7)
10.	KVK (CCSHAU), Fatehabad (Haryana)	5	5	5	5.0	-	-	-	5.0 (13)	-	-	-	-	5.0 (13)	-	5.0 (13)
11.	KVK (CCSHAU), Jhajjar (Haryana)	5	5	5	6.0*	-	-	-	6.0 (15)	-	-	-	-	6.0 (15)	-	6.0 (15)
12.	KVK, Shri BB Ashram, Rewari (Haryana)	5	5	5	5.0	-	-	5.0 (7)	-	-	-	-	-	5.0 (7)	-	5.0 (7)

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)
	NWPZ															
13.	RARI, SKNAU, Durgapura, Jaipur (Rajasthan)	5	5	5	5.0	1.0 (1)	-	3.0 (3)	1.0 (1)	-	-	-	-	5.0 (5)	-	5.0 (5)
14.	KVK, Tankarda, Chomu, Jaipur (Rajasthan)	5	5	5	5.0	1.2 (12)	-	2.0 (3)	-	0.6 (1)		1.2 (2)		3.2 (5)	1.8 (3)	5.0 (8)
15.	KVK, SKNAU, Khedla Khurd, Dausa (Rajasthan)	5	5	5	5.0	2.0 (5)	3.0 (6)	-	-	-	-	-	-	5.0 (11)	-	5.0 (11)
	CZ															
16.	RCOA, MPUA&T, Udaipur (Rajasthan)	5	5	5	5.0	0.5 (1)	1.0 (2)	1.5 (2)	0.5 (1)		1.0 (2)	0.5 (1)	-	3.5 (6)	1.5 (3)	5.0 (9)
17.	KVK (MPUA&T), Dhoinda, Rajasmand (Rajasthan)	5	5	5	5.0	-	-	3.8 (9)	-	-	-	1.2 (3)	-	3.8 (6)	1.2 (3)	5.0 (12)
18.	ZARS, COA, JNKVV, Kuthulia Farm, Rewa (MP)	5	5	5	5.0	-	-	2.0 (2)	3.0 (3)	-	-	-	-	5.0 (5)	-	5.0 (5)
19.	KVK (JNKVV), Purushottampur, Panna (MP)	5	5	5	5.0	0.20 (1)	02.40 (6)	0.80 (2)	01.60 (4)	-	-	-	-	5.0 (13)	-	5.0 (13)
20.	KVK (RVSKVV), Juara Khurd, Morena (MP)	5	5	5	6.4*	-	-	-	6.4 (16)	-	-	-	-	6.4 (16)	-	6.4 (16)
	Total	**100**	**100**	**100**	**108.30**	09.00 (17)	06.40 (14)	26.10 (45)	59.05 (107)	1.1 (2)	1.0 (2)	2.9 (6)	2.75 (6)	100.55 (183)	7.75 (16)	108.30 (199)

Note : The figures in brackets indicate the number of farmers.

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

ANNEXURE-III

Revised Guidelines
for Conducting Wheat and Coarse Cereals (Barley, Sorghum, Maize, Pearl Millet & Small Millets) Front Line Demonstrations (FLDs) as the approved component of National Food Security Mission (NFSM) Scheme of the Department of Agriculture & Cooperation, Ministry of Agriculture, Government of India, Krishi Bhawan, New Delhi.
Applicable for the year 2014-15

By Speed Post

F. No 2-1/2014-CU-I
Government of India
Ministry of Agriculture
Department of Agriculture & Cooperation
Crops Division

Krishi Bhawan, New Delhi.
Dated the 22nd April, 2014

Subject:- **Revised Guidelines for Frontline Demonstration on Rice, Wheat, Pulses and Coarse Cereals under National Food Security Mission (NFSM) - regarding.**

Please find enclosed a copy of the Revised Guidelines for Frontline Demonstration on Rice, Wheat, Pulses and Coarse Cereals for implementation of Frontline Demonstration Programme across the country.

It has approved by the Competent Authority.

(Dr. D.P. Malik)
Additional Commissioner (Crops)

Distribution:-

1. Director, Indian Institute of Pulses Research, Kanpur.
2. Director, Central Rice Research Institute, Cuttack, Orissa.
3. Project Director,Directorate of Rice Research, Hyderabad.
4. Project Director, Directorate of Wheat Research, Karnal.
5. Project Director, Directorate of Maize Research, Pusa, New Delhi.
6. Project Director, Directorate of Sorghem Research, Hyderabad.
7. Project Coordinator, AICRP on Small Millets, UAS, GKVK Campus, Bangalore, Karnataka.
8. Project Coordinator, AICRP on Pearl Millet, Mandore, Jodhpur, Rajasthan.
9. Director, Directorate of Pulses Development, Bhopal, Madhya Pradesh.
10. Director, Directorate of Millet Development, Jaipur, Rajasthan.
11. Director, Directorate of Rice Development, Patna, Bihar.
12. Director, Directorate of Wheat Development, Ghaziabad, U.P.

GUIDELINES FOR FRONT LINE DEMONSTRATIONS UNDER NFSM

Front Line demonstrations (FLDs) is a unique approach to provide an direct interface between researcher and farmers as the scientists are directly involved in planning, execution and monitoring of the demonstrations for the technologies developed by them and get direct feedback from the farmers' field about the crops like wheat, rice and pulses production in general and technology being demonstrated in particular. This enables the scientists to improvise upon the research programme accordingly. In FLDs, the subject matter scientists provide technological inputs to extension scientists to organize the demonstrations. Thus, FLDs provide an opportunity to researchers and extension personnel for understanding the farmer's resources and requirement to fine tune and/or modify the technologies for easy adaptability at farmers' fields.

The FLDs for Rice, Wheat, Pulses, Pearl millet, Maize, Barley, Sorghum and Small Millets are approved component of National Food Security Mission (NFSM). The FLDs are conducted by the ICAR/SAUs system. The ICAR Institutes i.e. Directorate of Rice Research, Hyderabad, Directorate of Wheat Research, Karnal, Indian Institute of Pulse Research, Kanpur, Directorate of Maize Research, Delhi, Directorate of Small Millets, Bangalore, Directorate of Pearl millet, Mandore, Jodhpur and Directorate of Sorghum Research, Hyderabad are the nodal Institutions for organizing the FLDs on rice, wheat, pulses, maize, small millets, pearl millet and sorghum, respectively.

1. FRONTLINE DEMONSTRATIONS

1.1 Frontline Demonstration is a form of applied research through ICAR/SAUs system on latest notified/released varieties along with full package of practices on selected farmers' fields with a view to demonstrate the potentiality of the technologies to (a) participating farmers (b) neighboring farmers and other agencies; (c) to analyze the production (d) performance of the technologies for scientific feed back.

2. OBJECTIVES

2.1 To demonstrate improved Crop Production Technologies of Rice, Wheat, Pulses and Coarse Cereals on the farmers' fields;

2.2 To popularize the newly notified and improved varieties/technologies for varietal diversification and efficient management of resources.

2.4 To bring synergy among planers, researchers, farmers and industry for parable interface through seminars/symposium on emerging themes of importance in the field of Rice, Wheat and Pulses production for deciding strategies for development of these crops.

3. SELECTION OF TECHNOLOGY

3.1 The need and necessity of demonstration should invariably be based on the emerging issues. The DAC will in advance communicate the desired technologies/thematic areas on which the FLDs to be conducted and the concerned ICAR institutes in consultation with SAUs and other stakeholders should develop a comprehensive plan for organizing the demonstrations.

3.2 There will be a committee under chairmanship of Director of Research of concerned State Agriculture University which will decide the technology to be demonstrated. The other members of the committee will be Director of Extension, Joint Directors/ Heads of Departments of Crop Production/ Agronomy, Plant Breeding and Plant Pathology. The technology so decided should be discussed along with the results of the station trials in Annual Workshops and the technical programme should be finalized well in advance.

3.3 The Technology programme should take care of the availability of seed of improved varieties /hybrid, drought resistance varieties, method of sowing, IPM, INM, micro irrigation, farm machines etc. to be demonstrated. The seed agencies and the manufacturers should also be taken on board for deciding the FLDs.

3.4 The varieties which are within 3 years (5 years for problem areas viz; Hills Saline, Alkaline Soils etc.) period from the date of notification/release/identification should only be included in the demonstration purpose and those varieties in the border lines should be avoided.

3.5 The details of the technical programme should be communicated by first week of April for kharif crops and by first week of August for winter crops to Crops Division of DAC to convey the administrative approvals. The plan of FLD will be approved by a committee comprising of:

Agriculture Commissioner	Chairman
Joint Secretary (Crops)	Member
Additional Commissioner (Crops)	Member
Directors/Project Directors (DWR/DRR/IIPR, DSR, DMR, DSM, DPM)	Member
Directors (DWD, DRD, DPD,DMD,)	Member
Additional Commissioner (Machinery)	Member
Deputy Commissioner (Seeds)	Member
Joint Director (Crops)	Member-Secretary

4. SELECTION OF SITE AND BENEFICIARY

4.1 The site of demonstrations should be at a place easily accessible and at central point to attract large number of audience/farmers for more impact, easy monitoring and feedback.

4.2 The technology selected for demonstration should be of paramount importance and preferably with a farmer.

4.3 To create better and visible impact of a technology the demonstrations may be conducted in **cluster approach of at least 10.0 hectares.** One demonstration at individual farmer should never be less than 0.4 hectare and not exceeding to one hectare.

4.4 Number of demonstrations of a particular variety and package of practices should be decided keeping in view the scientific requirement for reliability and validated of the results.

4.5 Demonstrations may be conducted on farming situations for scientific interpretation.

4.6 Participatory approach may be followed in conducting demonstrations associating (i) farm scientists (ii) extension workers and (iii) demonstrating farmers, so that we have effective implementation leading to better adoption and diffusion of technology.

4.7 Other equal size plots of the demonstrating farmers or the equal size of plot of neighboring farmers in the same farming situation may be considered as check or control plots for objective comparison of the results.

4.8 Selection of the site should be decided in consultation with Department of Agriculture of the concerned State and should be such that it is easily assessable to farmers of neighbouring villages and extension workers coming from different parts of the district. The demonstrating farmers should be progressive one with leadership quality and who is easily approachable by other farmers & extension workers.

4.9 Special attention towards soil problems like acidity, alkalinity, micro-nutrients deficiency, soil borne pests and diseases should be tackled before taking up the Frontline demonstrations. Identify broad based farming situations and conduct only limited number of FLDs with more emphasis on the quality of FLDs implementation.

4.10 Identification of FLDs beneficiaries shall be carried out by the Implementing Centres as per the requirement/aptitude of the farmers to conduct the Demonstrations. Preference for FLDs should be given to the Socio-economically backward/Small Marginal/ST/SC/OBC/ women shall be given at the time of the identification of FLD beneficiaries.

5. SIZE OF FLDS

5.1 The size of one demonstration will be 0.40 hectare to one hectare depending upon the size of plot available with small and marginal/women farmers who will be given preference in the selection of beneficiaries.

5.2 The assistance for demonstrations will be decided upon the area. The rate of assistance is Rs.7500/ for Rice, Wheat, Pulses and Rs.5000/- for Coarse Cereals per demonstration of one hectare.

6. IMPLEMENTING AGENCY

6.1 Front line Demonstrations will be organized by ICAR Institute through their Centers/Krishi Vigyan Kendras (KVKs under ICAR system) and State Agriculture Universities, reputed and registered NGOs.

6.2 Directorate of Rice Research, Hyderabad will be the nodal institute for organizing the FLDs on Rice; Directorate of Wheat Research, Karnal for wheat and barley, Indian Institute of Pulses Research, Kanpur for pulses, Directorate of Maize Research, Delhi for maize, Directorate of Small Millets, Bangalore for small millets, Directorate of Pearl millet, Jodhpur for pearl-millet and Directorate of Sorghum Research, Hyderabad for sorghum

7. PLANNING FOR THE DEMONSTRATION

7.1 A local survey may be conducted to (a) ascertaining the socio-economic conditions of the farmers; (b) farming situations under which the crop is grown; and (c) the existing level of adoption of technologies and the productivity. This will serve as a broad benchmark for future planning demonstrations work and evaluation.

7.2 Agro-economic constraint analysis should be done of the representative farmers sample to identify the critical factors/inputs for the adoption of technologies by the farmers require support for such inputs

7.3 Advance planning may be done for the demonstration so that all the critical inputs are arranged in time.

7.4 Orientation training may be organized for half a day for all the participating persons about all aspects of technologies and methodologies including aims and objectives of the demonstrations so that there is uniform clarity of purpose for better working relating and linkages.

8. APPROVAL OF TECHNICAL PROGRAMME

8.1 The details of physical and financial targets (Agency-wise and location-wise) for laying out the FLDs on Kharif crops to be organized by participating centres may be communicated to the Crops Division of Department of Agriculture & Cooperation, Ministry of Agriculture, Delhi latest by 30th April and 30th August for Rabi crops.

8.2 The in-principle approval for the conduct of FLDs will be communicated to the concerned ICAR institutes in first quarter of April for all the crops by the Department to facilitate them to arrange the required inputs and also the selection of beneficiary farmers.

9. IMPLEMENTATION

9.1 Prior to the launching of the demonstrations, all participating agencies/persons may be informed well in advance about the date and venue (demonstrating farmers on the demonstration and are invited to participate). On occasion, the neighbouring farmers may also be invited. They should be educated about the details of the technologies and objectives of the FLDs. Sowing of the crops, may be done in the presence of participating persons.

9.2 All the important farm operations may be carried out by the demonstrating farmers under the close supervision and guidance of the scientist' in-charge of FLDs. The concerned scientist(s) may record observations of all important events so that the results could be interpreted.

9.3 When the demonstrations plot is at maturity, the field day may be organized where neighbouring farmers including farm women and extension workers are invited. A question-answer hour i.e buzz session (between the scientists, farmers and extension workers) may be organized.

9.4 The information pertaining to different technological interventions adopted at Check plot and FLD plot must record to evaluate the technological gap.

9.5 The concerned scientist is expected to keep records of various expenses incurred on various inputs used for the demonstrations plot(s) and check plot (s) for deriving cost benefits.

9.6 After the harvesting and threshing the yield (grain & straw/stalk etc.) may be recorded for demonstration plot and check plot.

10. MONITORING

10.1 Monitoring is required on continuous and regular basis through visits to FLD plots, recording observations, getting the feed back from the farmers and extension workers.

10.2 The Scientist in Charge of the FLDs in SAUs and ICAR Institute should ensure to make regular visits to the demonstration plots to have proper feedback on the impact of the technology.

10.3 Monitoring teams comprising of Senior Scientists/Officers of the ICAR system/SAUs, Ministry of Agriculture and the State Department of Agriculture will make visits to such demonstration plots for getting direct feedback and offering suggestions and guidance.

10.4 The committee comprising of Agriculture Commissioner, Joint Secretary (Crops), ADG (FFC), Project Directors/Directors of concerned ICAR Institutes, ADG (FFC), ICAR, Additional Commissioner (Crops) and Director, Dte. of Rice, Wheat, millets and Pulses Development as representative from the Department of Agriculture & Cooperation, M/o Agriculture, Government of India will review progress of FLDs periodically at least once during the crop season. The periodical progress report will be submitted by ICAR to the Ministry.

10.5 The results and feedback as obtained by the monitoring teams/others should be complied by the Concerned Crop Development Directorates to be submitted to Agriculture Commissioner. The quartlery reports on physical and financial progress will be submitted directly to Agriculture Commissioner of this Department with a copy to the Director, Directorate of Rice, Wheat, Pulses and Millets Development, Patna, Ghaziabad, Bhopal and Jaipur regularly by 15th of succeeding month.

10.6 It is also requested to kindly arrange to introduce a more effective system to develop closer coordination between State functionaries of various input units/other State Officials, extension unit of State Agricultural Universities and

Panchyati Raj Institutions in implementing of the Programme. Details of such coordination exercise/meeting should include in the periodic physical report.

11. REPORTING AND DOCUMENTATION

11.1 The results of the demonstrations may be properly documented, reported and circulated among all the concerned personnel of the State Department of Agriculture, demonstrating farmers etc.

11.2 A success story may be published in popular extension journals (widely circulated in the state) for the benefits of other farmers preferably in local languages.

11.3 Full report of FLDs so conducted by ICAR/SAUs is to be sent to Ministry of Agriculture, Department of Agriculture & Cooperation by Directors/Project Directors well before the Annual Workshop and is also presented in the Workshop.

12. FUNDING PATTERN

12.1 Frontline Demonstrations on the basis of above guidelines would be conducted in different agro-ecologies through Crop Directorate/Coordinating Unit of ICAR in the potential areas of the country. The funds for the demonstrations so organized by the ICAR/SAUs would be provided by the Government of India from the funds available in National Food Security Mission. For such demonstrations, funds shall be provided directly to the concerned Director//Project Director and the pattern of assistance would be Rs.7500 for Rice, Wheat, Pulses and Rs.5000 for Coarse Cereals per demonstration of one hectare or actual of the cost, whichever is less.

The detailed item-wise break-up of the expenditure for organizing a Frontline Demonstration on one hectare of rice, wheat and pulses is given as under:

S.N.	Component	Amount (Rs.)	
		Rice, Wheat, Pulses	Coarse Cereals
1	Cost of critical inputs (seeds/ bio-fertilizers/manures/PP chemicals/ herbicides) to supplement the cultivation charges	6700	4200
2.	Organization of Field Day	250	250
3.	Display board and publicity material (posters/pamphlets/leaflets etc.)	250	250
4.	Visit of scientists excluding TA/DA, but hiring of Taxi/POL etc. and miscellaneous expenses	300*	300*
	Total	**7500**	**5000**

* Nodal FLD implementing Directorate may retain 50 % of the amount for monitoring of FLDs across the country.

12.2 Funds earmarked for FLDs may be made available to the concerned SAUs/Scientist well before the start of the sowing season by concerned Directorate/Project Directorate of ICAR.

12.3 FLD on newly released varieties should include the package of improved production technologies. The expenditure in excess of the approved norm per hectare if any, should be incurred by the beneficiary-farmer. Therefore, the FLDs only those farmers who are willing to contribute some of critical resources.

12.4 In order to monitor the programme, the following information may be furnished by concerned Director/Project Director to the concerned Crop Development Directorate under intimation to Crops Division of Department of Agriculture & Cooperation:

Kharif Crops		
Sl.No.	**Activity Milestone**	**Scheduled date for submission of reports**
1.	Name and full addresses of the selected farmers, varieties used, area sown under the Demonstration and Technology demonstrated	Kharif 15th July, Rabi- 15th November
2.	Crop stand and appropriate date for visit by the FLD monitoring team	Kharif- 15th September Rabi- 15th January
3.	Tentative dates for organization of Farmer's Day	Kharif- 30th September Rabi- 31th Janaury
4.	Report and complete data about FLDs conducted	Kharif- 15th December Rabi- 15th May

ANNEXURE-I

DETAILED INFORMATION OF INDIVIDUAL FRONT LINE DEMONSTRATION (FLD)

Details of beneficiaries of FLDs during Kharif/Rabi/summer of year _____

(1) Name & Complete address of the Implementing Centre :-

(2) Website/E-mail ID :

(3) Fax No.

(4) Name of Crop

(5) Name of variety/hybrid

(6) Location

(7) District

(8) state

S.N.	Name of beneficiary with address and Phone number	Category (SC/ST/OBC/Gen) & Gender (Male/ Female)	Area of FLD (ha)	Pattern of Financial Assistance								Technology demonstrated	Field day/ Kisan Ghosti	Follow visits of scientist
				Seed		Bio-fertlizers		Micro-nutrients		Weedicides/ pesticides				
				Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value			

Signature of beneficiary

Signature with Seal
Scientist In charge
Implementing Centre

Signature with Seal
Director/Project Coordinator

ANNEXURE-II

Quarterly/Final physical and financial progress report of FLDs during Kharif/Rabi/Summer of Year _____

(1) Name & Complete Address of the Implementing Centre :

(2) Website/E-mail ID :

(3) Fax No.

(4) Name of Crop

No.	Physical				Financial (Rs.)	
	Allocation		Achievement		Allocation	Achievement
	No. of FLDs	Area under FLD	Number of FLDs	Area under FLD		
Men						
SC						
ST						
OBC						
Gen						
Women						
SC						
ST						
OBC						
Gen.						
Total						

Signature with Seal

Director/Project Coordinator

ANNEXURE-III

Results of FLDs conducted at various locations on farmer's field during Kharif/Rabi/summer of year _____

(1)Name & Complete Address of the Implementing Centre :

(2) Website/E-mail ID :

(3) Fax No.

(4) Name of Crop

	Grain yield (kg./ha.)				Fodder yield (kg./ha.)	
Implementing Center/ location	Average yield of concerned State	Average yield of concerned district	Yield under improved practice of FLD	Yield under farmer's practice	Yield under improved practice of FLD	Yield under farmer's practice

Signature with Seal

Director/Project Coordinator

ANNEXURE -IV

ASSESSMENT OF TECHNOLOGY GAP FOR CHECK PLOT AND FLD PLOT

Interview schedule: Socio-Economic Profile of FLD/ check plot farmer

Name of the farmer:	
Address of the farmer:	
Education level:	
Name of KVK or other research station near FLD or check plot	
Number of visit of farmers to KVK or research station	
Number of training attended at KVK or research station	
Size of operational Land Holding	
Area under irrigation	
Area under Rain fed	
FLD conducted on irrigated/rainfed /shallow/lowland/ upland etc.	
Source of Irrigation : tube well /well/pond/canal/other	
Testing of soil: Yes/No	
The farmer has tested soil before FLD	
Place of soil testing/SAU/ICAR/ state Agril Department/ Public undertaking/ others	
Name of nutrients deficit in soil	
Name of prevalent crop-rotation followed at farm	
Name of farm machineries on the farm	
Name of person from implementing agency present at the plot at the time of estimate of yield to record it accurately.	

ANNEXURE –IV

ASSESSMENT OF TECHNOLOGY ADOPTION AND GAP

Items	Farmer's practice (Check plot)	Recommended Practice (FLD plot)
Source of seed Govt. agencies/public undertaking/others		
Name the varieties cultivated		
Other varieties most commonly adopted by the farmers		
Name of Hybrid rice if grown on the farm		
Seed Rate(Kg/Ha)		
Seed treatment with water Yes/No		
Age of seedlings are transplanted in the field		
Seed treatment with fungicides/ others, dose of fungicides/others		
Raising of nursery in case of rice by dry or wet method and raised bed or flat bed		
Quantity and type of NPK fertilizers and manures used in nursery of rice?		
Name and quantity of Plant Protection measures used in rice nursery		
Method of transplanting of rice		
No. of hills per unit area in case of rice.		
No. of plants per hill in case of rice.		
Spacing of row to row and plant to plant		
Method of Field Preparation for transplanting. i.e use of rotavator/other machinery		
Use of Gypsum /Lime: Quantity (Kg/ha.)		
Doses of NPK fertilizers applied		
Name and quantity of use of bio-fertilizers		
Quantity of vermi-compost applied		
Number of doses of N applied: single /double /others		
Name and quantity of micro nutrients applied in field		
Type of irrigation: flood/micro irrigation		
Number of irrigation applied in the field		
Method of weeding: mechanical/ chemical/ manual/others		
Weeding of crop by hand weeder/rotary weeder /cono weeder/ powered weeder		
Name and quantity of herbicides applied		
Name of common insects		
Name of common diseases		
Name and quantity of pesticides for the control of pests		
Number of sprayers of insecticides		
Name and quantity of insecticides of diseases.		
Number of sprayers of insecticides		
Biological control of insects-pests and diseases		
Harvesting of crop is done by manual/ mechanical/ others		
Name of machine used for harvesting		
Threshing of crop is done by manual/ mechanical /other		
Name of machine used for threshing		

Phone/Fax: 0141-2235631
E-mail: dmdrj00@nic.in

Government of India
Ministry of Agriculture
Department of Agriculture & Cooperation
Directorate of Millets Development
2nd Floor, Kendriya Sadan-A, Sector-10, Vidhyadhar Nagar, Jaipur-302 039

F.No. 5-18/2014-DMD-FLDs/360 **Dated:** 03.05.2014

To,

1. The Director, Directorate of Maize Research, ICAR, Pusa Campus, New Delhi-110 012
2. The Director, Directorate of Sorghum Research, ICAR, Rajendra Nagar, Hyderabad-500 030
3. The Director, Directorate of Wheat Research, ICAR, Karnal-132 001
4. The Project Coordinator (PM), All India Coordinated Pearl Millet Improvement Project, ICAR, Mandore, **Jodhpur-342 304.**
5. The Project Coordinator (SM), All India Coordinated Small Millets Improvement Project, ICAR, KVK Campus, **Bengaluru-560 065.**

Sub: Organization of Front Line Demonstrations of Coarse cereals during 2014-15-reg.

Ref: DAC letter No. 2-1/2014-CU.I dated 25th April, 2014

Sir,

DAC vide its letter referred above has communicated the allocation of FLDs on coarse cereals for implementation during 2014-15 as per details given below:-

(i) Crop specific physical and financial allocation of FLDs during 2014-15.

Name of implementing agency	Crop	FLDs (ha)	Allocation (Rs in lakh) @ Rs. 5,000/- per ha
DSR, Hyderabad	Sorghum	150	7.50
PC (PM), Mandore, Jodhpur	Pearl millet	200	10.00
PC (SM), Bengaluru	Small millets	300	15.00
DMR, New Delhi	Maize	200	10.00
DWR, Karnal	Barley	100	5.00
	TOTAL	**950**	**47.50**

(ii) The rate of assistance for coarse cereals is Rs. 5,000/- per ha.
(iii) All the FLDs should be conducted under the close supervision of scientist of ICAR/SAUs/KVKs.
(iv) AICRP on Pearl millet will focus to conduct FLDs on pearl millet in the Western part of Rajasthan.
(v) DSR, Hyderabad will conduct FLDs of Rabi sorghum in the States of Andhra Pradesh, Maharashtra and Karnataka.
(vi) Crop season and component specific detailed plan of FLDs should also be submitted by respective implementing agency after finalization of the programme.
(vii) The reports of FLDs in prescribed format (Annexure-I to IV attached with revised guidelines) need be submitted to Directorate of Millets Development, Jaipur.
(viii) The FLDs porgramme should be conducted as per revised guidelines (**copy enclosed**).
(ix) No chemical fertilizer is allowed as input under FLD programme.

Accordingly, centre-wise allocation and details of the technology to be demonstrated by the centres in each cluster may kindly be furnished to Dr. D.P. Malik, Additional Commissioner (Crops), DAC, Krishi Bhawan, New Delhi with copy to this Directorate for monitoring of the programme.

Encls: a/a.

Yours faithfully,

(Dr. M.N. Singh)
Director (I/c)

Copyto: Dr. D.P. Malik, Addl. Commissioner (Crops), DAC, Krishi Bhawan, New Delhi-110 001 w.r.t. his letter referred above.

सत्यमेव जयते

GOVERNMENT OF INDIA
DIRECTORATE OF WHEAT
DEVELOPMENT
MINISTRY OF AGRICULTURE
(DEPTT. OF AGRICULTURE AND COOPN.)
C.G.O. COMPLEX-I, 3rd Floor,
KAMLA NEHRU NAGAR
GHAZIABAD- 201 002 (U.P.)

Tel.:0120-2711380 (Dir.) -2710897 (O) Fax: 0120-2711380 Telegram: Gehun Vikas E-Mail: dwd.wheat@gmail.com

F. No. 8-1/2014-FLD-DWD 425 **Date: 07.05.2014**

To,

The Project Director,
Directorate of Wheat Research,
Agrasen Marg, Post Box No. 159,
Karnal- 132001(Haryana).

Subject: Approval of organisation of Frontline Demonstrations on Wheat (WFLDs) 2014-15- regarding.

Madam,

With reference to the Ministry's letter no. 2-1/2014-CU-I dated 25.04.2014 on the above cited subject, I am directed to convey that the competent authority has approved an outlay of Rs. 38.25 lakh for organizing 510 (total number) Frontline Demonstrations on Wheat with financial assistance @ Rs. 7500/ha for the year 2014-15 with following instructions.

1. All the FLDs should be conducted under the close supervision of Scientists of SAUs/KVK/ICAR institutes.
2. Crop season and component specific detailed plan of FLDs should also be submitted by respective implementing agency after finalization of the programme.
3. The FLDs programme should be conducted as per the revised guidelines.
4. No chemical fertilizer is allowed as input under FLDs programme.

Yours faithfully;

(Narender Kumar)
Joint Director

Copy to

Dr. D.P. Malik, Addl. Commissioner (Crops), Ministry of Agriculture, Deptt. of Agri. and Cooperation, Krishi Bhawan, New Delhi.

F.No.2-1/2014-CU-I
Government of India
Ministry of Agriculture
Department of Agriculture & Cooperation
Crops Division
****

Krishi Bhawan, New Delhi
Dated the 19th June, 2014

Subject: Organization of Frontline Demonstrations (FLDs) on Wheat for 2014-15 reg.

With reference to your letter no. DWR/EXTN/FLD/2013-14/1247-55 dated on May 5, 2014, it is informed that Frontline Demonstrations (FLDs) of cereals and pulses is one of the component of NFSM approved for the XII Plan. The ICAR institutes /SAUs may identify the beneficiary farmers under FLD programme who can contribute the recommended dose of chemical fertilizers from their own resources. Accordingly, ICAR institutes/SAUs may allocate the funds for different interventions within approved cost norms in organization of FLDs of wheat and barley.

19/6/14
(D.P.Malik)
Additional Commissioner (Crops)

To
Project Director,
Directorate of Wheat Research
Agrasen Marg, Post Box No. 159,
Karnal-132001 (Haryana)

577
28-5-15

F.No. 2-1/2014-CU-I
Government of India
Ministry of Agriculture
Department of Agriculture & Cooperation
*****

Krishi Bhawan, New Delhi
Dated 19th May, 2015

To

The Director
ICAR-Indian Institute of Rice Research,
Hyderabad (Andhra Pradesh)

The Director
ICAR -Indian Institute of Wheat & Barley Research,
Karnal (Haryana)

The Director
ICAR -Indian Institute of Pulses Research
Kanpur (UP)

The Director
ICAR -Indian Institute of Maize Research,
New Delhi

The Director
Indian Institute of Millets Research
Hyderabad (AP)

Project Coordinator
All India Coordinated Small Millets Improvement Project
Banglore

Project Coordinator,
All India Coordinated Pearl Millet Improvement Project
Jodhpur

Subject: Approval of organization of Front Line Demonstration of Rice, Wheat, Pulses & Coarse cereals for the year 2015-16 reg.

Sir,

I am directed to convey that the competent authority of this department has approved an outlay of Rs. 2,53,90,014 for organization of FLDs of Rice, wheat, pulses and Coarse Cereals during 2015-16. The crop specific details of FLDs are given as under:

Sl. No	Nodal Agency for Implementation of FLDs	Name of Crop	Number of FLDs approved	Rate of financial assistance/ (Rs./ha)	Total Amount (Rs)	Committed liability for 2014-15/Unspent balance for 2014-15	Total amount sanctioned* (Rs)
(1)	(2)	(3)	(5)	(6)	(7)	(8)	(9)
1.	I.I.W & B. R, Karnal	Wheat	600	7500	45,00,000	-310330	4189670
2.	I.I.R.R., Hyderabad	Rice	600	7500	45,00,000	40106	4540106
3	I.I.P.R, Kanpur	Pulses	1300	7500	97,50,000	146531	9896531
4	**Coarse Cereals**						
5	I.I.M.R, Delhi	Maize	300	5000	15,00,000	500000	2000000
6	AICSMIP, Bangalore	Small Millet	300	5000	15,00,000	-5118	1494882
7	AICPMIP, Jodhpur	Pearl Millet	250	5000	12,50,000	-6175	1243825
8	I.I.M.R, Hyderabad	Sorghum	200	5000	10,00,000	375000	1375000
9	I.I.W & B R., Karnal	Barley	130	5000	6,50,000	0	650000
	Total		**3680**		**2,46,50,000**		25390014

*Worked out taken into consideration unspent balance/committed liabilities for the year 2014-15.

PI (CSS)

20/5/15

2. The FLD proposal of Rice, Wheat, Pulses and Coarse Cereals (Pearl Millet, Sorghum, Small Millet, Maize and Barley) for the year 2015-16 has been approved with following conditions:

- Each implementing agency will constitute monitoring team with involvement of officials of Crop Development Directorates, State Department of Agriculture and Scientists of ICAR/SAU.
- All the FLDs should be conducted under the close supervision of scientists of SAUs/KVK/ICAR institute.
- Farmers practice, crop production and plant protection technologies used in FLDs should be outlined in the progress report. The reasons for yield gap between FLDs and farmers' practices should be mentioned in progress report.
- No chemical fertilizer is allowed as input under FLD programme, however, payment to various farm operations/farm services and other critical inputs (seed, bio-fertilizers, lime, gypsum and micronutrients etc.) are allowed. Farmers have to apply the recommended doses of fertilizers.
- The FLD programme should be conducted in cluster approach of 10 hectares as per guidelines already circulated.
- IIRR, Hyderabad has not included the FLDs on DSR in the proposal for Punjab. So IIRR may organize some FLDs of DSR and less water requiring varieties of rice as the ground water is depleting in the state.
- The proposal of FLDs as proposed by IIRR at serial number 57 and 58 of the proposal are not allowed. IIRR has already included FLDs for various states to be organized by SAUs/ICAR institutes.
- IIMR, Hyderabad will conduct FLDs of rabi sorghum in the state of Andhra Pradesh, Maharashtra and Karnataka.
- FLDs on sorghum will conduct in rice fallows of coastal Andhra Pradesh under zero-tillage condition.
- Field days should be regularly organized and prior information should be sent to DAC and ZPD of ICAR.
- The details of FLD beneficiary-farmers along with contact number should also be furnished to DAC.
- 5% of FLD in rice, pulses and coarse cereals shall be conducted in North-Eastern States.
- All implementing agencies and their coordinating centers should involve agronomist/plant breeder to finalize technologies to be demonstrated in FLD programme and follow up visits to demonstration sites.
- The FLD implementing agency will re-allocate the number of FLDs as per approval and intimate to DAC.
- Each implementing agency will send technical programme and progress report of FLDs of Rice, Wheat, Pulses and Coarse Cereals (maize, sorghum, pearl millet, small millets) in formats (already circulated) to DRD, Patna, DWD, Ghaziabad, DPD, Bhopal and DMD, Jaipur, respectively on quarterly basis.

19/5/15

(D.P.Malik)
Additional Commissioner (Crops)

Copy to:

1. ADG (FFC)/ADG (O&P), ICAR, Krishi Bhawan, New Delhi.
2. Director, Directorate of Rice/Patna/Wheat/Ghaziabad, Pulses/Bhopal, Millets/Jaipur
3. Under Secretary (Finance), DAC,Krishi Bhawan, New Delhi
4. Under Secretary (CA-V)/SO (NFSM), DAC, Krishi Bhawan, New Delhi
5. PPS to DDG (Crop Science), ICAR/Agriculture Commissioner (DAC), Krishi Bhawan, New Delhi.
6. PS to Joint Secretary (Crops), PS to Director (Crops), DAC Krishi Bhawan, New Delhi.
7. PA to ADC (Crops)/AC (Crops)/NFSM-Cell, Guard File, DAC, Krishi Bhawan, New Delhi
8. Programmer, NFSM, New Delhi.