# All India Coordinated Wheat & Barley Improvement Project

# PROGRESS REPORT 2015-16

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**Wheat Front Line Demonstrations** 

### Front Line Demonstrations (2015-2016)

Globally, wheat and barley occupy respectively the first and fourth position among the cultivated cereals. In India, these *Rabi* cereals altogether were grown in about 31 million hectares accounting for about 38% of total foodgrains produced in the country (2015-2016). Wheat has been under cultivation in 30.04 million hectares and barley covered 0.66 million hectares during the 2015-2016 *Rabi* season as per the third advance estimates from the Directorate of economics and statistics (DES), Ministry of Agriculture and Farmers Welfare (MoA&FW), India. Despite the decline in the wheat produced during 2014-2015 (86.53 mt), the current year estimates have showed an increase by 8.68 per cent (7.51 mt). During 2015-2016 *Rabi* season, the wheat production has registered 94.04 million tonnes from an area of 30.04 million hectares with an average national productivity of 3130 kg/ha. Similarly, barley production was 1.62 million tonnes during 2015-2016 with an average national yield of 2470 kg/ha.

Front line demonstrations (FLDs) conducted across regions also witnessed a similar kind of trend. Yet, the superior genotypes and technologies demonstrated through the FLD programme showed that yield registered in FLDs is significantly higher than check plots. However, there existed yield gaps across regions which should be bridged through need based interventions by identifying the locations specific constraints. The ICAR-Indian Institute of Wheat and Barley Research make continuous efforts to popularize the regions specific superior genotypes as well as micro level strategies to enhance the wheat and barley productivity. Despite this outreach programme, there exists the need for increasing the productivity of wheat and barley through different scientist-farmer interface 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 institute has also played a key role in taking contingent management measures, particularly against yellow rust. Several other programmes have been initiated as well at the institute level to transfer the efficient technologies to farmers' field.

Creation of awareness through mass media on seed treatment, seed replacement, disease management and timely procurement of harvested produces 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 outcome of wheat and barley FLDs, yield gain due to FLDs, costs and returns and constraints in wheat and barley production.

#### **Wheat Front Line Demonstrations (2015-16)**

During the wheat crop season 2015-16, 600 Wheat Front Line Demonstrations (WFLDs) of one hectare each were allotted to 82 cooperating centres across the country of which 568 were conducted through 79 cooperating centers. The technologies such as 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 in the selected farmers field. These WFLDs covered 578.25 hectares area of 1359 farmers in 19 states. The maximum number of WFLDs were conducted in UP (74) followed by MP (62), Rajasthan (47), Haryana (45), HP (39), Assam (38), Bihar (35), Punjab (34), Maharashtra (34), Jharkhand (24), J&K (20), West Bangal (20), Gujarat (18), Chhattisgarh (17), Tamilnadu (15), Delhi (14), Uttarakhand (12), Nagaland (10) and Karnataka (10). The details of centre wise and state wise WFLDs are given in Tables 1 & 2.

Table 1: Centre wise distribution of wheat front line demonstrations during rabi 2015-16

S.No.			WFLDs Conducted (1 ha basis)	Area Sown (ha)	No. of Farmers/ Locations
NHZ					
1.	VPKAS, Almora (Uttarakhand)	5	5	5	66
2.	CSKHPKV, HAREC, Bajaura, Kullu (HP)	5	5	5	23
3.	CSKHPKV, RWRC, Malan, Kangra (HP)	5+1=6**	6	6	25
4.	CSKHPKV, PCRS, Berthin, Bilaspur (HP)	5	5	4.6	14
5.	CSKHPKV, HAREC, Dhaulakuan, Sirmour (HP)	5	5	5.2	15
6.	IARI, RS, Amartara Cottage, Shimla (HP)	5	5	5	15
7.	ICAR-IIWBR, RS, Flowerdale, Shimla (HP)	5	5	5	13
8.	RR&RS, SKUAST-K, Khudwani, Anantnag (J&K)	5	5	5	21
9.	RARS, SKUAST-Jammu, Tandwal, Rajouri (J&K)	5	5	5	10
10.	KVK (CSKHPKVV), Bara, Hamirpur (HP)	5	5	5	58

NEI	PZ				
11.	NDUA&T, Faizabad (UP)	7	7	7	21
12.	CSAUA&T, Kanpur (UP)	10	10	10	25
13.	BHU, Varanasi (UP)	10	10	10	16
14.	KVK, Sohna, Sidharthnagar (UP)	10	10	10	25
15.	KVK, Sultanpur (UP)	5	5	5	13
16.	BCKV, Kalyani, Nadia (West Bengal)	10	10	10	60
17. 18.	UBKVV, Pundibari, Coochbehar (West Bengal) KVK-Dimapur, Jharnapani, Medziphema	10	10	10.40*	29
10.	(Nagaland)	10	10	10	30
19.	RARS, AAU, Shillongani, Nagaon (Assam)	10	10	10	13
20.	KVK (AAU)-Darrang , Mangaldai, Darrang (Assam)	5	5	5	11
21.	KVK (AAU), Chirakuta, (Revenue village Jamduar Pt.II) Dhubri (Assam)	5	5	5	10
22.	KVK (AAU), Citrus Research Station, Gellapukhuri, Tinsukia (Assam)	7	7	6.5	23
23.	KVK (AAU), Napam, Tejpur, Sonitpur (Assam)	7	6	6	4
24.	KVK (AAU), Kajalgaon, Chirang (Assam)	5	5	5	12
25.	IARI, RS, Pusa, Samastipur (Bihar)	7	7	7	14
26.	KVK, Sokhodeora, Nawada (Bihar)	7	7	7	7
27.	KVK, RAU, Hariharpur, Vaishali (Bihar)	7	7	7	7
28.	KVK, Adhaura, Kaimur, Bhabua (Bihar)	7	7	7	15
29.	KVK, Chainpura-Basaith, Madhubani (Bihar)	7	7	7	15
30.	BAU, Kanke, Ranchi (Jharkhand)	7	7	7	27
31.	KVK, Morabadi, Ranchi (Jharkhand)	10	10	10.40*	26
32.	KVK, BAU, West Singhbhum (Jharkhand)	7	7	7.20*	18
NWI			-	1.20	10
33.	KVK (SKUAST-Jammu), Rajhani, Kathua, Jammu (J&K)	10	10	10.40*	26
34.	PAU, Ludhiana (Punjab)	10	10	10	10
35.	PAU, RRS, Gurdaspur (Punjab)	7	7	7	7
36.	KVK, Haveli Kalan, Roopnagar (Punjab)	6	6	6	15
37.	KVK, Usman, Amritsar (Punjab)	6+5=11**	11	11	12
38.	RBS College, Bichpuri, Agra (UP)	7	7	7	7
39.	KVK, Baghara, Muzaffarnagar (UP)	7	7	7	11
40.	ZARS, Nagina, Bijnor (UP)	6	6	6	9
41.	KVK, Khajuri Bagh, New Gopal Nagar, Saharanpur (UP)	6	6	6	15
42.	Amity Centre for Extension Services, AUUP	6	6	6	15
42.	Campus, Sector-125, Noida (UP)		0	0	10
43.	ICAR-CSWCRTI, Kaulagarh Road, Dehradun (Uttarakhand)	5-5=0**	-	-	-
44.	GBPUA&T, Pantnagar, Udham Singh Nagar (Uttarakhand)	7	7	7	7
45.	CATAT, IARI, New Delhi	7	7	7	16
46.	KVK (NHRDF), Ujwa, New Delhi	7	7	6.8	17
47.	ICAR-IIWBR, Karnal (Haryana)	10	10	10	11
48.	ICAR-CSSRI, Karnal (Haryana)	7+3=10**	10	10	25
49.	CCSHAU, Hisar (Haryana)	7	7	7	7
50.	KVK, Bhiwani (Haryana)	6	6	6	15
51.	KVK, Tepla, Ambala (Haryana)	6	6	6	15
52.	KVK, Peoda Road, Kaithal (Haryana)	6	6	6	
UZ.	TVIT, 1 600a 100au, Maililai (Haiyalla)	U	Ü	Ö	15

53.	RARI, SKNAU, Durgapura, Jaipur (Rajasthan)	6	6	6	12
54.	KVK, Ajmer (Rajasthan)	5	5	5	10
55.	KVK, Banasthali Vidyapeeth, District-Tonk (Rajasthan)	5	5	5	10
56.	ARS (RAU), Sriganganagar (Rajasthan)	5	5	5	5
CZ				- <del>L.,,,</del>	
57.	RCOA (MPUA&T), Udaipur (Rajasthan)	7	7	7	10
58.	ARS, MPUA&T, Banswara (Rajasthan)	7	7	7	17
59.	ARS, MPUA&T, Kota (Rajasthan)	7	7	11*	11
60.	KVK, Sawai Madhopur (Rajasthan)	5	5	4.8	12
61.	WRS, JAU, Junagarh (Gujarat)	10	10	10.0	10
62.	MWRS, SDAU, Vijapur, Mehsana (Gujarat)	10	8	7.6	19
63.	JNKVV, Jabalpur (MP)	10	10	10.0	9
64.	IARI, RWRS, Indore (MP)	10	10	14.45*	31
65.	KVK (JNKVV), Purushottampur, Panna (MP)	7	7	7.0	18
66.	KVK, Kalukhera Shiksha Samiti, Kalukhera, Ratlam (MP)	5	5	4.8	12
67.	KVK (RVSKVV), Pipersama, Neemuch (MP)	5	5	5	12
68.	KVK (RVSKVV),COH, Mandsaur (MP)	5	5	5	12
69.	KVK (RVSKVV), MLNagar, Ujjain (MP)	5	5	5	12
70.	KVK (RVSKVV), COA, Gwalior (MP)	5	5	5	12
71.	KVK (RVSKVV), Budhapura, Lahar, Bhind (MP)	5	5	5	13
72.	KVK (JNKVV), Nowgaon, Pan Research Center, Chhatarpur (MP)	5	5	5	12
73.	KVK, RRS, IGKVV, Jagdalpur, Bastar (CG)	7	7	7	17
74.	IGAU, RARS, Sarkanda, Bilaspur (CG)	10	10	10	10
PZ					
75.	PDKV, Akola (Maharashtra)	10	4	4	10
76.	ARS, Niphad, Nasik (Maharashtra)	10	10	10	25
77.	MAU, Parbhani (Maharashtra)	10	10	10	22
78.	ARI, MACS, Pune (Maharashtra)	10	10	10	10
79.	UAS, Dharwad (Karnataka)	10	10	11.70*	23
80.	BIRDS KVK, Tukkanatti, Gokak, Belgaum (Karnataka)	10-4=6**	Not conducted	-	•
81.	KVK, Badami Road, Bagalkot (Karnataka)	10	Not conducted	-	
SHZ			<b>T</b>	<b>y</b> = 1/2	
82.	IARI, RS, Wellington (Tamil Nadu)	15	15	15.4*	31
	Very High Altitude Areas of NHZ				
83.	ICAR-IIWBR, Karnal	10	3	3	30
	Total	600	568	578.25	1373

<sup>\*</sup> Area covered more than allotted which is restricted to area equal to allotted FLDs.

<sup>\*\*</sup> ICAR-CSWCRTI, Dehradun (Uttarakhand) center was allotted 5 hectares (ha) WFLDs but has not conducted WFLDs. The KVK-Amritsar center was allotted 6 ha WFLDs but has conducted 11 ha WFLDs. 5 ha WFLDs were withdrawn from Dehradun center and 5 ha additional WFLDs were allotted to KVK-Amritsar center making a total allotment of 11 ha WFLDs to KVK-Amritsar center.

KVK-Belgaum (Karnataka) center was allotted 10 ha WFLDs but has not conducted WFLDs. ICAR-CSSRI, Karnal (Haryana) center was allotted 7 ha WFLDs but has conducted 10 ha WFLDs. CSKHPKV, RWRC, Malan, Kangra (HP) center was allotted 5 ha WFLDs but has conducted 6 ha WFLDs. 4 ha WFLDs were withdrawn from Belgaum center and 3 ha additional WFLDs were allotted to CSSRI-Karnal center making a total of 10 ha allotment to CSSRI-Karnal center, and 1 ha additional WFLD was allotted to Malan-Kangra (HP) center making a total of 6 ha allotment to Malan-Kangra center, after getting approval from the competent authority.

The reasons for not achieving the target were non-availability of newly released wheat varieties (NRWVs) (3-5 years old) seed at local level and non-availability of NRWVs seed in time. 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, farmers were not ready to grow wheat, as economically it was not a profitable venture for them. 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 Wheat FLDs during Rabi 2015-16

State	Allotted	Conducted	Area sown (ha)	No. of farmers/ locations
Uttarakhand	12	12	12.0	73
HP	46	39	38.8	193
J&K	20	20	20.4	57
Nagaland	10	10	10.0	30
UP	74	74	74.0	157
West Bengal	20	20	20.4	75
Assam	39	38	37.5	73
Bihar	35	35	35.0	58
Jharkhand	24	24	24.6	71
Punjab	34	34	34.0	44
Delhi	14	14	13.8	33
Haryana	45	45	45.0	88
Rajasthan	47	47	50.8	87
Gujarat	20	18	17.6	29
MP	62	62	66.25	143
Chhattisgarh	17	17	17.0	27
Maharashtra	40	34	34.0	67
Karnataka	26	10	11.7	23
Tamil Nadu	15	15	15.4	31
Total	600	568	578.25	1359

Table 3: Zonewise distribution of wheat FLDs during Rabi 2015-16

S. N.	Zone	WFLDs allotted (1 WFLD = 1ha)	WFLDs conducted (1 ha basis)	Area sown (ha)	No. of farmers/ Locations
1.	NHZ	61	54	53.80	290
2.	NEPZ	170	169	169.50	407
3.	NWPZ	163	163	163.20	292
4.	CZ	125	123	130.65	249
5.	PZ	66	44	45.70	90
6.	SHZ	15	15	15.40	31
	Total	600	568	578.25	1359

Table 4: Centre wise performance of improved wheat varieties 2015-16

7 . 00 . (	Mean yie	ld (q/ha)	~ .
Zone & Centre	Improved varieties	Check varieties	% Gain
NHZ			
Almora	20.17	12.30	63.98***
Bajaura	29.96	24.66	21.49***
Malan, Kangra	29.86	26.82	11.33***
Berthin, Bilaspur	19.69	13.85	42.17***
Dhaulakuan	38.33	29.42	30.29***
Shimla	34.36	29.80	15.30*
Flowerdale Shimla	28.38	18.65	52.17***
Khudwani, Anantnag	18.00	16.48	9.22***
Tandwal, Rajouri	25.25	20.21	24.94***
Hamirpur	24.70	18.07	36.69***
NEPZ			
Faizabad	41.83	32.05	30.51***
Kanpur	44.96	40.52	10.96***
Varanasi	33.63	27.13	23.96***
Sohna, Sidharthnagar	42.76	39.28	08.86***
Sultanpur	35.69	33.46	06.66 NS
Kalyani, Nadia	27.68	21.51	28.68***
Pundibari, Coochbehar	29.63	26.89	10.19 NS
Dimapur	12.95	11.29	14.70***
Shillongani	30.99	26.88	15.29***
Darrang, Mangaldai	28.50	22.31	27.75***
Dhubri	25.30	19.80	27.78***
Tinsukia	11.63	10.16	14.47***
Sonitpur	24.85	16.38	51.71***
Chirang	24.76	18.43	34.35***
Pusa Samastipur	40.00	35.25	13.48***
Nawada	43.20	37.87	14.07***
Vaishali	19.00	17.36	09.45*
Kaimur, Bhabua	50.10	32.83	52.60***
Madhubani	32.64	27.43	18.99***
Kanke, Ranchi	27.36	19.94	37.21***
Morabadi, Ranchi	44.12	31.17	41.55***
West Singhbhum	30.14	23.11	30.42***

NWPZ			
Kathua-Jammu	40.04	32.29	24.00***
Ludhiana	56.99	54.79	04.02*
Gurdaspur	49.64	45.47	09.17 NS
Ropar	49.96	46.64	07.12***
Amritsar	45.59	42.50	07.27***
Agra	45.50	43.71	04.10*
Muzaffarnagar	51.57	47.47	08.64**
Bijnor	45.86	43.04	06.55***
Saharanpur	58.20	47.87	21.58***
Noida	46.89	43.23	08.47***
Pantnagar	56.44	54.70	03.18 NS
IARI, New Delhi	41.49	38.84	06.82***
KVK, Ujwa, Delhi	42.80	39.69	07.84***
IIWBR, Karnal	51.85	49.33	05.11***
CSSRI, Karnal	45.73	43.20	05.86***
Hisar	53.36	52.50	01.64 NS
Bhiwani	53.56	49.44	08.33***
Ambala	48.75	47.95	01.67 NS
Kaithal	43.27	42.30	02.29*
Durgapura, Jaipur	56.88	50.96	11.62***
Ajmer	48.64	42.83	13.57***
Banasthali Tonk	48.38	44.60	08.48***
Sriganganagar	51.43	44.43	15.76***
CZ			
Udaipur	46.30	42.10	09.98**
Banswara	43.65	39.76	09.78***
Kota	51.45	46.09	11.63***
Sawai Madhopur	51.06	45.49	12.24***
Junagarh	50.35	47.45	06.11**
Vijapur, Mehsana	41.26	38.81	06.31***
Jabalpur	30.56	27.44	11.37***
Indore	60.00	48.18	24.53**
Panna	35.40	28.20	25.53***
Ratlam	36.13	28.98	24.67***
Neemuch	46.08	37.75	22.07***
Mandsaur	41.75	34.75	20.14***
Lahar, Bhind	43.54	38.62	12.74***
Jagdalpur, Bastar	27.00	22.06	22.39***
Sarkanda, Bilaspur	32.05	29.26	09.54**
PZ			
Akola	22.75	16.70	36.23*
Niphad, Nasik	36.14	30.55	18.30***
Parbhani	27.50	23.40	17.52***
Pune	36.87	31.50	17.05***
Dharwad	37.38	33.30	12.25***
SHZ			
Wellington	21.22	-	-

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 63.98 per cent at Almora centre followed by Flowerdale Shimla (52.17 %), Berthin Bilaspur (42.17%), Hamirpur (36.69 %), Dhaulakuan (30.29 %), Tandwal Rajouri (24.94 %), Bajaura (21.49 %), Tutikandi Shimla (15.30 %), Malan Kangra (11.33 %) and Khudwani Anantnag (09.22 %). In NEPZ, the yield gain varied from 8.86 per cent at Siddharthnagar to 52.60 per cent at Kaimur Bhabua.

The yield gain due to improved wheat varieties was 51.71 % at Sonitpur, 41.55 % at Morabadi Ranchi, 37.21 % at Kanke Ranchi, 34.35 % at Chirang, 30.51 % at Faizabad, 30.42 % at West Singhbhum, 28.68 % at Kalyani Nadia, 27.78 % at Dhubri and 27.75 % at Darrang Mangaldai. In NWPZ, the significant yield gain was highest at Kathua Jammu (24.00 %) followed by Saharanpur (21.58 %), Sriganganagar (15.76 %), Ajmer (13.57 %), Durgapura Jaipur (11.62 %) and Muzaffarnagar (08.64 %). In CZ, there was significant yield gain at Panna (25.53 %), followed by Ratlam (24.67 %), Indore (24.53 %), Jagdalpur Baster (22.39 %), Neemuch (22.07 %), Mandsaur (20.14%), Lahar Bhind (12.74 %) and Sawai Madhopur (12.24 %). In PZ, the significant yield gain of 36.23, 18.30, 17.52, 17.05 and 12.25 per cent was recorded at Akola, Niphad Nasik, Parbhani, Pune and Dharwad centers, respectively. In SHZ, the average yield of improved varieties under WFLDs was 21.22 q/ha at Wellington center.

Table 5: State wise performance of improved wheat varieties during 2015-16

State	Mean yie	eld (q/ha)	% Gain
State	Improved	Check	76 Gaill
Uttarakhand	28.78	22.60	27.35*
HP	27.27	20.99	29.92***
J&K	29.32	24.34	20.46***
UP	44.25	38.98	13.52***
West Bengal	28.26	23.12	22.23***
Nagaland	12.95	11.29	14.70***
Assam	22.38	17.99	24.40***
Bihar	38.56	30.76	25.36***
Jharkhand	34.06	24.77	37.51***
Punjab	50.43	47.28	06.66***
Delhi	42.35	39.40	07.49***
Haryana	48.86	46.73	04.56***
Rajasthan	49.34	44.30	11.38***
Gujarat	44.39	41.79	06.22**
MP	42.86	35.41	21.04***
Chhattisgarh	28.87	24.73	16.74***
Maharashtra	31.82	26.73	19.04***
Karnataka	37.38	33.30	12.25***
Tamil Nadu	21.22	L * Circificant at 10 narrount level	

<sup>\*\*\*</sup> 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 (37.51 %) followed by HP (29.92 %), Uttarkahand (27.35 %), Bihar (25.36 %), Assam (24.40 %), West Bengal (22.23 %), MP (21.04 %), J&K (20.46 %), Maharashtra (19.04 %), Chattisgarh (16.74 %), Nagaland (14.70 %), UP (13.52 %), Karnataka (12.25 %), Rajasthan (11.38 %), Delhi (07.49%), Gujarat (06.22 %), Punjab (06.06 %) and Haryana (04.56 %).

Table 6: Performance of improved timely sown aestivum wheat varieties during 2015-16

Zone & Centre	Improved varieties	Mean yield (q/ha)	Check varieties	Mean yield (q/ha)	% Gain
NHZ					
Almora	VL 907	20.17	Daulatkhani	12.30	63.98***
Bajaura	HS 542	29.96	VL 829	24.66	21.49***
Malan, Kangra	HPW 360	28.07	VL 829	25.86	08.55 NS
Malan, Kangra	HPW 368	27.00	HPW 349	25.75	04.85 <sup>NS</sup>
Malan, Kangra	HS 542	31.00	VL 829	27.38	13.22**
Berthin, Bilaspur	HS 542	19.69	HPW 155	13.85	42.17***
Shimla	HS 542	34.36	HD 2967	29.80	15.30*
Flowerdale Shimla	HS 542	28.38	HS 295	18.65	52.17***
Khudwani, Anantnag	HS 542	18.00	SW 1	16.48	09.22***
Tandwal, Rajouri	HS 542	25.25	PBW 175	20.21	24.94***
Hamirpur	HS 542	24.70	VL 829	18.07	36.69***
NEPZ			<b>-</b>		
Faizabad	HD 2967	41.13	PBW 154	31.50	30.57***
Faizabad	HD 2967	42.00	PBW 343	32.18	34.70***
Kanpur	HD 2967	42.18	HD 2733	36.91	14.28***
Kanpur	HD 2967	47.14	PBW 343	43.36	08.72*
Varanasi	HD 3118	33.91	HUW 234	27.36	23.94***
Varanasi	HD 3118	33.00	HUW 510	26.60	24.06***
Sohna, Sidharthnagar	HD 2967	43.59	PBW 343	39.39	10.66***
Kalyani, Nadia	HD 2967	31.35	Sonalika	22.31	40.52***
Pundibari, Coochbehar	HD 2967	41.49	PBW 343	36.69	13.08***
Shillongani	HD 2967	31.63	K 307	27.83	13.65**
Darrang, Mangaldai	HD 2967	28.50	Sonalika	22.31	27.75***
Dhubri	HD 2967	25.30	Sonalika	19.80	27.78***
Tinsukia	HD 2967	11.63	Sonalika	10.16	14.47***
Sonitpur	HD 2967	24.85	Local	16.38	51.71***
Chirang	HD 2967	24.76	Bhutia	18.43	34.35***
Pusa Samastipur	HD 2967	40.00	PBW 343	35.25	13.48***
Nawada	HD 2967	43.20	PBW 154	37.87	14.07***
Vaishali	HD 2967	19.00	HD 2733	17.36	09.45*
Kaimur, Bhabua	HD 2967	49.17	HUW 234	32.56	51.01***
Kaimur, Bhabua	HD 2967	51.50	PBW 343	33.25	54.89***
Madhubani	HD 2967	32.60	PBW 343	27.39	19.02***
Madhubani	HD 2967	32.69	UP 262	27.47	19.00***
Kanke, Ranchi	HD 2967	27.36	Sonalika	19.94	37.21***
Morabadi, Ranchi	HD 2967	44.12	UP 262	31.17	41.55***
West Singhbhum	HD 2967	30.14	PBW 343	23.11	30.42***
NWPZ			<u> </u>		
Dhaulakuan (FLDs at Paonta valley)	HD 2967	38.57	HD 2380	29.43	31.06***
Dhaulakuan (FLDs at Paonta valley)	WH 1080	38.00	HD 2380	29.40	29.25***
Kathua, Jammu	WH 1142	40.04	HD 2967	32.29	24.00***
Ludhiana	WH 1105	60.00	HD 2967	53.40	12.36*
Gurdaspur	WH 1105	49.64	HD 2967	45.47	09.17 NS
Ropar	WH 1105	49.96	HD 2967	46.64	07.12***
Amritsar	WH 1105	45.59	HD 2967	42.50	07.27***
Agra	WH 1105	46.00	PBW 502	43.00	06.98 NS
Saharanpur	WH 1105	58.20	PBW 502	47.87	21.58***
Noida	WH 1105	46.69	PBW 502	43.11	08.30***
Noida	WH 1105	47.19	PBW 550	43.42	08.68**
IARI, New Delhi	WH 1105	42.57	PBW 343	39.00	09.15*
KVK, Ujwa, Delhi	WH 1105	42.90	HD 2967	40.59	05.69***
KVK, Ujwa, Delhi	WH 1105	42.73	WH 711	39.06	09.40***
IIWBR, Karnal	WH 1105	51.78	HD 2967	48.34	07.12***

CSSRI, Karnal	KRL 210	45.73	HD 2967	43.20	01.17***
Hisar	WH 1105	55.31	HD 2967	53.88	02.65 NS
Ambala	WH 1105	50.25	HD 2967	49.05	02.45 NS
Kaithal	WH 1105	43.75	DPW 621-50	42.25	03.55*
Kaithal	WH 1105	44.40	HD 2967	43.70	01.60 NS
Durgapura, Jaipur	WH 1105	56.71	Raj 4079	51.21	10.74***
Durgapura, Jaipur	WH 1105	57.10	Raj 4037	50.60	12.85***
Ajmer	WH 1105	48.64	Raj 3077	42.83	13.57***
Banasthali, Tonk	WH 1105	48.38	Raj 3077	44.60	08.48***
Sriganganagar	WH 1105	50.75	HD 2967	45.50	11.54 NS
Sriganganagar	WH 1105	52.33	Raj 1482	43.00	21.70*
CZ		J.	4		
Udaipur	DBW 110	43.67	Raj 4079	40.33	08.28**
Banswara	DBW 110	43.65	Raj 4037	39.76	09.78***
Kota	DBW 110	51.45	GW 322	46.09	11.63***
Sawai Madhopur	DBW 110	51.06	Raj 4037	45.49	12.24***
Junagarh	DBW 10	50.31	Lok 1	47.19	06.61*
Vijapur, Mehsana	DBW 110	41.26	GW 496	38.64	06.78***
Jabalpur	DBW 110	30.56	Lok 1	27.44	11.37***
Indore	DBW 110	43.80	Lok 1	34.20	28.07*
Indore	HD 2987	38.00	Sujata	22.00	72.73 NS
Panna	DBW 110	36.02	Lok 1	28.88	24.72***
Panna	DBW 110	34.17	Sujata	26.83	27.36***
Ratlam	DBW 110	36.12	Lok 1	28.46	26.91***
Ratlam	DBW 110	36.13	GW 322	29.34	23.14***
Neemuch	DBW 110	46.08	GW 366	37.75	22.07***
Mandsaur	DBW 110	41.75	Lok 1	34.75	20.14***
Lahar, Bhind	DBW 110	43.54	Lok 1	38.62	12.74***
Jagdalpur, Bastar	DBW 110	25.13	Lok 1	16.13	55.80***
Sarkanda, Bilaspur	DBW 110	31.58	Sujata	29.36	07.56*
PZ					
Niphad, Nasik	NIAW 1415	38.05	Ajit 102	32.27	17.91***
Niphad, Nasik	NIAW 1415	34.64	Lok 1	29.20	18.63***
Parbhani	NIAW 1415	26.83	HD 2189	23.40	14.66***
Parbhani	NIAW 1415	27.75	Lok 1	23.40	18.59***
Pune	MACS 6478	37.96	HD 2189	32.13	18.15***
Dharwad	UAS 304	37.38	DWR 162	33.30	12.25***
SHZ					
Wellington	HW 5207	20.94	-	-	
Wellington	HW 5216	17.00	•	-	•

<sup>\*\*\*</sup> Significant at 1 percent level, \*\* Significant at 5 percent level, \* Significant at 10 percent level, NS- Non-significant

The variety wise mean yield data has revealed that variety HS 542 gave significantly higher yield (34.36 q/ha) at Tutikandi Shimla followed by the same variety HS 542 (29.96 q/ha) at Bajaura center in NHZ (Table 6). In NEPZ, the highest significant average yield was recorded by HD 2967 at Kaimur Bhabua (51.50 q/ha) followed by the same variety HD 2967 at Kanpur (47.14 q/ha) and Morabadi Ranchi (44.12 q/ha). In NWPZ, the highest significant average yield was recorded by WH 1105 at Ludhiana (60.00 q/ha) followed by 58.20 q/ha at Saharanpur and 57.10 q/ha at Durgapura Jaipur. In CZ, DBW 110 gave highest significant average yield of 51.45 q/ha at Kota centre followed by DBW 110 (51.06 q/ha) at Sawai Madhopur and DBW 110 (50.31 q/ha) at Junagarh center.

In PZ, NIAW 1415 gave highest and significant yield (38.05 q/ha) at Niphad Nashik followed by MACS 6478 (37.96 q/ha) at Pune centre. At Wellington centre of SHZ, HW 5207 variety recorded the average yield of 20.94 q/ha followed by HW 5216 (17.00 q/ha).

Table 7: Performance of improved late sown wheat varieties during 2015-16

Centre	Improved varieties	Mean yield (q/ha)	Check varieties	Mean yield (q/ha)	% Gain
NEPZ					
Varanasi	HD 3118	33.91	HUW 234	27.36	23.94***
Varanasi	HD 3118	33.00	HUW 510	26.60	24.06***
Sohna, Sidharthnagar	DBW 107	40.89	PBW 373	39.03	04.77 NS
Sultanpur	DBW 107	35.69	PBW 373	33.46	06.66 NS
Kalyani, Nadia	DBW 107	24.25	UP 262	20.76	16.81***
Pundibari, Coochbehar	DBW 107	22.99	Local	21.45	07.18 NS
Dimapur	DBW 107	13.04	Local	11.16	16.85***
PZ					
Akola	AKAW 4210	22.75	Lok 1	16.70	36.23*

The late sown varieties mean yield data revealed that variety HD 3118 gave significantly higher yield (33.91 q/ha) at Varanasi center in NEPZ (Table 7). In PZ, the significant average yield was recorded by AKAW 4210 at Akola (22.75 q/ha) center.

Table 8a: Zone wise productivity under FLDs over regional during 2015-16

Zone	Mean yi	Mean yield (q/ha)		
	WFLDs	Regional	% Gain	
NHZ	25.40	18.52	37.15***	
NEPZ	31.60	24.87	27.06***	
NWPZ	48.58	40.77	19.16***	
CZ	42.26	31.51	34.12***	
PZ	32.44	26.56	22.14***	
SHZ	21.22	-	-	

<sup>\*\*\*</sup> Significant at 1 percent level

The yield gain due to improved varieties over regional mean yield was highest in NHZ (37.15 %) followed by CZ (34.12 %), NEPZ (27.06 %), PZ (22.14 %) and NWPZ (19.16 %) (Table 8a).

Table 8b: Zone wise productivity under FLDs over check during 2015-16

Zone	Mean yi	Mean yield(q/ha)		
	WFLDs	Check		
NHZ	25.40	19.56	29.86***	
NEPZ	31.60	25.72	22.86***	
NWPZ	48.58	44.67	08.75***	
CZ	42.26	36.66	15.28***	
PZ	32.44	27.46	18.14***	
SHZ	21.22	-	-	

<sup>\*\*\*</sup> Significant at 1 percent level

The yield gain due to improved varieties over check was highest in NHZ (29.86 %) followed by NEPZ (22.86 %), PZ (18.14 %), CZ (15.28 %) and NWPZ (08.75 %) (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 2015-16

Zone	Centre	Variety	Yield (q/ha)
NHZ	Tutikandi Shimla	HS 542	38.00
NEPZ	Kanpur	HD 2967	55.00
NWPZ	Pantnagar	WH 1105	64.50
CZ	Indore	HI 8713 (d)	75.00
PZ	Pune	MACS 6478	43.70
SHZ	Wellington	HW 1098 (dic.)	56.00

The location specific highest varietal yield (Table 9) attained in a zone were; HI 8713 (d) (75.00 q/ha) at Indore centre in CZ, WH 1105 (64.50 q/ha) at Pantnagar in NWPZ, HW 1098 (dic.) (56.00 q/ha) in SHZ, HD 2967 (55.00 q/ha) at Kanpur in NEPZ, MACS 6478 (43.70 q/ha) at Pune in PZ and HS 542 (38.00 q/ha) at Tutikandi Shimla in NHZ.

Table 10: Yield gain through bio-fertilizer during 2015-16

Zone & Centre	100 % Inorganic + Bio-fertilizer (Azotobactor+PSB)		100 % Inorg	% Gain	
	Variety Mean yield (q/ha)		Variety	Mean yield (q/ha)	7,0 04.11
NEPZ.					
Dimapur	DBW 107	12.82	DBW 107	11.47	11.77***
Shillongani	HD 2967	30.53	HD 2967	26.17	16.66 NS
NWPZ					
Agra	WH 1105	45.67	WH 1105	43.83	04.20 NS
Muzaffarnagar	DBW 71	53.49	DBW 71	49.68	07.67**
Bijnor	DBW 71	46.16	DBW 71	41.35	11.63***
Pantnagar	WH 1105	64.50	WH 1105	62.50	03.20 NS
IARI, New Delhi	WH 1105	40.96	WH 1105	38.77	05.65***
IIWBR Karnal	WH 1105	51.03	WH 1105	49.69	02.70*
Hisar	WH 1105	54.50	WH 1105	54.00	00.93 NS
Bhiwani	HD 2967	54.75	HD 2967	50.75	07.88***
Bhiwani	WH 1105	54.00	WH 1105	49.80	09.09***
CZ					
Jagdalpur Bastar	DBW 110	28.67	DBW 110	27.33	04.90 NS

<sup>\*\*\*</sup> Significant at 1 percent level, \*\* Significant at 5 percent level, \* Significant at 10 percent level, NS- Non-significant

FLDs on bio-fertilizer (Azotobactor & PSB) along with 100 % inorganic fertilizer as compared to check (100% recommended dose of inorganic fertilizer) showed that the significant yield gain was 11.77 per cent at Dimapur in NEPZ, 11.63 per cent at Bijnor in NWPZ (Table 10).

Table 11: Performance of improved durum/dicoccum varieties during 2015-16

Zone & Center	Improved variety	Mean yield (q/ha)	Check variety	Mean yield (q/ha)	% Gain		
CZ							
Udaipur	HI 8737(d)	50.25	HI 8498(d)	44.75	12.29***		
Junagarh	HI 8737(d)	50.50	Lok 1	48.50	04.12 NS		
Vijapur, Mehsana	GDW 1255(d)	40.43	GW 496	38.48	05.07 NS		
Indore	HD 4728(d)	59.00	HI 8498(d)	53.00	11.32*		
Indore	HD 8713(d)	71.67	HI 8498(d)	57.78	24.04***		
Sarkanda Bilaspur	HI 8737(d)	32.74	HI 1500(d)	29.12	12.47 NS		
PZ							
Pune	HW 1098 (dic.)	32.50	DDK 1029	29.00	12.07 NS		
SHZ	SHZ						
Wellington	HW 1098 (dic.)	21.98	-	-	-		

<sup>\*\*\*</sup> 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 HD 8713 (d) gave a significant average yield of 71.67 q/ha followed by HD 4728 (d) at Indore centre in CZ. The variety HW 1098 (dic.) gave an average yield of 32.50 q/ha at Pune center, though it was non-significant (Table 11).

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

Zone & Center	Improved variety	Mean yield (q/ha)	Check variety	Mean yield (q/ha)	% Gain
NHZ					
Almora	VL 907	20.17	Daulatkhani	12.30	63.98***
Bajaura	HS 542	29.96	VL 829	24.66	21.49***
Malan, Kangra	HPW 360	28.07	VL 829	25.86	08.55 NS
Malan, Kangra	HPW 368	27.00	HPW 349	25.75	04.85 NS
Malan, Kangra	HS 542	31.00	VL 829	27.38	13.22**
Berthin, Bilaspur	HS 542	19.69	HPW 155	13.85	42.17***
Tutikandi, Shimla	HS 542	34.36	HD 2967	29.80	15.30*
Flowerdale Shimla	HS 542	28.38	HS 295	18.65	52.17***
Khudwani, Anantnag	HS 542	18.00	SW 1	16.48	09.22***
Tandwal, Rajouri	HS 542	25.25	PBW 175	20.21	24.94***
Hamirpur	HS 542	24.70	VL 829	18.07	36.69***
NWPZ					
Dhaulakuan (FLDs at Paonta valley)	WH 1080	38.00	HD 2380	29.40	29.25***
Kathua-Jammu	WH 1142	40.04	HD 2967	32.29	24.00***
CZ	-				
Udaipur	DBW 110	43.67	Raj 4079	40.33	08.28**
Banswara	DBW 110	43.65	Raj 4037	39.76	09.78***
Kota	DBW 110	51.45	GW 322	46.09	11.63***
Sawai Madhopur	DBW 110	51.06	Raj 4037	45.49	12.24***
Junagarh	DBW 110	50.31	Lok 1	47.19	06.61*
Vijapur, Mehsana	DBW 110	41.26	GW 496	38.64	06.78***

Jabalpur	DBW 110	30.56	Lok 1	27.44	11.37***
Indore	DBW 110	43.80	Lok 1	34.20	28.07*
Indore	HD 2987	38.00	Sujata	22.00	72.73 NS
Panna	DBW 110	36.02	Lok 1	28.88	24.72***
Panna	DBW 110	34.17	Sujata	26.83	27.36***
Ratlam	DBW 110	36.12	Lok 1	28.46	26.91***
Ratlam	DBW 110	36.13	GW 322	29.34	23.14***
Neemuch	DBW 110	46.08	GW 366	37.75	22.07***
Mandsour	DBW 110	41.75	Lok 1	34.75	20.14***
Lahar Bhind	DBW 110	43.54	Lok 1	38.62	12.74***
Jagdalpur Bastar	DBW 110	25.13	Lok 1	16.13	55.80***
Sarkanda Bilaspur	DBW 110	31.58	Sujata	29.36	07.56*
PZ					
Niphad, Nasik	NIAW 1415	38.05	Ajit 102	32.27	17.91***
Niphad, Nasik	NIAW 1415	34.64	Lok 1	29.20	18.63***
Parbhani	NIAW 1415	26.83	HD 2189	23.40	14.66***
Parbhani	NIAW 1415	27.75	Lok 1	23.40	18.59***
SHZ					
Wellington	HW 5216	17.00			

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

In NHZ, at Tutikandi Shimla center, improved rainfed variety HS 542 yielded 34.36 q/ha which was significantly higher than the check varieties, followed by same variety HS 542 (31.00 q/ha) at Malan Kangra, HS 542 (29.96 q/ha) at Bajaura and HS 542 (28.38 q/ha) at Flowerdale Shimla center. In NWPZ, variety WH 1142 yielded 40.04 q/ha which was significantly higher than the check variety. In CZ, DBW 110 gave significantly higher yield of 51.45 q/ha which was significantly higher than the check variety. In PZ, NIAW 1415 gave significantly higher yield of 38.05 q/ha than the check variety (Table 12). There was increase in zero tillage yield under WFLDs over check at all the centers but it was non-significant at most of the centres (Table 13).

Table 13: Performance of zero tillage in NWPZ during 2015-16

Zone & Centre	Improved varieties	Zero tillage mean yield (q/ha)	Conventional tillage mean yield (q/ha)	% Gain
NEPZ				
Pundibari, Coochbehar	HD 2967	42.20	35.40	19.21 NS
Pundibari, Coochbehar	DBW 107	26.50	24.77	06.98**
Shillongani	HD 2967	26.60	20.50	29.76 NS
Ludhiana	HD 2967	55.37	55.23	00.25 NS
Agra	WH 1105	44.75	44.25	01.13 NS
Pantnagar	WH 1105	48.25	46.88	02.92 NS
IIWBR Karnal	WH 1105	53.15	51.83	02.55 NS
Ambala	WH 1105	46.75	46.05	01.52 NS
Kaithal	WH 1105	42.00	40.67	03.27*

<sup>\*\* -</sup> Significant at 5 percent level, \* Significant at 10 percent level, NS- Non-significant

Table 14: Performance of rotavator during 2015-16

Zone & Centre	Improved varieties	Rotavator mean yield (q/ha)	Conventional tillage mean yield (q/ha)	% Gain
NWPZ				
Ludhiana	WH 1105	58.40	58.25	00.26 <sup>NS</sup>
Ludhiana	HD 2967	53.50	52.75	01.42 NS
Muzaffarnagar	WH 1105	48.23	43.61	10.59 NS
Bijnor	DBW 71	45.62	44.40	02.75 NS
Pantnagar	WH 1105	58.38	56.56	03.22 NS
Pantnagar	DBW 88	52.80	51.00	03.53 <sup>NS</sup>
Hisar	WH 1105	49.00	49.00	00.00 NS
Ambala	WH 1105	49.25	48.75	01.03 <sup>NS</sup>
Kaithal	WH 1105	42.00	41.67	00.79 <sup>NS</sup>

<sup>\*\* -</sup> 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, wheat FLDs 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 in NWPZ during 2015-16

Zone & Center	Improved variety	Mean yield (q/ha)	Check variety	Mean yield (q/ha)	% Gain
NWPZ					
CSSRI Karnal (FLDs in Kaithal, Karnal and Panipat)	KRL 210	45.73	HD 2967	43.20	01.17***

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

Table 16: Performance under sprinkler/drip irrigation during 2015-16

Zone & Center	Improved varieties	Drip irrigation mean yield (q/ha)	Flood irrigation mean yield (q/ha)	% Gain			
NWPZ							
Bhiwani (sprinkler)	HD 2967	55.00	52.00	05.77*			
Bhiwani (sprinkler)	WH 1105	50.75	45.75	10.93 NS			
CZ							
Vijapur, Mehsana (drip)	DBW 110	44.50	42.50	04.71 NS			

For effective and efficient use of water, demonstration on sprinkler/drip irrigation were organized at Bhiwani and Vijapur centers. There was significant yield gain due to sprinkler irrigation at Bhiwani center. There was no significant yield gain due to drip irrigation at Vijapur center. 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.

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

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

Smooth conduct of wheat FLDS		Zone				
Suggestions	NHZ	NEPZ	NWPZ	CZ	PZ	SHZ
Budget of FLDs should be increased	1	1				
Timely/ early release of funds should be ensured	1	√		1		1
Critical inputs like herbicide should be supplied	√					
Timely supply of inputs to the farmers	1	1				
Additional fund to hold farmers day at FLD sites	1					
Increase budget for POL/hiring of vehicle for monitoring of FLDs		√	√			
Budget pertaining to POL/hiring of vehicle, organizing field day should be increased		√				
Timely supply of seeds to ensure timely conduct of demonstrations		√		1		
Late sown variety with low/limited irrigation should be promoted through FLDs		√				
Centers should be allowed to conduct FLDs to individual farmers not in cluster approach	C.		1			
Number of demonstrations should be increased			√	1	√	
Soil testing of all the FLD plots must be ensured					1	
Provision of complete package i.e. seed, fertilizer and plant protection chemicals should be ensured		√		1		
More than one variety should be provide to a centre under FLD				1		
Use of neem coated urea should be promoted under FLD programme				1		
Make the provision of advance at the time of allotment for smooth conduct of FLDs.						1
Programme must continue for longer period				1		

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

Suggestions	Zone		
	NEPZ	NWPZ	CZ
Timely/ early release of funds should be ensured	√		. 1
Additional fund to hold farmers day under FLDs		√	
Increase budget for POL/hiring of vehicle for monitoring of FLD sites	√	√	
Centers should be allowed to conduct FLDs to individual farmers in different villages, not in cluster approach		1	
Number of demonstrations should be increased			1
Provision of complete package i.e. seed, fertilizer and plant protection chemicals should be ensured		1	1
More than one variety should be provide to a centre under FLD			1
Plot size for barley FLDs should be reduced to 0.20 ha		1	

#### Farmers' perception about FLDs

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

Observations/Farmers' Feedback during Monitoring of Front Line Demonstrations (FLDs) at different Cooperating centers during wheat crop season 2015-16.

Front Line Demonstrations (FLDs) Monitoring Report of CATAT-IARI-New Delhi, IARI-Wellington & UAS-Dharwad Centers.

Monitoring Centre: CATAT-IARI, New Delhi

Monitoring Date : 06.02.2016

- 1. Dr. R. Sendhil, Scientist, Social Sciences, ICAR-IIWBR, Karnal, Haryana.
- 2. Dr. B.K. Singh, Principal Scientist and Incharge, CATAT, IARI, Pusa, New Delhi
- 3. Sh. Nand Kishore, Technical Officer, CATAT, IARI, Pusa, New Delhi
- Improved or newly released wheat variety WH 1105 was demonstrated in 7 hectares of land at farmers' field in Rajpur village of Khair block, Aligarh district (Uttar Pradesh). The variety WH 1105 was demonstrated against WH 711, PBW 550, PBW 343, and WH 1105 (Bio-fertilizer). The following observations were made during the overall monitoring and discussion with FLD farmers' viz., Sh. Naubat Singh, Sh. Ramvir Sharma, Smt. Manjit Kaur, Sh. Dharam Pal Singh, Sh. Amar Singh and Smt. Prem Kaur.
- As per the discussion and site visit, a majority of the farmers opted for broadcasting. Only a few practiced line sowing. Around 40kg of seeds per acre was used for sowing. Farmers reported that in line sowing using seed drill, the holes were blocked during sowing time. Owing to this, they have to go for gap filling and hence they preferred broadcasting instead of line sowing.
- FLD farmers said that WH 1105 resulted in good germination and uniform crop growth with more tillers and grains per spike. However, two farmers reported that the variety resulted in poor tillering.
- Some monitored fields were infested with weeds (broad leaved).
- Out of six monitored FLD sites, three were demonstrated for bio-fertilizer (PSB+Azatobacter). All of them opted for broadcasting.
- In general farmers applied DAP: 50 kg/ac, Urea: 50kg/ac, MOP: 25 kg/ac and
   Zinc: 10 kg/ac. However, a majority didn't applied potash.
- Since the village is a low land, drainage is a major problem.

- 5-6 irrigations were given by the farmers.
- Harvesting is yet to be done in the monitored plots. FLD farmers expect yield around 50 quintals/ha from WH 1105 variety.
- 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 CATAT-IARI, New Delhi centre. They are interested to continue wheat cultivation even if the assistance from FLDs is stopped.

**Monitoring Centre: IARI-Wellington** 

Monitoring Date : 08.02.2016

- 1. Dr. R. Sendhil, Scientist, Social Sciences, ICAR-IIWBR, Karnal, Haryana.
- 2. Dr. P. Jayaprakash, Senior Scientist & FLD Coordinator, IARI Regional Station, Wellington, TN.
- 3. Shri. Meena, Technical Officer, IARI Regional Station, Wellington, Tamil Nadu.
- 4. Shri. Arun, Project Assistant, IARI Regional Station, Wellington, Tamil Nadu.
- Newly released wheat varieties viz., HW 1098, HW 5216 and HW 5207 were demonstrated by the IARI-Wellington centre through UAS-Dharwad, BARC-Maharashtra, KVK-UPASI and KVK-Papparapatty as well as through IARI-Wellington itself at the Nilgiris region. Of seven demonstration sites at Kenthorai, three locations were monitored. The following observations were made during the overall monitoring and discussion with Sh.N Murugan, Sh.Rajbettan and Sh.J Bellie from Kenthorai.
- Five kg seeds were distributed by IARI-Wellington centre to demonstrate in a limited area at Kenthorai (hilly region).
- The beneficiaries reported that this season they expect a good harvest after 5-6 years. This region cultivates wheat in a limited scale. Mostly they use their own seeds or buy from local market.
- None of the monitored farmers applied fertilizers/ plant protection chemicals and irrigation.
- Sh.N Murugan said that the FLD variety (HW 5207) produces long earheads in comparison to the previous grown traditional varieties.

- Harvesting and threshing is done manually as the size of the plot is small.
- All the monitored sites have opted for broadcast method of sowing.
- Generally farmers in the region manage their farm activities with family labour as availability of labour is limited and it is too costly.
- The beneficiaries stated harvested produce is intended for home consumption.
- They reported that wild buffalo is the major problem in Kenthorai
- Technical assistance and advisory offered by IARI-Wellington centre was much appreciated by the beneficiaries and they are interested to continue wheat cultivation in the coming years even if the assistance from FLD has been discontinued.

Monitoring Centre: UAS-Dharwad

Monitoring Date : 10.02.2016

- 1. Dr. R. Sendhil, Scientist, Social Sciences, ICAR-IIWBR, Karnal, Haryana.
- 2. Dr.MY Kamatar, Principal Scientist (Breeding) & Head Wheat Improvement Project-cum-FLD Coordinator, University of Agricultural Sciences, Dharwad, Karnataka.
- 3. Shri L.B. Zalli, Assistant Agricultural Officer, Dharwad, Karnataka
- Improved or newly released wheat varieties UAS 304, UAS 446 and HW1098 were demonstrated in 11.70 hectares of land at farmers' field by the UAS-Dharwad Centre. The variety UAS 304 was demonstrated against DWR 162 (bread wheat), UAS 446 against Bijaga Yellow (durum wheat) and HW 1098 against DDK 1029 (dicoccum wheat). The following observations were made during the overall monitoring and discussion with the FLD farmers' viz., Shri.KS Bhimannavar, Shri.Kallappa A Nagari, Shri.Tulujappa Appayya Yarachambi and Shri.VS Harikoppa.
- As per the discussion and site visit, a majority of the farmers opted for line sowing using seed drill. Around 40kg (RF) and 60kg (IR) of seeds per acre was used for sowing. Seeds were supplied through NSC and UAS-Dharwad.
- Shri.VS Harikoppa reported that Bijaga Yellow is prone to yellow rust and the FLD variety is resistant to the rust. He gave two irrigations only. He applied DAP: 50kg/ac and Urea: 50kg/ac. Potash was not applied.

- Shri.KS Bhimannavar said that he used 60 kg/ac of seed (seed drill) and gave four irrigations.
- Some of beneficiaries said they are growing wheat for the first time and intended to keep the harvested produce for home consumption.
- Stomp was used as herbicide by a few farmers which might be a reason for no infestation of weeds in the monitored fields.
- All the FLD farmers expect a better yield in comparison to past year as well against the check.
- Harvesting is yet to be done in the monitored plots. Mostly they adopt manual harvesting.
- Farmers are happy with the demonstrated new wheat production technologies via FLDs. They expect that the improved wheat varieties will perform better and give more yield than the check varieties. The technical assistance and advisories offered by the UAS-Dharwad centre were appreciated. The beneficiaries are also interested to continue the wheat production even if the financial support from FLDs is stopped.

#### Suggestions for betterment of the programme

- Display boards should be placed in all the FLD sites with the details of variety/technology demonstrated, date of sowing, funding agency and coordinating centre details.
- It is suggested for soil test based fertilizer application.
- Wheat production literature (in local language) has to be given to all beneficiaries for effective following of scientific package of practice.
- Alternatively, scientific package of practices shall be recommended by the FLD coordinating centre.
- To conduct FLDs or popularize varieties within the zone under the FLD coordinating centre.
- 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 line 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.
- Inputs shall be supplied by the nearest farmer cooperatives on bill basis.

Front Line Demonstrations (FLDs) Monitoring Report of Berthin-Bilaspur, Hamirpur, Gurdaspur, Amritsar and Ludhiana centers.

Monitoring Center : Berthin-Bilaspur (HP)

Monitoring Date : 08.03.2016

**Monitoring Team** 

1. Dr. Satyavir Singh, PS & PI (Social Sciences), ICAR-IIWBR, Karnal

- 2. Dr. Mahesh Kumar, Assistant Director, MOA&FW, DWD, Ghaziabad (UP)
- 3. Dr. Sanjay Kumar, Extension Specialist (Agronomy), KVK, Berthin-Bilaspur (HP)
- 4. Sh. Dhani Ram, Technical Assistant, Grade-II, KVK, Berthin-Bilaspur (HP)

The team visited KVK, CSKHPKV, Research-Sub-Station, Berthin, Bilaspur center on 8<sup>th</sup> March, 2016. The technology i.e. improved or newly released wheat variety (NRWV) with complete package of practices was demonstrated at farmers' fields. Wheat variety HS 542 was demonstrated and the check varieties were HPW 155 and HPW 236. The following observations were made during visit of the wheat FLDs farmers' fields (villages-Badgaon, Kharota, Berthin and Dharoti)

- The wheat crop of FLD improved wheat variety HS 542 was free from all 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.
- The neighbour farmers of the wheat FLDs were impressed by the performance of new variety. There was no display board at FLDs sites
- There was no lodging/ less lodging in new variety due to low height.
- The farmers expected more yield from the demonstrated variety HS 542 than the old or check variety.
- FLD is recognized as a good source of transfer of wheat production technology.
- 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.

Monitoring Center: KVK, Hamirpur (HP)

Monitoring Date : 09.03.2016

#### **Monitoring Team**

- 1. Dr. Satyavir Singh, PS & PI (Social Sciences), ICAR-IIWBR, Karnal
- 2. Dr. Mahesh Kumar, Assistant Director, MOA&FW, DWD, Ghaziabad (UP).
- 3. Dr. Dhanbir Singh, SMS (Soil Science), KVK, Hamirpur (HP).
- 4. Sh. Hem Raj, Technical Assistant, Grade-II, KVK, Hamirpur (HP)

The monitoring team visited wheat FLDs conducted by KVK, Hamirpur (HP) on 9<sup>th</sup> March, 2016. 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 HPW 829. The following observations were made during visit of the wheat FLDs farmers' fields (villages-Jhinjkari, Gulela, Dhirwin and Chabutra).

- The wheat crop of FLD variety HS 542 was free from diseases.
- The weed infestation was negligible in FLDs fields.
- The farmers were happy with the performance of HS 542 variety and expected more yield than the check variety.
- 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.

Monitoring Center: RRS, PAU, Gurdaspur (Punjab)

Monitoring Date : 10.03.2015

#### **Monitoring Team**

- 1. Dr. Satyavir Singh, PS & PI (Social Sciences), ICAR-IIWBR, Karnal.
- 2. Dr. Mahesh Kumar, Assistant Director, MOA&FW, DWD, Ghaziabad (UP).
- 3. Dr. Indoo Bhagat, Plant Breeder, RRS, PAU, Gurdaspur (Punjab).

The team visited wheat FLDs conducted by RRS, PAU, Gurdaspur center on 10<sup>th</sup> March, 2016. The technologies i.e. improved or newly released wheat variety with complete package of practices and zero tillage were demonstrated at farmers' fields. Wheat variety WH 1105 was demonstrated and the check variety was HD 2967. The following observations were made during visit of the wheat FLDs farmers' fields (villages-Ghasitpura, Dehariwal Daroga, Jaurasingha and Balewal).

- The wheat crop of FLD variety WH 1105 was free from diseases.
- Weed infestation was negligible in the FLD fields.
- A good crop stand, good crop health, compact earhead, more tillering, more number of grains per earhead, bold and lustrous grains were observed.
- The farmers expected more yield from the demonstrated variety WH 1105 than the old or check variety.
- The zero tillage method of wheat sowing saves time, fuel and energy.
- There was no lodging in new variety due to thick stem. There was no display board at FLDs sites.
- The farmers appreciated the advisory service and technical assistance given by the FLDs cooperators.

Monitoring Center: KVK, Amritsar (Punjab)

Monitoring Date : 11.03.2016

#### **Monitoring Team**

- 1. Dr. Satyavir Singh, PS & PI (Social Sciences), ICAR-IIWBR, Karnal.
- 2. Dr. Mahesh Kumar, Assistant Director, MOA&FW, DWD, Ghaziabad (UP).
- 3. Dr. G.S. Mavi, Assistant Wheat Breeder, PAU, Ludhiana (Punjab).

The team visited wheat FLDs conducted by KVK, Amritsar center on 11<sup>th</sup> March, 2016. The technologies i.e. improved or newly released wheat variety with complete package of practices and rotavator were demonstrated at farmers' fields. Wheat variety WH 1105 was demonstrated and the check variety was HD 2967. The following observations were made during visit of the wheat FLDs farmers' fields (villages-Bhakha Tara Singh, Tarpai, Nag Khurd and Jahangir).

- The wheat crop of FLD variety WH 1105 was free from diseases.
- Weed infestation was negligible in the FLD fields.
- Improved wheat variety was having good crop stand, smooth growth, good crop health, compact earhead, more tillering, more number of grains per earhead, bold and lustrous grains.
- There was no lodging in new variety and no display board at FLDs sites.
- The farmers expected more yield from the demonstrated variety WH 1105 than the old or check variety.
- The farmers appreciated the conduct and supervision of FLDs by cooperators.

Monitoring Center: PAU, Ludhiana (Punjab)

Monitoring Date : 11.03.2016

**Monitoring Team** 

- 1. Dr. Satyavir Singh, PS & PI (Social Sciences), ICAR-IIWBR, Karnal.
- 2. Dr. Mahesh Kumar, Assistant Director, MOA&FW, DWD, Ghaziabad (UP).
- 3. Dr. Jagmohan Singh, SMS (Soil Science), KVK, Amritsar (Punjab).

The team visited wheat FLDs conducted by Pau, Ludhiana center on 11<sup>th</sup> March, 2016. The technologies i.e. improved or newly released wheat variety with complete package of practices, rotavator and zero tillage were demonstrated at farmers' fields. Wheat varieties WH 1105 and HD 2967 were demonstrated and the check variety was HD 2967. The following observations were made during visit of the wheat FLDs farmers' fields (village-Bazurg).

- The wheat FLD varieties WH 1105 and HD 2967 was free from diseases.
- Weed infestation was negligible in the FLD fields.
- Improved wheat varieties were having good crop stand, smooth growth, good crop health, compact earhead, more tillering, more number of grains per earhead, bold and lustrous grains. There was no lodging in new varieties.
- The farmers expected more yield from the demonstrated varieties than the old or check variety.
- The zero tillage method of wheat sowing saves time, fuel and energy.
- The farmers appreciated the conduct and supervision of FLDs by cooperators.

Front Line Demonstrations (FLDs) Monitoring Report of CSAU&T, Kanpur, NDUA&T, Kumarganj, Faizabad and IAS, BHU, Varanasi centres

Monitoring Centre: CSAU&T, Kanpur (UP)

Monitoring Date : 08.03.2016

Monitoring Team: Dr. Anuj Kumar, Dr. Atul Kumar Singh, Dr. Rajveer Singh,

Dr. Ramashish Yadav and Dr. Arvind Kumar

The team visited CSAU&T, Kanpur on 08.03.2016. The technologies i.e. improved variety HD 2967 (wheat) and RD 2794 (barley) and bio fertilizer were demonstrated with complete package of practices at farmers' field. The check varieties were PBW 343 and HD 2733.

A few demonstration plots of barley were also monitored in which newly released variety RD 2794 was demonstrated with check variety Azad. The villages covered were Thati Niwada, Muderi and Shahtawan Purwa

- 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 ear head, more tillers, more number of grains per ear head as well and the grains were bold and lustrous.
- Line sowing was practiced in most of the visited wheat FLDs 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 as compared to old or check varieties.
- 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.
- Sowing of HD 2967 was done in December but the variety is recommended for timely sowing.

Monitoring Centre: NDUA&T, Faizabad (UP)

Monitoring Date: 09.03.2016

Monitoring Team: Dr. Anuj Kumar, Dr. Atul Kumar Singh, Dr. R. S. Viswakarma,

Dr. Rajesh Kumar, Dr. Vinod Kumar Singh and Dr. Vinod Kumar

The team visited NDUA&T, Kumarjanj, Faizabad, UP on 09.03.2016. The technologies i.e. improved barley variety RD 2794 with complete package of practices was demonstrated at farmers' field. The check variety was Faizabad local. The villages covered were Parashpur, Etgaun Milkipur, Pithla and Mahulara Milkipur. The following observations were recorded during FLD monitoring:

- 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 ear head, more tillers, more number of grains per ear head as well and the grains were bold and lustrous.

- Line sowing was practiced in most of the visited wheat FLDs sites.
- The farmers were expecting more yield from all the demonstrated as compared to old or check varieties.
- 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.
- There is a need to ensure weed management in all barley demonstration plots to ensure pure seed for the next crop season.

Monitoring Centre: IAS, BHU, Varanasi (UP)

Monitoring Date : 10.03.2016 and 11.03.2016

Monitoring Team (10.03.2016)

Dr. Anuj Kumar, Dr. Atul Kumar Singh, Dr. Lal Chand Prasad and Dr. S. K. Singh

The team visited Institute of Agricultural Sciences, BHU, Varanasi, UP on 10.03.2016. The technologies i.e. improved barley variety HUB 113 with complete package of practices was demonstrated at farmers' field. The check variety was Gitanjali. The villages covered were Kumhadevari and Naicoat. The following observations were recorded during monitoring of demonstration plots.

- 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 ear head, more tillers, more number of grains per ear head as well and the grains were bold and lustrous.
- Line sowing was practiced in most of the visited wheat FLDs sites.
- The farmers were expecting more yield from all the demonstrated as compared to old or check varieties.
- 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.
- There is a need to ensure weed management in all barley demonstration plots to ensure pure seed for the next crop season.

#### Monitoring Team (11.03.2016)

Dr. Anuj Kumar, Dr. Lal Chand Prasad and Dr. V. K. Mishra

The team visited Institute of Agricultural Sciences, BHU, Varanasi, UP on 11.03.2016. The technologies i.e. improved wheat variety HD 3118 with complete package of practices was demonstrated at farmers' field. The check variety was HUW 510. The villages covered were Akhari and Susuwahi. The following observations were recorded during monitoring of demonstration plots.

- 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 ear head, more tillers, more number of grains per ear head as well and the grains were bold and lustrous.
- Line sowing was practiced in most of the visited wheat FLDs sites.
- The farmers were expecting more yield from all the demonstrated as compared to old or check varieties.
- 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.
- The variety recommended for timely sown conditions was sown too late which will not express the actual yield. So variety recommended for timely sown condition must be sown as per the recommended date of sowing.

Front Line Demonstrations (FLDs) Monitoring Report of UBKVV-Pundibari, Coochbehar (West Bengal), KVK, Chirakuta, Dhubri (Assam) and KVK, Kajalgaon, Chirang (Assam) centers.

Monitoring Centre: UBKVV, Pundibari, Coochbehar (West Bengal)

Monitoring Date : 03.03.2016

- 1. Sh. Rajendra Singh, STO, ICAR-IIWBR, Karnal (Haryana)
- 2. Dr. Apurba Kr. Chowdhury, PC, UBKVV, Pundibari, Coochbehar, W. Bengal.
- 3. Sh. B. Ghosh, Field Assistant, UBKVV, Pundibari, Coochbehar, West Bengal.

On 3<sup>rd</sup> March 2016, the team visited fields of different villages demonstrated by Uttar Banga Krishi Vishwavidyalaya (UBKVV) Pundibari, Coochbehar (West Bengal) centre. Technologies like improved or newly released wheat varieties (NRWV) of *T. aestivum* with zero tillage and complete package of practices were demonstrated at farmers' fields. Improved wheat varieties HD 2967 (*T. aestivum*) timely sown under irrigated conditions were demonstrated in FLD farmers' fields and the check variety was PBW 343. Other wheat variety was DBW 107 (*T. aestivum*). It was late sown under irrigated conditions and the check variety was very old unidentified, known as local variety at different villages located in district Coochbehar. The following observations and suggestions were made through visit of wheat Front Line Demonstration fields of farmers in different villages; Morangabari & B.K. Bari, block Falimari; villages Charakar Kuthi & Ghughubari, block Ghughubari and village Patchara, block Coochbehar, district Coochbehar.

- FLDs were carried out in clusters.
- The wheat FLD plots were located near the pucca roads.
- The wheat crop was free from all diseases.
- Line sowing was practiced in all the visited FLD fields.
- Wheat fields were free from weeds.
- Display boards were beautifully displayed at FLD sites.
- The performance of zero tillage in all FLD fields was excellent.
- Neighboring farmers of wheat FLD plots and farmers of other villages were very much interested to grow improved varieties of wheat in their fields and would like to have the seeds 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 of *T. aestivum* in their fields in future.
- The coordination between farmers and In-charge of centre and other officers was very good.
- The demonstrated improved new wheat varieties had very good germination, more tillering, uniform and good crop stand, no lodging, good crop health, compactness of ear heads, and farmers were expecting high yields.
- The farmers were satisfied with advisory service and technical assistance given by officers of the center.

Monitoring Center: Krishi Vigyan Kendra, Dhubri (Assam) centre

Monitoring Date : 05.03.2016

**Monitoring Team** 

- 1. Sh. Rajendra Singh, STO, ICAR-IIWBR, Karnal (Haryana)
- 2. Dr. C. Deka, Programme Co-ordinator, KVK, Dhubri (Assam)
- 3. Dr. Pranjit Sutradhar, SMS (Agronomy), KVK, Dhubri (Assam)
- 4. Sh. Pradeep Rajbonshi, Farm Manager, KVK, Dhubri (Assam)

On 05.03.2016, we all team members reached in village Futkibari, block Raniganj District Dhubri (Assam) where demonstrations were conducted in a village in clusters. We monitored wheat Front Line Demonstrations (FLDs) conducted by K.V.K., Dhubri (Assam) center using improved varieties of wheat HD 2967 (T. aestivum) and check variety Sonalika was commonly grown in this district. All demonstration plots were excellent, weeds free and farmers also showed interest about wheat cultivation. Technologies like improved or newly released wheat varieties (NRWV) with complete package of practices were demonstrated at farmers' fields. The following observations and suggestions were made through visit of FLD plots.

- The wheat FLD plots were some away from the puccka road.
- Demonstration plots were in clusters in a village.
- The performance of all FLD plots was excellent.
- The FLD crop was free from diseases.
- Display boards were seen at FLD sites.
- Line sowing was practiced in all the visited FLD fields.
- Weed infestation was very less in the wheat FLD fields.
- The coordination between farmers and FLD centre was very good.
- Neighboring farmers were interested to grow improved varieties of wheat in their land and would like to have seeds from the FLD farmers.
- In demonstration plots good germination, more tillering, uniform and good crop stand, no lodging, good crop health, compact earheads were observed.
- The farmers expected more yield from the improved varieties than old/ local varieties.
- The farmers were satisfied with the advisory service and technical assistance given by the FLD coordinators.

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.

Monitoring Center: KVK (AAU), Kajalgaon, Chirang (Assam)

Monitoring Dated: 06.03.2016

### **Monitoring Team**

- 1. Sh. Rajendra Singh, STO, ICAR-IIWBR, Karnal (Haryana)
- 2. Dr. Kameshwar Das, PC, KVK, Chirang (Assam)
- 3. Dr. Smt. Saptadvipa, Scientist-In-Charge of FLDs.
- 4. Dr. H.K.Barua, Economist
- 5. Dr. B. Bhattacharya, SMS, Plant Protection
- 6. Dr. K. Bora, SMS, Soil Science.

On 06.03.2016, the team reached demonstration plots located in a village Mazrabari, block Borobazar, district Chirang (Assam). We monitored Wheat Front Line Demonstrations (FLDs) conducted in a cluster by K.V.K. Chirang (Assam) using improved varieties of wheat HD 2967 (*T.aestivum*) a timely sown under irrigated conditions and check varieties was Sonalika in this district.

- The performance of all FLD fields was excellent.
- Demonstration plots were in clusters in a village.
- The wheat FLD plots were near the puccka road.
- The FLD crop was free from diseases.
- Display boards were seen in some FLD sites.
- Line sowing was practiced in all the visited FLD fields.
- Weed infestation was very less in the wheat FLD fields
- In demonstration plots there was good germination, more tillering, uniform and good crop stand, no lodging, good crop health, compact ear heads.
- The farmers were expecting more yields from improved varieties than old /local varieties.
- The farmers were satisfied with the advisory service and technical assistance given by the FLD coordinators.
- Farmers were again taking interest in wheat cultivation with the efforts of this center.

Front Line Demonstrations (FLDs) Monitoring Report of Krishi Vigyan Kendra (KVK) Sultanpur (UP), and Krishi Vigyan Kendra Sidharthnagar (UP) centers of North Eastern Plane Zone.

Monitoring Center: KVK, Sultanpur (UP)

Monitoring Date : 15.03.2016

#### **Monitoring Team**

- 1. Sh. Rajendra Singh, STO, ICAR-IIWBR, Karnal (Haryana)
- 2. Sh. Ramsewak Yadav, Directorate of Sugarcane Dev., GOI, Lucknow (UP).
- 3. The following Scientists/ Officers joined the FLDs Monitoring Team at Krishi Vigyan Kendra (KVK) Sultanpur (UP) centre.
- 4. Dr. A.K. Singh, Programme Coordinator and In-charge of FLDs.
- 5. Dr. M.B. Singh, Advisor
- 6. Dr. R.K.Singh, Horticulturist
- 7. Sh. Atul singh, Programme Assistant

On 15.03.2016, we all team members, reached villages Pureghana, Trilokchandrapur, Beresera, of Block Bhadiyaya, village Parasrampur, Block Lambhua and village Aardiah (Pandit ka Purwa), block Dubepur of district Sultanpur (UP) for monitoring of wheat FLDs. We monitored wheat FLDs demonstrated by this centre using DBW 107 (*T.aestivum*), late sown under irrigated conditions, and check varieties were PBW 154 and GW 273.We monitored the Front Line Demonstrations demonstrated by this center. The following observations and suggestions were made through visit of Front Line Demonstration (FLDs) fields:

- Front Line Demonstrations (FLDs) were in clusters.
- The wheat FLD plots were located near the pucca roads.
- The wheat crop was free from all diseases.
- Line sowing was practiced in all the visited FLD fields.
- Wheat fields were free from weeds.
- The performance of demonstration plots was excellent.
- Display boards were beautifully displayed at FLD sites.
- Neighboring farmers of Wheat FLD plots and farmers of other villages were very much interested to grow improved varieties of wheat in their fields and would like to have the seeds from the FLD farmers.

- Farmers of the other villages were very happy to see the performance of the FLD plots. They showed their interest to grow new improved wheat varieties of (*T. aestivum*) in their fields in future.
- The coordination between farmers and In-charge of centre and other officers was very good.
- The demonstrated improved wheat variety had very good germination, more tillering, uniform and good crop stand, no lodging, good crop health, compactness of ear heads. Farmers were expecting high grain and straw yields.
- The farmers were satisfied with advisory service and technical assistance given by officers of the center.

Monitoring Center: KVK, Sohna, Sidharthnagar (UP)

Monitoring Date : 17.03.2016

## **Monitoring Team**

- 1. Sh. Rajendra Singh, Senior Technical Officer, ICAR-IIWBR, Karnal (Haryana).
- 2. Sh. Ramsewak Yadav, Directorate of Sugarcane Dev., GOI, Lucknow (UP).
- 3. The following Scientists/Officers joined the team at Krishi Vigyan Kendra, Sohna, Sidharthnagar (UP) centre.
- 4. Dr. S.K. Tomer, Programme Coordinator,
- 5. Dr. D.P. Singh, Scientist Animal Science,
- 6. Dr. S.K. Mishra, Scientist, Crop Production,
- 7. Dr. Pradeep Kumar, Scientist, Plant Protection,
- 8. Dr. Markandey Singh, Farm Manager.

On 17<sup>th</sup>, march, 2016, we all team members reached village Jigna Habibbpur, Block Bhanwapur, Tehsil Itwa of district Sidharthnagar (UP) and Krishi Vigyan Kendra, Kharaila Farm, Sohna, Sidharthnagar(UP). We monitored Wheat Front Line Demonstrations (FLDs) demonstrated in a cluster by this center of NEPZ zone. One demonstrated variety was HD 2967 (*T. aestivum*). It is timely sown under irrigated conditions and Zero tillage & Rotavator techniques were demonstrated. Check varieties were WH 711, PBW 343 and HD 2733.Other demonstrated variety was DBW 107 (*T. aestivum*). It was late sown under irrigated conditions and Zero tillage & Rotavator and check varieties were PBW 154 and PBW 373.

The following observations and suggestions were made through visit of Front Line Demonstrations (FLDs):

- The wheat FLD plots were near the puccka road.
- Demonstration plots were in a village in clusters.
- The performance of all FLD fields demonstrated with Zero tillage & Rotavator was excellent.
- The FLD crop was free from diseases.
- Display boards were seen in some FLD sites.
- Line sowing was practiced in all the visited FLD fields.
- Weed infestation was negligible or very less in the wheat FLD fields.
- The coordination between farmers and wheat In charge of centre was very good and appreciable.
- Farmers were interested to grow improved varieties of wheat in their land and would like to have seeds from the FLD farmers.
- In demonstration plots good germination, more tillering, uniform and good crop stand, no lodging, good crop health, compact ear heads were observed.
- The farmers expected more yield from the improved varieties than old varieties.
- The farmers were satisfied with the advisory service and technical assistance given by the FLD coordinators.
- 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.

Front Line Demonstration (Wheat) Monitoring Report of ARS, Niphad, Nasik (Maharashtra), Marathwada Agricultural University, Parbhani and Wheat Research Unit, Akola (Maharashtra).

Monitoring Centre: ARS, Niphad, Nasik, (Maharashtra)

Date of monitoring: 12.02.2016 to 13.02.2016

**Monitoring Team** 

- 1. J K Pandey, Asstt. Chief Technical Officer, IIWBR, Karnal
- 2. Shri Dinesh Kumar Solanki, STA, Directorate of Cotton Development, Nagpur
- 3. Dr. Deepak D. Dudhade, Training Officer, MPKV, Rahuri (Maharashtra)
- 4. Shri Kolse Ravindra Haridas, SRA, ARS, Niphad, Nasik (Maharashtra)

The team visited the Centre and FLDs (Wheat) fields. The technologies i.e. improved wheat variety /Sprinkler irrigation with complete package of practices was demonstrated at farmer's field. Wheat variety—NIAW-301 was demonstrated and check varieties were Ajit-102, LOK 1, Mohan Wonder & Nirmal-144. The following observations and suggestions were made through visit of the wheat FLDs farmer's field of the centre.

- The wheat crop under FLDs was free from diseases.
- Almost all the fields were free from weeds.
- The crop stand & health was very good.
- Almost all 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.
- Strong linkage between cooperating centre and farmers was observed.
- We advised to farmers to share seed & experiences about seed & technology to other farmers.

Monitoring Centre: MAU, Parbhani (Maharashtra)

Date of monitoring: 14.02.2016 to 15.02.2016

#### **Monitoring Team**

- 1. J K Pandey, Asstt. Chief Technical Officer, IIWBR, Karnal
- 2. Shri Dinesh Kumar Solanki, STA, Dirctorate of Cotton Development, Nagpur
- 3. Dr.V.D.Salunke, Wheat Breeder, MAU, Parbhani (Maharashtra)

The team visited to the centre and Farmer's field of FLDs (Wheat). At this monitoring centre, the improved variety (NRWV) with Bio-Fertilizer (Azotobacter+PSB) technologies and with complete package of practices were demonstrated in all the farmers field (FLDs). The demonstrated wheat variety was NIAW 1415 and check varieties were LOK 1 and HD- 2189. 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.
- The demonstrated sites were easily approachable and were on the side of pucca road.
- All the FLDs were well maintained & boards were properly displayed.
- Neighbouring farmer's demand to increase the nos. of beneficiaries of FLD (Wheat).
- The farmers were very happy with the test variety (NIAW-1415) & showed interest for further sowing of the variety.
- We have requested to farmers to share seed of the test variety & experiences about it to other farmers.
- The farmers appreciated advisory services & technical guidance rendered by the programme co-ordinator.

Monitoring Centre: Wheat Research Unit, Akola (Maharashtra)

Date of monitoring: 16.02.2016 to 17.02.2016

#### **Monitoring Team**

- 1. J K Pandey, Asstt. Chief Technical Officer, IIWBR, Karnal
- 2. Shri Dinesh Kumar Solanki, STA, Directorate of Cotton Development, Nagpur
- 3. Dr. Parvin Mahatale, Asstt. Agronomist, Wheat Research unit, Krishi Nagar, Akola (Maharashtra)
- 4. Shri Mahesh R. Maske, Scientist (Agril.), M.S.Swaminathan Research Foundation, Wardha

The team visited to the centre and farmer's field of FLDs (Wheat). At this monitoring centre, the only improved variety technology (NRWV) with complete package of practices were demonstrated in the entire farmers field (FLDs). The wheat varieties was AKAW 4210-6 and check varieties were LOK 1, Narmada sagar, GW-496, Suchitra, Eagal, Abhay & Netrawati. 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.

- The demonstrated sites were easily approachable & on the side of pucca road.
- All the FLDs were well maintained & boards were properly displayed.
- Neighbouring farmer's demand to increase the nos. of beneficiaries of WFLD.
- The farmers were very happy with the test variety (AKAW 4210-6) & showed interest for further sowing of the variety.
- We have requested to Farmers to share seed of the test variety & experiences about it to other farmers.
- The farmers appreciated advisory services & technical guidance rendered by the programme co-ordinator.

Over all observation/feedback at Farmer's fields of ARS, Niphad, Nasik (Maharashtra), Marathwada Agricultural University, Parbhani and Wheat Research Unit, Akola (Maharashtra).

- The farmers appreciated advisory services & technical guidance rendered by the FLDs (Wheat) co-ordinators.
- The demonstration of improved wheat varieties have good tillering, very good crop stand & crop health and good impact of demonstrated technologies.
- All the farmers were having perception that the FLD is an effective and proper method of transfer of technology for wheat production.
- The fellow & neighbouring farmers of FLDs were asking about the seed for next growing season.
- The neighbouring farmers were requesting for more number of FLDs.

Front Line Demonstration (Wheat) Monitoring Report of Krishi Vigyan Kendra (SKRAU), Karmoda, Sawai Madhopur (Rajasthan), and MPUA&T, ARS, Ummedganj Farm, Kota (Rajasthan).

Monitoring Centre: KVK, Karmoda, Sawai Madhopur (Rajasthan)

Date of monitoring: 02.03.2016 to 03.03.2016

#### **Monitoring Team**

- 1. J K Pandey, Asstt. Chief Technical Officer, ICAR- IIWBR, Karnal
- 2. Dr. Hari Ram Chaudhary, STA, Directorate of Millets Development, Jaipur
- 3. Dr. Ram Aasrey, Programme Coordinator, KVK, Karmoda, Sawai Madhopur
- 4. Dr. Harish Verma, Associate Prof. (Ento), KVK, Karmoda, Sawai Madhopur

The team visited the centre and Farmer's field of FLDs (Wheat). At this monitoring centre, the improved variety technology (NRWV) with Bio-fertilizer for irrigated (Restricted) timely sown with complete package of practices was demonstrated at all the farmers fields (FLDs). The improved wheat variety used was DBW 110 and Check varieties were Raj 3077, Raj 4037, Shri Ram 152 & Raj 1482. The following observations and suggestions were made through the visit of the wheat FLDs farmer's fields of the centre:

- The wheat crop of FLDs was free from disease.
- Almost all the fields were free from weeds.
- The crop stand & health was very good.
- The demonstrated sites were easily approachable.
- The Cooperating center asked to increase the number of beneficiaries of FLDs.
- The farmers were very happy with this variety (DBW 110) / technology and showed interest for further use of the variety.
- During the visit, the farmers told that the demonstrated variety (DBW 110)/ technology was beneficial.
- In this area maximum farmers apply over doses of nitrogen in wheat and other crops but the beneficiaries farmers of FLDs were aware about the recommended dose of fertilizers.
- Good linkage between cooperating centre and farmers.
- We advised to Farmers to share seed & experiences about seed & technology to other farmers.

Monitoring Centre: MPUA&T, ARS, Ummedganj Farm, Kota (Rajasthan)

Date of monitoring: 04.03.2016 to 05.03.2016

#### **Monitoring Team**

- 1. J K Pandey, Asstt. Chief Technical Officer, ICAR-IIWBR, Karnal
- 2. Dr. Hari Ram Chaudhary, STA, Directorate of Millets Development, Jaipur
- 3. Dr. Arun Sharma, Agronomist, MPUA&T, ARS, Ummedganj, Kota (Rajasthan)

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 timely sown with complete package of practices was demonstrated in all the farmers fields (FLDs). The improved wheat variety was DBW 110 and Check varieties were Raj 3077, Raj 3765, GW 322, GW 273 & Raj 4037.

The following observations and suggestions were made during FLD monitoring:

- The crop stand & health was very good.
- The wheat crop of FLDs was free from disease and weeds.
- The demonstrated sites were easily approachable & on the side of pucca road.
- Neighbouring farmer's demand to increase the nos. of beneficiaries of WFLDs.
- The farmers were very happy with the test variety (DBW 110) & showed interest for further sowing of the variety.
- We have requested to farmers to share seed of the test variety & experiences about it to other farmers.
- The farmers appreciated advisory services & technical guidance rendered by the FLD Cooperators.

# Over all observation/feedback at Farmer's fields of KVK, Karmoda, Sawai Madhopur and MPUA&T, ARS, Ummedganj Farm, Kota (Rajasthan)

- The farmers appreciated advisory services & technical guidance rendered by the FLDs (Wheat) co-ordinators.
- The demonstration of improved wheat varieties had good tillering, very good crop stand & crop health and good impacts of technologies.
- All the farmers were having perception that the FLD is an effective and proper method of Transfer of Technology for wheat production.
- The fellow & neighbouring farmers of the FLDs were asking about the seed for next growing season.
- The neighbouring farmers were requesting for more number of FLDs.

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

Zone	Improved Varieties	Check Varieties
NHZ	HS 542, VL 907, HPW 360, HPW 368, HD 2967, WH 1080	HPW 155, HPW 349, HS 240, Daulat Khani, PBW 175, Raj 3077, SW 1(SKW 196), VL 829, HD 2380, HD 2967
NEPZ	DBW 107, HD 2967, HD 3118	HD 2733, HD 2967, HUW 234, HUW 510, DBW 107, K 307, Bhutia, Local, NW 2036, NW 5054, PBW 154, PBW 343, PBW 373, Sonalika, UP 262
NWPZ	DBW 88, HD 2967, KRL 210, WH 1105, WH 1142, DBW 71	DBW 71, DBW 88, DPW 621-50, HD 2967, PBW 343, PBW 502, PBW 550, Raj 1482, Raj 3077, Raj 4037, Raj 4079, WH 1105, WH 711
CZ	DBW 110, GDW 1255(d), HD 2987, HD 4728(d), HI 8713(d), HI 8737(d)	DBW 110, GW 322, GW 366, GW 496, HI 1500, HI 8498(d), HI 8663(d), Lok 1, Raj 4037, Raj 4079, Sujata
PZ	AKAW 4210, HW 1098(dic.), MACS 6478, NIAW 1415, UAS 304	Ajit 102, DDK 1029(dic.), DWR 162, HD 2189, Lok 1, Raj 4037
SHZ	HW 1098(dic.), HW 5207, HW 5216	-

Table 18: Zone wise distribution of popular wheat varieties

Zone	Popular Wheat Varieties
NHZ	DPW 621-50, HPW 236, VL 829, Local, HPW 155, HS 507, Raj 3765, Sonalika, HPW 349, HD 2967, PBW 343, WH 1080, HD 2380, Kanku(Local), PBW 175, PBW 621, SW 1, UP 2572, VL 616, VL 907, WH 1040.
NEPZ	Bhutia, PBW 373, PBW 502, PBW 550, HUW 234, PBW 154, K 307, HD 2733, UP 262, PBW 343, K 307, K 9107, PBW 502, Local, NW 1012, UP 2338, Shatabadi, Sonalika, Berpetia (Local non descript variety).
NWPZ	HD 2967, PBW 550, PBW 590, DBW 16, DBW 17, PBW 226, DPW 621-50, WH 711, WH 1105, HD 2851, UP 2572, UP 2554, PBW 621, HD 3086, KRL 210, PBW 343, PBW 502, PBW 373, Raj 3077, Raj 3765, Raj 4037, Raj 4079, WH 283, WH 542.
CZ	Sujata, WH 147, HI 8498 (d), Lok 1, GW 322, GW 273, Raj 4037, Raj 3077, C 306, GW 366, GW 496, HI 1500, HI 1544, Raj 1482, Ratan, GW 173
PZ	Ajit 102, Mohan Wonder, Lok 1, Nirmal 144, AKAW 4210-6(PDKV Sardar), MACS 2971.

#### Wheat and barley FLDs at ICAR-IIWBR, Karnal centre

During *Rabi* 2015-16, ten (10 hectares) wheat Front Line Demonstrations (FLDs) were conducted at eleven farmers' fields in the villages namely Chhota Baans, Bakana, Palaka and Chamrodi in district Yamunanagar of Haryana state using variety WH 1105. The demonstrations were conducted with complete package of practices. Farmers were provided the critical inputs as per provision under the programme.

During rabi 2015-16, five (5 hectares) barley Front Line Demonstrations (FLDs) were conducted at ten farmers' fields in the villages Ganjogarhi (Karnal), Rasina (Kaithal) and Makhand (Jind) of Haryana state using varieties DWRB 101 and BH 946. 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 during summer-2015

During summer-2015, 3.0 hectares Special wheat Front Line Demonstrations (FLDs) were conducted at thirty farmers' fields in the villages of district Lahaul & Spiti (HP) and Leh (Jammu & Kashmir) using HS 375 variety. Varietal demonstrations were conducted.

# Constraints analysis in different wheat producing zones of India (2015-16)

India witnessed a continuous increase in wheat production in the recent years, and during last crop season 2015-16, the total wheat production was 93.50 m tons (Fourth advance estimate). Variation in yield levels exists among different states, farmers and farms leading to yield gap in different states and different zones. Several reasons shall be attributed to this yield gap which needs to be addressed for sustainable wheat production. Through constraint analysis, an effort has been made to identify constraints impeding wheat production in different parts of the country.

#### Methodology

An inventory of constraints impeding wheat production in the country was developed after thorough review of literature and taking experts' opinion. Data were collected on a well designed pre-structured questionnaire mailed to all the cooperating centres conducting wheat Front Line Demonstrations (FLDs). The responses were collected on a three point continuum *viz*; most serious, serious and not serious. The scores were assigned as 3, 2, 1 for the most serious, serious and not serious constraints, respectively. Based on 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) non-availability of seed of newly released variety, *Phalaris minor*, small land holdings, high cost of inputs, non-availability of farm machinery, yellow rust, yellow rust, birds, lack of knowledge among the farmers about recent technologies, imbalanced use of fertilizers and lack of irrigation facilities were major constraints perceived by the farmers.

Table 19: Constraints of NHZ

(n=190)

Constraints	Score	Rank
Non-availability of seed of newly released variety	249	I
Phalaris minor	241	ll II
Small land holdings	229	III
High cost of inputs	215	IV
Non-availability of farm machinery	213	V
Yellow rust	211	VI
Birds	209	VII
Lack of knowledge among the farmers about recent technologies	197	VIII
Imbalanced use of fertilizer	188	IX
Lack of irrigation facilities	186	X

#### 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 major constraints of this zone, small land holdings was ranked first followed by non-availability of seeds of newly released variety, lack of knowledge among the farmers about recent technologies, late sowing, temperature fluctuation during crop growth, high cost of inputs, poor quality of seeds, non-availability of labour, low organic matter in the soil and non-availability of farm machinery (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=420)

Constraints	Score	Rank
Small land holdings	665	1
Non-availability of seeds of newly released variety	653	11 -
Lack of knowledge among the farmers about recent technologies	525	III
Late sowing	523	IV
Temperature fluctuations during growth	486	V
High cost of inputs	475	VI
Poor quality of seeds	473	VII
Non-availability of labour	460	VIII
Low organic matter in the soil	459	IX
Non-availability of farm machinery	448	Х

#### North Western Plains Zone (NWPZ)

High cost of inputs, low price of wheat, erratic power supply, *Phalaris minor*, Low organic matter in the soil, poor quality of seeds, non-availability of labour, untimely rain, *Chenopodium album* and non-availability of electricity were perceived as major constraints in this mega zone (Table 21).

Table 21: Constraints of NWPZ

(n=315)

Constraints	Score	Rank
High cost of inputs	291	
Low price of wheat	254	ll ll
Erractic power supply	247	III
Phalaris minor	243	IV
Low organic matter in the soil	242	V
Poor quality of seeds	224	VI
Non-availability of labour	212	VII
Untimely rain	206	VIII
Chenopodium album	206	VIII
Non-availability of electricity	205	IX

#### Central Zone (CZ)

In central zone, non-availability of labour, imbalanced use of fertilizer, high temperature at maturity, non-availability of seeds of newly released variety, temperature fluctuation during crop growth, high cost of inputs, lack of irrigation facilities, small land holdings, decline in water table and untimely rain were the major constraints perceived by the farmers (Table 22).

Table 22: Constraints in CZ

(n=148)

Constraints	Score	Rank
Non-availability of labour	221	I
Imbalanced use of fertilizer use	214	II
High temperature at maturity	190	III
Non-availability of seed of newly released variety	188	IV
Temperature fluctuation during crop growth	188	IV
High cost of inputs	184	V
Lack of irrigation facilities	175	VI
Small land holding	171	VII
Decline in water table	171	VII
Untimely rain	167	VIII

# Peninsular Zone (PZ)

In peninsular zone, low price of wheat, erratic power supply, high cost of inputs, non-availability of labour, non-availability of electricity, higher rate of custom hiring, untimely rain, lack of facilities of canal irrigation, non-availability of seeds of newly released variety and temperature fluctuation during crop growth were the major constraints faced by wheat growers (Table 23).

Table 23: Constraints in PZ

(n= 71)

Constraints	Score	Rank
Low price of wheat	126	I
Erratic power supply	126	I
High cost of inputs	118	11
Non-availability of labour	116	III
Non-availability of electricity	109	IV
Higher rate of custom hiring	108	V
Untimely rain	96	VI
Lack of facilities of canal irrigation	94	VII
Non-availability of seeds of newly released variety	91	VIII
Temperature fluctuation during crop growth	89	IX

#### **Overall Constraints**

The overall constraints analysis across zones revealed that small land holding was the most serious constraint faced by farming community in the country. Due to small land holdings farmers are unable to use farm machinery in their fields. Economically, it is also not viable to purchase farm implements and machines for small holders. The other constraints which were also perceived most serious in nature were non-availability of seeds of newly released variety, lack of knowledge among the farmers about recent technologies, late sowing, temperature fluctuations during crop growth period, high cost of inputs, poor quality of seeds, non-availability of labour, low organic matter in the soil, non-availability of farm machinery and low price of wheat (Table 24). Farmers need to be educated and trained on recent wheat production technologies, complete package of practices and soil health management. There is a need of government intervention to ensure quality seeds as well as quality inputs. Farmers need to be updated on impact of climate change on wheat cultivation and what are the coping strategies they can adopt to mitigate it. The concept of conservation agriculture and adoption of resource conservation technologies at farmers' field can be propagated at a larger scale. To ensure better price, farmers have to go for quality wheat production. All the constraints need immediate attention in order to increase wheat production in all major wheat producing zones of the country.

Table 24: Overall constraints impeding wheat production in the country

(n=	1	14	4)

Constraints	Score	Rank	
Small land holding	665	ı	
Non-availability of seed of newly released variety	653	II	
Lack of knowledge among the farmers about recent technologies	525	III	
Late sowing	523	IV	
Temperature fluctuations during crop growth	486	V	
High cost of inputs	475	VI	
Poor quality of seeds	473	VII	
Non-availability of labour	460	VIII	
Low organic matter in the soil	459	IX	
Non-availability of farm machinery	448	Х	
Low price of wheat	254	XI	

**Barley Front Line Demonstrations** 

# Barley Front Line Demonstrations (BFLDs) during 2015-16

During the rabi crop season 2015-16, 130 Barley Front Line Demonstrations (BFLDs) were allotted to 25 different cooperating centers all over India in six states namely, HP, UP, Punjab, Haryana, Rajasthan and MP of which 125 were conducted by 24 centers, covering 130.6 hectares area of 265 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: Centre wise distribution of Barley FLDs during rabi 2015-16

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	21
2.	IARI, RS, Amartara Cottage, Shimla (HP)	5	5	5	13
NEPZ	-				
3.	NDUA&T, Faizabad (UP)	5	5	5	9
4.	KVK (IAS-BHU), Barkachha, Mirzapur (UP)	5	5	6*	6
5.	CSAUA&T, Kanpur (UP)	5	5	6.8*	16
6.	BHU, Varanasi (UP)	5	5	5	6
7.	KVK, Morabadi, Ranchi (Jharkhand)	5	Not conducted	-	-
NWPZ					
8.	PAU, Ludhiana (Punjab)	5	5	5	10
9.	ICAR-IIWBR, Karnal (Haryana)	5	5	5	11
10.	CCSHAU, Hisar (Haryana) – 125004	5	5	5	7
11.	KVK (CCSHAU), Fatehabad (Haryana)	5	5	5.4*	8
12.	KVK (CCSHAU), Jhajjar (Haryana)	5	5	5	17
13.	KVK, Shri BB Ashram, Rewari (Haryana)	5	5	5	7
14.	KVK (CCSHAU), Bhiwani (Haryana)	10	10	11.2*	22
15.	KVK (CCSHAU), Rohtak (Haryana)	5	5	5	12
16.	KVK (CCSHAU), Faridabad (Haryana)	5	5	5	5
17.	RARI, SKNAU, Durgapura, Jaipur (Rajasthan)	5	5	5	6
18.	KVK, Tankarda, Chomu, Jaipur (Rajasthan)	5	5	5	10
19.	KVK, SKNAU, Khedla Khurd, Dausa (Rajasthan)	5	5	5	10
CZ					
20.	RCOA, MPUA&T, Udaipur (Rajasthan)	5	5	5	7
21.	KVK (MPUA&T), Dhoinda, Rajasmand	5	5	4.8	12
	(Rajasthan)				
22.	ZARS, COA, JNKVV, Kuthulia Farm, Rewa (MP)	5	5	5	5
23.	KVK (JNKVV), Purushottampur, Panna (MP)	5	5	5	17
24.	KVK (RVSKVV), Juara Khurd, Morena (MP)	5	5	6.4*	16
25.	KVK (RVSKVV), Budhapura, Lahar, Bhind (MP)	5	5	5	12
	Total	130	125	130.6	265

<sup>\*</sup> Area covered more than allotted which is restricted to area equal to allotted FLDs.

Table 26: Statewise distribution of BFLDs during rabi 2015-16

State	Allotted	Conducted	Area sown (ha)	No. of farmers/locations
HP	10	10	10.0	34
UP	20	20	22.8	37
Punjab	5	5	5.0	10
Haryana	45	45	46.6	89
Rajasthan	25	25	24.8	45
MP	20	20	21.4	50
Jharkhand	5	-	-	-
Total	130	125	130.6	265

<sup>\*</sup> Area covered more than allotted which is restricted to area equal to allotted FLDs.

Table 27: Zone wise distribution of BFLDs conducted during rabi 2015-16

Zone	Allotted	Conducted	Area sown (ha)	No. of Farmers/ locations
NHZ	10	10	10.00	34
NEPZ	25	20	22.80	37
NWPZ	65	65	66.60	125
CZ	30	30	31.20	69
Total	130	125	130.60	265

<sup>\*</sup> Area covered more than allotted which is restricted to area equal to allotted FLDs.

Table 28: State wise yield gain during 2015-16

State	BFLDs yield (q/ha)	Check yield (q/ha)	% increase
HP	25.63	19.34	32.52***
UP	35.03	27.64	26.74***
Punjab	49.60	46.40	06.90 NS
Haryana	47.26	42.63	10.86***
Rajasthan	47.73	39.98	19.38***
MP	41.79	34.67	20.54***

<sup>\*\*\*</sup> Significant at 1 percent level, \*\* - Significant at 5 percent level.

The highest increase in barley yield was recorded in HP (32.52 %) followed by UP (26.74 %), Madhya Pradesh (20.54 %), Rajasthan (19.38 %) and Haryana (10.86 %). The lowest increase in yield was reported in Punjab (06.90 %) (Table 28).

Table 29: Zone wise productivity over regional during 2015-16

Zone	BFLDs yield (q/ha)	Regional mean yield (q/ha)	% Increase
NHZ	25.63	22.06	16.18***
NEPZ	35.03	27.43	27.71***
NWPZ	48.48	41.58	16.59***
CZ	41.74	29.57	41.16***

<sup>\*\*\*</sup> Significant at 1 per cent level.

The yield gain due to improved varieties over regional mean yield was highest in Central Zone (41.16 %) followed by north eastern plains zone (27.71 %), north western plains zone (16.59 %) and northern hills zone (16.18 %) (Table 29).

Table 30: Zone wise productivity over check during 2015-16

Zone	BFLDs yield (q/ha)	Check mean yield (q/ha)	% Increase
NHZ	25.63	19.34	32.52***
NEPZ	35.03	27.64	26.74***
NWPZ	48.48	43.46	11.55***
CZ	41.74	34.17	22.15***

<sup>\*\*\*</sup> Significant at 1 per cent level.

The yield gain due to improved varieties over check mean yield was highest in northern hills zone (32.52 %) followed by north eastern plains zone (26.74 %), central zone (22.15 %) and north western plains zone (11.55 %) (Table 30). Therefore, efforts should be made to increase barley yield in the NEPZ and CZ in collaboration with the state department of agriculture.

Table 31: Centre wise performance of improved barley varieties during 2015-16

Zone	Centre	BFLDs yield (q/ha)	Check yield (q/ha)	% increase
NHZ	Bajaura	26.55	20.69	28.32***
	Shimla	23.60	16.38	44.08***
NEPZ	Faizabad	27.94	21.56	29.59***
	Mirzapur	37.20	22.20	67.57***
	Kanpur	36.27	32.00	13.34***
	Varanasi	40.77	30.41	34.07***
NWPZ	Ludhiana	49.60	46.40	06.90 NS
	IIWBR, Karnal	49.31	42.26	16.68***
	Hisar	46.00	42.29	08.77*
	Fatehabad	35.93	33.21	08.19***
	Jhajjar	51.47	41.44	24.20***
	Rewari	45.54	43.00	05.91***
	Bhiwani	51.73	48.72	06.18***
	Rohtak	42.25	40.75	03.68**
	Faridabad	41.20	38.26	07.68 NS
	Durgapura-Jaipur	55.67	41.67	33.60***
	Chomu-Jaipur	51.56	48.35	06.64 NS
	Dausa	50.80	44.10	15.19***
CZ	Udaipur	43.43	35.86	21.11***
	Rajsamand	40.53	31.13	30.20***
	Rewa	40.64	37.46	08.49**
	Panna	37.40	26.20	42.75***
	Morena	46.04	39.91	15.36***
	Bhind	42.83	38.50	11.25***

<sup>\*\*\*</sup> Significant at 1 percent level, \*\* - Significant at 5 percent level, \* Significant at 10 percent level, NS- Non-significant

The yield gain at Mirzapur (67.57 %) centre was highest followed by Shimla (44.08 %), Panna (42.75 %), Varanasi (34.07 %), Durgapura-Jaipur (33.60 %), Rajsamand (30.20 %) and Faizabad (29.59 %) centers across the zones. The increase in improved variety's yield at Rohtak over check variety was the lowest (03.68 %) but significant (Table 31).

Table 32: Variety wise performance of improved barley varieties during 2015-16

Zone and Centre	Improved variety	Average yield (q/ha)	Check variety	Average yield (q/ha)	% Increase over check
NHZ		-			
Bajaura	BHS 400	26.55	Sonu	20.69	28.32***
Shimla	BHS 400	23.60	BHS 352	16.38	44.08***
NEPZ					
Faizabad	RD 2794	27.94	Faizabad Local	21.56	29.59***
Mirzapur	HUB 113	36.00	Jagriti	20.00	80.00 NS
•	HUB 113	39.00	Manjula	25.50	52.94 NS
Kanpur	RD 2794	36.27	Azad	32.00	13.34***
Varanasi	HUB 113	40.77	Geetanjali	30.41	34.07***
NWPZ					
Ludhiana	BH 946	44.17	PL 807	40.67	08.61**
	DWRB 101	57.75	DWRUB 52	55.00	05.00 NS
IIWBR, Karnal	BH 946	49.41	BH 393	42.68	15.77***
	DWRB 101	48.90	BH 393	40.60	20.44**
Hisar	BH 946	46.00	BH 393	42.29	08.77*
Fatehabad	BH 946	35.68	BH 393	33.08	07.86 NS
	DWRB 101	36.18	BH 393	33.35	08.49**
Jhajjar	BH 946	51.92	BH 393	41.75	24.36***
-	DWRB 101	51.23	BH 393	41.27	24.13***
Rewari	BH 946	46.00	BH 393	43.00	06.98***
	DWRB 101	45.08	BH 393	43.00	04.84***
Bhiwani	BH 946	51.73	BH 393	48.72	06.18***
Rohtak	BH 946	42.25	BH 902	40.75	03.68**
Faridabad	BH 946	41.20	BH 393	38.26	07.68 NS
Durgapura-Jaipur	BH 946	55.67	Raj 4079	41.67	33.60***
Chomu-Jaipur	BH 946	47.46	RD 2035	43.88	08.16 NS
	BH 946	51.96	RD 2052	48.96	06.13 NS
	BH 946	54.46	RD 2503	50.99	06.81 NS
Dausa	BH 946	50.80	RD 2052	44.10	15.19***
CZ					
Udaipur	BH 959	43.00	RD 2035	35.25	21.99**
•	BH 959	44.00	RD 2552	36.67	19.99*
Rajsamand	BH 959	40.53	Local	31.13	30.20***
Rewa	BH 959	39.17	JB 1	37.77	03.71 NS
	BH 959	42.85	JB 58	37.00	15.81 NS
Panna	BH 959	37.40	Munda Jawa	26.20	42.75***
Morena	BH 959	46.04	K 560	39.91	15.36***
Bhind	BH 959	42.83	Local	38.50	11.25***

<sup>\*\*\*</sup> 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 (26.55 q/ha) variety at Varanasi centre. In NEPZ, HUB 113 at Varanasi (40.77 q/ha), DWRB 101 at Ludhiana (57.75 q/ha) in NWPZ and BH 959 at Morena (46.04 q/ha) in central zone were the highest average yielding varieties (Table 32).

Table 33: Yield potential of barley varieties in different zones during 2015-16

Zone	Centre	Variety	Yield(q/ha)
NHZ	Bajaura	BHS 400	32.80
NEPZ	Varanasi	HUB 113	44.00
NWPZ	Ludhiana	DWRB 101	60.00
CZ	Morena	BH 959	49.80

At particular farmers' field as well as on average basis BHS 400 (32.80 q/ha), HUB 113 (44.00 q/ha), DWRB 101 (60.00 q/ha) and BH 959 (49.80 q/ha) performed better than other varieties at Bajaura, Varanasi, Ludhiana and Morena centres in the NHZ, NEPZ, NWPZ and CZ, respectively (Table 33).

Table 34: Barley varieties grown in different zones during 2015-16

Zone	Improved varieties	Check varieties	Popular varieties in the region
NHZ	BHS 400	BHS 352, Sonu	Sonu, Dolma, HBL 276, Local, HBL 316, BHS 352
NEPZ	RD 2794, HUB 113	Faizabad Local, Jagriti, Manjula, Azad, Geetanjali	Faizabad Local, Jagriti, Manjula, JB 58, Azad, Jyoti, Geetanjali, Local
NWPZ	BH 946, DWRB 101	PL 807, DWRUB 52, BH 393, RD 2035, RD 2052, RD 2503	PL 807, BH 393, Local, BH 902, RD 2035, RD 2660, RD 2052, RD 2503, RD 2552
CZ	BH 959	RD 2035, RD 2552, Local, JB 1, JB 58, Munda Jawa, K 560	RD 2035, RD 2552, RD 2715, RD 2660, JB 1, JB 58, Munda Jawa, K 560, Local

#### Conducting barley FLDs at ICAR-IIWBR, Karnal centre during 2015-16

During *Rabi* 2015-16, five hectares barley Front Line Demonstrations (FLDs) were conducted at ten farmers' fields in the villages Ganjogarhi (Karnal), Rasina (Kaithal) and Makhand (Jind) of Haryana state using varieties DWRB 101 and BH 946. The demonstrations were conducted with complete package of practices. Farmers were provided the critical inputs as per provision under the programme.

## Constraints analysis in different barley producing zones during 2015-16

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

**NHZ:** In northern hills zone, yellow rust, lack of knowledge among farmers about recent technologies, small land holdings, high cost of inputs, late sowing, low organic matter in the soil, imbalanced use of fertilizers, lack of facility of canal irrigation, untimely rain, water stress, lack of knowledge of appropriate dose and method of herbicide application, etc. were some of the constraints which need immediate intervention.

Table 35: Constraints of NHZ

(n≔16)

Constraints	Score	Rank
Yellow rust	32	I
Lack of knowledge among farmers about recent technologies	32	I
Small land holdings	27	II
Non-availability of seeds of newly released varieties	27	II
High cost of inputs	22	III
Late sowing	22	III
Low organic matter in the soil	22	III
Imbalanced use of fertilizers	22	III
Lack of facility of canal irrigation	22	111
Untimely rain	21	IV
Water stress	21	IV
Lack of knowledge of appropriate dose and method of herbicide application	21	IV

**NEPZ:** In north eastern plains zone, untimely rain was ranked first. The other major constraints were late sowing, *Phalaris minor*, non-availability of labour, small land holdings, zinc deficiency, imbalanced use of fertilizer, non-availability of farm machinery, temperature fluctuation during crop growth and erratic power supply.

Table 36: Constraints of NEPZ

(n=35)

Constraints	Score	Rank
Untimely rain	62	1
Late sowing	58	11
Phalaris minor	56	III
Non-availability of labour	56	III
Small land holdings	53	IV
Zn deficiency	53	IV
Imbalanced use of fertilizer	53	IV
Non-availability of farm machinery	53	IV
Temperature fluctuation during crop growth	51	V
Erratic power supply	44	VI

**NWPZ:** Being the most productive and potential zone for barley cultivation, the constraints which were most serious in nature need to be addressed. Among major constraints, erratic power supply, low price of barley, high temperature at maturity, high cost of inputs, temperature fluctuation during crop growth, untimely rain, non-availability of electricity, non-availability of labour, small land holdings and low organic matter in the soil were perceived by majority of the FLD farmers of NWPZ.

Table 37: Constraints of NWPZ

(n=125)

		111 120	
Constraints	Score	Rank	
Erratic power supply	121	1	
Low price of barley	119	l II	
High temperature at maturity	116	III	
High cost of inputs	116	III	
Temperature fluctuations during crop growth	114	IV	
Untimely rain	114	IV	
Non-availability of electricity	113	V	
Non-availability of labour	112	VI	
Small land holdings	110	VII	
Low organic matter in the soil	110	VII	

**CZ:** In central zone, high cost of inputs was perceived as the most serious constraint followed by non-availability of farm machinery, lack of facility of canal irrigation, temperature fluctuations during crop growth, low organic matter in the soil, low micronutrients in soil, decline in water table, non-availability of seeds of newly released varieties and lack of irrigation facility.

Table 38: Constraints of CZ

(n≔69)

Constraints	Score	Rank
High cost of inputs	95	I
Non-availability of farm machinery	85	II
Lack of facility of canal irrigation	85	II
Temperature fluctuation during crop growth	76	III
Low organic matter in the soil	69	IV
Low micro nutrient in the soil	69	IV
Imbalanced use of fertilizer	69	IV
Decline in water table	67	V
Non-availability of seeds of newly released varieties	64	VI
Lack of irrigation facility	64	VI

# Most serious constraints impeding barley production in the country

Over all analysis of constraints in different zones clearly indicated that erratic power supply, low price of barley, high temperature at maturity, high cost of inputs, temperature fluctuation during crop growth, untimely rain, non-availability of electricity, non-availability of labour, small land holdings, low organic matter in the soil, high cost of inputs, non-availability of farm machinery and lack of facility of canal irrigation were identified as major constraints affecting barley production and productivity of the country.

Table 39: Major constraints impeding barley production in the country

(n=245)

Constraints	Score	Rank
Erratic power supply	121	I
Low price of wheat	119	l II
High temperature at maturity	116	III
High cost of inputs	116	III
Temperature fluctuations during crop growth	114	IV
Untimely rain	114	IV
Non-availability of electricity	113	V
Non-availability of labour	112	VI
Small land holdings	110	VII
Low organic matter in the soil	110	VII
High cost of inputs	95	VIII
Non-availability of farm machinery	85	IX
Lack of facility of canal irrigation	85	IX

**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 on investment is one of major deciding criterions for adoption of any crop production technology. In this section, costs and returns analysis for wheat and barley FLDs have been attempted across regions for the improved production technologies that were tested in farmers' field during 2015-16.

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

#### **Data Collection**

Primary data were collected by the cooperating centres from the selected farmers who were allotted with the FLDs. Personal interview and discussion method was adopted with the aid of pre-tested schedules designed exclusively for the purpose evaluating the technologies disseminated through FLDs. The data collected pertained to the *Rabi* season 2015-2016. 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 inappropriate data reported from the cooperating centres were not included for the costs and returns analysis.

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

Perusal of Table 40 indicates that on an average, wheat varieties or technologies demonstrated in FLDs gave ₹2.53 per rupee of investment in comparison to the check varieties (₹2.19). A significant difference in returns per rupee of investment was noticed between the FLD and check plots across states, zones and technologies. The returns from FLDs ranged from ₹5.35 (Tamil Nadu) to ₹1.66 across states, ₹5.35 (SHZ) to ₹1.89 (NHZ) across zones and ₹5.26 (Dicoccum) to ₹1.76 (Sprinkler) across technologies. Tamil Nadu registered the highest returns per rupee of investment owing to the low operational costs, followed by Punjab (₹3.67) and Haryana (₹3.28). In 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.

The profit per hectare in FLDs was highest in Punjab (₹72813), followed by Rajasthan (₹68075) and Gujarat (₹64376). The difference in profit between FLDs and check ranged from ₹18945 in Madhya Pradesh to ₹1944 in Haryana. Interestingly, operational costs in Punjab, Madhya Pradesh, Rajasthan and Jammu & Kashmir were lower in FLDs than check plots. The probable reason might be demonstration of resource efficient zero tillage and rotavator techniques reduced the operational costs. Estimates of cost of production indicated that the cost incurred in producing a unit quantity of output was least in Punjab (₹542 per quintal) owing to less operational costs and the likelihood of getting more yield being a progressive state. Among wheat growing zones, the returns per rupee of investment were highest in the SHZ due to less operational costs in raising the crop and high price (₹2600 per quintal). NWPZ also realized a good return per rupee of investment which is mainly due to the higher productivity.

Among the wheat production technologies demonstrated at the farmers field, durum cultivation gave the highest profit per hectare (₹84427) and the least profit was observed for the late sown wheat varieties (₹29783). However, the results were not consistent across sites owing to testing of particular technology in different locations of diverse soil properties. Overall, on an average, an Indian farmer by adopting a new wheat variety or production technology will earn ₹45840 per hectare at his/her farm. Further, ₹914 have to be spent to produce a quintal of wheat through adoption of a new wheat variety or production technology against ₹1064 (check varieties).

Table 40: Costs and returns from Wheat during 2015-16

Particulars         Operativator         Check         FLD         Check         FLD         Obeck         PLD         Check         FLD         Check         Alagon         20303         36782         36345         41823         31612         2.90         2.435         2.90         4.90         2.90         6.90         2.00	able 40: Costs and retur		Cost	Returns per			st of					
Page	Particulars	Operatio	nal Costs	Gross Returns		Profit				Production (₹/QtI)		
Asom         23381         22868         38716         31537         15335         8669         1.66         1.38         1210         I           Bihar         32003         30763         74508         60915         42505         30152         2.33         1.98         935         1           Chhattisgarh         21969         21833         63782         53445         41823         31612         2.90         2.45         792         5           Gujarat         31266         34804         82212         76664         47167         41860         2.36         3.00         718         7           Haryana         28093         26060         88080         63965         62021         3.08         3.03         768         68         3         62021         3.28         3.38         658         658         6         2021         3.28         3.38         658         652         48         1.00         3.00         718         7         4         7         4         7         3.00         3.00         7         7         1.00         3.00         3.00         3.00         7         1.00         3.00         3.00         3.00         3.00 <th< th=""><th></th><th>FLD</th><th>Check</th><th colspan="2">FLD Check</th><th colspan="2">FLD Check</th><th colspan="2">FLD Check</th><th>FLD</th><th>Check</th></th<>		FLD	Check	FLD Check		FLD Check		FLD Check		FLD	Check	
Binar   32003   30763   74508   60915   42505   30152   2.33   1.98   935   71     Chhattisgarh   21959   21833   63782   53445   41823   31612   2.90   2.45   7.92   53     Delhi   35054   34804   82212   76654   47157   41850   2.35   2.20   830   83     Gujarat   31266   30934   95642   92809   64376   61874   3.06   3.00   718   74     Haryana   28093   28060   92056   88080   63956   6207   3.28   3.38   563   58     Haryana   38644   29722   61623   48317   27979   18595   3.28   3.38   563   58     Jammu & Kashmir   19594   20423   60009   50313   40915   29809   3.09   2.46   821   53     Jammu & Kashmir   19594   20423   60009   50313   40915   29809   3.09   2.46   821   53     Jarkhand   32013   31535   67962   49507   35949   17971   2.12   1.57   1019   1.4     Karnataka   44730   44730   83450   74611   38720   29881   1.87   1.67   1198   1.8     Madhya Pradesh   27940   28812   83813   65739   58873   36928   3.00   2.28   681   8.8     Maharashtra   30831   30248   83651   69491   52800   39243   2.71   2.30   1013   7     Nagaland   18740   18800   36649   32081   77931   63365   6367   341   542   58     Rajasthan   38448   38468   106523   93607   72813   66336   3.67   3.41   542   58     Rajasthan   38448   38468   106523   93607   72813   66336   3.67   3.41   542   58      Rajasthan   21675   19258   56088   43929   3414   24671   2.59   2.88   845   1      Uttar Pradesh   36238   33732   88116   77138   51878   43406   2.4   2.5   2.8   845   1      Uttar Pradesh   36243   3866   3693   3699   3421   2610   2.1   3.0   319   314   320   319   319   314   319   314   319   314   319   314   319	State											
Chhattisgarh	Asom '	23381	22868	38716	31537	15335	8669	1.66	1.38	1210	1469	
Delhi         35054         34804         82212         76654         47157         41850         2.35         2.20         830         8           Gujarat         31266         30934         95642         92809         64376         61874         3.06         3.00         718         7           Haryana         28093         26060         92058         88080         63965         62021         3.28         3.38         563         5           Himachal Pradesh         33644         29722         61623         48317         27979         18595         1.83         1.63         1274         1.5           Jammu & Kashmir         19594         20423         60509         5013         4915         28980         3.09         2.46         821         5           Jamkhand         32031         31535         67962         49507         35879         17971         2.12         1.57         1019         1           Madhya Pradesh         27940         28812         33813         65739         55873         36928         3.00         2.28         6811         8           Malarashtra         30831         30248         33651         69491         2820	Bihar	32003	30763	74508	60915	42505	30152	2.33	1.98	935	1078	
Haryana	Chhattisgarh	21959	21833	63782	53445	41823	31612	2.90	2.45	792	998	
Haryana	Delhi	35054	34804	82212	76654	47157	41850	2.35	2.20	830	885	
Himachal Pradesh	Gujarat	31266	30934	95642	92809	64376	61874	3.06	3.00	718	753	
	Haryana	28093	26060	92058	88080	63965	62021	3.28	3.38	563	550	
Markhand   32013   31535   67962   49507   35949   17971   2.12   1.57   1019   118   118   119   11	Himachal Pradesh	33644	29722	61623	48317	27979	18595	1.83	1.63	1274	1434	
Karnataka         44730         44730         83450         74611         38720         29881         1.87         1.67         1198         1.88           Madhya Pradesh         27940         28812         83813         65739         55873         36928         3.00         2.28         681         28           Maharashtra         30831         30248         83651         69491         52820         39243         2.71         2.30         1013         1           Nagaland         18740         18600         36649         32081         17909         13481         1.96         1.72         1453         1           Punjab         27246         27531         100059         93867         72813         66336         3.67         3.41         542         5           Rajasthan         38448         38486         106523         95700         68075         57214         2.77         2.49         796         8           Uttar Pradesh         36238         33732         88116         77138         51878         43406         2.43         2.29         841         9           Uttar Pradesh         32053         38058         65939         41990         37886 <th>Jammu &amp; Kashmir</th> <th>19594</th> <th>20423</th> <th>60509</th> <th>50313</th> <th>40915</th> <th>29890</th> <th>3.09</th> <th>2.46</th> <th>821</th> <th>976</th>	Jammu & Kashmir	19594	20423	60509	50313	40915	29890	3.09	2.46	821	976	
Madhya Pradesh         27940         28812         83813         65739         55873         36928         3.00         2.28         681         8           Maharashtra         30831         30248         83651         69491         52820         39243         2.71         2.30         1013         1           Nagaland         18740         18600         36649         32081         17909         13481         1.96         1.72         1453         1           Punjab         27246         27531         100059         93867         72813         66336         3.67         3.41         542         5           Rajasthan         38448         38486         106523         95700         68075         57214         2.77         2.49         796         8           Juttar Pradesh         36238         33732         88116         77138         51878         43406         2.43         2.29         841         9           Uttar Pradesh         36238         33732         88116         77138         51878         43406         2.43         2.29         841         9           Uttar Pradesh         36238         33732         86763         74980         45990 <th>Jharkhand</th> <th>32013</th> <th>31535</th> <th>67962</th> <th>49507</th> <th>35949</th> <th>17971</th> <th>2.12</th> <th>1.57</th> <th>1019</th> <th>1368</th>	Jharkhand	32013	31535	67962	49507	35949	17971	2.12	1.57	1019	1368	
Maharashtra         30831         30248         83651         69491         52820         39243         2.71         2.30         1013         1           Nagaland         18740         18600         36649         32081         17909         13481         1.96         1.72         1453         11           Punjab         27246         27531         100059         93867         72813         66336         3.67         3.41         542         5           Rajasthan         38448         38486         106523         95700         68075         57214         2.77         2.49         796         8           Tamil Nadu         11256         NE         60243         NE         48987         NE         5.35         NE         569         1           Uttar Pradesh         36238         33732         88116         77138         51878         43406         2.43         2.29         841         9           Uttar Pradesh         36238         33732         86186         43929         34414         24671         2.59         2.28         845         1           Uttar Pradesh         36238         33732         86783         74086         55567	Karnataka	44730	44730	83450	74611	38720	29881	1.87	1.67	1198	1347	
Nagaland	Madhya Pradesh	27940	28812	83813	65739	55873	36928	3.00	2.28	681	839	
Punjab   27246   27531   100059   93867   72813   66336   3.67   3.41   542   548	Maharashtra	30831	30248	83651	69491	52820	39243	2.71	2.30	1013	1197	
Rajasthan         38448         38486         106523         95700         68075         57214         2.77         2.49         796         8           Tamil Nadu         11256         NE         60243         NE         48987         NE         5.35         NE         569         1           Uttar Pradesh         36238         33732         88116         77138         51878         43406         2.43         2.29         841         2           Uttar Akhand         21675         19258         56088         43929         34414         24671         2.59         2.28         845         1           West Bengal         32054         30806         69939         41990         37886         11184         2.18         1.36         1197         4           CZ         31195         31479         86763         74086         55567         42607         2.78         2.35         761         8           NEPZ         31099         29587         65309         50399         34211         20812         2.10         1.70         1091         1.1           NWPZ         28874         28471         95740         8792	Nagaland	18740	18600	36649	32081	17909	13481	1.96	1.72	1453	1665	
Tamil Nadu	Punjab	27246	27531	100059	93867	72813	66336	3.67	3.41	542	583	
Uttar Pradesh         36238         33732         88116         77138         51878         43406         2.43         2.29         841         9           Uttarakhand         21675         19258         56088         43929         34414         24671         2.59         2.28         845         1           West Bengal         32054         30806         69939         41990         3786         11184         2.18         1.36         119         1           CZ         31195         31479         86763         74086         55567         42607         2.78         2.35         761         8           NEPZ         31099         29587         65309         50399         34211         20812         2.10         1.70         1091         1.           NHZ         29619         26421         56079         43906         26460         17485         1.89         1.66         1194         1.5           NWPZ         28874         28471         95740         87924         66866         59453         3.32         3.09         591         6           SHZ         11256         NE         60243 <th< th=""><th>Rajasthan</th><th>38448</th><th>38486</th><th>106523</th><th>95700</th><th>68075</th><th>57214</th><th>2.77</th><th>2.49</th><th>796</th><th>881</th></th<>	Rajasthan	38448	38486	106523	95700	68075	57214	2.77	2.49	796	881	
Uttarakhand         21675         19258         56088         43929         34414         24671         2.59         2.28         845         1           West Bengal         32054         30806         69939         41990         3786         11184         2.18         1.36         1197         1.35           CZ         31195         31479         86763         74086         55567         42607         2.78         2.35         761         8           NEPZ         31099         29587         65309         50399         34211         20812         2.10         1.70         1091         1.7           NHZ         29619         26421         56079         43906         26460         17485         1.89         1.66         1194         1.7           NWPZ         28874         28471         95740         87924         66866         59453         3.32         3.09         591         6           PZ         32376         31857         33629         70060         51253         38203         2.58         2.20         1034         11           SHZ         11256         NE         60243         NE         48987         NE	Tamil Nadu	11256	NE	60243	NE	48987	NE	5.35	NE	569	NE	
West Bengal         32054         30806         69939         41990         37886         11184         2.18         1.36         1197         1.36           Zone           CZ         31195         31479         86763         74086         55567         42607         2.78         2.35         761         8           NEPZ         31099         29587         65309         50399         34211         20812         2.10         1.70         1091         1.7           NHZ         29619         26421         56079         43906         26460         17485         1.89         1.66         1194         1.3           NWPZ         28874         28471         95740         87924         66866         59453         3.32         3.09         591         6           PZ         32376         31857         83629         70060         51253         38203         2.58         2.20         1034         11           SHZ         11256         NE         60243         NE         48987         NE         5.35         NE         569         1           Technilizer         29890         29349         77784         72473	Uttar Pradesh	36238	33732	88116	77138	51878	43406	2.43	2.29	841	903	
Zone           CZ         31195         31479         86763         74086         55567         42607         2.78         2.35         761         8           NEPZ         31099         29587         65309         50399         34211         20812         2.10         1.70         1091         1.5           NHZ         29619         26421         56079         43906         26460         17485         1.89         1.66         1194         1.3           NWPZ         28874         28471         95740         87924         66866         59453         3.32         3.09         591         6           PZ         32376         31857         83629         70060         51253         38203         2.58         2.20         1034         1.5           Text           Text         505         NE         505         NE         505         NE         509         1           Bio-fertilizer         29890         29349         77784         72473         47894         43124         2.60         2.47         897         9         9           Dicoccum         13061         30500	Uttarakhand	21675	19258	56088	43929	34414	24671	2.59	2.28	845	1058	
CZ         31195         31479         86763         74086         55567         42607         2.78         2.35         761         8           NEPZ         31099         29587         65309         50399         34211         20812         2.10         1.70         1091         1.           NHZ         29619         26421         56079         43906         26460         17485         1.89         1.66         1194         1.3           NWPZ         28874         28471         95740         87924         66866         59453         3.32         3.09         591         66           PZ         32376         31857         83629         70060         51253         38203         2.58         2.20         1034         11           SHZ         11256         NE         60243         NE         48987         NE         5.35         NE         569         1           Technology           Bio-fertilizer         29890         29349         77784         72473         47894         43124         2.60         2.47         897         9           Dicoccum         13061         30500         68697	West Bengal	32054	30806	69939	41990	37886	11184	2.18	1.36	1197	1369	
NEPZ         31099         29587         65309         50399         34211         20812         2.10         1.70         1091         1.70           NHZ         29619         26421         56079         43906         26460         17485         1.89         1.66         1194         1.70           NWPZ         28874         28471         95740         87924         66866         59453         3.32         3.09         591         60           PZ         32376         31857         83629         70060         51253         38203         2.58         2.20         1034         11           SHZ         11256         NE         60243         NE         48987         NE         5.35         NE         569         1           Technology           Bio-fertilizer         29890         29349         77784         72473         47894         43124         2.60         2.47         897         9           Dicoccum         13061         30500         68697         108100         55636         77600         5.26         3.54         600         11           Dirpirigation         33121         32321 <td></td> <td></td> <td></td> <td></td> <td>Zone</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>					Zone							
NHZ 29619 26421 56079 43906 26460 17485 1.89 1.66 1194 11 NWPZ 28874 28874 28471 95740 87924 66866 59453 3.32 3.09 591 6 PZ 32376 31857 83629 70060 51253 38203 2.58 2.20 1034 11 SHZ  Technology  Bio-fertilizer 29890 29349 77784 72473 47894 43124 2.60 2.47 897 9 Dicoccum 13061 30500 68697 108100 55636 77600 5.26 3.54 2.94 744 7 Durum 30895 33930 115322 89742 84427 55811 3.73 2.64 601 7 Rotavator 28801 29378 90722 88277 61921 58899 3.15 3.00 584 6 Sprinkler 59603 37403 104793 96289 45100 58886 1.76 2.57 1140 7 Improved Variety (LS) 31153 30357 60936 47531 29783 17174 1.96 1.57 1246 13 Zero Tillage 27822 28148 79799 77575 51977 49427 2.87 2.76 677 7	CZ	31195	31479	86763	74086	55567	42607	2.78	2.35	761	890	
NWPZ         28874         28471         95740         87924         66866         59453         3.32         3.09         591         6           PZ         32376         31857         83629         70060         51253         38203         2.58         2.20         1034         11           SHZ         11256         NE         60243         NE         48987         NE         5.35         NE         569         M           SHZ         Technology           Technology           Bio-fertilizer         29890         29349         77784         72473         47894         43124         2.60         2.47         897         9           Dicoccum         13061         30500         68697         108100         55636         77600         5.26         3.54         600         10           Drip Irrigation         33121         32321         94038         95000         60917         62679         2.84         2.94         744         7           Durum         30895         33930         115322         89742         84427         55811         3.73         2.64         601         7           Ro	NEPZ	31099	29587	65309	50399	34211	20812	2.10	1.70	1091	1280	
PZ         32376         31857         83629         70060         51253         38203         2.58         2.20         1034         125           SHZ         11256         NE         60243         NE         48987         NE         5.35         NE         569         NE           Technology           Bio-fertilizer         29890         29349         77784         72473         47894         43124         2.60         2.47         897         9           Dicoccum         13061         30500         68697         108100         55636         77600         5.26         3.54         600         11           Dirip Irrigation         33121         32321         94038         95000         60917         62679         2.84         2.94         744         7           Durum         30895         33930         115322         89742         84427         55811         3.73         2.64         601         7           Rotavator         28801         29378         90722         88277         61921         58899         3.15         3.00         584         6           Sprinkler <th< th=""><td>NHZ</td><td>29619</td><td>26421</td><td>56079</td><td>43906</td><td>26460</td><td>17485</td><td>1.89</td><td>1.66</td><td>1194</td><td>1366</td></th<>	NHZ	29619	26421	56079	43906	26460	17485	1.89	1.66	1194	1366	
SHZ         11256         NE         60243         NE         48987         NE         5.35         NE         569         NE           Technology           Bio-fertilizer         29890         29349         77784         72473         47894         43124         2.60         2.47         897         9           Dicoccum         13061         30500         68697         108100         55636         77600         5.26         3.54         600         10           Drip Irrigation         33121         32321         94038         95000         60917         62679         2.84         2.94         744         7           Durum         30895         33930         115322         89742         84427         55811         3.73         2.64         601         7           Rotavator         28801         29378         90722         88277         61921         58899         3.15         3.00         584         6           Sprinkler         59603         37403         104793         96289         45190         58886         1.76         2.57         1140         7           Improved Variety (LS)         31153         30357	NWPZ	28874	28471	95740	87924	66866	59453	3.32	3.09	591	639	
Technology           Bio-fertilizer         29890         29349         77784         72473         47894         43124         2.60         2.47         897         9           Dicoccum         13061         30500         68697         108100         55636         77600         5.26         3.54         600         10           Drip Irrigation         33121         32321         94038         95000         60917         62679         2.84         2.94         744         7           Durum         30895         33930         115322         89742         84427         55811         3.73         2.64         601         7           Rotavator         28801         29378         90722         88277         61921         58899         3.15         3.00         584         6           Sprinkler         59603         37403         104793         96289         45190         58886         1.76         2.57         1140         7           Improved Variety         29975         28956         75475         62979         45501         34023         2.52         2.18         910         10           Zero Tillage         27822         28148	PZ	32376	31857	83629	70060	51253	38203	2.58	2.20	1034	1213	
Bio-fertilizer         29890         29349         77784         72473         47894         43124         2.60         2.47         897         9           Dicoccum         13061         30500         68697         108100         55636         77600         5.26         3.54         600         10           Drip Irrigation         33121         32321         94038         95000         60917         62679         2.84         2.94         744         7           Durum         30895         33930         115322         89742         84427         55811         3.73         2.64         601         7           Rotavator         28801         29378         90722         88277         61921         58899         3.15         3.00         584         6           Sprinkler         59603         37403         104793         96289         45190         58886         1.76         2.57         1140         7           Improved Variety         29975         28956         75475         62979         45501         34023         2.52         2.18         910         10           Zero Tillage         27822         28148         79799         77575         51977<	SHZ	11256	NE	60243	NE	48987	NE	5.35	NE	569	NE	
Dicoccum         13061         30500         68697         108100         55636         77600         5.26         3.54         600         10           Drip Irrigation         33121         32321         94038         95000         60917         62679         2.84         2.94         744         7           Durum         30895         33930         115322         89742         84427         55811         3.73         2.64         601         7           Rotavator         28801         29378         90722         88277         61921         58899         3.15         3.00         584         6           Sprinkler         59603         37403         104793         96289         45190         58886         1.76         2.57         1140         7           Improved Variety         29975         28956         75475         62979         45501         34023         2.52         2.18         910         10           Improved Variety (LS)         31153         30357         60936         47531         29783         17174         1.96         1.57         1246         13           Zero Tillage         27822         28148         79799         77575         <				Tec	hnology							
Drip Irrigation         33121         32321         94038         95000         60917         62679         2.84         2.94         744         7           Durum         30895         33930         115322         89742         84427         55811         3.73         2.64         601         7           Rotavator         28801         29378         90722         88277         61921         58899         3.15         3.00         584         6           Sprinkler         59603         37403         104793         96289         45190         58886         1.76         2.57         1140         7           Improved Variety         29975         28956         75475         62979         45501         34023         2.52         2.18         910         10           Improved Variety (LS)         31153         30357         60936         47531         29783         17174         1.96         1.57         1246         13           Zero Tillage         27822         28148         79799         77575         51977         49427         2.87         2.76         677         7	Bio-fertilizer	29890	29349	77784	72473	47894	43124	2.60	2.47	897	962	
Durum         30895         33930         115322         89742         84427         55811         3.73         2.64         601         7           Rotavator         28801         29378         90722         88277         61921         58899         3.15         3.00         584         6           Sprinkler         59603         37403         104793         96289         45190         58886         1.76         2.57         1140         7           Improved Variety         29975         28956         75475         62979         45501         34023         2.52         2.18         910         10           Improved Variety (LS)         31153         30357         60936         47531         29783         17174         1.96         1.57         1246         13           Zero Tillage         27822         28148         79799         77575         51977         49427         2.87         2.76         677         7	Dicoccum	13061	30500	68697	108100	55636	77600	5.26	3.54	600	1053	
Rotavator         28801         29378         90722         88277         61921         58899         3.15         3.00         584         6           Sprinkler         59603         37403         104793         96289         45190         58886         1.76         2.57         1140         7           Improved Variety         29975         28956         75475         62979         45501         34023         2.52         2.18         910         10           Improved Variety (LS)         31153         30357         60936         47531         29783         17174         1.96         1.57         1246         13           Zero Tillage         27822         28148         79799         77575         51977         49427         2.87         2.76         677         7           All Categories	Drip Irrigation	33121	32321	94038	95000	60917	62679	2.84	2.94	744	760	
Sprinkler         59603         37403         104793         96289         45190         58886         1.76         2.57         1140         7           Improved Variety         29975         28956         75475         62979         45501         34023         2.52         2.18         910         10           Improved Variety (LS)         31153         30357         60936         47531         29783         17174         1.96         1.57         1246         13           Zero Tillage         27822         28148         79799         77575         51977         49427         2.87         2.76         677         7           All Categories	Durum	30895	33930	115322	89742	84427	55811	3.73	2.64	601	728	
Improved Variety         29975         28956         75475         62979         45501         34023         2.52         2.18         910         10           Improved Variety (LS)         31153         30357         60936         47531         29783         17174         1.96         1.57         1246         13           Zero Tillage         27822         28148         79799         77575         51977         49427         2.87         2.76         677         7           All Categories	Rotavator	28801	29378	90722	88277	61921	58899	3.15	3.00	584	615	
Improved Variety         29975         28956         75475         62979         45501         34023         2.52         2.18         910         10           Improved Variety (LS)         31153         30357         60936         47531         29783         17174         1.96         1.57         1246         13           Zero Tillage         27822         28148         79799         77575         51977         49427         2.87         2.76         677         7           All Categories	Sprinkler	59603	37403	104793	96289	45190	58886	1.76	2.57	1140	779	
Zero Tillage 27822 28148 79799 77575 51977 49427 2.87 2.76 677 7  All Categories	Improved Variety	29975	28956	75475	62979	45501	34023	2.52	2.18	910	1070	
All Categories	Improved Variety (LS)	31153	30357	60936	47531	29783	17174	1.96	1.57	1246	1390	
All Categories	Zero Tillage	27822	28148	79799	77575	51977	49427	2.87	2.76	677	718	
				All C	ategories							
India   29883   29251   75723   63919   45840   34668   2.53   2.19   914   10	India	29883	29251	75723	63919	45840	34668	2.53	2.19	914	1064	

Note: NE indicates that check varieties were not grown and hence costs and returns were not estimated.

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

Table 41 indicates that on an average, improved barley varieties demonstrated in FLDs gave around 16 per cent better returns in comparison to the check. A significant difference in returns per rupee of investment was noticed between the FLD and check plots across states and zones. Punjab registered the highest returns per rupee of investment (₹5.58) through demonstrations, followed by Haryana (₹3.42) and Uttar Pradesh (₹3.17). However, the difference in the returns per rupee of investment between FLDs and Checks was highest in Uttar Pradesh. The profit per hectare in FLDs was highest in Punjab (₹59990), followed by Haryana (₹57605) and Rajasthan (₹55076). The difference in profit between FLDs and check ranged from ₹16047 in Uttar Pradesh to ₹5120 in Punjab. Interestingly, operational costs in Madhya Pradesh and Uttar Pradesh were lower in FLDs than check plots. The valid reason might be reduction in the use of inputs based on the recommendation. The returns per rupee of investment across barley growing zones were highest in the NWPZ (₹3.41) followed by NEPZ (₹3.20) and CZ (₹2.84). Estimates of cost of production indicated that the cost incurred in producing a unit quantity of output was least (₹289) in Punjab (NWPZ) owing to less operational costs and relatively higher yield.

Table 41: Costs and Returns from Barley during 2015-16

	Cost of Cultivation (₹/ha)							Returns per ₹		ost of duction
Particulars	Operational Costs		Gross	Gross Returns		Profit		invested		tuction ₹/QtI)
	FLD	Check	FLD	Check	FLD	Check	FLD	Check	FLD	Check
State										
Haryana	23757	22655	81362	73297	57605	50642	3.42	3.24	516	539
Himachal Pradesh	24919	22788	51679	40275	26761	17488	2.07	1.77	983	1206
Madhya Pradesh	25046	25491	66084	55110	41038	29619	2.64	2.16	604	760
Punjab	13100	13100	73090	67970	59990	54870	5.58	5.19	269	289
Rajasthan	25771	25387	80846	65981	55076	40594	3.14	2.60	539	631
Uttar Pradesh	22728	24788	72070	58083	49342	33295	3.17	2.34	660	908
				Zone						
CZ	24103	24197	68346	55095	44242	30898	2.84	2.28	579	720
NEPZ	22617	24694	72422	58258	49805	33564	3.20	2.36	658	905
NHZ	24919	22788	51679	40275	26761	17488	2.07	1.77	983	1206
NWPZ	23927	23130	81703	73133	57776	50003	3.41	3.16	504	539
	Variety									
Improved Variety	23854	23631	74655	63782	50800	40151	3.13	2.70	578	686
			P	All Catego	ries					
India	23854	23631	74655	63782	50800	40151	3.13	2.70	578	686

Overall, the costs and returns analysis on wheat barley indicated that profit per hectare from FLDs was more than the check varieties by ₹10650 and ₹10650 respectively establishing the fact that FLDs carry the successful technologies from lab to land. In a few cases it was found that the operational costs under check varieties were more than FLDs. However, the present estimates are only the indicators for comparison within the current year and may not have a complete inter-year relevance as the demonstrations were conducted in different sites. Further, the difference in profit earned from wheat/barley cultivation is subject to farm-farmer-region specific conditions as it varies from one another.

# Production Scenario of Wheat and Barley in India

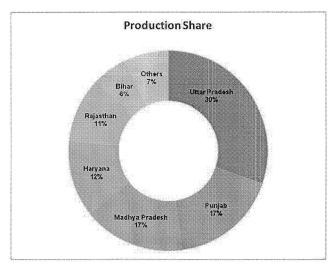
#### **Production Scenario of Wheat in India**

Wheat production has set an all-time highest 95.85 million tonnes (mt) in 2013-14. Despite the record, the subsequent year's production has witnessed a major quantum fall of 9.32 mt registering 86.53 mt. However, it has revived in the recent past 2015-16 Rabi season with an estimated production of 94.04 mt (3rd Advance Estimate). The positive growth in production (8.68%) is attributed to the increased yield by 13.82 per cent despite a fall in the crop acreage by 4.53 per cent (Table 42). In spite of increase in the support price by ₹ 75 per quintal in comparison to the previous year and announced as ₹ 1525 per quintal of wheat, the current year acreage has reduced by 1.43 mha. The average productivity of the country has increased by 380 kg/ha which is a major reason for the increased current year 94.04 mt production against the acreage decline. However, there are regional disparities in all the three variables in compasion to the previous year final estimates (2014-15). Lack of sufficient soil moisture for germination owing to warm temperature prevailed in Madhya Pradesh and late harvesting of rice and sugarcane varieties respectively in pockets of Punjab and Uttar Pradesh led to the fall in wheat sown area.

Table 42: Quantum change in area, production and yield of wheat

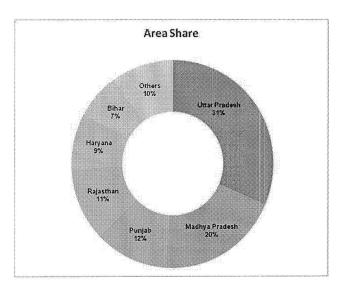
State/Country	2014-15 (Final Estimates)*			2015-1	6 (Third Estim	ates)**	Quantum Change in			
	Area (000'ha)	Production (000't)	Yield (kg/ha)	Area (000'ha)	Production (000't)	Yield (kg/ha)	Area (000'ha)	Production (000't)	Yield (kg/ha)	
Asom	24	28.77	1216	30	38	1267	6	9	51	
Bihar	2154	3986.98	1851	2155.6	5251.1	2436	2	1264	585	
Chhattisgarh	98	135.3	1388	102	136.4	1337	4	1	-51	
Gujarat	1112	3059	2751	901	2630	2919	-211	-429	168	
Haryana	2601	10354	3981	2610	11489	4402	9	1135	421	
Himachal Pradesh	330	646.46	1957	345.1	494.1	1432	15	-152	-525	
Jammu & Kashmir	320.97	314.32	979	320.9	497.4	1550	0	183	571	
Jharkhand	171.13	330.38	1931	161.1	274.4	1703	-10	-56	-228	
Kamataka	198	261	1318	170	163	959	-28	-98	-359	
Madhya Pradesh	6002	17103.9	2850	5911	15644.1	2647	-91	-1460	-203	
Maharashtra	1067	1308	1226	629	718	1141	-438	-590	-85	
Odisha	0.4	0.66	1650	1.3	2	1566	1	1	-84	
Punjab	3505	15050	4294	3497	16512	4722	-8	1462	428	
Rajasthan	3318.25	9823.88	2961	3042.2	10002.7	3288	-276	179	327	
Telengana	6	7	1167	4	3	750	-2	-4	-417	
Uttar Pradesh	9846	22417.37	2277	9455	28365	3000	-391	5948	723	
Uttarakhand	347.76	654.15	1881	342	755	2208	-6	101	327	
West Bengal	334.64	939.25	2807	335	945	2821	0	6	14	
Others	29	106	3598	27.2	115.3	4233	-2	9	635	
INDIA	31466	86527	2750	30040	94036	3130	-1426	7509	380	

<sup>\*</sup> and \*\* indicate the final and third advance estimates respectively from the DES, MoA&FW, India.



Perusal of state wise production indicated that Uttar Pradesh tops the list with 28.37 mt, followed by Punjab (16.51mt), Madhya Pradesh (15.64 mt), Haryana (11.49 mt), Rajasthan (10 mt) and Bihar (5.25 mt). These top six states together contributed about 93 per cent of the total production. Barring Madhya

Pradesh, the rest of the major producers showed an increase in production in comparison to 2014-15. Production in Madhya Pradesh has declined by 1.46 mt owing to the fall in yield levels and acreage during 2015-16. The increase in wheat production was maximum in the case of Uttar Pradesh (5.95 mt), followed by Punjab (1.46 mt) and Bihar (1.26 mt).



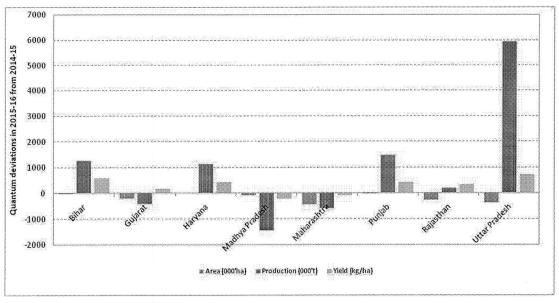
Wheat acreage during 2015-16 has declined by 1.43 mha with regional differences in terms of magnitude. The highest decline was noticed in Maharashtra (0.44 mha), followed by Uttar Pradesh (0.39 ha) and Rajasthan (0.28 mha). Yet, Uttar Pradesh occupies more area under wheat (9.46 mha), followed by Madhya

Pradesh (5.91 mha), Punjab (3.50 mha), Rajasthan (3.04 mha), Haryana (2.61 mha) and Bihar (2.16 mha). All these states together cover about 90 per cent of the total area and produce 93 per cent of the total wheat. Among states, Himachal Pradesh, Bihar and Haryana registered an increase in the crop acreage during 2015-16 in comparison to 2014-15 and the highest increase was noticed in Himachal Pradesh (15,000 ha). The percentage decline in acreage was highest in the case of Maharashtra, followed by Telengana and Gujarat. States like Jharkhand, Karnataka, Madhya Pradesh, Maharashtra and Telengana have registered a decline in both area and yield.

Table 43: Contribution of yield and/or area to wheat production (2015-16)

State/Country	Change in pro 2015-16* over		% contribution by				
	Quantity (in '000 tonnes)	Deviation (in %)	Area	Yield			
Asom	9	32.08	25.00	4.19			
Bihar	1264	31.71	0.07	31.60			
Chhattisgarh	1	0.81	4.08	-3.67			
Gujarat	-429	-14.02	-18.97	6.11			
Haryana	1135	10.96	0.35	10.58			
Himachal Pradesh	-152	-23.57	4.58	-26.83			
Jammu & Kashmir	183	58.25	-0.02	58.32			
Jharkhand	-56	-16.94	-5.86	-11.81			
Karnataka	-98	-37.55	-14.14	-27.24			
Madhya Pradesh	-1460	-8.53	-1.52	-7.12			
Maharashtra	-590	-45.11	-41.05	-6.93			
Odisha	1	203.03	225.00	-5.09			
Punjab	1462	9.71	-0.23	9.97			
Rajasthan	179	1.82	-8.32	11.04			
Telengana	-4	-57.14	-33.33	-35.73			
Uttar Pradesh	5948	26.53	-3.97	31.75			
Uttarakhand	101	15.42	-1.66	17.38			
West Bengal	6	0.61	0.11	0.50			
Others	9	8.77	-6.21	17.65			
INDIA	7509	8.68	-4.53	13.82			

Note: \* indicate the third advance estimates from the DES, MoA&FW, India.



Analysis on contribution of yield and/or area to the current year's wheat production indicated that the average productivity increase by 13.82 per cent (380 kg/ha) in 2015-16 has been the major reason for enhanced country's production by producing an additional 7.51 mt of wheat (Table 43). State wise estimates indicate that barring Madhya Pradesh, the rest registered a significant increase in wheat production. With the exception of Madhya Pradesh and Maharashtra, in the rest of the states like Bihar, Gujarat, Haryana, Punjab, Rajasthan and Uttar Pradesh yield levels have increased relative to 2014-15.

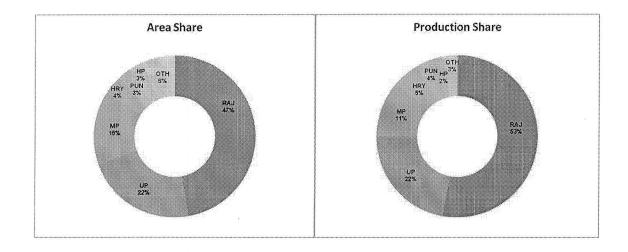
# **Production Scenario of Barley in India**

Barley, the nutri-rich and competing cereal for wheat also witnessed a similar kind of scenario. The current year production of barley witnessed a quantum jump of 5510 tonnes (Table 44) registering 1.62 mt which is attributed to yield increase by 8.35 per cent against a fall in the crop acreage by 7.39 per cent (3<sup>rd</sup> Advance Estimates from the Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare, India). The overall reduction in area has been estimated at 0.5 lakh hectares despite the increase in the support price by ₹ 75 per quintal in comparison to the previous year and announced as ₹ 1225 per quintal of barley. Since the *Rabi* season (2015-16) has encountered weather anomalies and fraught with uncertainites similar to 2014-15, the barley production in both the years reduced significanlty in comparion to 2013-14.

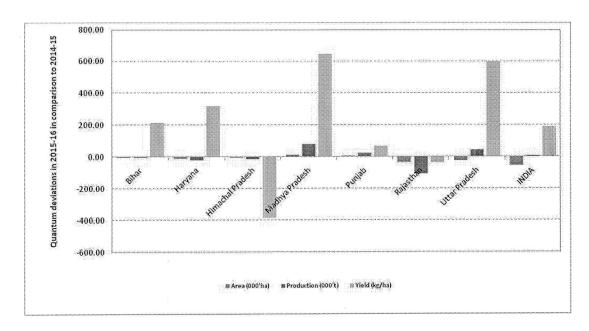
Table 44: Quantum change in area, production and yield of barley

State/Country	2014-15 (Final Estimates)*			2015-1	16 (Third Estim	ates)**	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	12.1	13.4	1109	10.9	14.4	1321	-1.21	0.97	212
Chhattisgarh	2.3	3.0	1304	2.4	1.8	750	0.10	-1.20	-554
Haryana	33.0	105.0	3182	24	84	3500	-9.00	-21.00	318
Himachal Pradesh	21.7	37.8	1739	19.2	26	1354	-2.53	-11.78	-384
Jammu & Kashmir	6.7	4.0	602	6.7	4.3	642	0.04	0.29	40
Madhya Pradesh	83.0	104.3	1257	97	184.6	1903	14.00	80.30	646
Punjab	11.0	39.4	3582	17	62	3647	6.00	22.60	65
Rajasthan	343.3	962.4	2803	309.4	856.7	2769	-33.90	-105.69	-34
Uttar Pradesh	170.0	315.0	1853	146	358	2452	-24.00	43.00	599
Uttarakhand	21.3	24.5	1149	19	22	1158	-2.28	-2.45	9
West Bengal	2.0	3.0	1500	2.5	3.5	1400	0.50	0.50	-100
Others	1.08	1.23	1139	1.1	1.2	1091	0.02	-0.03	-48
INDIA	707	1613	2280	655	1619	2470	-52.26	5.51	190

<sup>\*</sup> and \*\* indicate the final and third advance estimates respectively from the DES, MoA&FW, India.



Perusal of state wise estimates indicate that Rajasthan tops the list in barley production (0.86 mt), followed by Uttar Pradesh (0.36 mt) and Madhya Pradesh (0.19 mt). These three states altogether accounted for 86 per cent of total national barley production. Rajasthan had the maximum area under barley (0.31 mha) during 2015-16 and contributed a share of 47 per cent to the total area under the crop in India, a plausible reason for its high share in production as well (53 %). In the 2015-16 *Rabi* season, the average crop productivity in barley was highest in the case of Punjab (3647 kg/ha) followed by Haryana (3500 kg/ha), Rajasthan (2769 kg/ha) and Uttar Pradesh (2452 kg/ha). These states with their consistent higher yield coupled with high area under barley cultivation helped to produce 1.62 mt.



Despite the increase at national level productivity, a wide range of yield reduction has been noticed across states. The decline was highest in Chhattisgarh (-554 kg/ha), followed by Himachal Pradesh (-384 kg/ha) and West Bengal (-100 kg/ha). However, some states like Bihar, Haryana, Jammu & Kashmir, Madhya Pradesh, Punjab, Uttar Pradesh and Uttarakhand have registered a higher yield in 2015-16 in comparison to 2014-15. The maximum positive growth in yield was noticed in Madhya Pradesh (+51.44 %), followed by Uttar Pradesh (+32.33 %), and Bihar (+19.12 %), In terms of quantum change, it was highest in the case of Madhya Pradesh (+646 kg/ha), followed by Uttar Pradesh and Haryana. It is also interesting to note that Jammu & Kashmir, Madhya Pradesh and Punjab showed an increase in all the three variables *viz.*, area, production and yield.

**Technology Outreach Programme** 

### **Technology Outreach Programme**

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

The 'Mera Gaon Mera Gaurav' Scheme has been implemented at the ICAR- IIWBR, Karnal. Honourable Director, ICAR-IIWBR, Karnal is the Patron and Dr. Satyavir Singh, Principal Scientist & PI (Social Sciences) is the Nodal Officer of the scheme. Fourteen teams of scientists of different disciplines have been constituted including four to five scientists. Each of the team has selected five different villages (Table 45) and organised different 'Agriculture Awareness Programmes'. The teams have completed following activities in their respective villages:

- Baseline survey of all the villages
- Organization of agriculture awareness programmes.
- Collection of soil samples, analysis & soil health card distribution among the farmers.

Table 45: The team wise name of scientists, villages selected and districts

Name of Scientists	Discipline	District and state	Name of village
TEAM - 1			
Dr. Satyavir Singh	Agricultural Extension	Yamunanagar	1.Bakana
Dr. Ajit Singh Kharub	Soil Science	(Haryana)	2. Chhota Baans
Dr. Rinki	Plant Physiology		3.Chamrori
Mr. Kailash Prajapat	Agronomy		4.Jubal
• •			5.Palaka
TEAM - 2			
Dr. Anuj Kumar	Agricultural Extension	Karnal (Haryana)	1.Jarauli Kalan
Dr. R.K. Sharma	Agronomy		2.Jarauli Khurd
Dr. Jogendra Singh	Plant Breeding		3.Nabipur
Mr. Senthil Kumar K M	Biotechnology		4.Kharajpur
			5.Mohmadpur
TEAM - 3			A 11-1 (17-10-1)
Dr. Anil Khippal	Agronomy	Kaithal and	1.Hajwana (Kaithal)
Dr. Dinesh Kumar	Bio Chemistry	Kurukshetra	2.Rasina (Kaithal)
Dr. Poonam Jasrotia	Entomology	(Haryana)	3. Yara (Kurukshetra)
Dr. Mamrutha H.M.	Plant Physiology		4. Chhapra
Dr. Chuni Lal	Plant Breeding		(Kurukshetra) 5.Jandheri
			5.Janonen
TEAM - 4	Τ.Δ.	I/lrahatua anal	1.Bara Gaon
Dr. R.S. Chhokar	Agronomy	Kurukshetra and	Control of the contro
Dr. R.K. Gupta	Quality & Basic Sciences	Karnal (Haryana)	2.Gheer 3.Landora
Mr. Gopala Reddy K	Plant Breeding		
Dr. Pradeep Sharma	Biotechnology		4.Seedpur 5.Poojam
P P A B R P			5.P00jam
TEAM - 5	Dient Prooding		1.Majra Roran
Dr. S.K. Singh	Plant Breeding		2. Sitamai
Dr. Vinod Tiwari	Plant Breeding		3. Koer
Dr. S.C. Tripathi	Agronomy	Vernel (Hemiene)	4. Mohri
Dr. Sendhil R.	Agri. Economics	Karnal (Haryana)	5.Sagga
TEAM - 6			1 J.Ouggu
Dr. Lokendra Kumar	Plant Breeding	Kurukshetra and	1. Jajanpur
Dr. D. Mohan	Biotechnology	Karnal (Haryana)	2.Sikendra Kheri
Dr. Rekha Malik	Plant Breeding	( , , , , , , , , , , , , , , , , , , ,	3. Chandana
Mr. Charan Singh	Plant Breeding	-	4.Sanghour
mi. Onaran onign	I lant brooding		5. Mangoli Jattan

TEAM - 7			
Dr. Raj Kumar	Plant Breeding	Karnal (Haryana)	1.Raipur Jattan
Dr. Sewa Ram	Plant Biochemistry		2.Shekhpura
Dr. Sindhu Sareen	Genetics		3.Gagsina
Dr. Sneh Narwal	Plant Biochemistry		4. Furlak
Dr./Ms. Vanita Pandey	Plant Biochemistry		5.Staundi
TEAM - 8			
Dr. Ajay Verma	Statistics	Karnal (Haryana)	1.Pingli
Dr. Arun Gupta	Economic Botany		2.Kheri Naru
Mr. Vikas Gupta	Plant Breeding		-3.Jaani
Ms. Priyanka Chandra	Microbiology		4.Bid Majra
			5.Chirao
TEAM - 9			
Dr. Sudheer Kumar	Plant Pathology	Karnal (Haryana)	1.Patanpuri
Dr. Sonia Sheoran	Biotechnology		2.Haibatpur
Dr. Karnam Venkatesh	Plant Breeding		3.Bukhapuri 4.Karsa Dod
TEAM - 10			4.Narsa Dou
Dr. Subhash Katare	Agri. Entomology	Karnal (Haryana)	1. Kalwa Heri
Dr. B.S. Tyagi	Plant Breeding		2. Subhri
Dr. Suman Lata	Computer Science		3. Mohay-Ud-Dinpur
Dr. Anita Meena	Agronomy		4. Kunjpura
	J		5. Chundipur
TEAM - 11			
Dr. Amit Kumar Sharma	Plant Breeding	Shamli (UP)	1.Vaidkhedi
Dr. Gyanendra Singh	Plant Breeding		2.Dokpura
Dr. Vishnu Kumar Goel	Plant Breeding		3.Paoti-Khurd
Ms. Ankita Jha	Agril. Meteorology		4.Bibipur
TEAM - 12			5.Lakshmanpura
Dr. Subhash Chander Gill	Agronomy	Karnal (Haryana)	1.Salaru
Dr. Ravish Chatrath	Plant Breeding	ramar (naryana)	2.Darar
Dr. M.S. Saharan	Plant Pathology		3.Rambha
Dr. Ratan Tiwari	Biotechnology		4.Sangoha
Dr. Natari Timari	Biotocimology		5.Sangohi
TEAM - 13			
Dr. Raj Pal Meena	Agronomy	Lahaul & Spiti (HP)	1.Jagla
Dr. Rajender Singh Khokhar	Ag. Biotechnology		2.Dalang
Dr. Satish Kumar	Plant Breeding		3.Thorang
Dr. C.N. Mishra	Plant Breeding		4.Khangsar
TEAM 44			5.Gondhla
TEAM - 14	Dignt Dathology	Solan (HP)	1. Tanseta
Dr. S.C. Bhardwaj	Plant Pathology	Sulan (NP)	2. Badog
Dr. Om Prakash Gangwar	Plant Breeding		3. Nanog
Dr. Hanif Khan	Plant Pathology		4. Brahmna
Dr. Pramod Prakash	Plant Pathology		5. Rajeena
Mr. Siddanna Savadi	Biotechnology		o. Rajoona

### **Organising Training Programmes**

Organized a one day "Training-cum-Workshop" on Baseline Data Collection under Tribal-Sub-Plan (TSP) Project on "Improving the Socio-economic Condition and Livelihood of Tribes in India through Extension Education and Development Programmes" at ICAR-IIWBR, Karnal for the TSP Centers' Cooperators on 31.10.2015.

### Dissemination of Information to Stakeholders

Dissemination of information/transfer of wheat & barley production technologies through demonstration at research farm, exhibitions, field day, awareness programmes, etc (Table 46).

Table 46: Organisation/Participation in Exhibition/Field Day/Agricultural Awareness Programmes

S.No.	Program	Date	Organized by
1.	Kharif Kisan Sammelan-2015 and Exhibition at KVK, Baghra, Muzaffarnagar (UP)	27 June, 2015	KVK-Baghra, Muzaffarnagar (UP)
2.	Agriculture Awareness Programme at village Ramba (District Karnal)	13 July, 2015	ICAR-IIWBR, Karnal
3.	Agriculture Awareness Programme at village Bakana (District Yamunanagar)	14 July, 2015	ICAR-IIWBR, Karnal
4.	Kisan Sammelan, KVK, NDRI, Karnal	14 July, 2015	KVK, NDRI, Karnal
5.	Agriculture Awareness Programme at village Rasina (District Kaithal).	15 July, 2015	I CAR-IIWBR, Karnal
6.	Exhibition at ICAR-IIWBR Farm, Hisar	15 Aug., 2015	ICAR-IIWBR, Karnal
7.	Exhibition at Pipara Kothi, Motihari, Bihar	20-21Aug., 2015	Pipara Kothi, Motihari, Bihar
8.	Agritech World – International Exhibition on Agriculture & Horticulture at ICAR-IIWBR, Karnal.	7-9 Oct., 2015	ICAR-IIWBR, Karnal
9.	Exhibition on "World Soil Day" at ICAR-IIWBR, Karnal.	05 Dec., 2016	ICAR-IIWBR, Karnal
10.	Exhibition on 'World Soil Health Day' at KVK, NDRI, Karnal	05 Dec., 2015	KVK, NDRI, Karnal
11.	'Jai Kisan Jai Vigyan Week (23-29 December, 2015)' at Vaid Kheri (Shamli), Faiz Alipur Majra (Karnal), Furlakand Badshahpur (Karnal), National Seeds Corporation, Area Office, Karnal (Haryana), The Millennium School, Karnal	23-29 Dec. 2015	ICAR-IIWBR, Karnal
12	'Field Day' on Farmers' Participatory Quality Seed Production under ICAR Seed Project at village Phurlak, Karnal	19 Jan., 2016	ICAR-IIWBR, Karnal
13.	Exhibition during Bufallo Mela at ICAR-CIRB, Hisar	01 Feb., 2016	ICAR-CIRB, Hisar
14.	Exhibition during 'Ganna Kisan Mela' at ICAR-SBI, RS, Karnal.	03 March, 2016	ICAR-SBI, RS, Karnal
15.	Exhibition during 'Rabi Kisan Mela' at ICAR-CSSRI, Karnal	05 March, 2016	ICAR-CSSRI, Karnal
16.	Exhibition during National Level Seminar at NHRDF, Salaru, Karnal	9-10 March, 2016	NHRDF, Salaru, Karnal
17.	Exhibition during Launch of 'International Year of Pulses' at ICAR-IIPR, Kanpur (UP)	13 March, 2016	ICAR-IIPR, Kanpur, UP.
18.	Exhibition during National Agricultural Fair, Krishi Unnati Mela at ICAR-IARI, Pusa, New Delhi	19-21March, 2016	ICAR-IARI, New Delhi
19.	Field Day at Village Makhand (Jind) Barley FLD site	21 March, 2016	ICAR-IIWBR, Karnal
20.	Field Day at Village Bakana (Yamunanagar) Wheat FLD site	31 March, 2016	ICAR-IIWBR, Karnal
21.	Exhibition at NDRI, Karnal	31 March, 2016	NDRI, Karnal

### **Training Programmes Organized**

Table 47: Training programmes conducted at ICAR – IIWBR, Karnal

Date	No. of Trainees	From
17.04.2015	27 newly recruited field officers	IFFCO, Karnal
08.08.2015	52 Women Farmers	Mehasana, Gujarat
22.08.2015	57 Farmers	Anand, Gujarat
19.10.2015	40 Farmers nominated by IFFCO	IFFCO Village Nindana, Rohtak
26.10.2015	25 farmers	Krishi Vistaar Evam Mahila Utthan Samiti, Karnal
26.11.2015	41 Women farmers	Punjab, Haryana, Rajasthan
11.01.2016	45 Farmers	Narmada, Gujarat
02.02.2016	06 Farmers	Hosangabad, MP
03.02.2016	42 Farmers	Alwar, Rajasthan
05.02.2016	30 Farmers	Bathinda, Punjab
15.02.2016	10 Farmers	Gurgaon, Haryana
25.02.2016	50 Farmers	Saharanpur, UP
25.02.2016	20 Farmers	Krishi Vistaar Evam Mahila Utthan Samiti, Karnal
11.03.2016	26 Farmers	Chandigarh, Punjab
15.03.2016	31 Farmers	Datia, MP

### **Capacity Building Programmes for different Stakeholders**

### For Students

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

### For Extension Professionals

- 1. Dr. Anuj Kumar delivered a lecture on "Leadership & task on selection of leader" at EEI, Nikokheri on 28<sup>th</sup> August, 2015.
- Dr. Anuj Kumar delivered a lecture on "Extension Skills for faster Adoption of DSR and other CA based RCTs" during national training workshop on "Zero tillage rice establishment and crop weed dynamics in rice and wheat cropping systems in India and Australia during 22-09-2015 to 01-10-2015 at CCSHAU, Uchani, Karnal on 25<sup>th</sup> September, 2015.
- 3. Dr. Anuj Kumar delivered an invited lecture on "Food Security in India: Issues and Challenges" in Two days National Seminar on "Food Security in India: Issues and Challenges" during 28-29 September, 2015 at Sanatan Dharma College (Lahore), Ambala Cant on 29<sup>th</sup> September, 2015.

- 4. Dr. Anuj Kumar delivered a lecture on "ICT: An Important Extension Method in Transfer of Technology" during a workshop on ICT held at EEI, Nilokheri during 1-5 December, 2015 on 2<sup>nd</sup> December, 2015.
- 5. Dr. Anuj Kumar delivered a lecture on "ICT in Agriculture" at EEI, Nilokheri on 22<sup>nd</sup> January, 2016.
- 6. Dr. Anuj Kumar delivered a lecture on "Participatory Extension approaches for improving irrigation and soil management in the Indian Rice-wheat production system in training programme: Participatory irrigation management for maintaining regional food security in North India organised during 16-19 February, 2016 at CSSRI, Karnal on 16<sup>th</sup> February, 2016.
- 7. Dr. Anuj Kumar delivered a lecture on "Role of ICT in transfer of Technology" at EEI, Nilokheri on 16<sup>th</sup> March, 2016.

### For Farmers

- Dr. Anuj Kumar delivered a lecture on "Kisanon Ke Khet Par Gehoon Ka Utpadan Badhana" on 29<sup>th</sup> July, 2015 in farmer workshop organised during International Agriculture Horti Expo held at Pragati Maidan during 29-31 July, 2015.
- 2. Dr. Anuj Kumar delivered a lecture on "Yellow Rust management in wheat" at Village Sikri for farmers' cooperative society of NABARD on 20<sup>th</sup> February, 2016.
- Dr. Anuj Kumar delivered lecture on "Disease Management" at village Anjanthali for farmers' cooperative society of NABARD on 20<sup>th</sup> February, 2016.

### **TV Programme**

Four programmes for DD Kisan were organized on the following dates:

- 07.10.2015: Kisan Prashna Manch on wheat and barley cultivation was organized at ICAR-IIWBR, Karnal.
- 17.12.2015: Kisan Prashna Manch was organized at village Jadauli Kalan,
   Karnal on wheat production
- 17.02.2016: DD Kisan Prashna Manch was organized at village Furlak, Karnal on wheat seed production.
- 16.03.2016: DD Kisan Prashna Manch was organized at village Hajwana, Kaithal on harvesting and post harvest management of wheat.

### **Advisory Services**

The farmers were advised on various aspects of wheat and barley cultivation. More than 500 farmers/entrepreneurs and other stakeholders were provided replies to their queries through letters, phone calls, emails and SMS.

### Creation of WhatsApp Group: Farm Advisories\_IIWBR

On 20.01.2016 Dr.Sendhil, R. created a WhatsApp Group named "Farm Advisories\_IIWBR" comprising agriculture professionals of northern states in order to provide timely help to the farmers in case of any disease and pest outbreak. Till today there are 71 agricultural professionals actively associated with this group.

### **Advisories Linkage to MANAGE Portal**

On 17.03.2016, ICAR-IIWBR has linked its scientific advisory services to MANAGE Portal (http://14.139.87.205:8082/). The activity is coordinated by Dr. Sendhil R.

### **Visit Coordination**

Table 48: Coordination of visits at ICAR-IIWBR, Karnal during 2015-16

Date	No. of Visitors	From
01.04.2015	32 Students of M.Sc. (agri.) and Ph.D. (Agri.) of UHF, Nauni, Solan (HP).	Nauni, Solan, HP
10.04.2015	49 students of B.Sc. (Agri.) 2nd & 3rd Year	Malwa College, Bathinda, Punjab
17.04.2015	29 Agriculture Graduate Trainees from IFFCO, Regional Office, Karnal (Haryana)	Karnal
18.04.2015	2 Staff members + 43 students	COA, Lalsot, SKNAU, Jobner
01.05.2015	2 Staff members + 53 Students	DAV College, Ajmer (SKNAU, Jobner)
02.05.2015	90 Students of B.Sc. (Agri.) Final Year	COA, SKNRAU, Jobner, Rajasthan
11.05.2015	15 Students under RAWE of SKN College	Bikaner, Rajasthan
11.05.2015	42 Students of B.Sc. (Agri.) IVth year	COA, SKNRAU, Bikaner, Rajasthan
28.05.2015	4 students + 2 staff members from St. Theresa's Convent School, Karnal.	Karnal, Haryana
25.06.2015	75 Students of B.Sc. (Agri.), 3rd Year	COA, CSKHPKV, Palampur, HP
04.07.2015	15 Farmers	Gochar Educational & Welfare Society & NABARD, Saharanpur
30.07.2015	6 Farmers	Vidisha, MP
30.07.2015	23 Farmers	Vidisha, MP
10.08.2015	40 Farmers	Vadodara, Gujarat
14.08.2015	33 Farmers	Vadodara, Gujarat
20.08.2015	29 Students of B.Sc. (Agri.), 4th year	BAU, Kanke, Ranchi
28.08.2015	22 Farmers	Chhota Udaipur, Gujarat
30.08.2015	95 Students	ACSRI, Annamalainagar, Tamil Nadu
31.08.2015	50 Students (10+2) of St. Mary School, Panipat	Panipat, Haryana

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31.08.2015	B.Sc. (Agri.) Final year students	TNAU, Madurai, Tamil Nadu
02.09.2015	30 Farmers	Jhunjhunu, Rajasthan
08.09.2015	19 farmers	Vidisha (MP)
11.09.2015	90 Students of B.Sc.(Agri.)	TNAU, Annamalainagar, Tamil Nadu
22.09.2015	18 Farmers	Vidisha, MP
29.10.2015	35 Farmers	ChhotaUdaipur, Gujarat
30.10.2015	32 Farmers	Pali, Rajasthan
31.10.2015	29 Farmers	Dang, Gujarat
02.11.2015	48 Farmers	Ahmdabad, Gujarat
05.11.2015	09 Students of B.Sc. Agri. Final Year, Ch. Chhotu Ram PG College, Muzaffarnagar, UP	Muzaffarnagar , UP
09.11.2015	38 Students (10+2)	Urmila Coaching Institute, Karnal
26.11.2015	54 Farmers	Hanumangarh, Rajasthan.
27.11.2015	116 Students of B.Sc. (Agri.)	TNAU, Annamalainagar, Tamil Nadu
3.12.2015	38 Farmers	Sriganganagar, Rajasthan
05.12.2015	35 Farmers	Hanumangarh, Rajasthan
07.12.2015	9 Farmers	Sajapur, MP
07.12.2015	167 Students and staff	Karnal International School
08.12.2015	16+1 Farmers	Vidisha, MP
17.12.2015	44 Farmers	Bharatpur, Rajasthan
25.12.2015	70 Students of B.Sc. II year	College of Basic Sciences, CSKHPKV, Palampur, HP
20.01.2016	39 Farmers	Behrod, Alwar, Rajasthan
18.02.2016	40 Farmers	Churu, Rajasthan
24.02.2016	62 Farmers	Department of Agririculture, Gandarbal, J&K
25.02.2016	23 Farmers	Krishi Vistar & Mahila Utthan Samiti, Karnal, Haryana
27.02.2016	50 Farmers	Muzaffarnagar, UP
03.032016	21 Farmers	Bharatpur, Rajasthan
05.03.2016	100 Farmers	Nigdu block, Nilokheri, Karnal
11.03.2016	100 Farmers	Kalsora, Karnal, Haryana
15.03.2016	47 Farmers	IFFCO, Shamli (UP)
16.03.2016	29 Farmers	Bansur, Rajasthan
16.03.2016	08 Officers	EEI, Nilokheri, Haryana
19.03.2016	26 Farmers	Village Amba, Ratlam, MP
30.03.2016	43 Students of B. Sc. (Biotechnology)	MMPG College, Fatehabad, Haryana
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# **ANNEXURE - I**

Category wise number of Wheat Front Line Demonstrations (FLDs) Farmers during 2015-16

Annexure – I: Category wise number of wheat FLDs farmers during 2015-16

Total	Area(ha) (No. of Farmers)		10 60	3000	2000	9 (4	5.2 (15)	5)	5 (13)	- <del>-</del>	5 (10)	9)	, =	0 (5	0 (0	0 16	<u>~</u>	0.6
P	Are: (No Farm		(6)	2, 0		4. 5	3.5	(15)	1, E	5 (21)	, E	(58)	1, 0	7 0	===	F 8	1 E	(60)
Women	Area(ha) (No. of Farmers)		0.6	0.62	9.1.6	'	τ	ı	1.8	i	1.0 (2)	1.36 (20)	ı			1		0.99
Men	Area(ha) (No. of Farmers)		4.4 (64)	4.38	4.4	4.6	5.2 (15)	5 (15)	3.2 (9)	5 (21)	4 (8)	3.64 (38)	7 (21)	10 (25)	10 (16)	10 (25)	5 (13)	9.01 (55)
mers)	Gen		0.6	0.62	6.8	,			1.8		0.5	0.72	î	ī	ı			1
Achievement Women, Area in ha, (No. of Farmers)	OBC				0.8	-				1	1	0.44 (11)		ı	ı	ı	Î	1
Achievement	ST			1	1		1				(1)			r	1	1		0.29
Women	၁၄		ı				1		ı		1	0.2 (5)		ι				0.7
ars)	Gen		3.36 (42)	3.98	4.4 (16)	(12)	5.2 (15)	4.6 (14)	2.5 (6)	3.8 (19)	2.0 (4)	2.96 (27)	3.2 (10)	0.8	3.5	2.4	1.9	
ment Vo. of Farme	080		1			0.2				1.2 (2)	(1)	0.12	2.0	8.8	6.5	6.4 (16)	2.0	0.42 (3)
Achievement Men, Area in ha, (No. of Farmers)	ST			ī	1		î	· ·	1		1.0 (2)	1		1		-	1	
Men,	သွ		1.04 (22)	(2)	'	0.4	ı	0.4	(3)	,	(1)	0.56 (8)	1.8	0.4 (1)		1.2	1.1	8.59 (52)
ement	Area under FLDs (ha)		2	2	9	4.6	5.2	rc	2	သ	ıcı	2	7	10	10	10	5	10
Achievement	No. of FLDs		2	2	9	2	വ	ιΩ	ഹ	ιΩ	ιΩ	ω	7	10	10	9	5	10
ion	Area under FLDs (ha)		5	2	5+1=6	5	5	S	5	S	2	5	7	10	10	10	5	10
Allocation	No. of FLDs		5	2	5+1=6	2	5	က	വ	က	വ	2	7	10	10	10	2	10
	Name of Centre	NHZ	VPKAS, Almora (Uttarakhand)	CSKHPKV, HAREC, Bajaura, Kullu (HP)	CSKHPKV, RWRC, Malan, Kangra (HP)	CSKHPKV,PCRS, Berthin, Bilaspur (HP)	CSKHPKV, HAREC, Dhaulakuan, Sirmour (HP)	IARI, RS, Amartara Cottage, Shimla (HP)	ICAR-IIWBR, RS, Flowerdale, Shimla (HP)	RR&RS, SKUAST-K, Khudwani, Anantnag (J&K)	RARS, SKUAST- Jammu, Tandwal, Rajouri (J&K)	KVK (CSKHPKVV), Bara, Hamirpur (HP) NEPZ	NDUA&T, Faizabad (UP)	CSAUA&T, Kanpur (UP)	BHU, Varanasi (UP)	KVK, Sohna, Sidharthnagar (UP)	KVK, Sultanpur (UP)	BCKV, Kalyani, Nadia (West Bengal)
	S. N.		<del></del>	2.		4	ည်	.9	7.	ω.	<u>ග</u>	6.	7.	15.	13.	4.	15.	9.

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											<del></del>		F					
Area(ha) (No. of Farmers)	10.40	10	(30) 10 (13)	5 (43)	(11) 5 (10)	6.5 (23)	9 §	5	(12)	(H) 7 (H)	(2)	7 (15)	7 (15)	7	10.4	7.2 (18)		10 (26)
Area(ha) (No. of Farmers)	2.804	(8)	ì				ı	1	ı	1	1	ı		0.4	-	1		0.4
Area(ha) (No. of Farmers)	7.596	10	(30) (13)	5	(10)	6.5 (23)	9 (	5 (4)	7 (14)	(+1)	(7)	7 (15)	7 (15)	6.6	10.40	7.20 (18)		10.0 (25)
Gen				ī	ī	i		-				1	1		1			(1)
ОВС	8:0	-	1	ı	1	ı					,				,	1		
ST	0.266	-			1	ī	ı	,			1	1	1	0.4	-	ı		
သွ	1.738	(2)	1				1	1	r	1	1	1	ı	1				
Gen	1.2	3.6	1.6	5 (11)	,	4.1 (12)	6 (4)	5 (12)	3.6	-	(9)	5.8 (12)	7 (15)	ı				8.40 (21)
OBC	3.33	-	3.8 (4)		(10)	2.2 (10)			3.0	D ~ E	3-5			3.4	1.6	1		1
ST	0.266	6.4	(4)			0.2		1	ì	,	ı		1	3.2 (15)	8.8 (22)	7.20 (18)		1
SC	2.8	-	0.6	1					0.4	'	1	1.2	1	ı		ĩ		1.6 (4)
Area under FLDs (ha)	10.40*	10	10	5	2	6.5	9	2	7	7	7	7	7	7	10.40*	7.20*		- 10.40*
No. of FLDs	10	10	10	2	c)	7	9	2	7		7	7	2	7	10	7		10
Area under FLDs (ha)	10	10	10	2	5	7	7	വ	7	7	7	7	7	7	10	7		10
No. of FLDs	10	10	10	5	2	7	7	5	7	7	7	7	7	7	10	2		10
	UBKVV, Pundibari, Co (West Bengal)	KVK-Dimapur, Jharnap MEDZIPHEMA (Nagala	RARS, AAU, Shillongani, Nagaon (Assam)	KVK (AAU)-Darrang , N Darrang (Assam)	KVK (AAU), Chirakuta, village Jamduar Pt.II) Dhubri (Assam)	KVK (AAU), Citrus Res station, Gellapukhuri, Tinsukia	KVK (AAU), Napam, Te Sonitpur (Assam)	KVK (AAU), Kajalgaon, (Assam)	IARI, RS, Pusa, Samastipur (Bihar)	KVK, Sokhodeora, Nawadah (Bihar)	KVK, RAU, Hariharpur,Vaishali (Bihar)	KVK, Adhaura, Kaimur, Bhabua (Bihar)	KVK, Chanpura- Basaith, Madhubani (Bihar)	BAU, Kanke, Ranchi (Jharkhand)	KVK, Morabadi, Ranchi (Jharkhand)	KVK, BAU, West Singhbhum (Jharkhand)	NWPZ	KVK (SKUAST- Jammu), Rajhani, Kathua, Jammu
S.N.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	32.		33.

S.M. Numer Cleanter         R.D. of London         No. of London         Area (London         R.D. of London         Area (London         R.D. of London         Area (London         Area (London <th< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>_</th><th></th><th>-</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></th<>										_		-							
Numary of Centre	Area(ha) (No. of Farmers)	10,5	(S) / (S)	6 (4)	17 (2)	7 (5)	7 (11)	9 6	(5) (15)	6 (15)	1	7 (7)	7 (16)	6.8	19	10	<u> </u>	6 (15)	(15)
Name of Centre   Fl.Ds   Fl.Ds   Fl.Ds (table)   Fl.Ds (table)   Fl.Ds   Fl.Ds (table)   Fl.	Area(ha) (No. of Farmers)	က 🤅	(6)	ı	ı	,	1					(2)	2.2	-	1		ı	ı	
Name of Centre	Area(ha) (No. of Farmers)	7	(c) (c)	(1) (6)	11 (13)	7 (7)	7 (11)	9 (6)	(5) (15)	6 (15)		5 (5)	4.8	6.8	10	10	() ~ ()	6 (15)	(15)
Name of Centre	Gen	e @	(6) -		,	1		,		1	1					1		ı	
Name of Centre	OBC				1		ı		ī	1		(2)			1	,	ı	ı	
Name of Centre	ST									1	1	1			1	,		ı	
Name of Centre	သွ						1	E		1		T	2.2 (4)			ī	ı	1	
Name of Centre	Gen	5 (2)	5 ~ 5	-	11	1	(11)	3 (4)	-	1	•	(2)	2.4	1.2	2.0	10 (25)	3)	4.8	5.6 (14)
Name of Centre	ОВС			6 (15)	(2)	9 (9		1.5	6 (15)	5.2 (13)	1	3)	0.4	5.2	5.6		4 (4)	0.8	0.4
Name of Centre	ST	ı	1	ı				1	ı	ī	ı	,							
Name of Centre	သွ	2 (2)	1 -					1.5		(2)			2.0	0.4	2.4		ı	0.4	'
Name of Centre	Area under FLDs (ha)	10	7	9	#	7	7	9	9	9		7	7	6.8	9	10	7	9	9
Name of Centre FLDs PAU, Ludhiana 10 (Punjab) PAU, RRS, Gurdaspur (Punjab) 7 RVK, Haveli Kalan, 6 Rupnagar (Punjab) 7 RWK, Usman, 8+5=11 Amritsar (Punjab) 7 RBS College, 7 Bichpuri, Agra (UP) 7 RBS College, 7 Bichpuri, Agra (UP) 7 RWK, Baghara, 7 Muzaffarnagar (UP) 6 Bijnor (UP) 6 Bijnor (UP) 6 Services, 7 AUUP Campus, 8 Sector-125, Noida (UP) ICAR-CSWCRTI, Kault 5-5=0* Dehradun (Uttarakhand 5-5=0* Dehradun (Uttarakhand 5-5=0* CATAT, IARI, New 7 Delhi (UP) ICAR-CSSWI, Karnal 10 (Haryana) 7 CCSHAU, Hisar (Hary 7 KVK, Bhiwani 6 (Haryana) 7 KVK, Bhiwani 6 (Haryana) 7 KVK, Bhiwani 6 (Haryana) 6 (Haryana) 7 KVK, Bhiwani 6 (Haryana) 6 (Haryana) 7 KVK, Bhiwani 6 (Haryana) 7 (Haryana) 6 (Haryana) 6 (Haryana) 7 (Haryana) 6 (Haryana) 7 (Haryana) 6 (Haryana) 7 (Haryana) 6 (Haryana) 7 (Haryana) 7 (Haryana) 6 (Haryana) 6 (Haryana) 7 (Haryana) 6 (Haryana) 6 (Haryana) 6 (Haryana) 7 (Haryana) 6 (Haryana) 6 (Haryana) 7 (Haryana) 6 (Haryana) 7 (Haryana) 8 (H	No. of FLDs	9	7	9	1	7	7	9	9	9	Not conduc ted	2	2	2	10	10	7	9	9
Name of Centre PAU, Ludhiana (Punjab) PAU, RRS, Gurdaspur (Punjab) KVK, Haveli Kalan, Rupnagar (Punjab) KVK, Usman, Amritsar (Punjab) RBS College, Bichpuri, Agra (UP) RBS College, Bichpuri, Agra (UP) KVK, Baghara, Muzaffarnagar (UP) ZARS, Nagina, Bijnor (UP) ZARS, Nagina, Bijnor (UP) KVK, Khajuri Bagh, New Gopal Nagar, Saharanpur (UP) Amity Centre for Exten, Services, AUUP Campus, CATAT, IARI, New Delhii KVK (NHRDF), Ujwa, New Delhii ICAR-LSSRI, Karnal (Haryana) CCSHAU, Hisar (Harya KVK, Bhiwani (Haryana) KVK, Tepla, Ambala (Haryana)	Area under FLDs (ha)	10	7	9	6+5=11	7	7	9	9	9	5-5=0*	7	7	7	10	7+3=10	7	9	9
	No. of FLDs	10	7	9	6+5=11	7	7	9	9	9	5-5=0*	7	7	7	10	7+3=10	7	9	9
S.N. 34. 34. 34. 37. 38. 38. 38. 38. 38. 38. 38. 38. 38. 38		PAU, Ludhiana (Punjab)	PAU, RRS, Gurdaspur (Punjab)	KVK, Haveli Kalan, Rupnagar (Puniab)	KVK, Usman, Amritsar (Puniab)	RBS College, Bichpuri, Agra (UP)	KVK, Baghara, Muzaffarnagar (UP)	ZARS, Nagina, Bijnor (UP)	KVK, Khajuri Bagh, New Gopal Nagar, Saharanpur (UP)	Amity Centre for Exten Services, AUUP Campus, Sector-125, Noida (UP)	ICAR-CSWCRTI, Kaul≀ Dehradun (Uttarakhand	GBPUA&T, Pantnagar, Udham Singh Nagar (Uttarakhand)	CATAT, IARI, New Delhi	KVK (NHRDF), Ujwa, New Delhi	ICAR-IIWBR, Karnal (Haryana)	ICAR-CSSRI, Karnal (Haryana)	CCSHAU, Hisar (Harya	KVK, Bhiwani (Haryana)	KVK, Tepla, Ambala (Haryana)
	S. S.	34.	35.	36.	37.	38.	39.	40.	41.	42.	43.	4.	45.	46.	47.	48.	49.	20.	51.

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				·		_								·	1		
Area(ha) (No. of Farmers)	6 (15)	(12)	5 (10)	5 (10)	5 (5)		7 (10)	(17)	11	4.8 (12)	10	7.6 (19)	10	14.45	(18)	4.8 (12)	5 (12)
Area(ha) (No. of Farmers)		1		0.5 (1)			1.0		,	i	ı	ī	ī		1.4 (4)		
Area(ha) (No. of Farmers)	6 (15)	(12)	5 (10)	4.5 (10)	5 (5)		9 (8)	(17)	11)	4.8 (12)	10	7.6 (19)	10	14.45	5.6 (14)	4.8 (12)	5 (12)
Gen	1							1		ı	1	ı	i	,	1.2	1	
ОВС				0.5			1 2			1	ı			,	0.2	ı	1
S		ı		ı			1.0	1	,	т	ī	1			·	•	1
SC				1	,			ī	r		1		ì	ř		Ī s	
Gen	5.6	1.5		0.5	ı		<b>-</b> €		2 (2)		6	7.2 (18)	3	1.50	3.2	2.4 (6)	1.2
OBC		2.0 (4)	5 (10)	4.0	5 (5)		8 (4)		5 (5)	1	- €		7 (8)	11.55	2.4 (6)	1.6 (4)	3.8 (9)
ST		1.5		ı			1.0	7 (17)	(2)	4.8 (12)		1			1	ı	ı
သွ	0.4	(2)					- E		2 (2)		ı	(1)		1.4		0.8 (2)	
Area under FLDs (ha)	9	9	2	2	2		7	7	*-	4.8	10.0	7.6	10.0	14.45*	7.0	4.8	2
No. of FLDs	9	9	2	5	2		7	2	7	ις	10	ω	10	10	2	വ	വ
Area under FLDs (ha)	9	9	2	5	2		7	7	7	2	10	10	10	10	7	ಬ	S.
No. of FLDs	9	ဖ	2	5	5		_	7	7	ည	10	10	10	10	7	5	22
Name of Centre	KVK, Peoda Road, Kaithal (Haryana)	RARI, SKNAU, Durgapura, Jaipur (Rajasthan)	KVK, Ajmer (Rajasthan)	KVK, Banasthali Vidyapeeth, District- Tonk (Rajasthan)	ARS (RAÚ), Sriganganagar (Rajasthan)	CZ	RCOA (MPUA&T), Udaipur (Rajasthan)	ARS, MPUA&T, Banswara (Rajasthan)	ARS, MPUA&T, Kota (Rajasthan)	KVK, Sawai Madhopur (Rajasthan)	WRS, JAU, Junagarh (Gujarat)	MWRS, SDAU, Vijapur, Mehsana (Gujarat)	JNKVV, Jabalpur (MP)	IARI, RWRS, Indore (MP)	KVK (JNKVV), Purushottampur, Panna (MP)	KVK, Kalukhera Shiksha Samiti, Kalukhera, Ratlam (MP)	KVK (RVSKVV), Pipersama, Neemuch (MP)
S.N.	25.	53.	54.	55.	56.		57.	. 28.	29.	.09	61.	62.		64.	65.	.99	.79

	T	Т	Т	T	Т	Т	Т-	Т	1	т	T	т-	т	T	Т	_	Т	Т	_	
Area(ha) (No. of Farmers)	5 (12)	5 (1)	5 (1)	5 (13)	5 (12)	7 (71)	01 (1)	(2)	4 (10)	10 (25)	10 (20)	10 (1)	11.70		1		15.4		30	578.25 (1373)
Area(ha) (No. of Farmers)			1	1	ı	1	2	(=)	ı	ı	ı	t	1				0.8			24.874 (77)
Area(ha) (No. of Farmers)	5 (12)	(12)	5 (12)	(13)	5 (12) s	7 (17)	8 8	5	4 (10)	10	10	9 6	11.70				14.6		1	553.376 (1296)
Gen	ı				L	1	- 5	=	1	,			1		•					10.64 (26)
OBC			ı	ı	1	,	,					1					0.4		i	5.14 (21)
ST	1			1			r E			ı		1	ı				0.4			4.256 (12)
သွ	ı	1			1	1					1	1	ı	,					ı	4.838 (18)
Gen	1.80	4.2 (10)	2.0	4.2 (11)	1.4	,	,			9.2 (23)	8.4	4 (4)	9.1				4.2 (2)			257.5 (596)
OBC	1.2	0.8	3.0		3.6		5		1.2	'	1.6	9 (9)	1.4	1			7.2 (13)			187.52 (379)
ST	ı	1		1		7 (17)	3 (3)		2.8	-	,		1.2				1.2			62.566 (159)
သွ	2 (4)			0.8	1		т			0.8			1	ı			(8)			45.79 (162)
Area under FLDs (ha)	5	2	5	5	2	7	10		4	10	10	10	11.70*	1	ı		15.4*		3	578.25
No. of FLDs	5	2	2	2	2	7	10		4	10	9	10	10	Not conduc ted	Not conduc ted		15		3	268
Area under FLDs (ha)	5	2	2	ည	Ω.	7	10		10	10	10	10	10	10- 4=6*	10		15		10	009
No. of FLDs	2	2	5	2	ည	7	10		10	10	10	10	10	10-4=6*	10		15		10	009
	KVK (RVSKVV),COH, Mandsour (MP)	KVK (RVSKVV), MLNagar, Ujjain (MP)	KVK (RVSKVV), COA, Gwalior (MP)	KVK (RVSKVV), Budhapura, Lahar, Bhind (MP)	KVK (JNKVV), Nowgaon, Pan Research Center, Chhatarpur (MP)	KVK, RRS, IGKVV, Jagdalpur, Bastar (CG)	IGAU, RARS, Sarkanda, Bilaspur	PZ	PDKV, Akola (Maharashtra)	ARS, Niphad, Nasik (Maharashtra)	MAU, Parbhani (Maharashtra)	ARI, MACS, Pune (Maharashtra)	UAS, Dharwad (Karnataka)	BIRDS KVK, Tukkanatti, Gokak, Belgaum (Karnataka)	KVK, Badami Road, Bagalkot (Karnataka)	SHZ	IARI, RS, Wellington (Tamil Nadu)	Very High Altitude Areas of NHZ	ICAR-IIWBR, Karnal	Total 600 600 568 578.25
S.N.	.89	.69	70.	7.	72.	73.	74.		75.	76.	77.	78.	79.		81.		82.		83.	

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

# **ANNEXURE - II**

Category wise number of Barley Front Line Demonstrations (FLDs) Farmers during 2015-16

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Annexure - II: Category wise number of barley FLDs farmers during 2015-16

5 5 5 6 6 4.8 (2) (2) (2) (2) (3) (4) (4) (19) (9) (1) (19) (19) (19) (19) (19)	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)
5 0.5		ဂ	ဂ	ဂ	o.		(2)	(2)	1.7	ı		r.		(9)		( <u>0</u>
5       0.5       0.5        4         4        5        4       1        5        4       1        4       1        4       1       1        4       1       1        4       1       1        4       1       1        4       4       1       1        4       4       1       1        4       4       1       1        4       4       1       1        4       4       1       1        6       6       1       1         4       1       1         4       1       1         4       1       1          4       1       1		2	2	သ	2	0.5		1	(8)	(1)	1	1		4.5 (9)	0.5	5 (10)
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1	5	2	Ŋ	5	0.5	0.5	ı	(8)		1		ı	5 (10)		5 (10)
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		5	2	2	2	0.5	1.0	1.0	1.5	- E			ı	4 (6)	- E	5
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		ಬ	ಬ	2	4.8	0.8 (2)	0.8	2.4 (6)	ī	1		0.8 (2)		4.0 (10)	(2)	4.8 (12)
5 0.3 0.6 2.6 1.5 5 5 6.4 - 6.4 - 6.4 - 6.4 - 6.4 - 6.4 - 6.4 - 6.4 - 6.4 - 6.4 - 6.4 - 6.4 - 6.4 - 6.4 - 6.4 - 6.4 - 6.4 - 6.4 - 6.4 - 6.4 - 6.		ಬ	ಬ	2	5	ı	1	3)	<del>L</del> £	ı		- E		(4)	<del>-</del> <del>(</del> )	5 (5)
6.4* 2.4 4 6.4 6.4 6.4 -		೭	5	2	5	0.3	0.6 (2)	2.6 (9)	1.5 (5)	ı				5 (17)	1	5 (17)
5 3.6 14 5 5 (12) (12) - 130.60 9.5 4.7 19.7 92.34 1.5 0.6 1.8 0.46 126.24 4.36 (19) (9) (41) (188) (2) (1) (3) (2) (257) (8)		ಬ	ನ	2	6.4*	1		2.4 (6)	(10)					6.4 (16)	1	6.4 (16)
130.60         9.5         4.7         19.7         92.34         1.5         0.6         1.8         0.46         126.24         4.36           (19)         (9)         (41)         (188)         (2)         (1)         (3)         (2)         (257)         (8)		2	ಬ	വ	5	1	ı	3.6	1.4 (3)			1		5 (12)	1	5 (12)
		130	130	125	130.60	9.5	4.7	19.7 (41)	92.34 (188)	1.5 (2)	0.6 (1)	1.8	0.46	126.24 (257)	4.36	130.6 (265)

### **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 & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India, Krishi Bhawan, New Delhi applicable for the year 2015-16



### 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 22<sup>nd</sup> April, 2014

Subject:-

Revised Guidelines for Frontline Demonstration on Rice, Wheat, Pulses and Coarse Cereals under National Food Security Mission 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.

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.

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# 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 only should be included 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 Socioeconomically 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

- 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 30<sup>th</sup> April and 30<sup>th</sup> 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 15<sup>th</sup> 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,	Coarse
		Pulses	Cereals
1	Cost of critical inputs (seeds/ bio-	6700	4200
	fertilizers/manures/PP chemicals/ herbicides) to		
	supplement the cultivation charges		
2.	Organization of Field Day	250	250
3.	Display board and publicity material	250	250
	(posters/pamphlets/leaflets etc.)	100 Professional Control of Contr	
4.	Visit of scientists excluding TA/DA, but hiring	300*	300*
	of Taxi/POL etc. and miscellaneous expenses		
	Total	7500	5000

<sup>\*</sup> 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	Kharif 15 <sup>th</sup> July, Rabi- 15 <sup>th</sup> November
	Demonstration and Technology demonstrated	
2.	Crop stand and appropriate date for visit by the FLD monitoring team	Kharif- 15 <sup>th</sup> September Rabi- 15 <sup>th</sup> January
3.	Tentative dates for organization of Farmer's Day	Rabi- 31" Janaury
4.	Report and complete data about FLDs conducted	Kharif- 15 <sup>th</sup> December Rabi- 15 <sup>th</sup> May

# ANNEXURE-I

X

# 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
- (7) District (6) Location
- (8) state

							S Z	
	e E		Phone number	address and	Delielicial y with	bonoficing	Name of	
		2	Female)	& Oction (Interly	& Conder (Male)	(SC/ST/OBC/Gen)	Calegory	Cotocomi
						FLD (ha)	WICG OI	A rea of
	Quantity		Seed					
	Value		•				1	
	Value Quantity Value		Bio-fertlizers				, 4,,,	Patte
	Value		ers	-				rn of Fina
	Quantity		Micro-nutrients			10101	Pattern of Financial Assistance	
	Value		ients				-	)Ce
	Quantity	pesticides	Weedicides/					
	Value		s/					
5 400.00		e de la comp	ale alebat	2412	0.8098	demonstrated   Visali Gliosti	A CO	Lechilonesy
						VISQU GLEOSTI	Vices Charti	rieid day/
					scientist	עוטונט טו	111111111111111111111111111111111111111	FOLION

Signature of beneficiary

Signature with Seal Scientist In charge Implementing Centre

Director/Project Coordinator Signature with Seal

### 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.			nysical		Finan	cial (Rs.)
		ocation	Achie	vement	Allocation	Achievement
U	No. of FLDs	Area under FLD	Number of FLDs	Area under FLD	- Interest of	Acmevement
Men						
SC						
ST	3			<del></del>		
OBC	360					
Gen			T		- 7	
Women					. *	
SC						
ST						
OBC						
Gen.						
Total		4				

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	d (kg./ha.)
Implementing Center/ Iocation	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:	T							
	*.						×	
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								
	<del> </del>		-					
Number of training attended at KVK or research station								
of research station								
Size of approximation 11 111 111	-			Manual Transport				
Size of operational Land Holding								
Aran undar iminati								
Area under irrigation								
Area wada Dai C. I								
Area under Rain fed								
PID 1								
FLD conducted on irrigated/rainfed					1			
/shallow/lowland/ upland etc.								
Source of Irrigation: tube well								-
/well/pond/canal/other								
m - 1								
Testing of soil: Yes/No								
	_ \							
The farmer has tested soil before FLD		1					S 6	
Place of soil testing/SAU/ICAR/ state						<del></del>		
Agril Department/ Public undertaking/								
others								
Name of nutrients deficit in soil								
Name of prevalent crop-rotation					<del></del>	· · · · · · · · · · · · · · · · · · ·		
followed at farm	•							
Name of farm machineries on the								
farm	TOMOREN DETROMATION	e de la companie de l		Ceromonomores	1227450 PROPERTY SEA		POLICEMENTAL	THE PROPERTY OF
Name of person from implementing				-				
agency present at the plot at the time								
of estimate of yield to record it			14.					
accurately.								
								1

### 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		Tractice (TED plot)
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?	9 9	
Name and quantity of Plant Protection measures used in		
rice nursery	v   1	100
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  weeder/ powered weeder		
Name and quantity of herbicides applied		3
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		



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### Government of India Ministry of Agriculture

# Department of Agriculture & Cooperation Directorate of Millets Development

2<sup>nd</sup> 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
1	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. Singth 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.



### GOVERNMENT OF INDIA DIRECTORATE OF WHEAT DEVELOPMENT

MINISTRY OF AGRICULTURE (DEPTT. OF AGRICULTURE AND COOPN.) C.G.O. COMPLEX-I, 3<sup>rd</sup> 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

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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.

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22-04-2014

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**

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Krishi Bhawan, New Delhi Dated the 19<sup>th</sup> 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.

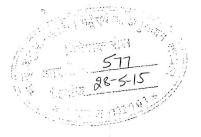
Additional Commissioner (Crops)

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

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### 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

То

The Director

ICAR-Indian Institute of Rice Research,

Hyderabad (Andhra Pradesh)

The Director

ICAR -Indian Institute of Pulses Research

Kanpur (UP)

The Director

Indian Institute of Millets Research

Hyderabad (AP)

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

The Director

Karnal (Haryana)

Project Coordinator

All India Coordinated Small Millets Improvement Project

ICAR -Indian Institute of Wheat & Barley Research,

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:

SI. 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.

- 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.

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.

# No. 2-1/2014-CU,1 Government of India Ministry of Agriculture

### Department of Agriculture & Cooperation

Krishi Bhawan, New Delhi. Dated 24<sup>th</sup> April , 2015

To,

Project Director/Project Coordinator

- 1. Directorate of Rice Research, Hyderabad
- 2. Directorate of Wheat Research, Kernal
- 3. Directorate of Maize Research, New Delhi
- 4. Indian Institute of Pulses Research, Kanpur
- 5. Directorate of Sorghum Research, Hyderabad
- 6. AICRP on Small Millets, UAS, GKVK Campus, Bangalore, Karnataka
- 7. AICRP on Pearl Millets, Agricultural Research Station, Mandore, Jodhpur, Rajasthan

Subject:- Minutes of meeting to review Technical Programme of Front Line Demonstrations on Rice, Wheat, Pulses and Coarse Cereals under National Food Security Mission for the year 2014-15 and proposal of FLDs for the 2015-16 held at Krishi Bhawan, New Delhi. 13.4.2015.

Please find enclosed a copy of the Minutes of meeting to review Technical Programme of Front Line Demonstrations on Rice, Wheat, Pulses and Coarse Cereals under National Food Security Mission for the year 2014-15 and proposal of FLDs for the 2015-16 held at Krishi Bhawan, New Delhi. 13.4.2015 held under the chairmanship of Agriculture Commissioner for information and necessary action.

Encl As above

Additional Commissioner (Crops)

### Copy to:-

- 1. PS to DDG(CS)/Agriculture Commissioner, DAC
- 2. PA to ADG (FFC)/ PA to ADG (OS)
- 3. PS to Joint Secretary(Crops)
- 4. PA to Additional Commissioner (Crops)
- 5. PA to Additional Commissioner (CC)
- 6. Deputy Commissioner (Crops)/Under Secretary (CA-V)/Assistant Commissioner (Crops)
  Joint Director (NFSM)/Section Officer (NFSM)/Section Officer (CA-V)

Minutes of meeting to review Technical Programme of Front Line Demonstrations on Rice, Wheat, Pulses and Coarse Cereals under National Food Security Mission for the year 2014-15 and proposal of FLDs for the 2015-16 held at Krishi Bhawan, New Delhi on 13.04.2015

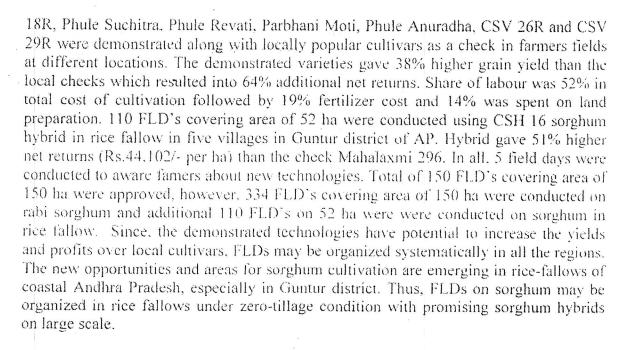
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A meeting to review of Technical Programme of Front Line Demonstrations (FLDs) on Rice, Wheat, Pulses and Coarse Cereals under National Food Security Mission (NFSM) for the year 2014-15 and proposal for FLDs for the 2015-16 was held—under chairmanship of Agriculture Commissioner on 13.4.2015 at 2.15 PM at Krishi Bhawan, New Delhi. The list of participants is annexed.

- Joint Secretary (Crops) welcomed participants and gave brief account of FLD programme. He emphasized that scientists looking after FLDs must attend the review meeting since their feedback will be very useful for strengthening the programme. The proposal of FLDs for the year 2015-16 should be submitted at earliest indicating the crop varieties and technologies to be undertaken in particular agro-ecology/district/state. New HYV varieties/ hybrids released and new technologies generated which are not still popular in particular area need to be promoted for enhancing crop productivity in particular agro-ecology/district/state. The proposal should be complete in all aspects including regional distribution of FLD's, work plan and name of coordinating centres. The monitoring team should also be constituted for FLD programme involving officials of state department of agriculture, Crop Development Directorate and scientists of SAU/ ICAR JS (crops) also desired reasons for yield gap between FLDs and farmers practices. The farmers' practices, crop production and plant protection technologies used in FLDs should be outlined in the programme report. As already circulated, no chemical fertilizer is allowed as input under FLD progrmmme, however, payment for various farm operations/farm services and other critical inputs (seed, bio-fertilizers, lime, gypsum and micronutrients etc.) are allowed. The farmers should apply recommended dose of fertilizers. The FLDs programme should be conducted as per guidelines circulated to implementing agencies. At least 5% FLD in rice, pulses and maize should be conducted in North-east.
- Agriculture Commissioner stressed that area under sorghum is decreasing and more emphasis should be given to rabi sorghum since farmers are already growing more kharif sorghum than rabi sorghum. Rabi sorghum should be promoted in cluster of 10 hectares or more where ever it is possible. He also suggested that FLDs on pulses In Uttarkhand should be given to Rani Chauri/ Almora station and more focus should be given on conducting FLDs of pulses in North-Eastern states as these states have been included under NFSM-pulses. Field days at demonstration sites should be regularly organized and prior information should be sent to Additional Commissioner (crops), DAC, and Ministry of Agriculture, State department of Agriculture and Zonal Project Director, ICAR. The details of FLD beneficiary-farmers along mobile number should also be furnished to DAC and this will help the officers from Ministry to monitor FLD's during their visit.
- Scientist, Indian Institute of Millets Research, Hyderabad conducted 334 FLD's in 26 villages on 150 ha area at five locations. Latest sorghum varieties viz., CSV 22R, CSV

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- Project Coordinator, AlCSMIP, Small Millet, Bangalore informed that 300 FLDs of six small millet crops in 9 states covering 1324 farmers were conducted. The breakup of demonstrations conducted based on area for different crops was Finger millet 97 ha, Foxtail millet 65 ha, Kodo millet 55, little millet 70 ha and Barnyard millet 13 ha. There were 639 demonstrations of finger millet across the country followed by little millet (251), barnyard millet (199), and Kodo millet (121) and foxtail millet (114) during 2014-15. The main purpose of this activity was to demonstrate the yield potential that could be attained by adopting the improved cultivation practices. Most of the demonstrations were conducted by adopting the whole package with improved varieties versus farmers' practices with local varieties. However, at Nandyal promising inter-cropping (foxtail millet + pigeon pea) and sequences cropping system (foxtail millet-pigeon pea) were demonstrated. These demonstrations might help not only for validation of research findings under real farm situations but also serves as nodal point for bringing together field extension personnel and scientists besides elucidating farmers reaction to the new agro-production technologies recommended. The yield obtained from the improved varieties with whole package demonstrations was compared with farmers practice in Karnataka, Tamil Nadu, Maharashtra, Jharkhand, Odisha, Andhra Pradesh, Chhartisgarh and Gujarat. In general, the grain yield ranged from 1228 to 3720 in rainfed/irrigated conditions, respectively under improved crop management practice as against 800 to 3100 kg per hectare under farmers' practice with local varieties. The FLD of improved varieties versus local varieties were demonstrated with recommended management practices indicated that there was 14 percent to 305 percent increase in grain yield over local varieties. In case of Foxtail millet, Koto millet, Barnyard millet, the increase in yield ranged from 14-47%, 15-152%, 12-53%, respectively.
- Scientist, Indian Institute of Rice Research, Hyderabad informed that 459 FLDs area covering 17 states and four major rice eco-systems of the country were conducted against approval of 650 FLDs during 2014-15. FLDs have been effective in creating the awareness about the potential of new rice varieties, hybrids and other management technologies. Out of 431 FLDs reported, about 67% were conducted in irrigated rice ecosystem; whereas about 11% of FLDs were conducted in rainfed uplands. More than 16% of FLDs were organized in shallow lowlands and 3% in hill ecologies. About 4% of the FLDs were conducted in problematic soil. There is a scope to increase the number of

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FLDs in rainfed ecologies. The mean yield advantage was the highest in Rainfed upland areas (59% mean yield advantage). FLD technologies demonstrated in irrigated ecosystem have recorded mean yield of 5.27 t/ha where as in shallow lowlands FLD technologies have recorded an average yield of 4.80 t/ha. Average demonstration yields in rainfed uplands was 3.67 t/ha. This shows the attainable yield potential in the farmer's fields, which needs to be considered for planning the extension programs in these regions. The new varieties and technologies demonstrated need to be popularized in an extensive way, so as to enhance the productivity and production of rice on a location specific basis. The effectiveness of the FLDs can be enhanced much more through proper planning, expeditious administrative approval, timely release of funds and critical monitoring. The fruits of FLDs can be harnessed on large scale, if proper follow up activities are taken up by scientists of coordinating centres.

- HPR. Kanpur conducted total of 1320 FLD's on pulses during 2014-15. All the approved 385 FLD's on chickpea in 18 states, 125 FLD's on Lentil in 8 states, 75 FLD's on Field peas in 8 states and 100 FLD's on Arid legumes in 5 states were conducted. Out of 290 approved FLD's on Pigeonpea, 280 were conducted in 15 states, out of 170 approved FLD's on Urdbean, 145 were conducted in 10 states and out of 225 approved FLD's on Mungbean, 195 were conducted in 13 states.
- Scientist, AICRP on Pearl Millet informed that FLDs on different production aspects of pearl millet on 186 ha area against the target plan of 200 ha in the states of Rajasthan, Haryana, Gujarat. Madhya Pradesh, Maharashtra, Karnataka. Andhra Pradesh and Tamil Nadu were conducted. The average increase in grain yield ranged from 10.10 % to 63.0% withh adoption of improved production technologies. In summer 2014, FLD's were conducted on 40 ha in Jamnagar and 8.63% increase in grain yield of pearl millet was recorded with adoption of improved variety (GHB 538) and cultivation practices compared to the farmers practice (Local variety).
- Indian Institute of Wheat and Barley Research, Karnal conducted FLDs of wheat on 448.4 ha out of approved 510 ha involving 1036 famers/ locations at 70 centres. Similarly, FLDs on barley were conducted on an area of 100 ha at 20 centres involving 199 farmers/ locations. The detailed report will be submitted after compilation of data from different coordinating centres.
- Scientist, Indian Institute of Maize Research, New Delhi informed that 130 FLDs of maize conducted in kharif 2014. All promising technologies were demonstration at farmers, field. The demonstrations on quality protein maize were conducted in Bihar. Gujarat, Haryana, H.P. Jharkhand, Mizoram and Uttar Pradesh, FLDs were conducted on sweet corn and pop corn cultivation in Himachal Pradesh during kharif, 2014. IIMR has also organized field days at demonstration site.

After detailed discussion, the following action points emerged are as under:

1. Each FLD implementing institute should submit proposal for the year 2015-16 by April 36. 2015 indicating regional distribution of FLD's, work plan (technologies to be demonstrated in each agro-ecology/district) and details of coordinating centres.

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- Each implementing agency will constitute monitoring team with involvement of officials of Crop Development Directorate, State department of Agriculture and Scientist of ICAR/SAU.
- All the FLDs should be conducted under the close supervision of scientist of SAUs/ KVK/ICAR institutes.
- 4. Farmers' practices, 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.
- 5. 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.
- 6. The FLD programme should be conducted in cluster approach of 10 hectares as per guidelines already circulated.
- 7. DSR, Hyderabad will conduct FLDs of rabi sorghum in the state of Andhra Pradesh, Maharashtra and Karnataka.
- 8. The new opportunities for sorghum cultivation are emerging in rice-fallows of coastal Andhra Pradesh. Thus, FLDs on sorghum may be organized in rice fallows under zero-tillage condition.
- Field days should be regularly organized and prior information should be sent to DAC and ZPD of ICAR.
- (1). The details of FLD beneficiary-farmers along with contact number should also be furnished to DAC.
- 11.5% of FLD in rice, pulses and maize shall be conducted in North-east.
- (12) All implementing agencies and their coordinating centres should involve agronomist/plant breeder to finalize technologies to be demonstrated in FLD programme and follow up visits to demonstration sites.
- 13. Each implementing agency will send the 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.

The meeting ended with a vote of thanks to chair.

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### List of the Participants

- 1. Dr.J.S.Sandhu, Deputy Director General (Crops Science)/ Agriculture Commissioner, Krishi Bhawan.
- 2. Shri. Sanjay Lohiya, Joint Secretary (Crops Division, DAC, Krishi Bhawan)
- 3. Dr. T.G. Nageswara Rao, Project Coordinator(Small Millets), GKVK, Bangalore
- 4. Dr. Arun Kumar S, Sr. Scientist, ICAR-IIRR, (DRR) Hyderabad
- 5. Dr.Rendra R Chapke Sr. Scientist, IIMR(DSR), Hyderabad
- 6. Dr. S.W.Singh, HOD, IIPR, Kanpur
- 7. Dr. Ashok Kumar, Pr. Scientist IIMR, Pusa Campus New Delhi
- 8. Dr. Manoj Kumar, Assistant Professor, Pearl Millet, Mandore, Jodhpur
- 9. Dr. Satyavir Singh, Pr. Scientist (Agri. Extn.) IIWBR, Karnal
- 10. Dr. Dinesh Kumar, Pr. Scientist (FFC) ICAR, Krishi Bhawan
- 11. Dr. Anil Prathap Singh, Additional Commissioner (C.C.), Crops Division
- 12. Dr.D.P.Malík, Additional Commissioner (Crops), Crops Division
- 13. Dr. U.S. Sadana, Consultant (NFSM), Crops Division
- 14. Dr. Ram Sanehi, Assistant Commissioner (Crops), Crops Division
- 15. Dr.M.N.Singh, Joint Director (NFSM), Crops Division
- 16. Dr.K.K.Dash, Assistant Director (NFSM), Crops Division
- 17. Shri. Sudip Dutta, Section Officer (NFSM), Crops Division
- 18. Shri. Sudhakar Dhakate, Section Officer (CA-V) Crops Division

# F. No. 2-2/2014-CUI Government of India Ministry of Agriculture Department of Agriculture & Cooperation Crops Division

Krishi Bhawan, New Delhi. Dated 9<sup>th</sup> October, 2014

Subject: Allotment of Front Line Demonstration (FLDs) of Wheat & Barley for the year 2014-15 – regarding

With reference to your letter No. DWR/EXTN/FLD/2014-15 dated 22<sup>nd</sup> September. 2014 on the above cited subject. It is informed that the Agriculture Commissioner has desired to conduct the demonstration in one village by each FLD coordinating centre.

The FLDs of Wheat and Barley to be conducted in cluster approach adopting one village to visualize the impact of improved technologies.

(Dr/D.P. Malik)

Additional Commissioner (Crops)

Project Director,
Directorate of Wheat Research
Post Box 158, Kunjpura Road,
Karnal – 132001,
India

# F. No 2-1/2015-CU-I (Pt-I) Government of India Ministry of Agriculture Department of Agriculture & Cooperation Crops Division

Krishi Bhawan, New Delhi Dated 6th August, 2015

**Subject:-**Approval of organization of Front Line Demonstration of Wheat and Barley for the year 2015-16-reagrding.

With reference to your letter no. IIWBR/EXTN/FLD/2014-15/4149-50dated on 30-06-2015it is informed that there is provision to make the payment of farm operations/farm services and other critical inputs (Seed, bio-fertilizers, lime, gypsum, and micro nutrients etc.,) for smooth conduct of FLDs with recommended package of practices.

The implementing agency will take the decision for the payment of various operations according to their suitability. Further, the FLD implementing agency have an option to pay the farmer after verifying the farm operations carried out by the farmer. It would be preferable that payment is to be made by fund transfer to the bank account of the beneficiary farmer.

(D.P.Malik)

Additional Commissioner (Crops)

To

Director, ICAR- Indian Institute of Wheat & Barley Research Karnal-132001, Haryana

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13.8.2015

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# CPS 2-2/2016-NIFOM

Government of India

Ministry of Agriculture & Farmers Wufare

Department of Agriculture, Cooperation & Farmers Welfare NFSM Cell

Krishi Bhawan, New Delhi Dated: 9 May, 2016

To

Director

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

Director

Indian Institute Wheat & Barley

Research, ICAR, Karnal (Haryana)

Director

Indian Institution of Pulses Research,

**ICAR** Kanpur (Uttar Pradesh) Director

ICAR, Indian Institution of Maize Research

Pusa Campus, New Delhi

Director

Indian Institution of Millets Research,

**ICAR** 

Hyderabad (Andhra Pradesh)

Project Coordinator

India Coordinated Small Millets A11

Improvement Project

Bangalore (Karnataka)

Project Coordinator

Coordinated Millets India Pearl Improvement Project

Jodhpur (Rajasthan)

Subject: Approval of organization of Front Line Demonstration of Rice, Wheat, Pulses & Coarse Cereals for the year 2016-17-reg.

Sir,

I am directed to convey that the competent authority of this department has approved an outlay of Rs. 260.00 lakh for organization of FLDs of Rice, Wheat, Pulses and Coarse Cereals during 2016-17. The crop specific details of FLDs are given as under:

S. No.	Nodal Agency for Implementation of FLDs	Name of crop	Approved No. of FLDs	Rate of financial assistance (Rs/ha)	Financial alloc. (Rs. In lakh)
1	IIW & BR, Karnal	Wheat	600	7500	45.00
2	IIRR, Hyderabad	Rice	800	7500	60.00
3	IIPR, Kanpur	Pulses	1300	7500	97.500
	Coarse Cereals				
4	IIMR, Delhi	Maize	300	5000	15.00
5	AICSMIP, Bengaluru	Small millet	300	5000	15.00
6	AICPMIP, Jodhpur	Pearl 'millet	250	5000	12.50
7	IIMR, Hyderabad	Sorghum	200	5000	10.00
8	IIW & BR, Karnal	Barley	100	5000	5.00
	Grand Total		3850		260.00

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Details of FLDs for crop-wise and season-wise is given in Annexure-I

2 FLD proposal of Rice, Wheat, Pulses and Coarse Cereals (year, malet, sorghum, small milet, maize and barely for the year 2016-17 has been approve by with following conditions.

- 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.
- Except varietal trials, the demonstrations on other crop production technologies, the variety should not be older than 10 years.
- Each implementing agency will constitute monitoring team with involvement of officials of Crop Development Directorates, State, Department, of Agriculture and Scientists of ICAR/SAUs.
- All the FLDs should be conducted under the close supervision of SAUs/KVK/ICAR institutes.
- Farmers practice, crop production and plant protection technologies used in FLDs should be obtained 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, biofertilizers, lime, gypsum and micronutrients etc.) are allowed. Farmers have to apply the recommended doses of fertilizers.
- FLD programme should be conducted in cluster approach of 10 hectares as per guidelines already circulated.
- Field days should be regularly organized and prior information should be sent to DA,C&FW and Director, ATARI of ICAR.
- The details of FLD beneficiary-farmers along with contact number should also be furnished to DA,C&FW.
- 5% of FLDs on rice, pulses and coarse cereals shall be conducted in North-Eastern States.
- All implementing agencies and their coordinating centres should involve agronomist/plant breeder to finalize technologies to be demonstrated in FLD programme and follow up visits to demonstration sites.
- The FLDs implementing agency will re-allocate the number of FLDs as per approval and intimate to DA,C&FW.
- Critical input amounting Rs. 6700/- out of Rs. 7500/- for Rice, Wheat, Pulses and Rs. 4200/- out of Rs. 5000/- for Coarse cereals should be provided to beneficiary farmers.
- FLDs of pulses should be conducted in areas other than technology demonstrations to be conducted by KVKs funded under NFSM.
- 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 and barley) in formats (already circulated) to DRD, Patna, DWD, Ghaziabad, DPD, Bhopal and DMD, Jaipur respectively on quarterly basis.

Addl. Commr. (Crops)

Copy to:

3. ADG (FFC)/ADG (O&P)/ADG (Seeds), ICAR, Krishi Bhawan, New Delhi

- 4. Director, Directorate of Rice, Patna/Wheat, Ghaziabad/Pulses, Bhopal/Millets, Jaipur
- 5. Under Secretary (Finance), DA, C&FW, Krishi Bhawan, New Delhi
- 6. Under Secretary (CA-V)/SO (NFSM), DA, C&FW, Krishi Bhawan, New Delhi
- 7. PPS to Agriculture Commissioner (DA,C&FW), Krishi Bhawan, New Delhi
- 8. PS to JS (Crops), PS to Director (Crops), DA, C&FW, Krishi Bhawan, New Delhi
- 9. PS to ADC (Crops), NFSM Cell, Guard File, DAC, &FW, Krishi Bhawan, New Delhi

10. Programmer (NFSM), DA, C&FW, Krishi Bhawan, New Delhi

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Institute- wise, crop -wise and season- wise allocation of FLDs on Rice, Wheat, Pulses and Coarse Cereals under NFSM during 2016-17.

S. No.	Nodal Agency for Implementation of FLDs	Name of crop	Season	Tentative allocation of No. of FLDs (ha.)	Rate of financial assistance (Rs/ha)	Tentative Financial allocation (Rs. In lakh)		
1	IIW & BR, Karnal	Wheat	Rabi '	600	7500	45.00		
$\dot{2}$	IIRR, Hyderabad*	Rice	Kharif/Rabi /Summer*	. 800	7500	60.00		
	The second secon	1	L. Company	Pulses				
		Chickpea	Rabi	389	7500	29.175		
		Pigeonpea	Kharif	335	7500	25.125		
V		Mungbean	Kharif	95	7500	7.125		
			Rabi	30	7500	2.25		
			Summer	15	7500	1.125		
		Total Munbea	n	140	7500	10.50		
		J.T. 11	Kharif	90	7500	6.75		
3	IIPR, Kanpur	Urdbean	Rabi	75	7500	5.625		
		Total U	Irdbean	165	7500	12.375		
		Lentil	Rabi	130	7500	9.75		
		Fieldpea	Rabi	75	7500	5.625		
			Arid legumes					
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Mothbean	Kharif	19	7500	1.425		
		Horsegram	Kharif	27	7500	2.025		
		Cowpea	Kharif	20	7500	1.5		
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		d legume	66	7500	4.95		
	Total Pulses			1300	7500	97.500		
		700077000	Coarse					
	IIMR, Delhi	Maize	Kharif	110	5000	5.50		
4			Rabi	150	5000	7.50		
<b>T</b>			spring	40	5000	2.00		
	1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Total Maize	<u> </u>	300	5000	15.00		
5	AICSMIP, Bengaluru	Finger millet	Kharif/Rabi	115	5000	5.75		
		Foxtail millet	Kharif	50	5000	2.50		
		Little millet	Kharif	60	5000	3.00		
		Kodo millet	Kharif	45	5000	2.25		
		Proso millet	Kharif	10	5000	0.50		
		Barnyard millet	Kharif	20	5000	1.00		
		Total small millets		300	5000	15.00		
6,	AICPMIP, Jodhpur	Pearl millet	Kharif	215	5000	10.75		
			Summer	35	5000	1.75		
		Total Peal Mi	ALTO DE LA COLONIA DE LA COLON	250	5000	12.50		
	IIMR, Hyderabad	Sorghum	Kharif	70	5000	3.50		
			Rabi	110	5000	5.50		
7			Forage	20	5000	1.00		
		Total Sorghum		200	5000	10.00		
Q	IIW & BR, Karnal	Barley		100	5000	5.00		
8	<ul> <li>1412-9-254-224-4 October Stangen (Stanger) (School Stanger) (School Stanger)</li> </ul>	Dailey		3850		260.00		
15/20/20	Grand Total			0000		200.00		

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