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PROGRESS REPORT
2023-24

सामाजिक विज्ञान
SOCIAL SCIENCE

अखिल भारतीय समन्वित गेहूँ एवं जौ अनुसंधान परियोजना

AICRP on Wheat and Barley

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

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

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All India Coordinated Research Project on Wheat and Barley

PROGRESS REPORT
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SOCIAL SCIENCES

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

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Principal Investigator
(Social Sciences)

Dated : 01 September, 2024

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Frontline Demonstrations (2023-24)

India has achieved a record wheat production of 112.92 million tons during 2023-24 despite of heavy rainfall and water logging during grain filling and harvesting stages in central India, higher temperature during early stages of crop establishment, too low temperature at flowering stage and rise in temperature during second fortnight of February in northern parts of the country. Despite of such weather vagaries, the climate resilient varieties being developed by the ICAR-Indian Institute of Wheat and Barley Research, Karnal and All India Coordinated Wheat and Barley Improvement Program helped in surpassing all-time record production in 2023-24. These varieties being developed are not only climate resilient but most of them are bio-fortified which provide nutrients such as protein (>12%), Iron (Fe) and Zinc (> 40 ppm) to the consumers, thereby tackling malnutrition.

The ICAR-IIWBR Karnal has done a remarkable work in developing improved climate resilient and bio-fortified wheat and barley varieties for different agro-climatic zones of the country. At present, the varieties developed by the institute are recommended for more than 65 percent of the total wheat grown area in the country and occupy about 45 percent of the total area sown under wheat.

India faces a number of challenges including yield gap, awareness about bio-fortified and climate resilient varieties among the farmers, availability of quality seed, adoption of latest production technologies, *etc.* These challenges are more prominent in barley as compared to wheat. Availability of seeds of improved barley varieties (Husk less) for food is a major challenge in the country. As we know that a large population is suffering from diabetes in urban as well as in rural areas, inclusion of barley in their diet could be a great contribution. Making barley a staple food is one of the major challenges on which ICAR-IIWBR, Karnal is emphasizing by developing huskless barley varieties in coming years. Increase in area and production is still a major challenge for barley. There is a need to identify areas for promotion of barley. It also requires policy support under MSP to make its cultivation more profit oriented. We have to collaborate with private partners in seed production, trade, and value addition in order to re-establish this crop. Contract farming has been popular for malt barley in many barley producing states, but we have to work for food barley too.

During *rabi* 2023-24, dissemination of wheat and barley production technologies was carried out among farmers through 24 Krishi Vigyan Kendras and 15 All India Coordinated Wheat and Barley Improvement centres and other centers. The demonstrations were conducted in different agro-climatic conditions across the country on the basis of need-based interventions by identifying the location-specific constraints to bridge yield gap and to popularize these technologies. Under Barley Frontline Demonstrations, Wheat Demonstrations under SCSP, TSP programs, and Cluster Demonstrations, critical inputs were provided to the farmers in addition to seeds of newly released varieties of wheat and barley. The neighboring farmers, extension workers and other stakeholders were invited at different stages of crop growth at the demonstration sites to demonstrate the superiority of technologies being demonstrated. The scientists

and extension personnel interacted with the farmers to educate them about the latest technologies. The scientists issued need-based advisories to the farmers during the crop season. The DA&FW and ICAR-IIWBR Karnal organized regular meetings to issue advisories to the farmers to tackle heat stress, erratic rainfall and water logging problems. The beneficiary farmers were also advised to provide seed of improved varieties to the fellow farmers so that the whole village is saturated with the latest variety. Integrated communication approach was used to transfer the efficient technologies to farmers' fields.

The report highlights the outcome of barley FLDs, yield gain due to FLDs, wheat demonstrations under SCSP, cluster demonstrations of climate resilient and bio-fortified wheat varieties, costs and returns as well as constraints in barley production.

Barley Frontline Demonstrations (2023-24)

During the *rabi* crop season 2023-24, 140 hectares Barley Frontline Demonstrations (BFLDs) were allotted to 40 cooperating centers all over India in eight states/UT namely, Himachal Pradesh, Uttar Pradesh, Bihar, Jammu & Kashmir, Punjab, Haryana, Rajasthan and Madhya Pradesh. Out of these, 135.2 BFLDs were conducted by 39 centers, covering 138.4 hectares area of 420 farmers (Table1). Improved barley varieties with complete package of practices (irrigation management, nutrient management, weed control, seed treatment *etc.*) were demonstrated.

Table 1: Centre wise distribution of Barley FLDs during *rabi* 2023-24 (in hectares)

S.No.	Zone and Centre	BFLDs allotted	BFLDs conducted	Area sown (hectares)	No. of farmers/ locations
Northern Hills Zone (NHZ)					
1.	CSKHPKV, HAREC, Bajaura , District Kullu (HP)	4.8	Not conducted	-	-
2.	IARI, Regional Station, Amartara Cottage, Shimla (HP)	2	2	2.0	10
North Eastern Plains Zone (NEPZ)					
3.	ANDUA&T, Narendranagar, Kumarganj, Ayodhya (UP)	4	4	4.0	10
4.	Head, KVK (IAS- BHU), Barkachha, Mirzapur (UP)	4	4	4.0	10
5.	CSAUA&T, Kanpur (UP)	4	4	4.0	12
6.	KVK (NDUA&T), Kallipur, Mirzamurad, Varanasi (UP)	4.8	4.8	4.8	12
7.	Mahayogi Gorakhnath KVK, Gorakhpur-2, (GGSS), Chauk Mafi (Peppeganj), Jangal Kaudiya, Gorakhpur (UP)	4	4	4.0	10
8.	KVK (NDUA&T) Basti, Post-Katiya, Banjariaya Farm, Basti (UP)	4	4	4.0	20
9.	KVK (Dr. RPCAU), Begusarai (Bihar)	2	2	2.0	8
10.	KVK (BAU Bhagalpur), Agwanpur, Barh, Patna (Bihar)	2	2	2.0	6
11.	KVK, Samastipur-1 (Dr. RPCAU), Birauli, Samastipur (Bihar)	2	2	2.0	17
12.	KVK, Samastipur-2 (Dr. RPCAU), Lada, Singhia, Samastipur (Bihar)	2	2	2.0	5
North Western Plains Zone (NWPZ)					
13.	KVK (SKUAST-Jammu), Rajhani, Kathua (J&K)	4	4	4.0	36
14.	PAU, Ludhiana (Punjab)	3.2	3.2	3.2	8
15.	KVK (PAU), Khokhar Khurd, Tehsil & District-Mansa (Punjab)	4	4	5.2	13
16.	KVK (PAU), Kheri, Patran Road, Sangrur (Punjab)-148001	4	4	4.0	10
17.	KVK (PAU), Goneana, Mukatsar (Punjab)	4	4	4.8	12
18.	KVK (PAU), Dabwali Road, Near Kheti Bhawan, Bathinda (Punjab)	4	4	4.0	10
19.	COA, CCSHAU, Hisar (Haryana)	4	4	4.0	10
20.	KVK (Shri B.B. Ashram), Rampura, Rewari (Haryana)	3.2	3.2	3.2	8
21.	KVK (CCSHAU), Opposite Bhim Stadium, Bhiwani (Haryana)	3.2	3.2	4.4	11
22.	PI (Social Sciences), ICAR-IIWBR, Karnal (Haryana)	2.4	2.4	2.4	6
23.	Dean, FoAS, SGT University, NCR, Gurugram (Haryana)	2	2	2.0	5
24.	RARI (SKNAU), Durgapura, Jaipur (Rajasthan)– 302018	4	4	4.0	10
25.	KVK (Pragati Trust), Tankarda, Chomu, Jaipur (Rajasthan)	3.2	3.2	3.2	10

S.No.	Zone and Centre	BFLDs allotted	BFLDs conducted	Area sown (hectares)	No. of farmers/ locations
26.	KVK (AU-Kota), Akorashi, Hindauncity, Karauli (Rajasthan)	4	4	4.0	14
27.	KVK, Alwar-1 (SKNAU-Jobner), Navgaon, Alwar (Rajasthan)	2	2	2	5
28.	ACES, AUUP, J-1 Block, LGF, Amity Uni Campus, Noida (UP)	4	4	4.0	10
29.	KVK (SVPUA&T, Modipuram, Meerut), RRS, Nagina, Bijnor (UP)	2	2	2.0	5
Central Zone (CZ)					
30.	RCOA, MPUA&T, Udaipur (Rajasthan)	4.8	4.8	4.8	12
31.	KVK (MPUA&T), Dhoinda, Rajasmand (Rajasthan)	4.8	4.8	4.8	12
32.	KVK (JNKVV), Rewa, CoA, Kuthulia Farm, Rewa (MP)	4.8	4.8	4.8	12
33.	KVK (JNKVV), Purushottampur, Panna (MP)	4.8	4.8	4.8	12
34.	KVK (JNKVV), Kundeshwar Road,Tikamgarh (MP)	4.8	4.8	4.8	12
35.	KVK (RVSKVV), Rajgarh, Biaora, Kothi Bagh, Rajgarh (MP)	2.8	2.8	2.8	12
36.	Dean, CoA (JNKVV), Ganj Basoda, District-Vidisha (MP)	4.8	4.8	4.8	16
37.	Director Extension Services, RVSKVV, Gwalior (MP)	2	2	2.0	5
38.	KVK (BUA&T-Banda), Govt Agri Farm, Khiria Misra, Bamourikala, Devgarh Road, Lalitpur (UP)	4.8	4.8	4.8	12
39.	KVK (BUA&T-Banda), Bharari, Bhojla, Jhansi (UP)	2.8	2.8	2.8	7
40.	Director Extension Education, RLBCAU, Jhansi (UP)	2	2	2.0	5
	TOTAL	**140**	**135.2**	**138.4***	**420**

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

Table 2: State wise distribution of barley FLDs during *rabi* 2023-24 (in hectares)

S.No.	State/UT	BFLDs allotted	BFLDs conducted	Area Sown (hectares)	No. of Farmers/ locations
1.	HP	6.8	2.0	2.0	10
2.	UP	40.4	40.4	40.4	113
3.	Bihar	8.0	8.0	8.0	36
4.	J&K	4.0	4.0	4.0	36
5.	Punjab	19.2	19.2	21.2	53
6.	Haryana	14.8	14.8	16.0	40
7.	Rajasthan	22.8	22.8	22.8	63
8.	MP	24.0	24.0	24.0	69
	Total	**140**	**135.2**	**138.4***	**420**

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

Table 3: Zone wise distribution of barley FLDs during *rabi* 2023-24 (in hectares)

Zone	BFLDs allotted	BFLDs conducted	Area sown (hectares)	No. of farmers/ locations
NHZ	6.8	2	2	10
NEPZ	32.8	32.8	32.8	110
NWPZ	57.2	57.2	60.4	183
CZ	43.2	43.2	43.2	117
Total	**140**	**135.2**	**138.4**	**420**

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

Table 4: State wise yield gain during *rabi* 2023-24

State	BFLDs mean yield (q/ha)	Check mean yield (q/ha)	Gain (in %)
HP	29.25	21.75	34.48**
Eastern UP	35.58	25.68	38.56***
Central UP	34.78	24.40	42.52***
Western UP	61.25	49.53	23.67***
Bihar	38.28	31.03	23.37***

State	BFLDs mean yield (q/ha)	Check mean yield (q/ha)	Gain (in %)
All UP	37.78	27.60	36.87***
J&K	33.05	20.98	57.57***
Punjab	47.50	41.50	14.46***
Haryana	43.60	40.18	08.53*
Rajasthan (NWPZ)	57.90	51.78	11.83***
Rajasthan (CZ)	40.78	32.45	25.65***
All Rajasthan	51.38	44.43	15.64***
MP	40.40	29.88	35.23***
All India	42.05	33.83	24.32***

**** Significant at 1 per cent level, ** Significant at 5 per cent level, * Significant at 10 per cent level*

The highest gain in barley yield was recorded in UT of J&K (57.57%) followed by Central UP (42.52%), Eastern UP (38.56%), All UP (36.87%), MP (35.23%), HP (34.48%), Rajasthan-CZ (25.65%). The lowest gain in yield was reported in Haryana (8.53%) (Table 4).

Table 5: Zone wise productivity over regional productivity during *rabi* 2023-24

Zone	BFLDs mean yield (q/ha)	Regional mean yield (q/ha)	Gain (%)
NHZ	29.25	19.75	48.10**
NEPZ	36.15	25.18	43.59***
NWPZ	47.15	39.23	20.20***
CZ	39.25	28.38	38.33***

**** Significant at 1 per cent level ** Significant at 5 per cent level*

The yield gain due to improved varieties over regional mean yield was highest in NHZ (48.10%) followed by NEPZ (43.59%), CZ (38.33%) and NWPZ (20.20%) (Table 5).

Table 6: Zone wise productivity over check during *rabi* 2023-24

Zone	BFLDs mean yield (q/ha)	Check mean yield (q/ha)	Gain (%)
NHZ	29.25	21.75	34.48**
NEPZ	36.15	26.83	34.76***
NWPZ	47.15	40.43	16.64***
CZ	39.25	29.25	34.19***

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

The yield gain due to improved varieties over check was highest in NEPZ (34.76%) followed by NHZ (34.48%), CZ (34.19%) and NWPZ (16.64%) (Table 6). Therefore, efforts should be made to increase barley yield in the NEPZ, CZ and NHZ by promoting recent barley production technologies in collaboration with the state department of agriculture.

Centre wise data analysis revealed that the yield gain under barley FLD was highest at center Basti (81.47%) followed by Kanpur (40.59%) in NEPZ; Rewa (64.92%) followed by RLBCAU Jhansi (62.65%) and Lalitpur (45.55%) in CZ; Shimla (34.48%) in NHZ; and Kathua (57.57%) followed by Mansa (34.53%) in NWPZ. The yield gain was lowest at Muktsar (04.58%) in NWPZ (Table 7).

Table 7: Centre wise performance of improved barley varieties during *rabi* 2023-24

Zone and Centre	BFLDs mean yield (q/ha)	Check mean yield (q/ha)	Gain (%)
NHZ			
Shimla	29.25	21.75	34.48**
NEPZ			
Ayodhya	35.08	26.33	33.24***
Mirzapur	27.83	22.50	23.67***
Kanpur	36.03	25.63	40.59***
Kallipur Varanasi	36.28	32.65	11.10***
Gorakhpur	43.15	32.40	33.18***
Basti	35.25	19.43	81.47***
Begusarai	39.88	35.25	13.12***
Barh Patna	43.48	31.70	37.15***
Lada Samstipur	29.20	22.55	29.49***
NWPZ			
Kathua	33.05	20.98	57.57***
Ludhiana	52.50	45.95	14.25*
Mansa	38.28	28.45	34.53***
Sangrur	57.63	50.00	15.25***
Muktsar	49.70	47.53	4.58**
Bathinda	42.75	39.13	9.27*
Hisar	49.13	46.25	6.22^{NS}
Rewari	50.30	46.00	9.35***
Bhiwani	31.25	27.65	13.02***
Karnal	48.05	45.30	6.07 ^{NS}
Durgapura, Jaipur	60.63	51.63	17.43***
Chomu, Jaipur	54.80	47.88	14.46***
Karauli	60.25	57.38	5.01***
Alwar-1	52.15	44.20	17.99***
Noida	61.25	49.53	23.67***
CZ			
Udaipur	40.00	32.08	24.71***
Rajasmand	41.58	32.83	26.66***
Rewa	38.55	23.38	64.92
Panna	30.38	23.93	26.96***
Tikamgarh	38.28	29.40	30.19***
Rajgarh	47.18	35.13	34.31***
Vidisha	46.68	36.25	28.76***
Lalitpur	37.23	25.58	45.55***
KVK Jhansi	31.35	25.00	25.40***
RLBCAU Jhansi	33.75	20.75	62.65***

**** Significant at 1 per cent level, ** Significant at 5 per cent level, * Significant at 10 per cent level, NS is Non-significant*

Table 8: Variety wise performance of improved barley varieties during *rabi* 2023-24

Zone and Centre	Improved variety	Average yield (q/ha)	Check variety	Average yield (q/ha)	Yield gain over check (%)
NHZ					
Shimla	BHS 400	29.25	Local	21.75	34.48**
NEPZ					
Ayodhya	DWRB 137	35.33	Local	25.78	37.05***
Ayodhya	DWRB 137	34.38	Narender Jau 2	26.25	30.95 NS
Ayodha	RD 2907	35.00	Local	26.25	33.33 NS
Ayodhya	RD 2907	35.20	Narender Jau 2	27.08	30.01***
Mirzapur	DWRB 137	30.00	K 71 Amber	22.50	33.33 NS
Mirzapur	RD 2907	25.63	K 71 Amber	22.50	13.89 NS
Kanpur	DWRB 137	35.00	K 226	24.55	42.57***
Kanpur	DWRB 137	37.45	K 508	27.13	38.06***
Kanpur	DWRB 137	38.00	NB-1	34.33	10.71***
Kanpur	RD 2907	32.83	Narender Jau 2	29.33	11.94***
Kallipur Varanasi	DWRB 137	38.00	NB-1	34.33	10.71***
Kallipur Varanasi	RD 2907	32.83	NB-1	29.33	11.94***
Gorkhpur-2	DWRB 137	42.40	RD 2660	32.50	30.46***
Gorkhpur-2	RD 2907	44.50	RD 2660	32.30	37.77***
Basti	RD 2907	35.90	K 287	21.15	69.74***
Basti	RD 2907	33.20	Narender Jau 2	20.70	60.39***
Basti	DWRB 137	35.30	K 287	18.45	91.33***
Begusarai	DWRB 137	39.88	BR 32	35.25	13.12***
Barh Patna	DWRB 137	43.48	Local	31.70	37.15***
Lada Samstipur-2	DWRB 137	29.20	Local	22.55	29.49***
NWPZ					
Kathua	DWRB 137	33.28	Local	21.08	57.89***
Kathua	RD 2907	32.78	Local	20.85	57.19***
Ludhiana	DWRB 137	50.52	PL 807	45.95	14.25*
Mansa	DWRB 137	38.28	Local	28.45	34.53***
Sangrur	DWRB 137	58.25	PL 126	48.75	19.49***
Sangrur	DWRB 137	57.00	PL 807	51.25	11.22*
Sri Muktsar Sahib	DWRB 137	48.13	PL 426	45.88	4.90**
Sri Muktsar Sahib	DWRB 137	51.25	PL 807	49.18	4.22*
Bathinda	DWRB 137	42.75	Local	39.13	9.27*
Hisar	DWRB 137	49.13	BH 946	46.25	6.22 NS
Rewari	DWRB 137	50.30	BH 393	46.00	9.35***
Bhiwani	DWRB 137	31.25	BH 393	27.65	13.02***
Karnal	DWRB 137	48.05	DWRUB 52	45.30	6.07 NS
Durgapura	RD 2907	70.40	Local	49.28	42.87**
Durgapura	RD 2907	62.33	PL 426	54.05	15.31***
Durgapura	DWRB 137	52.03	Local	47.68	9.12*
Durgapura	DWRB 137	58.13	RD 2052	53.43	8.80 NS
Chomu Jaipur	RD 2907	55.93	PL 426	45.18	23.80 NS
Chomu Jaipur	RD 2907	59.58	RD 2035	51.01	16.79***
Chomu Jaipur	RD 2907	58.49	RD 2052	48.80	19.85***
Chomu Jaipur	DWRB 137	52.09	PL 426	46.39	12.29**
Chomu Jaipur	DWRB 137	49.88	RD 2035	47.38	5.28 NS
Karauli	DWRB 137	59.28	RD 2035	56.08	5.71***
Karauli	RD 2907	61.23	RD 2035	58.68	4.35**
Alwar	DWRB 137	52.43	RD 2552	45.25	15.86***
Alwar	RD 2907	51.75	RD 2552	42.63	21.41**
Amity Noida	DWRB 137	61.25	BH 393	49.53	23.67***

Zone and Centre	Improved variety	Average yield (q/ha)	Check variety	Average yield (q/ha)	Yield gain over check (%)
CZ					
Udaipur	DWRB 137	39.38	RD 2035	31.88	23.53*
Udaipur	DWRB 137	38.75	RD 2715	30.00	29.17**
Udaipur	DWRB 137	41.88	RD 2786	34.38	21.82**
Rajsamand	DWRB 137	37.63	Local	31.50	19.44 NS
Rajsamand	DWRB 137	42.60	RD 2786	32.90	29.48***
Rajsamand	RD 2899	37.50	Local	31.75	18.11 NS
Rajsamand	RD 2899	45.18	RD 2786	34.25	31.90***
Rewa	DWRB 137	36.65	JB 58	23.15	58.32***
Rewa	RD 2899	41.20	JB 58	23.73	73.66***
Panna	RD 2899	30.65	Local	24.15	26.92***
Panna	DWRB 137	30.43	JB 58	23.75	28.11***
Panna	DWRB 137	30.00	Local	23.75	26.32***
Tikamgarh	DWRB 137	38.43	JB 15	29.38	30.81***
Tikamgarh	RD 2899	38.05	JB 15	29.43	29.31***
Rajgarh	RD 2899	46.38	Local	32.13	44.36**
Rajgarh	DWRB 137	47.38	Local	35.88	32.06***
Vidisha	DWRB 137	46.85	Local	36.10	29.78***
Vidisha	RD 2899	46.43	Local	36.43	27.45***
Lalitpur	DWRB 137	37.23	K 560 Haritma	25.58	45.55***
KVK Jhansi	DWRB 137	31.35	Local Mundi	25.00	25.40***
RLBCAU Jhansi	DWRB 137	33.75	Local Parvati	20.75	62.65***

**** Significant at 1 per cent level ** Significant at 5 per cent level, * Significant at 10 per cent level, NS is Non-significant*

The varieties BHS 400 (29.25 q/ha) at Shimla centre in NHZ; RD 2907 (44.50 q/ha) at Gorakhpur in NEPZ; RD 2907 (70.40 q/ha) at Durgapura Jaipur in NWPZ and DWRB 137 (47.38 q/ha) at Rajgarh in CZ were the highest average yielding (Table 8). It is evident from table 8 that recent varieties outperformed check varieties at all the locations. The yield gain due to varietal intervention ranged from 4.22 % at Sri Muktsar Sahib center in Punjab to 91.33% at Basti center in UP.

Table 9 : Highest grain yield of barley varieties in different zones during *rabi* 2023-24

Zone	Centre	Variety	Yield(q/ha)
NHZ	Shimla	BHS 400	33.75
NEPZ	Gorakhpur	RD 2907	46.25
NWPZ	Durgapura Jaipur	RD 2907	70.85
CZ	Vidisha	DWRB 137	49.40

It is evident from table 9 that varieties BHS 400 (33.75 q/ha), RD 2907 (46.25 q/ha), RD 2907 (70.85 q/ha) and DWRB 137 (49.40 q/ha) performed better than other varieties at Shimla, Gorakhpur, Durgapura Jaipur and Vidisha centres in the NHZ, NEPZ, NWPZ and CZ, respectively.

Table 10: Barley varieties grown in different zones during *rabi* 2023-24

Zone	Improved varieties	Check varieties	Popular varieties in the region
NHZ	BHS 400	Local	Local
NEPZ	DWRB 137, RD 2907	Local, Narendra Jau-2, Amber (K 71), K 226, K 508, NB-1, RD 2660, K 287, BR 32	Narendra Jau-2, Lakhan, Jyoti, Jagriti, Amber (K 71), K 125 (Azad), RD 2660, RD 2794, Local, Prakhar, Narendra Barley-4, DL 36, BR 32, Narendra Barley-7, HUB 113, K 226, K 287, K 329
NWPZ	DWRB 137, RD 2907	Local , PL 807, PL 426, BH 393, BH 946, DWRUB 52, RD 2035, RD 2052, RD 2552	RD 2907, PL 807, PL 426, PL 891, DWRUB 52, BH 393, BH 946, RD 2035, RD 2052, RD 2552, RD 2660, RD 2715, RD 2786, RD 2794, RD 2899, , RD 2907, Local
CZ	DWRB 137, RD 2899	RD 2035, RD 2715, RD 2786, Local, JB 58, JB 15, Haritma (K 560), Local Mundi, Local Parvati	RD 2035, RD 2552, RD 2715, RD 2899, JB 58, Mundi, Local, RD 2907, JB 15, JB 58, Haritma, Parvati, RD 2508, PL 419, DL 88, GRD 222

Barley FLDs conducted at ICAR-IIWBR, Karnal centre

During the year 2023-24, Barley FLDs were conducted by ICAR-IIWBR, Karnal in collaboration with United Breweries Limited, Patiala using improved barley variety DWRB 137, covering total 5 acres area of five farmers in villages Faggu, Kalanwali, Jalaana and Taruana in district Sirsa of Haryana state. The demonstrations were conducted with complete package of practices.

Constraints analysis in different barley producing zones of India (2023-24)

Variation in yield levels among different states, farmers and farms leads to yield gap in different fields, states and different zones. There are many reasons of this yield gap which need to be addressed to increase area, production and productivity of barley across different zones. Through constraint analysis an effort has been made to identify the factors impeding barley production in different parts of the country. For this an inventory of constraints was developed after thorough review of literature and taking experts' opinion. Data were collected on a pre-structured questionnaire mailed to all the cooperating centers conducting barley FLDs. The responses were collected on a three point continuum *viz.;* most serious, serious and not serious. The scores were assigned as 2, 1 and 0 for the most serious, serious and not serious constraints, respectively. Based on the total score, the level of seriousness for each constraint has been calculated and final ranks were assigned.

Northern Hills Zone (NHZ)

In NHZ, untimely rain, water stress, lack of knowledge among farmers about recent technologies, lack of irrigation facilities, yellow rust, *Phalaris minor*, small land holding, poor participation in exposure visits arranged by various departments, poor participation in *kisan melas*/field days/*kisan gosthi*/training, poor quality seeds, poor information delivery by state extension machinery, low price of barley grains were perceived as major constraints (Table 11).

Table 11: Constraints in NHZ (n=05)

Constraints	Score	Rank
Untimely rain	10	I
Water Stress	10	I
Lack of knowledge among farmers about recent technologies	10	I
Lack of irrigation facilities	08	II
Yellow rust	05	III
Phalaris minor	05	III
Small land holding	05	III
Poor participation in exposure visits arranged by various departments	05	III
Poor participation in *kisan melas*/field days/*kisan gosthi*/training	05	III
Poor quality seeds	05	III
Poor information delivery by state extension machinery	05	III
Low price of barley grains	05	III

North Eastern Plains Zone (NEPZ)

In this zone, decline in water table, high cost of inputs, small land holding, *Phalaris minor*, untimely rain, non-availability of labour, poor quality herbicides/pesticides, low price of barley grains, poor participation in *kisan melas*/field days/*kisan gosthi*/training and lack of facility of canal irrigation were identified as major constraints in NEPZ. These constraints need to be addressed immediately to make barley cultivation easier and profitable. Marketing of barley grains ensuring better price has been a concern for area expansion under barley in NEPZ. There is a need to promote contract farming is eastern states too for popularization of barley as nutri-cereal (Table 12).

Table 12: Constraints in NEPZ (n=94)

Constraints	Score	Rank
Decline in water table	114	I
High cost of inputs	92	II
Small land holding	64	III
Phalaris minor	62	IV
Untimely rain	62	IV
Non availability of labour	60	V
Poor quality herbicides/pesticides	57	VI
Low price of barley grains	57	VI
Poor participation in *kisan melas*/field days/*kisan gosthi*/training	57	VI
Lack of facility of canal irrigation water	57	VI

North Western Plains Zone (NWPZ)

NWPZ is the most important zone for the production of barley in the country. Farmers of this zone perceived decline in water table, high cost of inputs, *Phalaris minor*, small land holding, non-availability of labour, low price of barley grains, non-availability of seed of newly released varieties, low organic matter, lodging and lack of facility of canal irrigation water were reported as major production constraints. In NWPZ, barley is grown for industrial purposes under contract farming too. Hence, there is a need to address these constraints for the benefit of the farmers and area expansion under barley crop (Table 13). In recent years many new varieties have been released for malt purposes in NWPZ. These varieties need to be promoted through contract farming for more yield and returns.

Table 13: Constraints in NWPZ (n=172)

Constraints	Score	Rank
Decline in water table	257	I
High cost of inputs	239	II
Phalaris minor	223	III
Small land holding	197	IV
Non availability of labour	175	V
Low price of barley grains	161	VI
Non availability of seed of newly released varieties	148	VII
Low organic matter	145	VIII
Lodging	145	VIII
Lack of facility of canal irrigation water	144	IX

Central Zone (CZ)

In CZ, decline in water table, *Phalaris minor*, non-availability of labour, high cost of inputs, high temperature at maturity, temperature fluctuation during crop growth, small land holding, poor information delivery by state extension machinery, lack of extension literature, poor participation in exposure visits arranged by various departments and poor participation in *kisan melas*/field days/*kisan gosthi*/training were the major production constraints of barley crop (Table 14).

Table 14: Constraints in CZ (n=98)

Constraints	Score	Rank
Decline in water table	97	I
Phalaris minor	97	I
Non availability of labour	94	II
High cost of inputs	94	II
High temperature at maturity	77	III
Temperature fluctuation during crop growth	70	IV
Small land holding	69	V
Poor information delivery by state extension machinery	68	VI
Lack of extension literature	68	VI
Poor participation in exposure visits arranged by various departments	65	VII
Poor participation in *kisan melas*/field days/*kisan gosthi*/training	65	VII

Major constraints impeding barley production in the country

Overall analysis of constraints in different zones clearly indicated that decline in water table, high cost of inputs, *Phalaris minor*, small land holding, non-availability of labour, low price of barley grains, poor participation in exposure visits arranged by various departments, lack of facility of canal irrigation water, untimely rain and poor quality of herbicides/pesticides were the major constraints affecting barley production and productivity in the country (Table 15). Farmers need to be educated and upskilled on recent barley production technologies, complete package of practices and soil health management. There is a need of government intervention to ensure supply of quality seed and inputs to the farmers. Farmers need to be updated on impact of climate change on barley cultivation and adaptation strategies for mitigation. To ensure better price, farmers have to go for quality barley production. There is a need to register barley growers on e-NAM platform for selling of barley.

Table 15: Major constraints impeding barley production in the country p(n=369)

Constraints	Score	Rank
Decline in water table	478	I
High cost of inputs	435	II
Phalaris minor	393	III
Small land holding	343	IV
Non availability of labour	337	V
Low price of barley grains	292	VI
Poor participation in exposure visits arranged by various departments	278	VII
Lack of facility of canal irrigation water	267	VIII
Untimely rain	263	IX
Poor quality herbicides/pesticides	254	X

Farmers' perception about Barley FLDs

- The farmers of the same village and nearby villages were highly satisfied with the performance of demonstrated varieties and ready to adopt them in the coming crop season.
- All the farmers were highly satisfied with the yield advantage of demonstrated varieties and with their increased income due to higher yield.
- Neighbouring farmers booked seed from FLD farmers for next crop season.

- The FLD farmers were highly satisfied with performance of demonstrated barley varieties and production technologies. All the improved varieties outperformed check varieties on all locations.

Monitoring of Barley Frontline Demonstrations (FLDs) and SCSP Wheat Demonstrations during rabi 2023-24

The ICAR-IIWBR team accompanied by the experts from the Ministry of Agriculture & Farmers Welfare and the concerned centres monitored the following barley FLDs and SCSP Wheat Demonstrations centres during the *rabi* crop season 2023-24.

Table 16: Centers monitored by different monitoring teams

Team Leader	Centres Monitored	Dates of Monitoring
Dr. Satyavir Singh	Sangrur, Mansa, Bathinda, Muktsar	02-04 April, 2024
Dr. Anil Khippal	Kathua, Kapurthala	12-13 March, 2024
Dr. Raj Kumar	Ayodhya, Varanasi, Mirzapur	10-14 March, 2024

FLD Monitoring Report of Sangrur, Mansa, Bathinda and Muktsar centers

Monitoring Centre: KVK, Sangrur (Punjab)
Monitoring Date: 02.04.2024
Monitoring Team

Dr. Satyavir Singh, Principal Scientist & PI (Social Sciences), ICAR-IIWBR, Karnal (Haryana).
Dr. Ravinder Kaur, Assistant Professor (Horticulture), KVK, Sangrur (Punjab)
Dr. Sunil Kumar, Assistant Professor (Farm Machinery & Power), KVK, Sangrur (Punjab)
Sh. Gurpreet Singh, Junior Field Helper, KVK, Sangrur (Punjab)

The team visited the Barley FLDs on 2nd April, 2024 conducted by KVK, Sangrur center at village-Duggan using variety DWRB 137. The team also visited wheat demonstrations conducted by KVK, Sangrur under SCSP programme at village-Mehlan using wheat varieties DBW 187 and DBW 370. The technology i.e. improved or newly released wheat and barley varieties with complete package of practices were demonstrated at farmers' fields.

Monitoring Centre: KVK, Mansa (Punjab)
Monitoring Date: 02.04.2024
Monitoring Team

Dr. Satyavir Singh, Principal Scientist & PI (Social Sciences), ICAR-IIWBR, Karnal (Haryana).
Dr. Tejpal Singh, Assistant Professor (Vegetables), KVK, Mansa (Punjab)
S. Kulwant Singh, Farm Manager, KVK, Mansa (Punjab)

The team visited the Barley FLDs on 2nd April, 2024 conducted by KVK, Mansa center at village-Khokhar Khurd using variety DWRB 137. The team also visited wheat demonstrations conducted by KVK, Mansa under SCSP programme at village- Khokhar Khurd using wheat variety DBW 370. The technology i.e. improved or newly released wheat and barley varieties with complete package of practices were demonstrated at farmers' fields.

Monitoring Centre: KVK, Bathinda (Punjab)
Monitoring Date: 03.04.2024
Monitoring Team

Dr. Satyavir Singh, Principal Scientist & PI (Social Sciences), ICAR-IIWBR, Karnal (Haryana).
Dr. Sarvpriya Singh, Assistant Professor (Fruit Science), KVK, Bathinda (Punjab)
Mr. Parkash Singh, SRF (Agronomy), KVK, Bathinda (Punjab)

The team visited the Barley FLDs on 3rd April, 2024 conducted by KVK, Bathinda center at village-Mehma Sawai using variety DWRB 137. The team also visited wheat demonstrations conducted by KVK, Bathinda under SCSP programme at village-Mehma Sarkari using wheat varieties DBW 332 and DBW 370. The technology i.e. improved or newly released wheat and barley varieties with complete package of practices were demonstrated at farmers' fields.

Monitoring Centre: KVK, Muktsar (Punjab)
Monitoring Date: 04.04.2024
Monitoring Team

Dr. Satyavir Singh, Principal Scientist & PI (Social Sciences), ICAR-IIWBR, Karnal (Haryana).
Dr. Karamjit Sharma, Head, KVK, Muktsar (Punjab)
S. Manjinder Singh, CRM Project, KVK, Muktsar (Punjab)

The team visited the Barley FLDs on 4rd April, 2024 conducted by KVK, Muktsar center at village-Assa Buttar using variety DWRB 137. The team also visited wheat demonstrations conducted by KVK, Muktsar under SCSP programme at villages Khirkianwali and Chhatiana using wheat varieties DBW 332 and DBW 370. The technology i.e. improved or newly released wheat and barley varieties with complete package of practices were demonstrated at farmers' fields.

Observations / Feedback

The weeds infestation in FLDs was negligible. The barley FLDs crop was free from diseases. The new barley variety has good tillering, good crop stand, long earhead, more number of grains per earhead and bold grains. The improved barley variety being popularized was DWRB 137. The check barley varieties being used were PL 426, PL 807 and Local. The improved wheat varieties being popularized were DBW 187, DBW 332 and DBW 370. The check wheat varieties being used were HD 3086, PBW 766 and DBW 303. The neighbour farmers of the barley FLDs and wheat demonstrations were impressed with the performance of new barley and wheat varieties. Lodging was observed at few demonstration sites. Farmers expected more yield from the new varieties than the check varieties. FLD is good source of transfer of technology. The farmers appreciated the work done by barley FLDs / wheat demonstrations cooperators.

FLD Monitoring Report of Ayodhya, Mirzapur and Varanasi centers

Monitoring Date: 10.03.2024 to 14.03.2024
Monitoring Team

Dr. Raj Kumar, Principal Scientist (Plant Breeding), ICAR-IIWBR, Karnal (Haryana).
Dr. N. Raghubansi, Head, KVK, Kallipur, Varanasi (UP)
Dr. Vinod Kumar Singh, Incharge Wheat and Barley Programme, ANDUA&T, Kumarganj, Ayodhya (UP).
Dr. S.N. Singh, Soil Scientist, KVK, Mirzapur (UP)
Dr. Piyusha Singh, Assitt. Prof., Genetics & Plant Breeding, ANDUA&T, Kumarganj, Ayodhya (UP).
Dr. Priyanka Jaiswal, Assitt. Prof., Genetics & Plant Breeding, ANDUA&T, Kumarganj, Ayodhya (UP).
Dr. S.P. Singh, STA, Department of Genetics & Plant Breeding, ANDUA&T, Kumarganj, Ayodhya (UP).

To monitor the performance of the demonstrated barley varieties DWRB 137 and RD 2907 in frontline demonstrations at Varanasi, Ayodhya and Mirzapur centers, a designated team visited

the FLDs during 10-14th March 2024. The team member nominated from Ministry of Agriculture and Farmers Welfare did not attend the monitoring of barley FLDs conducted. These demonstrations were sown during 14-19th November, 2023 and the performance of both the varieties was very good. All FLDs monitored were sown with complete package of practices. In general, farmers were very happy with the performance of these varieties.

FLD field of barley variety RD 2907 at village Jorium (Milkipur) under ANDUA&T, Kumarganj, Ayodhya was very good with slight lodging due to luxuriuos vegetative crop growth at few points and nearby farmers were impressed with the demonstration. However, FLD field of barley variety DWRB 137 at village Kachhwa (Arajiline) was grazed by stray animals and was burnt by leaf blight completely. The farmers were advised to save their own barley seed and were advised for the rogueing of off-type plants to maintain the quality of farm saved seed.

FLD Monitoring Report of Kathua and Kapurthala centers

Monitoring Centre: KVK, Kathua (Jammu and Kashmir)
Monitoring Date: 12.03.2024
Monitoring Team

Dr. Anil Kumar Khippal, Principal Scientist (Agronomy), ICAR-IIWBR, Karnal (Haryana)
Dr. Vishal Mahjan, Senior Scientist and Head, KVK, Kathua (J&K)
Dr. Berjesh Ajrawat, Senior Scientist, KVK, Kathua (J&K)
Dr. Vishal Sharma, SMS (Agronomy), KVK, Kathua (J&K)

Improved barley varieties DWRB 137 and RD 2907 were demonstrated at farmers' fields at multiple locations by the KVK, Kathua centre against local check to popularize these varieties. The following observations were made during the overall monitoring and discussion with the FLD beneficiaries.

Observations/Feedback

The locations of FLDs conducted were excellent and were on the main road.
The board with all informations was displayed.
Line sowing by seed drill was the most common practice witnessed in the demonstrated plots with the recommended seed rate.
Almost all farmers had done seed treatment.
Around two to three irrigations were given to the crop amidst scarcity of water.
The crop stand was good in all the plots.
Almost all the visited FLD sites were at milking stage.
Fertilizer nutrients were applied based on the recommended dose for the region and the monitoring team asked the farmers for soil test based application.
There was no incidence of pests and diseases in the monitored plot.
Few weeds were present in some visited fields.
Technical assistance and advisories offered by the center was much appreciated by the beneficiaries and they were interested to continue.

Monitoring Centre: KVK Kapurthala (Punjab)
Monitoring Date: 13.03.2024
Monitoring Team

Dr. Anil Kumar Khippal, Principal Scientist (Agronomy), ICAR-IIWBR, Karnal (Haryana)
Dr. Harinder Singh, Associate Director, KVK, Kapurthala, Punjab
Dr Suman, KVK, Kapurthala, Punjab

Improved wheat varieties DBW 187, DBW 332 and DBW 370 were demonstrated at farmers' field against local check to popularize these varieties. The following observations were made during the overall monitoring and discussion with the Scheduled Caste (SC) beneficiaries.

Observations/Feedback

The locations of demonstration conducted were excellent.
The board with all informations was displayed at the demonstration's site.
Selection of beneficiaries was only SC farmers.
Line sowing by seed drill was the most common practice witnessed in the demonstrated plots with the recommended seed rate.
All the farmers had done seed treatment.
Around four to five irrigations were given to the crop.
The crop stand was good in all the plots.
Almost all the visited sites were at milking stage.
Fertilizers were applied based on the recommended dose for the region and the monitoring team asked the farmers for soil test based application.
There was an incidence of aphid in the monitored plot.
Weeds were not present in the visited fields and herbicide was sprayed to control weeds.
Technical assistance and advisories offered by the KVK was much appreciated by the beneficiaries and they were interested to continue.

Wheat Demonstrations Conducted Under SCSP Programme During 2023-24

Under SCSP Programme, 520 varietal demonstrations of wheat varieties DBW 187, DBW 332 and DBW 370 were organized during 2023-24 *rabi* crop season to assess their performance at farmers' field. The demonstrations were carried out through KVKs of Punjab (18), Haryana (4), Rajasthan (2), Jammu & Kashmir (1); and RLBCAU Jhansi (1) benefitting 520 farmers (Table 17). The demonstrations were conducted in 18 aspirational districts of Punjab (Amritsar, Barnala, Bathinda, Faridkot, Fatehgarh Sahib, Firozpur, Gurdaspur, Hoshiarpur, Jalandhar, Kapurthala, Ludhiana, Mansa, Moga, Muktsar Sahib, Rupnagar, Sangrur, Nawanshahar and Tarn Taran), 4 aspirational districts of Haryana (Ambala, Fatehabad, Sirsa and Yamunanagar), 2 aspirational districts of Rajasthan (Sriganganagar and Hanumangarh), 1 aspirational district of UT of Jammu & Kashmir (Samba), and 1 aspirational district of UP (Jhansi) covering a total of 520 acres area and 520 farmers of Scheduled Castes (SC) category. In Punjab, the demonstrations were conducted in 360 acres area benefitting 360 SC farmers; in Haryana, the demonstrations were conducted in 80 acres area benefitting 80 SC farmers; in Rajasthan, the demonstrations were conducted in 40 acres area benefitting 40 SC farmers; in J&K (UT), the demonstrations were conducted in 20 acres area benefitting 20 SC farmers; and in UP, the demonstrations were conducted in 20 acres area benefitting 20 SC farmers (Table 18). In each aspirational district, 20 demonstrations were conducted. At all the locations, the yields of demonstrated varieties were more than the check varieties. Improved wheat varieties DBW 187, DBW 332 and DBW 370 with complete package of practices (irrigation management, nutrient management, weed control, seed treatment etc.) were demonstrated.

Table 17: District wise distribution of wheat demonstrations under SCSP programme during 2023-24

S.No.	State and District	Demonstrations conducted	Area sown (acres)	Number of farmers
Punjab				
1.	Amritsar	20	20	20
2.	Barnala	20	20	20
3.	Bathinda	20	20	20
4.	Faridkot	20	20	20
5.	Fatehgarh Sahib	20	20	20
6.	Firozpur	20	20	20
7.	Gurdaspur	20	20	20
8.	Hoshiarpur	20	20	20
9.	Jalandhar	20	20	20
10.	Kapurthala	20	20	20
11.	Ludhiana	20	20	20

12.	Mansa	20	20	20
13.	Moga	20	20	20
14.	Muktsar Sahib	20	20	20
15.	Rupnagar	20	20	20
16.	Sangrur	20	20	20
17.	SBS Nagar (Nawanshahar)	20	20	20
18.	Tarn Taran	20	20	20
Haryana				
19.	Ambala	20	20	20
20.	Fatehabad	20	20	20
21.	Sirsa	20	20	20
22.	Yamunanagar	20	20	20
Rajasthan				
23.	Sriganganagar	20	20	20
24.	Hanumangarh	20	20	20
Jammu & Kashmir (UT)				
25.	Samba	20	20	20
Uttar Pradesh				
26.	Jhansi	20	20	20
Total		**520**	**520**	**520**

Table 18: State wise distribution of wheat demonstrations under SCSP programme during 2023-24

Zone and State	Demonstrations conducted	Area sown (acres)	Number of farmers
Punjab	360	360	360
Haryana	80	80	80
Rajasthan	40	40	40
Jammu & Kashmir	20	20	20
Uttar Pradesh	20	20	20
Total	**520**	**520**	**520**

Table 19: District wise yield gain in wheat demonstrations under SCSP programme during 2023-24

State and District	Wheat demonstrations yield (q/ha)	Check yield (q/ha)	Gain (%)
Punjab			
Amritsar	65.60	56.20	16.73***
Barnala	55.63	50.63	9.88***
Bathinda	47.20	44.03	7.21^{NS}
Faridkot	56.03	53.30	5.11***
Fatehgarh Sahib	53.75	49.20	9.25***
Firozpur	60.68	56.58	7.25***
Gurdaspur	51.40	50.13	2.54^{NS}

State and District	Wheat demonstrations yield (q/ha)	Check yield (q/ha)	Gain (%)
Hoshiarpur	46.33	45.63	1.53^{NS}
Jalandhar	54.68	52.45	4.24***
Kapurthala	53.75	48.90	9.92***
Ludhiana	51.65	50.53	2.23***
Mansa	57.50	55.68	3.28**
Moga	50.30	48.33	4.09***
Muktsar Sahib	58.23	56.20	3.60**
Rupnagar	53.20	51.50	3.30**
Sangrur	59.28	56.83	4.31***
Nawanshahar	49.38	48.58	1.65**
Tarn Taran	53.53	50.45	6.10***
Haryana			
Ambala	52.63	51.13	2.93***
Fatehabad	59.98	57.65	4.03***
Sirsa	60.80	57.70	5.37***
Yamunanagar	53.60	51.13	4.84***
Rajasthan			
Sriganganagar	57.93	38.80	49.29***
Hanumangarh	63.38	55.85	13.47***
Jammu & Kashmir			
Samba	23.23	19.10	21.60***
Uttar Pradesh			
Jhansi	50.60	39.95	26.66***

**** Significant at 1 per cent level, ** Significant at 5 per cent level, NS is Non-significant*

The yield gain due to improved variety under SCSP wheat demonstrations was highest in Sriganganagar (49.29%) district in Rajasthan state followed by Jhansi (26.66%) in UP state, Samba (21.60%) district in Jammu and Kashmir (UT), Amritsar (16.73%) district in Punjab state and Hunumangarh (13.47%) district in Rajasthan state. The lowest yield gain was in Hoshiarpur (1.53%) district in Punjab state (Table 19).

Table 20: State wise yield gain in wheat demonstrations under SCSP programme during 2023-24

State and Zone	Wheat demonstrations yield (q/ha)	Check yield (q/ha)	Gain (%)
Punjab	53.63	51.10	04.94***
Haryana	56.75	54.00	05.09***
Rajasthan	60.93	47.33	28.74***
Jammu & Kashmir	23.23	19.10	21.60***
Overall (North Western Plains-NWPZ)	52.85	49.38	07.04***
Uttar Pradesh (CZ)	50.60	39.95	26.66***

**** Significant at 1 per cent level*

Under SCSP wheat demonstrations, the yield gain was highest *i.e.* 28.74% in Rajasthan. The lowest yield gain was 4.94 % in Punjab state. The zonal (NWPZ) yield gain was 7.04% (Table 20). The demonstrated varieties outperformed the existing varieties.

Table 21: Varietal performance in wheat demonstrations under SCSP programme during 2023-24

State and Centre	Improved variety	Improved variety mean yield q/ha)	Check variety	Check variety mean yield (q/ha)	Yield gain over check (%)
Punjab					
Amritsar	DBW 187	53.75	HD 3086	51.58	4.22**
Amritsar	DBW 332	52.33	HD 3086	50.53	3.56**
Amritsar	DBW 370	51.88	HD 3086	50.00	3.75^{NS}
Barnala	DBW 187	54.50	HD 2967	49.33	10.49***
Barnala	DBW 332	58.68	HD 2967	55.00	6.68***
Barnala	DBW 332	55.63	HD 3086	50.30	10.59*
Barnala	DBW 370	46.00	PBW 766	41.75	10.18^{NS}
Barnala	DBW 370	58.43	HD 3086	52.98	10.29***
Bathinda	DBW 187	55.18	HD 3086	50.43	9.42***
Bathinda	DBW 332	43.90	HD 3086	41.40	6.04^{NS}
Bathinda	DBW 370	40.63	HD 3086	38.75	4.84^{NS}
Faridkot	DBW 187	56.08	HD 3086	53.68	4.47***
Faridkot	DBW 332	54.95	HD 3086	53.45	2.81^{NS}
Faridkot	DBW 370	56.08	PBW 826	53.68	4.47*
Faridkot	DBW 370	55.50	DBW 222	54.75	1.37^{NS}
Faridkot	DBW 187	57.00	HD 3086	52.43	8.73**
Fatehgarh Sahib	DBW 187	56.25	PBW 677	43.75	28.57**
Fatehgarh Sahib	DBW 187	50.43	HD 3086	47.50	6.16^{NS}
Fatehgarh Sahib	DBW 332	56.25	DBW 222	43.75	28.57**
Fatehgarh Sahib	DBW 332	55.00	PBW 677	50.00	10.00***
Fatehgarh Sahib	DBW 370	52.83	PBW 677	50.33	4.97^{NS}
Ferozepur	DBW 332	58.60	HD 3086	55.83	4.97^{NS}
Ferozepur	DBW 187	60.78	HD 3086	55.90	8.72***
Ferozepur	DBW 370	65.13	HD 3086	59.38	9.68^{NS}
Gurdaspur	DBW 187	47.25	PBW 677	44.85	5.35^{NS}
Gurdaspur	DBW 187	52.33	PBW 725	51.08	2.45^{NS}
Gurdaspur	DBW 332	51.95	PBW 725	51.05	1.76^{NS}
Gurdaspur	DBW 370	53.58	PBW 725	52.58	1.90^{NS}
Hoshiarpur	DBW 187	45.13	PBW 725	45.00	0.28^{NS}
Hoshiarpur	DBW 187	44.90	HD 3086	44.35	1.24^{NS}
Hoshiarpur	DBW 332	46.38	PBW 677	45.50	1.92^{NS}
Hoshiarpur	DBW 332	44.25	PBW 725	43.75	1.14^{NS}
Hoshiarpur	DBW 332	49.75	PBW 766	49.38	0.76^{NS}
Hoshiarpur	DBW 370	49.00	DBW 222	47.38	3.43^{NS}
Hoshiarpur	DBW 370	46.68	PBW 725	45.93	1.63^{NS}
Jalandhar	DBW 187	54.58	PBW 766	52.98	3.02**
Jalandhar	DBW 332	54.75	PBW 766	52.53	4.24***
Jalandhar	DBW 370	54.63	PBW 766	51.38	6.33**
Kapurthala	DBW 187	54.85	HD 2967	49.25	11.37***
Kapurthala	DBW 332	53.35	HD 2967	48.68	9.60***
Kapurthala	DBW 370	52.63	HD 2967	48.50	8.51***
Ludhiana	DBW 187	53.75	PBW 677	53.50	0.47^{NS}
Ludhiana	DBW 187	51.58	HD 3086	50.43	2.28*
Ludhiana	DBW 332	51.20	HD 2967	49.75	2.91*
Ludhiana	DBW 332	50.38	HD 3086	49.63	1.51^{NS}
Ludhiana	DBW 332	52.68	Unnat PBW 343	51.08	3.13^{NS}
Ludhiana	DBW 370	51.58	HD 3086	50.70	1.73^{NS}
Mansa	DBW 187	60.00	DBW 222	57.50	4.35^{NS}
Mansa	DBW 187	58.75	HD 3086	52.25	12.44^{NS}
Mansa	DBW 187	56.58	PBW 766	55.00	2.86^{NS}
Mansa	DBW 332	57.50	HD 3086	55.00	4.55^{NS}
Mansa	DBW 332	58.58	PBW 766	57.68	1.56^{NS}
Mansa	DBW 370	55.33	DBW 187	54.38	1.75^{NS}
Moga	DBW 187	49.95	HD 2967	47.28	5.66**
Moga	DBW 187	50.83	HD 3086	47.88	6.16***
Moga	DBW 332	50.70	HD 3086	48.98	3.52***

State and Centre	Improved variety	Improved variety mean yield q/ha)	Check variety	Check variety mean yield (q/ha)	Yield gain over check (%)
Moga	DBW 332	50.15	PBW 725	48.78	2.82^{NS}
Moga	DBW 370	49.48	HD 3086	48.30	2.43^{NS}
Muktsar Sahib	DBW 187	56.88	PBW 766	54.38	4.60^{NS}
Muktsar Sahib	DBW 187	56.10	HD 3086	53.50	4.86*
Muktsar Sahib	DBW 332	60.35	DBW 303	59.33	1.73*
Muktsar Sahib	DBW 332	56.88	HD 3086	54.38	4.60^{NS}
Muktsar Sahib	DBW 370	58.45	PBW 766	55.95	4.47*
Rupnagar	DBW 187	51.50	HD 3086	50.25	2.49^{NS}
Rupnagar	DBW 187	51.38	PBW 725	51.25	0.24^{NS}
Rupnagar	DBW 332	53.75	HD 3086	52.00	3.37^{NS}
Rupnagar	DBW 332	53.45	PBW 725	51.58	3.64^{NS}
Rupnagar	DBW 370	55.63	PBW 725	52.50	5.95^{NS}
Rupnagar	DBW 370	55.00	DBW 222	52.50	4.76^{NS}
Sangrur	DBW 187	60.13	DBW 222	52.50	14.52^{NS}
Sangrur	DBW 187	60.20	HD 3086	57.70	4.33*
Sangrur	DBW 332	60.00	DBW 222	57.50	4.35^{NS}
Sangrur	DBW 332	57.90	HD 3086	56.33	2.80^{NS}
Sangrur	DBW 370	59.75	HD 3086	58.43	2.27*
Nawanshahr	DBW 187	50.03	PBW 725	48.80	2.51^{NS}
Nawanshahr	DBW 187	50.33	PBW 824	49.65	1.36^{NS}
Nawanshahr	DBW 332	49.53	PBW 725	48.40	2.32^{NS}
Nawanshahr	DBW 332	48.60	PBW 824	48.03	1.20^{NS}
Nawanshahr	DBW 370	48.60	PBW 824	47.78	1.73*
Tarn Taran	DBW 187	50.80	PBW 677	49.00	3.67^{NS}
Tarn Taran	DBW 187	52.50	Sriram 272	51.25	2.44^{NS}
Tarn Taran	DBW 332	52.25	PBW 677	50.00	4.50^{NS}
Tarn Taran	DBW 332	56.88	PBW 725	51.88	9.64^{NS}
Tarn Taran	DBW 332	55.83	Sriram 272	53.75	3.86^{NS}
Tarn Taran	DBW 370	56.25	Unnat PBW 343	48.75	15.38**
Haryana					
Ambala	DBW 187	52.08	HD 3086	50.90	2.31**
Ambala	DBW 332	52.58	HD 3086	51.25	2.59**
Ambala	DBW 370	53.70	HD 3086	51.25	4.78*
Fatehabad	DBW 187	59.73	HD 3086	58.10	2.80^{NS}
Fatehabad	DBW 332	60.53	HD 3086	57.65	4.99**
Fatehabad	DBW 370	58.50	HD 3086	55.50	5.41^{NS}
Sirsa	DBW 187	61.63	HD 3086	58.38	5.57***
Sirsa	DBW 332	59.80	HD 2851	57.30	4.36^{NS}
Sirsa	DBW 332	60.88	HD 3086	57.08	6.66^{NS}
Sirsa	DBW 370	61.00	HD 3086	57.95	5.26**
Yamunanagar	DBW 187	54.13	HD 2967	50.70	6.76**
Yamunanagar	DBW 187	53.70	HD 3086	51.00	5.29***
Yamunanagar	DBW 332	54.18	HD 2967	51.58	5.04**
Yamunanagar	DBW 332	53.05	HD 3086	51.10	3.82*
Yamunanagar	DBW 370	53.20	HD 3086	51.33	3.65*
Rajasthan					
Sriganganagar	DBW 187	56.70	HD 2851	38.38	47.75***
Sriganganagar	DBW 332	57.18	WH 1105	46.83	22.10**
Sriganganagar	DBW 332	58.05	HD 2851	36.68	58.28***
Sriganganagar	DBW 370	65.43	HD 2851	36.18	80.86***
Hanumangarh	DBW 187	59.40	HD 3086	55.40	7.22***
Hanumangarh	DBW 332	65.38	HD 3086	55.30	18.22***
Hanumangarh	DBW 370	65.80	HD 3086	57.88	13.69***
Jammu & Kashmir					
Samba	DBW 187	24.63	HD 3086	20.13	22.36***
Samba	DBW 332	22.48	HD 2967	19.15	17.36***
Samba	DBW 332	26.25	HD 3086	21.13	24.26***
Samba	DBW 370	22.93	HD 2967	18.75	22.27***

State and Centre	Improved variety	Improved variety mean yield q/ha)	Check variety	Check variety mean yield (q/ha)	Yield gain over check (%)
Uttar Pradesh					
Jhansi	DBW 187	50.25	Lok-1	39.73	26.49^{NS}
Jhansi	DBW 187	51.88	Sriram 303	41.13	26.14***
Jhansi	DBW 187	50.33	WH 147	39.38	27.81***

**** Significant at 1 per cent level, ** Significant at 5 per cent level, * Significant at 10 per cent level, NS is Non-significant*

In Punjab state, the significant yield gain due to improved wheat variety DBW 332 over check mean yield was highest at Fatehgarh Sahib (28.57%). In Haryana state, the highest significant yield gain due to improved wheat variety DBW 187 was at Yamunanagar (6.76%). In Rajasthan state, the highest significant yield gain due to improved wheat variety DBW 370 was at Sriganganagar (80.86%). In J&K (UT), the highest significant yield gain due to improved wheat variety DBW 332 was at Samba (24.26%). In UP, the highest significant yield gain due to improved wheat variety DBW 187 was at Jhansi (27.81%) (Table 21).

Table 22: Highest yield of wheat varieties under SCSP wheat demonstrations during *rabi* 2023-24

State	District	Variety	Yield(q/ha)
Punjab	Barnala	DBW 187	67.00
Punjab	Jalandhar	DBW 332	68.75
Punjab	Sangrur	DBW 370	70.00
Haryana	Sirsa	DBW 187	65.00
Haryana	Sirsa	DBW 332	68.00
Haryana	Sirsa	DBW 370	62.50
Rajasthan	Sriganganagar	DBW 187	62.00
Rajasthan	Hanumangarh	DBW 332	68.00
Rajasthan	Hanumangarh	DBW 370	68.80
UT of J&K	Samba	DBW 187	28.75
UT of J&K	Samba	DBW 332	27.00
UT of J&K	Samba	DBW 370	23.75
UP	Jhansi	DBW 187	53.75

In Punjab, the highest yield of variety DBW 370 was 70.00 q/ha in Sangrur district. In Haryana, the highest yield of variety DBW 332 was 68.00 q/ha in Sirsa district. In Rajasthan, the highest yield of variety DBW 370 was 68.80 q/ha in Hanumangarh district. In UT of Jammu & Kashmir, the highest yield of variety DBW 187 was 28.75 q/ha in Samba district. In UP, the highest yield of variety DBW 187 was 53.75 q/ha in Jhansi district (Table 22).

Table 23: Improved and check wheat varieties at farmers' field in Punjab, Haryana, Rajasthan, UT of J&K and UP during *rabi* 2023-24

State	Improved varieties	Check varieties
Punjab	DBW 187, DBW 332, DBW 370	HD 3086, HD 2967, DBW 222, PBW 725, PBW 723 (Unnat PBW 343), PBW 677, PBW 766, PBW 826, PBW 824, PBW 869, DBW 303, Sriram 272
Haryana	DBW 187, DBW 332, DBW 370	HD 3086, HD 2967, HD 2851, WH 1105
Rajasthan	DBW 187, DBW 332, DBW 370	HD 3086, HD 2851, WH 1105
UT of J&K	DBW 187, DBW 332, DBW 370	HD 2967, HD 3086
Uttar Pradesh	DBW 187	WH 147, Sriram 303, Lok-1

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

Profitability is one of the major factors influencing the adoption of any crop production technology. In this section, costs and returns analysis for wheat demonstrations under the SCSP programme and barley frontline demonstrations (FLDs) have been attempted across regions for the improved production technologies that were tested in the farmers' field during the 2023-2024 *Rabi* season. 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. 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 with the assumption of fixed costs remain the same for the particular farm wherein the technology (or variety) has been demonstrated. Operational costs include expenditure incurred on labour, seeds, manure, fertilizers, plant protection chemicals, *etc*. The returns over variable costs give an idea of profitability accrued to the farmer after meeting all the day-to-day expenses. Cost of production was estimated to know the cost incurred in producing a unit quantity of crop output *i.e.,* ₹ per quintal. Returns per rupee of investment were also worked out to know the comparative profitability between wheat and barley.

Primary data were collected by the cooperating centres from the selected farmers who were allotted the FLDs. For wheat demonstrations conducted under the SCSP programme, the data were collected by the KVKs of the respective states. The personal interview and discussion method were adopted with the aid of pre-tested schedules designed exclusively for the purpose of evaluating the technologies disseminated through wheat demonstrations and barley FLDs. The data collected pertained to the *rabi* season 2023-2024. 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 coordinators to collect realistic data from the wheat demonstrations and barley FLD beneficiaries.

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

A perusal of Table 24 indicates that on average, demonstration of improved wheat varieties at the farmers' field under the SCSP programme gave ₹3.44 per rupee of investment in comparison to the farmers' practice (₹3.19). A significant difference in returns per rupee of investment was noticed between the demonstrated and check plots at the farmer's field. The profit per hectare in the demonstrated plot was highest in Rajasthan (₹133866), followed by Punjab (₹98259). The difference in profit levels between demonstration and check plots was highest in the case of Rajasthan. Operational costs were found to be lower in several wheat demonstrations in comparison to the check plots. Overall, by adopting a new wheat variety, a farmer earns a profit of ₹95301/ha comprising all regions. Further, ₹799 has to be spent to produce a quintal of wheat through a new variety against ₹871 (farmers' choice of variety in the check plots).

Table 24: Costs and returns from the wheat during 2023-24

Particulars	Cost of Cultivation (₹/ha)						Returns per ₹ invested		Cost of Production (₹/qtl)	
	Operational Costs		Gross Returns		Profit					
	Demonstration	Farmers Practice	Demonstration	Farmers Practice	Demonstration	Farmers Practice	Demonstration	Farmers Practice	Demonstration	Farmers Practice
State										
Haryana	49186	51347	143933	138371	94747	87024	2.93	2.69	894	973
Jammu & Kashmir	44153	44494	62429	49308	18276	4814	1.41	1.11	1940	2363
Punjab	36382	36628	134641	128649	98259	92022	3.70	3.51	695	734
Rajasthan	28953	27218	162818	127004	133866	99787	5.62	4.67	468	519
Uttar Pradesh	58910	51500	145579	116257	86669	64758	2.47	2.26	1182	1312
Zone										
NWPZ	39058	39161	134359	124884	95301	85724	3.44	3.19	799	871
Technology										
Improved Variety	38296	38063	134281	124713	95985	86649	3.51	3.28	787	853
Rotavator	58420	67065	136569	129314	78149	62249	2.34	1.93	1102	1328
Super Seeder	59890	68535	132059	128329	72168	59794	2.21	1.87	1177	1374
All Categories										
India	**39058**	**39161**	**134359**	**124884**	**95301**	**85724**	**3.44**	**3.19**	**799**	**871**

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

Table 25 indicates that on average, improved barley varieties demonstrated at the farmers' field under the FLD programme gave profit around ₹67404 per hectare. A significant difference in returns per rupee of investment was noticed between the demonstration and check plots across states and zones. Himachal Pradesh registered the highest returns per rupee of investment (₹6.58) through demonstrations, followed by Punjab (₹4.25) and Rajasthan (₹3.13). The difference in returns per rupee of investment between demonstration and check plots was highest in Himachal Pradesh, followed by U.T of J&K, and Uttar Pradesh. The profit per hectare in FLDs was highest in Rajasthan (₹86033), followed by Himachal Pradesh (₹75174) and Punjab (₹74516). The difference in profit between FLD and check plots ranged from ₹28634 in U.T of J&K to ₹5724 in Haryana. Interestingly, operational costs were lower in FLDs than in check plots for a majority of the barley growing states. The probable reason might be a reduction in the use of inputs based on the recommendation. The returns per rupee of investment across barley growing zones were highest in the NHZ (₹6.58), followed by NWPZ (₹3.39) and CZ (₹2.79). Estimates of the cost of production indicated that the cost incurred in producing a unit quantity of barley output was the least (₹476 per quintal) in Himachal Pradesh owing to relatively less operational costs coupled with relatively higher yield levels.

Table 25 : Costs and returns from barley during 2023-24

Particulars	Cost of Cultivation (₹/ha)						Returns per ₹ invested		Cost of Production (₹/Qtl)	
	Operational Costs		Gross Returns		Profit					
	FLD	Check	FLD	Check	FLD	Check	FLD	Check	FLD	Check
State										
Bihar	54059	56413	102298	84292	48238	27880	1.89	1.49	1440	1807
Haryana	32880	33019	90960	85376	58080	52357	2.77	2.59	808	883
Himachal Pradesh	13462	14697	88636	68160	75174	53463	6.58	4.64	476	721
Madhya Pradesh	39899	37733	106164	82003	66265	44270	2.66	2.17	989	1207
Punjab	22957	23744	97472	89231	74516	65487	4.25	3.76	510	627
Rajasthan	40300	40551	126333	109807	86033	69257	3.13	2.71	805	954
Uttar Pradesh	34960	34177	97431	70009	62471	35832	2.79	2.05	971	1344
U.T. of J&K	30183	30521	88748	60451	58565	29930	2.94	1.98	927	1476
Zone										
CZ	36511	36214	101873	78229	65362	42016	2.79	2.16	945	1240
NEPZ	39242	38505	90012	66539	50770	28033	2.29	1.73	1112	1478
NHZ	13462	14697	88636	68160	75174	53463	6.58	4.64	476	721
NWPZ	32394	32467	109827	95058	77433	62590	3.39	2.93	724	896
Technology										
Improved Variety	34975	34791	102380	82793	67404	48002	2.93	2.38	878	1137
All Categories										
India	**34975**	**34791**	**102380**	**82793**	**67404**	**48002**	**2.93**	**2.38**	**878**	**1137**

Overall, the profit analysis on wheat and barley indicated that the additional returns per hectare from the demonstrated varieties and/or technologies were more than the check varieties and/or technologies establishing the fact that demonstrations carry the successful technologies from lab to land. For some beneficiaries, it was found that the operational costs under check varieties were more than the demonstrations/FLDs. However, the present estimates are only the indicators for comparison within the current year's *rabi* season (2023-2024) and may not have a complete inter-year relevance as the demonstrations (improved varieties were different across regions) were conducted at different sites as well as by different farm households. Further, the difference in profit earned from wheat/barley cultivation is subject to farm-farmer-region specific conditions as it varies from case to case.

Cluster Demonstrations of Climate Resilient and Biofortified Wheat Varieties 2023-24

India has achieved a record wheat production of 112.74 million tons during 2023-24 despite of erratic rainfall, water logging during grain filling stages in different parts of the country. Despite of such natural calamities, the climate resilient varieties being developed by the IIWBR and All India Coordinated wheat and barley improvement program helped in surpassing the target in 2023-24. The varieties being developed are not only climate resilient but most of them are bio-fortified which provide nutrients to the consumers, thereby tackling malnutrition.

Due to reduction in yield because of climate fluctuations and also to overcome malnutrition, Ministry of Agriculture and Farmers Welfare conducted a project (1014856) - "Cluster Demonstration of Climate Resilient and Biofortified Wheat Varieties" under NFSM- National Food Security Mission dated October 13th, 2023. This project is approved for three years i.e. 2023-24 to 2025-26 by NFSM Cell – Crops and PHMF division of MOA&FW. In this project, 33 districts of 7 states are to be covered during 2023-26. These states and districts are selected on the basis of need based interventions by identifying the location specific constraints to bridge yield gap and popularize the varieties. Out of these 33 districts, 11 districts were covered during 2023-24 crop season.

During the *rabi* crop season 2023-24, 440 hectares of Wheat Cluster Demonstrations were allotted to 11 selected districts of 7 states, namely Punjab (71): Moga, Haryana (77): Mewat, Uttarakhand (75): Haridwar, Rajasthan (100): Dholpur, UP (200): Shrawasti and Balrampur, MP (195): Chhatarpur and Damoh, and Bihar (322): Sitamarhi, Muzaffarpur and Begusarai. In these states, 1100 cluster demonstrations were conducted by 11 Krishi Vigyan Kendras covering 440 hectares area benefitting 1038 farmers.

Under cluster demonstration programme, the following climate resilient and bio-fortified wheat varieties were demonstrated.

Sr. No.	States	Districts	Demonstrated Varieties	Check Varieties
1.	Punjab	Moga	DBW-370 DBW-371 DBW-332 DBW-303	DBW 222, HD 3086, PBW 826
2.	Haryana	Mewat	DBW-332	DBW 222, SR 231, SR 303, HD 2967, HD 3086, PBW 343
3.	Uttarakhand	Haridwar	DBW-303	DBW 222, SR 303, HD 2967, HD 3086, HI 1620
4.	Rajasthan	Dholpur	DBW-303	RAJ 4120, RAJ 3077, RAJ 1482, HD 2967, RAJ 3777
5.	Uttar Pradesh	Balrampur	DBW 187 DBW 316	HD 2967, SR 303
		Shrawasti	DBW 187	SR 303, HD 2967, PBW 343
6.	Madhya Pradesh	Chhattarpur	DBW-303 DBW 187 DBW 327	SR 111, SR 252, SR 303, GW 322, WH 147
		Damoh	DBW 187 DBW 303 DDW 55 (d)	GW 322, GW 263, Lok-1
7.	Bihar	Begusarai	DBW 187 DBW 222	PBW 343, HD 2967
		Muzaffarpur	DBW 187 DBW 316	PBW 343, HD 2967, SR 303
		Sitamarhi	DBW 187	PBW 343, HD 2967, SR 303

During the crop season, farmers were guided by providing timely advice on different intercultural operations. Among all the demonstrations, maximum yield gain (27.03%) was recorded in Muzaffarpur (Bihar) and minimum yield gain (08.12%) was recorded in Shrawasti (UP). It could be inferred from these findings that in state like Bihar, yield potential of climate resilient and bio-fortified wheat varieties could be realised by organizing cluster demonstrations with complete package of practices.

Table: District-wise varietal performance in cluster demonstrations

States/ Districts	Demonstrated variety	Average yield of demonstrated variety (q/ha)	Average yield of check variety (q/ha)	Yield gain (%)
Moga, Punjab	DBW 370	61.25	55.65	10.06
	DBW 371	59.00	55.25	06.07
	DBW 332	58.32	53.00	10.30
	DBW 303	59.02	54.00	09.29
Mewat, Haryana	DBW 332	49.31	43.40	13.61
Haridwar, Uttarakhand	DBW 303	45.06	43.40	13.61
Dholpur, Rajasthan	DBW 303	46.59	39.63	17.56
Balrampur, Uttar Pradesh	DBW 187	50.54	40.53	24.69
	DBW 316	48.18	41.46	16.20
Shrawasti, Uttar Pradesh	DBW 187	50.03	46.27	08.12
Chhattarpur, Madhya Pradesh	DBW 303	35.66	30.96	15.18
	DBW 327	41.84	36.08	15.96
	DBW 187	43.20	37.28	15.87
Damoh, Madhya Pradesh	DBW 187	41.82	37.97	10.13
	DBW 303	39.12	36.28	07.82
	DDW 55(D)	40.87	37.25	09.71
Begusarai, Bihar	DBW 187	37.18	29.53	25.90
	DBW 222	46.34	37.27	24.33
Muzaffarpur, Bihar	DBW 187	41.75	33.41	24.96
	DBW 316	40.07	33.99	17.88
Sitamarhi, Bihar	DBW 187	41.80	34.15	22.43

Centre wise highest yield of demonstrated wheat varieties

Highest performing variety was DBW 332 with yield of 70 qtl/ha in Mewat Haryana while at many centres it was noticed that performance of DBW 187 is highest against other demonstrated varieties. Centre wise highest performing wheat varieties are given in the following table.

Table: Centre-wise highest yield of different wheat varieties

Sr. No.	States	Districts	Demonstrated Varieties	Yield (qtl/ha)
1	Punjab	Moga	DBW 370	65.00
2	Haryana	Mewat	DBW 332	70.00
3	Uttarakhand	Haridwar	DBW 303	51.25
4	Rajasthan	Dholpur	DBW 303	57.00
5	Uttar Pradesh	Balrampur	DBW 187	60.00
		Shrawasti	DBW 187	57.50
6	Madhya Pradesh	Chhattarpur	DBW 187	47.50
		Damoh	DBW 187	50.00
7	Bihar	Begusarai	DBW 222	50.50
		Muzaffarpur	DBW 187	46.00
		Sitamarhi	DBW 187	46.25

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

A perusal of following table indicates that on an average, demonstration of improved wheat varieties at the farmers' field under the cluster demonstration programme gave better returns per rupee of investment in comparison to the farmers' practice. As observed, farmers of Moga, Punjab got the highest returns of ₹4.63 for per rupee invested while farmers of Chhattarpur, MP got the lowest of ₹1.08 for per rupee invested. A significant difference in returns per rupee of investment was noticed between the demonstrated and check plots at the farmer's field. The profit per hectare in the demonstrated plots was highest in Moga, Punjab (₹48951), followed by Dholpur, Rajasthan (₹44935). The difference in profit levels between demonstration and check plots was highest in the case of Balrampur, UP.

Table : Cost and returns for cluster demonstrations of wheat varieties

Name of the center	Cost of cultivation (₹/ha)						Returns per ₹ invested		Cost of production (₹/qtl)	
	Operational cost		Gross returns		Profit					
	Demo.	Check	Demo.	Check	Demo.	Check	Demo.	Check	Demo.	Check
Moga (Punjab)	10556	10294	59607	54533	48951	44239	4.63	4.29	444	471
Mewat (Haryana)	16807	16781	56373	48845	39565	32063	2.35	1.91	851	966
Haridwar (Uttarakhand)	16755	16495	57313	50273	40558	33778	2.42	2.04	828	889
Dholpur (Rajasthan)	18197	18162	63133	53855	44935	35692	2.46	1.96	976	1145
Balrampur (UP)	16814	16417	56773	45615	39959	29198	2.37	1.77	841	1006
Shrawasti (UP)	17145	16919	63133	53855	44935	35692	2.62	2.10	856	914
Chhatarpur (MP)	20187	19335	42175	36725	21988	17390	1.08	0.89	1294	1433
Damoh (MP)	20117	18812	44133	40682	24017	21870	1.19	1.16	1237	1263
Muzaffarpur (Bihar)	17268	16775	47322	38533	30054	21759	1.74	1.29	1047	1248
Begusarai (Bihar)	18069	17330	47697	38569	29628	21239	1.63	1.22	1125	1351
Sitamarhi (Bihar)	17411	16622	48762	40175	31351	23553	1.80	1.41	1041	1216

Technology Outreach Programme (2023-24)

Mera Gaon Mera Gaurav Scheme at ICAR-IIWBR, Karnal

The activities of the government's flagship programme towards doubling of farmers' income under 'Mera Gaon Mera Gaurav' (MGMG) scheme were carried out on large scale during the current crop season and all the teams advised and created awareness among the farmers on advanced practices of crop cultivation. Conducted barley frontline demonstrations (FLDs) at farmers' fields in Sirsa district of Haryana state. Timely reports of monthly and quarterly activities were compiled at IIWBR and submitted to the Zonal Nodal Officer & Director, ICAR- Agricultural Technology Application Research Institute (ATARI), Zone-2, Jodhpur (Rajasthan), regularly. Fourteen MGMG teams of scientists of different disciplines have been constituted at ICAR-IIWBR, Karnal including four to five scientists. Out of these, each of the twelve MGMG teams have selected five different villages, one team has selected four different villages and one team has selected one village.

Extension Activities

Training programmes organized/conducted by ICAR–IIWBR, Karnal

Sr.No	Date	Duration (Days)	No. of Trainees	Subject	Organized by
1.	22 May, 2023	1	120 Farmers	Jalvayu Anukul Smart Krishi Abhiyaan ke Antargat (Gehoon evam Jau ki Jalvayu Anukul Kismein, Jau Utpad Kendrit Udhyamsheeltaa ko Protsaahan) at village Padha, Karnal.	ICAR-IIWBR, Karnal, Haryana
2.	24 May, 2023	1	119 Farmers	Awareness-cum-Training Programme on Barley at Bageshwar in collaboration with KVK, Kafligar, Bageshwar, Uttarakhand under SCSP Programme	ICAR-IIWBR, Karnal in collaboration with KVK, Kafligair, Bageshwar, Uttarakhand
3.	26 May, 2023	1	100 Farmers	Jalvayu Anukul Smart Krishi Abhiyaan ke Antargat (Gehoon evam Jau ki Jalvayu Anukul Kismein, Jau Utpad Kendrit Udhyamsheeltaa ko Protsaahan) at village Mathana, Kurukshetra.	ICAR-IIWBR, Karnal, Haryana
4.	21 July, 2023	1	30 Students	Igniting Young Mind for Career in Agricultural Science	ICAR-IIWBR, Karnal
5.	04 October, 2023	1	200 Farmers	Awareness-cum-Training Programme on Barley under SCSP Programme at KVK, Bajaura, Kullu in collaboration with KVK, Bajaura, Kullu	ICAR-IIWBR, Karnal in collaboration with KVK, Bajaura, Kullu

Sr.No	Date	Duration (Days)	No. of Trainees	Subject	Organized by
6.	05 October, 2023	1	200 Farmers	Awareness-cum-Training Programme on Barley under TSP Programme at ICAR-IIWBR, RS, Dalang Maidan, Lahaul & Spiti, HP, in collaboration with KVK, Kukumseri, Lahaul & Spiti, HP.	ICAR-IIWBR, Karnal in collaboration with KVK, Kukumseri, Lahaul & Spiti, HP.
7.	01 December, 2023	1	59 Farmers	Awareness-cum-Training Programme on Agricultural Technologies under SCSP Programme under NICRA Project NO. 1013323 at KVK, Damla, Yamunanagar, Haryana	ICAR-IIWBR, Karnal in collaboration with KVK, Damla, Yamunanagar, Haryana
8.	21-23 December, 2023	3	40 Farmers	Uttarakhand mein Gehoon evam Jau ki Unnat Kheti	ICAR-IIWBR, Karnal
9.	9 January, 2024	1	50 Farmers	Awareness-cum-Training Programme on Agricultural Technologies'	ICAR-IIWBR, Karnal in collaboration with KVK, Tepla, Ambala, Haryana
10.	10 January, 2024	1	50 Farmers	Awareness-cum-Training Programme on Agricultural Technologies'	ICAR-IIWBR, Karnal in collaboration with KVK, Kaithal, Haryana
11.	11 January, 2024	1	50 Farmers	Awareness-cum-Training Programme on Agricultural Technologies'	ICAR-IIWBR, Karnal in collaboration with KVK, Jhajjar, Haryana
12.	15 March, 2024	1	100 Farmers	'Training Programme on Conservation Agriculture and Spray Techniques' at Ganju Majra, Ambala, Haryana	ICAR-IIWBR, Karnal, Haryana

Organization of Farmers Day/Field Day/Foundation day *etc.*

Sr.No	Date	Subject	Organised by
4.	06 April, 2023	Field Day	ICAR-IIWBR Karnal at Village Gagsina, Karnal
5.	10 April, 2023	Field Day	ICAR-IIWBR Karnal at Village Sheikhpura, Yamunanagar.
6.	28 April 2023	Kisan Vichar Gosthi , Mangal Kranti	Social Organisation, Kachhwa, Karnal
7.	03 December, 2023	Agricultural Education Day	ICAR-IIWBR, Karnal
8.	05 December, 2023	World Soil Day at Village Brass, Karnal	ICAR-IIWBR, Karnal
9.	23 December, 2023	Rashtriya Kisan Diwas	ICAR-IIWBR, Karnal
10.	09 Febrauary, 2024	Foundation Day	ICAR-IIWBR, Karnal

Participation in Exhibitions

Sr.No.	Date	Programme	Organized by
1.	08-10 April, 2023	National Dairy Mela 2023	ICAR-National Dairy Research Institute, Karnal, Haryana
2.	16-18 July, 2023.	95th Foundation and Technology Day of ICAR	ICAR at NASC Complex, New Delhi
3.	28-30 August, 2023	62nd All India Wheat and Barley Research Workers Meet 2023	MPUA&T at Rajasthan College of Agriculture, Udaipur, Rajasthan
4.	07 October, 2023	Kisan Mela 2023	ICAR-National Dairy Research Institute, Karnal, Haryana
5.	10-13 October, 2023	"XVI Agriculture Science Congress (ASC) Expo"	ICAR-CMFRI, Kochi, Kerala
6.	20-23 October, 2023	Krishi Kumbh Millets and Horticulture Expo Mela 2023	Global Media Group at Karnal, Haryana
7.	16 December, 2023.	Natural and Organic Farming Kisan Sammelan 2023	Surya Sadhana Foundation Sthali at Jhinjholi, Sonipat, Haryana
8.	08-10 April, 2023	National Dairy Mela 2023	ICAR-NDRI, Karnal
9.	03-05 February, 2024	Regional Agriculture Fair 2024	ICAR-IIVR, Varanasi (UP)
10.	01-03 March, 2024	Virat Kisan Mela 2024	Baghpat, Uttar Pradesh
11.	09-10 March, 2024	National Potato Fest 2024	ICAR-CPRI, RS, Modipuram, Meerut (UP)
12.	18-19 March, 2024	Krishi Mela (Kharif) 2024	CCSHAU, Hisar, Haryana

Coordination of visits at ICAR-IIWBR, Karnal

Sr.No.	Date	Farmers, Students, Agriculture Officers	From
1.	05.04.2023	42 Farmers	Bulandshahar, Uttar Pradesh
2.	06.04.2023	40 Students	CoA (CCSHAU), Kaul, Kaithal, Haryana
3.	07.04.2023	55 Students	Nagaur, Rajasthan
4.	11.04.2023	44 Students	KSAK University, Tamil Nadu
5.	14.04.2023	86 Students	BFIT College, Dehradun, Uttarakhand
6.	15.04.2023	60 Students	Tamil Nadu Agricultural University, Tamil Nadu
7.	21.04.2023	35 Farmers	KVK, Ujwa, Delhi
8.	02.05.2023	54 Students	Dayal Singh Public School, Karnal, Haryana
9.	03.05.2023	42 Farmers	Partapur, Meerut
10.	04.05.2023	23 Students	Jagannath University, Bahadurgarh, Haryana
11.	16.05.2023	45 Students	Agriculture College, Jodhpur, Rajasthan
12.	17.05.2023	50 Students	Dayal Singh Public School, Karnal, Haryana
13.	17.05.2023	18 Students	SKUAST, Shalimar, Srinagar
14.	23.05.2023	59 Students	SKNAU, Jobner, Rajasthan
15.	29.05.2023	50 Farmers	Muzaffarnagar, Uttar Pradesh
16.	06.06.2023	06 Officers	NAARM, Hyderabad
17.	06.06.2023	114 Students	MPKV, Rahuri, Maharashtra
18.	22.06.2023	50 Farmers	Saharanpur, Uttar Pradesh
19.	17.08.2023	02 Officers	Baharaich, Uttar Pradesh
20.	26.08.2023	50 Female Farmers	Ahmedabad, Gujarat
21.	27.08.2023	50 Farmers	Ghaziabad, Uttar Pradesh
22.	11.09.2023	45 Farmers	Gujarat
23.	13.09.2023	45 Farmers	Sawai Madhopur, Rajasthan
24.	13.09.2023	50 Farmers	Sabarmati, Gujarat
25.	17.09.2023	50 Farmers	Sabarmati, Gujarat
26.	17.09.2023	50 Farmers	Narmada, Gujarat
27.	22.09.2023	59 Farmers	TNAU, Tamil Nadu
28.	23.09.2023	54 Farmers	Chhota Udaipur, Gujarat
29.	29.09.2023	25 Students	KVA DAV College, Karnal, Haryana
30.	04.10.2023	23 Farmers	Rajasthan
31.	05.10.2023	56 Farmers	Etawah, Uttar Pradesh

Sr.No.	Date	Farmers, Students, Agriculture Officers	From
32.	05.10.2023	31 Farmers	Auraiya, Uttar Pradesh
33.	06.10.2023	52 Farmers	Vadodara, Gujarat
34.	10.10.2023	13 Farmers	Orai, Uttar Pradesh
35.	10.10.2023	12 Farmers	Jalore, Uttar Pradesh
36.	11.10.2023	56 Students	RPS International School, Karnal, Haryana
37.	11.10.2023	40 Farmers	Jaipur, Rajasthan
38.	11.10.2023	35 Farmers	Jodhpur, Rajasthan
39.	12.10.2023	50 Farmers	Vadodara, Gujarat
40.	16.10.2023	53 Students	Mata Gujari College, Fatehgarh Sahib, Punjab
41.	21.10.2023	50 Farmers	Udham Singh Nagar, Uttarakhand
42.	27.10.2023	53 Students	Mata Gujari College, Fatehgarh Sahib, Punjab
43.	27.10.2023	39 Farmers	Arpan Sewa Sansthan, Jhunjhunu, Rajasthan
44.	04.11.2023	45 Farmers	Gujarat
45.	23.11.2023	87 Students	Patiala, Punjab
46.	28.11.2023	32 Students	TNAU, Tamil Nadu
47.	12.12.2023	95 Students	Kendriya Vidyalaya, Patiala, Punjab
48.	18.12.2023	43 Students	SVPUAT, Meerut, Uttar Pradesh
49.	21.12.2023	22 Officers	Haridwar, Uttarakhand
50.	09.01.2024	40 Farmers	Firozabad, UP
51.	19.01.2024	47 Farmers	Sriganganagar (Rajasthan)
52.	30.01.2024	50 Farmers	Nagore, Rajasthan
53.	31.01.2024	7 Agricultural Officers	Ujjain, MP
54.	01.02.2024	48 Farmers	Fatehpur, UP
55.	01.02.2024	50 Farmers	Alwar, Rajasthan
56.	05.02.2024	20 Students	PM Shri GSS School, Kunjpura, Karnal (Haryana)
57.	06.02.2024	14 Students	PM Shri Kendriya Vidyalaya ITBP, Bhanu Ramgarh, Panchkula (Haryana)
58.	06.02.2024	35 Students	GDGU, Gurugram (Haryana)
59.	07.02.2024	37 Farmers	ICAR-CSWRI Avikanagar, Tonk (Rajasthan)
60	07.02.2024	50 Farmers	Hanumangarh, Rajasthan
61.	08.02.2024	23 Farmers	Sugarcane Breeding Institute, Karnal (Haryana)
62.	13.02.2024	48 Students	GSS School, Nara, Panipat (Haryana)
63.	13.02.2024	59 Farmers	ICAR-CSWRI Avikanagar, Tonk (Rajasthan)
64.	13.02.2024	50 Students	GSS School, Kutail, Karnal (Haryana)
65.	13.02.2024	50 Students	PM Shri GSS School, Nilokheri, Karnal (Haryana)
66.	16.02.2024	14 Farmers	Raisen, MP
67.	19.02.2024	26 Students	M.Sc. & Ph.D. Students from NDRI, Karnal, Haryana
68.	21.02.2024	160 Students	PM Shri GSS School, Urlana Kalan,Panipat (Haryana)
69.	23.02.2024	100 Students	Uncha Samana, Haryana
70.	23.02.2024	150 Students	PM Shri Kendriya Vidyalaya No. 2 Ambala Cantt, Haryana
71.	26.02.2024	30 Farmers	Meerut (Reference - Agriculture Department, Meerut)
72.	26.02.2024	43 Students	Shri Vaishnav Vidyapeeth University, Indore (MP)
73.	28.02.2024	58 Students	Bharath University, Chennai
74.	02.03.2024	43 Students	Ahmednagar, Maharashtra
75.	05.03.2024	40 Students	College of Agriculture Baramati, Pune (Maharashtra)
76.	06.03.2024	19 Farmers	Amritsar, Punjab
77.	06.03.2024	8 Officers	Datiya, MP
78.	07.03.2024	4 Officers	Dr. Yoshihasi, Dr. Kumashiro, Ms. Ozonoe from JIRCAS, Japan And Ms Endo Noriko
79.	07.03.2024	112 Students	JSA College of Agriculture & Technology, Tamil Nadu
80.	07.03.2024	119 Students	Don Bosco College of Agriculture, Ranipet, Tamil Nadu
81.	12.03.2024	25 Farmers	Batala, Gurdaspur (Punjab)
82.	12.3.2024	85 Students	DAESC KDM TNAU, Tamil Nadu
83.	12.03.2024	119 Students	MIT CoA&T, Trichy, Tamil Nadu
84.	12.03.2024	85 Students	Sethu Bhaskara Agricultural College and Research Foundation,Karaikudi, Tamil Nadu
85.	12.03.2024	96 Students	Krishna College of Agriculture and Technology (KRISAT) Usilampatty, Tamil Nadu
86.	13.03.2024	35 Students	CSAUA&T, Kanpur, Uttar Pradesh.

Sr.No.	Date	Farmers, Students, Agriculture Officers	From
87.	13.03.24	46 Farmers	CAFAD, Ghaziabad, UP
88.	13.03.24	34 Students	CSAUA&T, Kanpur, UP
89.	13.03.24	110 Students	TNAU, Tamil Nadu
90.	14.03.24	179 Students	AC&RI, Madurai, TNAU, Tamil Nadu
91.	14.03.24	115 Students	AC&RI, Killikulum, TNAU
92.	15.03.24	110 Students	AC&RI, Killikulum, TNAU
93.	16.03.24	38 Students	CoA, Jodhpur Agricultural University, Jodhpur
94.	18.03.24	42 Students	CCS University, Meerut
95.	22.03.24	122 Students	Adhiparasakthi Agricultural College, Tamil Nadu
96.	22.03.24	95 Students	SRM CoAS, Baburayanpettai, Tamil Nadu
97.	26.03.24	20 Students	Students from NBPGR, New Delhi
98.	27.03.24	95 Students	Students from SRM College of Agricultural Sciences, Changalpattu, Tamil Nadu
99.	29.03.24	118 Students	Pushkaram College of Agricultural Sciences, Thiruvarankulam, Pudukkotai

TV Programme

Date	Name of the programme
09.01.2024	DD Kisan Prashn Manch

Awards and Recognition

Utkrisht Lekh First Award for the popular article on '**Krishi mein Prodhyogiki Adharit Start-ups ka Bhartiya Krishi mein Yogdan',** Authored by Mangal Singh, Anuj Kumar, Satyavir Singh, Sendhil R, Ramesh Chand and Rakesh Kumar Kushwaha)publishedin *Dugdh Ganga 2021*- 2022 (Rajbhasha Patrika): ICAR-NDRI, Karnal.

Utkrisht Lekh First Award for the popular article on Jalwayu parivartan ka krishi par prabhav evam upay, authored by Praveen Kumar, Sethpal, Anuj Kumar, Ravindra Kumar, Satyavir Singh, Mangal Singh and Randhir Singh *Gehoon evam Jau Swarnima* (2023)(14): 63-68, ICAR-IIWBR, Karnal.

Dr. Anuj Kumar got **'Second Prize'** in Ashu Bhashan Competition organized by ICAR-IIWBR, Karnal during *Rajbhasha Utsav Evam Hindi Pakhwada* from September 16-30, 2023.

Dr. Mangal Singh got **'Second Prize'** in Best worker Competition (maximum use of Hindi in official work) organized by ICAR-IIWBR, Karnal during *Rajbhasha Utsav Evam Hindi Pakhwada* from September16-30, 2023.

Dr. Mangal Singh got **'Third Prize'** in Khula Manch Competition organized by ICAR-IIWBR, Karnal during *Rajbhasha Utsav Evam Hindi Pakhwada* from September 16-30, 2023.

Dr. Mangal Singh got **'Third Prize'** in Nibandh Lekhan Competition organized by ICAR-IIWBR, Karnal during *Rajbhasha Utsav Evam Hindi Pakhwada* from September 16-30,2023.

Dr. Mangal Singh got appreciation letter from Director, ICAR-IIWBR, Karnal on the occasion of 15th August, 2023.

Trainings/Meetings/Webinar/Conference *etc.* attended by Scientist/Technical Staff

Dr. Mangal Singh participated in the Five Days Drone Training programme organized by Telangana State Aviation Academy, Hyderabad, Telangana during 17-21 April, 2023.

Dr. Ramesh Chand participated in ICAR-HRM training programme on **'Sreamlining Data Recording and Reporting under AICRP on Wheat and Barley'** organized by ICAR-IIWBR, Karnal from 11-13 March, 2024 at ICAR-IIWBR Karnal.

Annexures

Annexure-I: **Center wise, State wise and Zone wise distribution of Barley FLDs 2023-24 (In Acres)**

Annexure-II: **Category wise number of Barley Frontline Demonstrations (FLDs) Farmers during 2023-24**

Annexure-III: **Information on barley varieties demonstrated in Frontline Demonstrations (FLDs) during 2023-24**

Annexure-IV: **Guidelines for conducting Rice, Wheat, Barley, Pulses, Maize and Nutri-Cereals (Sorghum, Pearl Millet & Small Millets) Frontline 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.**

ANNEXURE-I

Centre wise, State wise and Zone wise distribution of Barley FLDs 2023-24 (in Acres)

Centre wise distribution of Barley FLDs during *rabi* 2023-24

S.No.	Zone and Centre	BFLDs Allotted	BFLDs Conducted	Area sown (acres)	No. of farmers/ locations
	Northern Hills Zone (NHZ)				
1.	CSKHPKV, HAREC, Bajaura , District – Kullu (HP)	12	Not conducted	-	-
2.	IARI, Regional Station, Amartara Cottage, Shimla (HP)	5	5	5.0	10
	North Eastern Plains Zone (NEPZ)				
3.	NDUA&T, Narendranagar, Kumarganj, Ayodhya (UP)	10	10	10.0	10
4.	Head, KVK (IAS- BHU), Barkachha, Mirzapur (UP)	10	10	10.0	10
5.	CSAUA&T, Kanpur (UP)	10	10	10.0	12
6.	KVK (NDUA&T), Kallipur, Mirzamurad, Varanasi (UP)	12	12	12.0	12
7.	Mahayogi Gorakhnath KVK, Gorakhpur-2, (GGSS), Chauk Mafi (Peppeganj), Jangal Kaudiya, Gorakhpur (UP)	10	10	10.0	10
8.	KVK (NDUA&T) Basti, Post-Katiya, Banjariaya Farm, Basti (UP)	10	10	10.0	20
9.	KVK (Dr. RPCAU), Begusarai (Bihar)	05	5	5.0	8
10.	KVK (BAU Bhagalpur), Agwanpur, Barh, Patna (Bihar)	05	5	5.0	6
11.	KVK, Samastipur-1 (Dr. RPCAU), Birauli, Samastipur (Bihar)	05	5	5.0	17
12.	KVK, Samastipur-2 (Dr. RPCAU), Lada, Singhia, Samastipur (Bihar)	05	5	5.0	5
	North Western Plains Zone (NWPZ)				
13.	KVK (SKUAST-Jammu), Rajhani, Kathua (J&K)	10	10	10.0	36
14.	PAU, Ludhiana (Punjab)	08	8	8.0	8
15.	KVK (PAU), Khokhar Khurd, Tehsil & District-Mansa (Punjab)	10	10	13.0*	13
16.	KVK (PAU), Kheri, Patran Road, Sangrur (Punjab)-148001	10	10	10.0	10
17.	KVK (PAU), Goneana, Mukatsar (Punjab)	10	10	12.0*	12
18.	KVK (PAU), Dabwali Road, Near Kheti Bhawan, Bathinda (Punjab)	10	10	10.0	10
19.	COA, CCSHAU, Hisar (Haryana)	10	10	10.0	10
20.	KVK (Shri B.B. Ashram), Rampura, Rewari (Haryana)	08	8	8.0	8
21.	KVK (CCSHAU), Opposite Bhim Stadium, Bhiwani (Haryana)	08	8	11.0*	11
22.	PI (Social Sciences), ICAR-IIWBR, Karnal (Haryana)	06	6	6.0	6
23.	Dean, FoAS, SGT University, NCR, Gurugram (Haryana)	05	5	5.0	5
24.	RARI (SKNAU), Durgapura, Jaipur (Rajasthan)– 302018	10	10	10.0	10
25.	KVK (Pragati Trust), Tankarda, Chomu, Jaipur (Rajasthan)	08	8	8.0	10
26.	KVK (AU-Kota), Akorashi, Hindauncity, Karauli (Rajasthan)	10	10	10.0	14
27.	KVK, Alwar-1 (SKNAU-Jobner), Navgaon, Alwar (Rajasthan)	05	5	5.0	5
28.	ACES, AUUP, J-1 Block, LGF, Amity Uni Campus, Noida (UP)	10	10	10.0	10
29.	KVK (SVPUA&T, Modipuram, Meerut), RRS, Nagina, Bijnor (UP)	05	5	5.0	5
	Central Zone (CZ)				
30.	RCOA, MPUA&T, Udaipur (Rajasthan)	12	12	12.0	12
31.	KVK (MPUA&T), Dhoinda, Rajasmand (Rajasthan)	12	12	12.0	12
32.	KVK (JNKVV), Rewa, CoA, Kuthulia Farm, Rewa (MP)	12	12	12.0	12
33.	KVK (JNKVV), Purushottampur, Panna (MP)	12	12	12.0	12
34.	KVK (JNKVV), Kundeshwar Road,Tikamgarh (MP)	12	12	12.0	12
35.	KVK (RVSKVV), Rajgarh, Biaora, Kothi Bagh, Rajgarh (MP)	07	7	7.0	12
36.	Dean, CoA (JNKVV), Ganj Basoda, District-Vidisha (MP)	12	12	12.0	16
37.	Director Extension Services, RVSKVV, Gwalior (MP)	05	5	5.0	5
38.	KVK (BUA&T-Banda), Govt Agri Farm, Khiria Misra, Bamourikala, Devgarh Road, Lalitpur (UP)	12	12	12.0	12
39.	KVK (BUA&T-Banda), Bharari, Bhojla, Jhansi (UP)	07	7	7.0	7
40.	Director Extension Education, RLBCAU, Jhansi (UP)	05	5	5.0	5
	Total	**350 Acres**	**338**	**346***	**420**

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

State wise distribution of Barley FLDs during *rabi* 2023-24

S.No.	State/UT	BFLDs Allotted	BFLDs Conducted	Area sown (acres)	No. of farmers/ locations
1.	HP	17	5	5	10
2.	UP	101	101	101	113
3.	Bihar	20	20	20	36
4.	J&K	10	10	10	36
5.	Punjab	48	48	53*	53
6.	Haryana	37	37	40*	40
7.	Rajasthan	57	57	57	63
8.	MP	60	60	60	69
	Total	350	338	346*	420

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

Zone wise distribution of Barley FLDs during *rabi* 2023-24

S.No.	Zone	BFLDs Allotted	BFLDs Conducted	Area sown (acres)	No. of farmers/ locations
1.	NHZ	17	5	5	10
2.	NEPZ	82	82	82	110
3.	NWPZ	143	143	151	183
4.	CZ	108	108	108	117
	Total	**350**	**338**	**346**	**420**

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

Annexure - II : Category wise number of barley FLDs farmers during 2023-24

S.N.	Name of Centre	Allocation		Achievement		Achievement Men, Area in ha, (No. of Farmers)				Achievement Women, Area in ha, (No. of Farmers)				Men	Women	Total
		No. of FLDs	Area under FLDs (Acre)	No. of FLDs	Area under FLDs (Acre)	SC	ST	OBC	Gen	SC	ST	OBC	Gen	Area(ha) (No. of Farmers)	Area(ha) (No. of Farmers)	Area(ha) (No. of Farmers)
	NHZ															
1.	CSKHPKV, HAREC, Bajaura, Kullu (HP)	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-
2.	ICAR-IARI, RS, Amartara Cottage, Shimla (HP)	5	5	5	5	2.0 (04)	-	-	3.0 (06)	-	-	-	-	5.0 (10)	-	5.0 (10)
	NEPZ															
3.	NDUA&T, Kumarganj, Ayodhya (UP)	10	10	10	10	-	-	2.0 (02)	8.0 (08)	-	-	-	-	10.0 (10)	-	10.0 (10)
4.	KVK (IAS-BHU), Barkachha, Mirzapur (UP)	10	10	10	10	-	-	9.0 (09)	-	-	-	1.0 (01)	-	9.0 (09)	1.0 (01)	10.0 (10)
5.	CSAUA&T, Kanpur (UP)	10	10	10	10	1.0 (01)	-	5.75 (07)	2.25 (03)	-	-	1.0 (01)	-	9.0 (11)	1.0 (01)	10.0 (12)
6.	BHU, Varanasi (UP)	12	12	12	12	-	-	3.0 (03)	9.0 (09)	-	-	-	-	12.0 (12)	-	12.0 (12)
7.	KVK, Gorakhpur-2 (GGSS), Gorakhpur (UP)	10	10	10	10	-	-	9.0 (09)	1.0 (01)	-	-	-	-	10.0 (10)	-	10.0 (10)
8.	KVK (NDUA&T) Basti, Katiya, Banjariaya Farm, Basti (UP)	10	10	10	10	-	-	3.0 (6)	7.0 (14)	-	-	-	-	10.0 (20)	-	10.0 (20)
9.	KVK (Dr. RPCAU, Pusa, Samastipur), Begusarai (Bihar)	5	5	5	5	-	-	-	4.5 (07)	-	-	-	0.5 (01)	4.5 (07)	0.5 (01)	5.0 (08)
10.	KVK (BAU, Bhagalpur), Agwanpur, Barh, Patna (Bihar)	5	5	5	5	1.0 (01)	-	2.0 (02)	2.0 (03)	-	-	-	-	5.0 (06)	-	5.0 (06)
11.	KVK, Samastipur-1 (Dr. RPCAU, Pusa, Samastipur), Birauli, Samastipur (Bihar)	5	5	5	5	0.25 (01)	-	3.25 (11)	1.0 (03)	0.25 (01)	-	0.25 (01)	-	4.5 (15)	0.5 (02)	5.0 (17)
12.	KVK, Samastipur-2 (Dr. RPCAU, Pusa, Samastipur), Lada, Singhia,	5	5	5	5	-	-	-	4.0 (04)	-	-	-	1.0 (01)	4.0 (04)	1.0 (01)	5.0 (05)

S.N.	Name of Centre	Allocation		Achievement		Achievement Men, Area in ha, (No. of Farmers)				Achievement Women, Area in ha, (No. of Farmers)				Men	Women	Total
		No. of FLDs	Area under FLDs (Acre)	No. of FLDs	Area under FLDs (Acre)	SC	ST	OBC	Gen	SC	ST	OBC	Gen	Area(ha) (No. of Farmers)	Area(ha) (No. of Farmers)	Area(ha) (No. of Farmers)
	Samastipur (Bihar)															
	NWPZ															
13.	KVK (SKUAST-Jammu), Rajhani, Kathua (J&K)	10	10	10	10	-	-	-	9.3 (31)	-	-	-	0.7 (05)	9.3 (31)	0.7 (05)	10.0 (36)
14.	PAU, Ludhiana (Punjab)	8	8	8	8	1.0 (01)	-	-	7.0 (07)	-	-	-	-	8.0 (08)	-	8.0 (08)
15.	KVK, (PAU), Khokhar Khurd, Mansa (Punjab)	10	10	10	13	-	-	-	13.0 (13)	-	-	-	-	13.0 (13)	-	13.0 (13)
16.	KVK (PAU), Kheri, Patran Road, Sangrur (Punjab)	10	10	10	10	2.0 (02)	-	1.0 (01)	7.0 (07)	-	-	-	-	10.0 (10)	-	10.0 (10)
17.	KVK (PAU), Goneana, Muktsar (Punjab)	10	10	10	12	10.0 (10)	-	-	-	2.0 (02)	-	-	-	10.0 (10)	2.0 (02)	12.0 (12)
18.	KVK (PAU), Dabwali Road, Near Kheti Bhawan, Bathinda (Punjab)	10	10	10	10	-	-	-	9.0 (09)	-	-	-	1.0 (01)	9.0 (09)	1.0 (01)	10.0 (10)
19.	CCSHAU, Hisar (Haryana)	10	10	10	10	2.0 (02)	-	3.0 (03)	5.0 (05)	-	-	-	-	10.0 (10)	-	10.0 (10)
20.	KVK (BB Ashram), Rampura, Rewari (Haryana)	8	8	8	8	1.0 (01)	-	7.0 (07)	-	-	-	-	-	8.0 (08)	-	8.0 (08)
21.	KVK (CCSHAU), Bhiwani (Haryana)	8	8	8	11	1.0 (01)	-	-	10.0 (10)	-	-	-	-	11.0 (11)	-	11.0 (11)
22.	ICAR-IIWBR, Karnal (Haryana)	6	6	6	6	-	-	-	6.0 (06)	-	-	-	-	6.0 (06)	-	6.0 (06)
23	SGT University, NCR, Gurugram (Haryana)	5	5	5	5	1.0 (01)	-	3.0 (03)	1.0 (01)	-	-	-	-	5.0 (05)	-	5.0 (05)
24.	RARI (SKNAU), Durgapura, Jaipur (Rajasthan)	10	10	10	10	-	-	5.0 (05)	1.0 (01)	-	-	4.0 (04)	-	6.0 (06)	4.0 (04)	10.0 (10)
25.	KVK (Pragati Trust), Chomu, Jaipur (Rajasthan)	8	8	8	8	-	1.5 (02)	4.0 (05)	1.75 (02)	-	-	-	0.75 (01)	7.25 (09)	0.75 (01)	8.0 (10)
26.	KVK (AU-Kota), Akorashi, Dhindora,	10	10	10	10	-	1.0	5.0	-	-	-	4.0	-	6.0	4.0	10.0

S.N.	Name of Centre	Allocation		Achievement		Achievement Men, Area in ha, (No. of Farmers)				Achievement Women, Area in ha, (No. of Farmers)				Men	Women	Total
		No. of FLDs	Area under FLDs (Acre)	No. of FLDs	Area under FLDs (Acre)	SC	ST	OBC	Gen	SC	ST	OBC	Gen	Area(ha) (No. of Farmers)	Area(ha) (No. of Farmers)	Area(ha) (No. of Farmers)
	Hindauncity, Karauli (Rajasthan)						(02)	(07)				(05)		(09)	(05)	(14)
27.	KVK Alwar-1, SKNAU, Jobner, Jaipur, Rajasthan	5	5	5	5	-	2.0 (02)	3.0 (03)	-	-	-	-	-	5.0 (05)	-	5.0 (05)
28.	ACES, Amity University Uttar Pradesh, Noida (UP)	10	10	10	10	4.0 (04)	-	-	5.0 (05)	1.0 (01)	-	-	-	9.0 (09)	1.0 (01)	10.0 (10)
29.	KVK (SVPUA&T, Modipuram, Meerut), RRS, Nagina, Bijnor (UP)	5	5	5	5	1.0 (01)	-	3.0 (03)	1.0 (01)	-	-	-	-	5.0 (05)	-	5.0 (05)
	CZ															
30.	RCOA (MPUA&T), Udaipur (Rajasthan)	12	12	12	12	-	1.0 (01)	5.0 (05)	-	1.0 (01)	1.0 (01)	4.0 (04)	-	6.0 (06)	6.0 (06)	12.0 (12)
31.	KVK (MPUA&T), Dhoinda, Rajasmand (Rajasthan)	12	12	12	12	6.0 (06)	-	3.0 (03)	3.0 (03)	-	-	-	-	12.0 (12)	-	12.0 (12)
32.	KVK (JNKVV), Kuthulia Farm, Rewa (MP)	12	12	12	12	-	-	8.0 (08)	4.0 (04)	-	-	-	-	12.0 (12)	-	12.0 (12)
33.	KVK (JNKVV), Purushottampur, Panna (MP)	12	12	12	12	-	1.0 (01)	10.0 (10)	-	-	-	1.0 (01)	-	11.0 (11)	1.0 (01)	12.0 (12)
34.	KVK (JNKVV), Tikamgarh (MP)	12	12	12	12	-	1.0 (01)	4.0 (04)	7.0 (07)	-	-	-	-	12.0 (12)	-	12.0 (12)
35	KVK (RVSKVV), Biaora, Kothi Bagh, Rajgarh (MP)	7	7	7	7	1.5 (03)	-	2.5 (04)	1.0 (02)	0.5 (01)	-	1.5 (02)	-	5.0 (09)	2.0 (03)	7.0 (12)
36.	COA (JNKVV), Ganj Basoda, Vidisha (MP)	12	12	12	12	-	-	3.5 (05)	7.5 (10)	-	-	-	1.0 (01)	11.0 (15)	1.0 (01)	12.0 (16)
37.	DES, RVSKVV, Gwalior (MP)	5	5	5	5	-	-	1.0 (01)	4.0 (04)	-	-	-	-	5.0 (05)	-	5.0 (05)
38.	KVK (BUA&T-Banda), Lalitpur (UP)	12	12	12	12	1.0 (01)	-	6.0 (06)	5.0 (05)	-	-	-	-	12.0 (12)	-	12.0 (12)

S.N.	Name of Centre	Allocation		Achievement		Achievement Men, Area in ha, (No. of Farmers)				Achievement Women, Area in ha, (No. of Farmers)				Men	Women	Total
		No. of FLDs	Area under FLDs (Acre)	No. of FLDs	Area under FLDs (Acre)	SC	ST	OBC	Gen	SC	ST	OBC	Gen	Area(ha) (No. of Farmers)	Area(ha) (No. of Farmers)	Area(ha) (No. of Farmers)
39.	KVK (BUA&T-Banda), Bharari, Bhojla, Jhansi (UP)	7	7	7	7	3.0 (03)	-	3.0 (03)	1.0 (01)	-	-	-	-	7.0 (07)	-	7.0 (07)
40.	Rani Lakshmi Bai Central Agricultural University (RLBCAU), Jhansi, UP	5	5	5	5	-	-	-	5.0 (05)	-	-	-	-	5.0 (05)	-	5.0 (05)
	Total	**350**	**350**	**338**	**346***	**38.75 (43)**	**7.5 (09)**	**117 (135)**	**155.3 (196)**	**4.75 (06)**	**1.0 (01)**	**16.75 (19)**	**4.95 (10)**	**318.55 (384)**	**27.45 (36)**	**346.0 (420)**

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

Annexure-III : Information on barley varieties demonstrated in Frontline Demonstrations (FLDs) during 2023-24

Variety	Zone	Production condition	Year	Released by CVRC/SVRC	Developed by	Height (cm)	Days to maturity	TGW (gm)	Average Yield (q/ha)	Pot. Yield (q/ha)
BHS 400	NHZ	Rainfed, Timely sown	2014	CVRC	IARI, Regional Station, Shimla, HP	83	168	39.13	32.71	58.70
RD 2907	NWPZ NEPZ	Saline/ Alkaline soils	2018	CVRC	RARI, Durgapura, Jaipur, Rajasthan	88	124	43.3	35.25	53.60
RD 2899	CZ	Irrigated, Timely sown	2018	CVRC	RARI, Durgapura, Jaipur, Rajasthan	84	115	46.67	42.19	57.43
DWRB 137	NEPZ	Irrigated, Timely sown	2018	CVRC	IIWBR, Karnal, Haryana	87.67	155	40.3	37.9	53.62
	CZ	Irrigated, Timely sown	2018	CVRC	IIWBR, Karnal, Haryana	80.70	113	46.0	42.9	67.44
	NWPZ	Irrigated, Timely sown	2018	CVRC	IIWBR, Karnal, Haryana		124	44.0		52.94

Annexure-IV

F. No. 18-4/2023-NFSM (127686)
Government of India
Ministry of Agriculture & Farmers Welfare
Department of Agriculture & Farmers Welfare
(Crops & PHMF Division, NFSM Cell)

Krishi Bhawan, New Delhi
Dated: 20th June, 2023

To,

1. The Director
ICAR- Indian Institute of Pulses Research, Kanpur (Uttar Pradesh)
2. The Director
ICAR- Indian Institute of Millets Research, Hyderabad (Andhra Pradesh)
3. The Director
ICAR- Indian Institute of Wheat & Barley Research, Karnal (Haryana)
4. The Director
ICAR- Indian Institute of Maize Research, PAU, Ludhiana (Punjab)
5. Project Coordinator
ICAR- All India Coordinated Research Project on Small Millets Bengaluru (Karnataka)
6. Project Coordinator
ICAR- All India Coordinated Research Project on Pearl Millet, Jodhpur (Rajasthan)

Sir/Madam,

Subject: Administrative Approval for organization of Front Line Demonstrations on Pulses, Coarse cereals and Nutri-Cereals during the year 2023-24-reg.

I am directed to convey that the competent authority of this Department has approved an outlay of **Rs. 387.18 lakh (Rupees three crore eighty-seven lakh eighteen thousand only)** for organization of FLDs of Barley, Pulses, Maize & Nutri-Cereals (Sorghum, Pearl Millet and Small Millets) during 2023-24. The crop specific details of FLDs for 2023-24 are given as under:

S. No	Nodal Agency for Implementation of FLDs	Name of crop	Approved No. of FLDs (in ha.)	Rate of financial assistance (Rs/ha)	Approved Financial allocation (Rs. In lakh)
1	ICAR-IIW & BR, Karnal	Barley	140	6000	16.81*
2	ICAR-IIPR, Kanpur	Pulses	1719	9000	154.71#
3	ICAR-IIMR, Ludhiana	Maize	1400	6000	84.00
4	ICAR-AICRP on Small Millets Bengaluru	Small millet	300	6000	45.00**
5	ICAR-AICRP on Pearl Millet	Pearl millet	1000	6000	74.66***
6	ICAR-IIMR, Hyderabad	Sorghum	200	6000	12.00
	Grand Total		**4759**		**387.18**

* Including committed liability of Rs.8.41 lakh.
** Including committed liability of Rs.27.0 lakh.
***Including committed liability of Rs.14.66 lakh.
IIPR, Kanpur to submit the proposal for 100 nos FLDs on chickpea.

Contd... /-

The above approval is subject to the following conditions:

- Total 1719 FLDs to be conducted on pulses crops including Arhar (827), Urad (544), Lentil (248) and Chickpea (100).
- Each implementing agency will constitute monitoring team with involvement of officials of Crop Development Directorates, DA&FW, State Department of Agriculture and Scientists of ICAR/SAUs.
- The varieties which are within 3 years either of own production or SAUs sources be used (5 years for problematic 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.
- Under FLDs, full package kit like seed, INM, IPM material should be given to farmers at the time of sowing.
- All the FLDs should be conducted under the close supervision of SAUs/KVKs/ICAR institute.
- Farmers practice, crop production and protection technologies used in FLDs should be obtained in the progress report. The reasons for yield gap between FLDs and farmers' practice 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.
- Field days should be regularly organized and prior information should be sent to DA&FW and Director, ATARIs of ICAR.
- The details of FLD beneficiary-farmers along with contact number should also be furnished to DA &FW.
- All implementing Institutes should ensure to organize at least 10% of the FLDs or as per availability of seeds on bio-fortified variety of pulses/nutri-cereals and Coarse Cereals in the districts with high burden of malnutrition.
- 5% of FLD on pulses and Nutri cum coarse Cereals shall be conducted in North-Eastern States.
- More focus should be given to extra and early maturing varieties of Pigeonpea and Lentil.
- 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.
- Critical input amounting to Rs. 8100/- out of Rs. 9000/- for Pulses Rs. 5100/- out of Rs. 6000/- for Barley, Maize & Nutri-Cereals (Sorghum, Pearl Millet and Small Millets) should be provided to beneficiary farmers.
- Each implementing agency will send technical programme and progress report of FLDs of Pulses, Barley, Maize & Nutri-Cereals (Sorghum, Pearl Millet and Small Millets) in formats (already circulated) to DPD, Bhopal and DMD, Jaipur respectively on quarterly basis.
- **Geo-tagging of all FLDs is compulsory which is to be conducted during 2023-24 by each centre of FLD.**
- In eastern region, FLDs should focus on technologies in weed management aspects.

Yours faithfully,

20.06.2023

(Dr. Sudhir Singh Bhadauria)
Deputy Commissioner (Crops)

Copy to:

1. ADG (FFC)/ADG (O&P), ICAR, Krishi Bhawan, New Delhi.
2. Director, Directorate of Pulses, Bhopal/Millets, Jaipur.
3. Under Secretary (Finance)/(CA-V), DA&FW, Krishi Bhawan, New Delhi.
4. PPS to Agriculture Commissioner (DA&FW), Krishi Bhawan, New Delhi
5. PPS to JS (Crops & Oilseeds)/ADC (Crops), Krishi Bhawan, New Delhi.
6. AC (Pulses)/AC (Crops)/AD (Crops), DA&FW, Krishi Bhawan, New Delhi.
7. Programmer (NFSM), DA&FW, Krishi Bhawan, New Delhi for uploading in website.

Copy for information to: PPS to DG, ICAR, Krishi Bhawan/DDG (Extn.) ICAR, KAB-I, New Delhi.

ii

GUIDELINES FOR FRONT LINE DEMONSTRATIONS UNDER NFSM

Front Line Demonstrations (FLDs) is an unique approach to provide a 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, maize, barley and nutri-cereals, etc., 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, Barley, Pulses, Maize and Nutri-Cereals (Sorghum, Pearl Millet 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. Indian Institute of Rice Research, Hyderabad, AP; Indian Institute of Wheat & Barley Research, Karnal; Indian Institute of Pulses Research, Kanpur; Indian Institute of Maize Research, Ludhiana, Punjab; Indian Institute of Millets Research, Hyderabad, AP; AICRP on Small Millets, UAS, GKVK Campus, Bangalore, Karnataka and AICRP on Pearl Millet, Mandore, Jodhpur, Rajasthan for organizing the FLDs on Rice, Wheat & Barley, Pulses, Maize, Sorghum, Pearl Millet and Small Millets respectively.

1. FRONT LINE DEMONSTRATIONS (FLDs)

Frontline Demonstration is a foam 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 and (d) performance of the technologies for scientific feedback.

2. OBJECTIVES

- To demonstrate improved Crop Production Technologies of Rice, Wheat, Barley, Pulses, Maize, Nutri-Cereals such as Pearl Millet, Sorghum and Small Millets, on the farmers' fields;

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

- To bring synergy among planners, researchers, farmers and industry for parable interface through seminars/symposium on emerging themes of importance in the field of Rice, Wheat, Barley, Pulses, Maize, Nutri-Cereals such as Pearl Millet, Sorghum and Small Millets production for deciding strategies for development of these crops.

3. SELECTION OF TECHNOLOGY

The need and necessity of demonstration should invariably be based on the emerging issues. The DAC&FW 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.

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.

The Technology programme should take care of the availability of seed of improved varieties/hybrids, drought resistance varieties, resource conservation technologies, 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.

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.

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&FW to convey the administrative approvals. The plan of FLDs will be approved by a committee comprising of:

Agriculture Commissioner	Chairman
Joint Secretary (Crops)	Member
Additional Commissioner (Crops)	Member
Directors (IIWBR/DRR/IIPR/IIMR)	Member
Directors (DWD/DRD/DPD/DMD)	Member
Deputy Commissioner (Seeds)	Member
Deputy Commissioner (Machinery)	Member
Deputy Commissioner (Crops)	Member-Secretary

4. SELECTION OF SITE AND BENEFICIARY

- 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.
- The technology selected for demonstration should be of paramount importance and preferably with a farmer.
- 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. Besides, technology demonstration in hilly and non-traditional areas of crops, each cluster should be up to 4.0 hectare depending upon the size of each Demonstration. However, one individual demonstration should never be less than 0.20 hectare.
- No local varieties/farm produced seeds under Frontline demonstrations should be used.
- 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.
- Demonstrations may be conducted on farming situations for scientific interpretation. 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.
- 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.
- 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.
- 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.
- Identification of FLDs beneficiaries shall be carried out by the Implementing Centres as per the requirement/aptitude of the farmers to conduct the demonstrations. Preference for FLDs should be given to the Socio-economically backward/Small and Marginal/ST/SC/OBC/ women farmers shall be given at the time of the identification of FLD beneficiaries.

5. SIZE OF FRONT LINE. DEMONSTRATIONS

- 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.

- The assistance for demonstrations will be decided upon the area. The rate of assistance is Rs.9000/- for Rice, Wheat & Pulses and Rs.6000/- for Coarse Cereals (Maize & Barley) and Nutri-Cereals (Sorghum, Pearl Mints and Small Millets) per demonstration of one ha.

6. IMPLEMENTING AGENCY

- Frontline Demonstrations will be organized by ICAR Institutes through their Centers/Krishi Vigyan Kendras (KVKs under ICAR system) and State Agriculture Universities, reputed and registered NGOs.
- Indian Institute of Rice Research, Hyderabad, AP will be the nodal institute for organizing the FLDs on Rice; Indian Institute of Wheat & Barley Research, Karnal for Wheat & Barley; Indian Institute of Pulses Research, Kanpur for Pulses; Indian Institute of Maize Research, Ludhiana, Punjab for Maize; Indian Institute of Millets Research, Hyderabad, AP for Sorghum; AICRP on Small Millets, UAS, GKVK Campus, Bangalore, Karnataka for Small Millets and AICRP on Pearl Millets, Mandore, Jodhpur, Rajasthan for Pearl Millet.

7. PLANNING FOR THE DEMONSTRATION

- 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.

- 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.

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

- 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

- 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 centers may be

Communicated to the Crops Division of Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Delhi latest by 30th April and by 30th August for Rabi crops.

- The in-principle approval for conduct of FLDs will be communicated to the concerned ICAR institutes in 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

- 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 neighboring 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.

- 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.

- When the demonstrations plot is at maturity, the field day may be organized where neighboring 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.

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

- 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..

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

10. MONITORING

- Monitoring is required on continuous and regular basis through visits to FLDs plots, recording observations, getting the feedback from the farmers and extension workers.

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

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

- The Committee comprising of scientist of the University, concerned Project Director/Coordinator, ADG (FFC), ICAR, Additional Commissioner (Crops) and Director, Directorate of Rice, Wheat, Millets and Pulses Development as representative from the Department of Agriculture, Cooperation & Farmers Welfare, M/o Agriculture & Farmers Welfare, Government of India. The Committee will review the progress of FLDs periodically at least twice during the crop season. The periodical progress report will be submitted by ICAR to the Ministry.

- The results and feedback as obtained by the monitoring teams/others should be compiled by the Concerned Crop Development Directorates to be submitted to Agriculture Commissioner. The 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, Millets and Pulses Development, Patna, Ghaziabad, Jaipur and Bhopal regularly by 10^{th} of every subsequent month.

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

11. REPORTING AND DOCUMENTATION

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

12. FUNDING PATTERN

- Frontline Demonstrations on the basis of above guidelines would be conducted in Different Eco-system through Crop Directorate/Coordinating Unit of Indian Council of Agricultural Research/State Agricultural Universities 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.9000 for Rice, Wheat & Pulses and Rs.6000 for Barley, Maize & Nutri-Cereals (Sorghum, Pearl Millet and Small Millets) per demonstration of one hectare or actual of the cost, whichever is less. The item-wise detailed break-up of the expenditure for organizing a Frontline Demonstration in one hectare of rice, wheat, pulses, maize, Barley and Nutri-Cereals is given as under:

S.N.	Component	Amount (Rs.)			Maize, Barley & Nutri-Cereals (Sorghum, Pearl Millet & Small Millets)
		Rice	Wheat	Pulses	
1	Cost of critical inputs (seeds/ biofertilizers/PP chemicals/ herbicides) to supplement the cultivation charges	8100	8100	8100	5100
2.	Organization of Field Day	250	250	250	250
3.	Display board and publicity material (posters/pamphlets/ leaflets etc.)	250	250 .	250	250
4.	visit of scientists excluding TA/DA, but hiring of Taxi/POL etc.	300*	300*	300*	300*
	Contingencies/typing of results/ minutes etc.	100	100	100	100
	Total	9000	9000	9000	6000

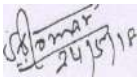
* Nodal FLD implementing Institute/Directorate may retain 50 percent of the amount for effective monitoring of FLDs across the country.

- 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.

- 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, for the FLDs only those farmers who are willing to provide critical resources should be identified.

- 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 & Farmers Welfare:

Rice		
Sl. No.	**Activity Milestone**	**Scheduled date for submission of reports**
1.	Name and full addresses of the selected farmers, varieties used, area sown under the Demonstration and Technology demonstrated	Kharif - 15th July, Rabi - 15th November
2.	Crop stand and appropriate date for visit by the FLD monitoring team	Kharif - 15th September Rabi - 15th December
3.	Tentative dates for organization of Farmer's Day.	Kharif - 30th September Rabi - 25th February
4.	Report and complete data about FLDs conducted	Kharif - 15th December Rabi - 15th May
Wheat & Barley		
1.	Name and full addresses of the selected farmers, varieties used, area sown under the Demonstration and Technology demonstrated	15th December
2.	Crop stand and appropriate date for visit by the FLD monitoring team	15th January
3.	Organization of Farmer's Day	30th January
4.	Report and complete data about FLDs conducted	15th May
Pulses, Maize & Nutri-Cereals (Sorghum, Pearl Millet & Small Millets) Kharif		
1.	Name and full addresses of the selected farmers, varieties used, area sown under the Demonstration and Technology demonstrated	Kharif - 15th July,
2.	Crop stand and appropriate date for visit by the FLD monitoring team	Kharif - 15th September
3.	Tentative dates for organization of Farmer's Day	Kharif - 30th September
4.	Report and complete data about FLDs conducted	Kharif - 15th December
Pulses-Rabi		
1.	Name and full addresses of the selected farmers, varieties used, area sown under the Demonstration and Technology demonstrated	15th December
2.	Crop stand and appropriate date for visit by the monitoring team	15th January
3.	Organization of Farmer's Day	30th January
4.	Report and complete data about FLDs conducted	15th May



ANNEXURE-I

DETAILED INFORMATION OF INDIVIDUAL FRONT LINE DEMONSTRATION (FLD)

Detail of beneficiaries of FLDs during Kharif/Rabi/Summer of Year_____

(1) Name & Complete address of the Implementing Centre:-
(2) Website/E-mail ID :
(3) Fax No.
(4) Name of Crop
(5) Name of Variety/hybrid
(6) Location
(7) District
(8) State

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

Signature of Beneficiary

Signature with Seal
Scientist in Charge
Implementing Centre

Signature with Seal
Director/Project Coordinator

ANNEXURE-II

Monthly/Quarterly/Final physical and financial progress report of FLDs during Kharif/Rabi/Summer of Year_____

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

(2) Website/E-mail ID :

(3) Fax No. :

(4) Name of Crop :

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

Signature with Seal
Director/Project Coordinator

ANNEXURE-III

Results of FLDs conducted at various locations on farmer's field during Kharif/Rabi/Summer of year_____

(1) Name & Complete Address of the implementing Centre :
(2) Website/E-mail ID :
(3) Fax No. :
(4) Name of Crop :

	Grain yield (kg./ha.)				Fodder yield (kg./ha.)	
Implementing Center/Location	Average Yield of concerned State	Average Yield of concerned District	Yield under improved practice of FLD	Yield under farmer's Practice	Yield under Improved Practice of FLD	Yield under farmer's Practice

Signature with Seal
Director/Project Coordinator

हर कदम, हर डगर
किसानों का हमसफर
भारतीय कृषि अनुसंधान परिषद
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स्वच्छ भारत
एक कदम स्वच्छता की ओर

भाकृअनुप
ICAR

ICAR-Indian Institute of Wheat & Barley Research

63वीं अखिल भारतीय गेहूँ एवं जौ अनुसंधान कार्यकर्ता गोष्ठी-2024

आचार्य नरेन्द्र देव कृषि एवं प्रौद्योगिकी विश्वविद्यालय, अयोध्या (उत्तर प्रदेश)

63rd All India Wheat and Barley Workers Meet-2024

Acharya Narendra Deva University of Agriculture & Technology, Ayodhya (Uttar Pradesh)

सितम्बर 11-13, 2024 | September 11-13, 2024