

प्रगति प्रतिवेदन
PROGRESS REPORT
2020-21



सामाजिक विज्ञान
SOCIAL SCIENCES

अखिल भारतीय समन्वित गेहूँ एवं जौ अनुसंधान परियोजना

AICRP on Wheat and Barley

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

ICAR-Indian Institute of Wheat and Barley Research, Karnal

For official use only

All India Coordinated Research Project on Wheat and Barley

**PROGRESS REPORT
2020-21**

SOCIAL SCIENCES

**Satyavir Singh
Anuj Kumar
Sendhil R
Anil Kumar Khippal
GP Singh**



ICAR–Indian Institute of Wheat and Barley Research
PO Box - 158, Agrasain Marg, Karnal – 132001
Haryana, India
<https://iiwbr.icar.gov.in/>



Correct Citation

ICAR-IIWBR 2021. Progress Report of AICRP on Wheat and Barley 2020-21, Social Sciences. Eds: Satyavir Singh, Anuj Kumar, Sendhil R, Anil Kumar Khippal and GP Singh. ICAR-Indian Institute of Wheat and Barley Research, Karnal, Haryana, India. P. 32.

**NO PART OF THIS REPORT SHOULD BE REPRODUCED
WITHOUT PRIOR PERMISSION OF THE DIRECTOR**

Issued on the occasion of 60th All India Wheat and Barley Research Workers' Meet organised in online mode during August 23-24, 2021.

ACKNOWLEDGEMENT

I wish to express my deep sense of gratitude to Dr. G.P. Singh, Director, ICAR-IIWBR, Karnal for his continuous encouragement, support and guidance in coordinating the activities under the AICRP on wheat and barley and during the preparation of this report.

Financial assistance provided by the Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India, New Delhi to coordinate barley frontline demonstrations; and financial assistance under SCSP Programme for conducting wheat demonstrations provided by Indian Council of Agricultural Research, New Delhi is duly acknowledged.

I thankfully acknowledge the whole hearted support of each one of the co-operators whose sincere efforts helped in successful execution of barley frontline demonstrations (FLDs) and wheat demonstrations during 2020-21.

Sincere thanks to my colleagues Dr. Anuj Kumar, Dr. Sendhil R, Dr. Anil Kumar Khippal and Dr. Raj Kumar for their prompt and sincere help in coordinating different activities of the Social Sciences Programme.

Appreciation and thanks are due to Dr. Mangal Singh and Dr. Ramesh Chand in extension activities, compilation, analysis and preparation of the report; Sh. Harinder Kumar for his support to the Social Sciences Programme; Mr. Naveen Kumar and Mr. Parveen Kumar for their help in typing this manuscript. I am thankful to Dr. Ajay Verma and Mr. P. Chandra Babu for the help rendered in smooth functioning of the computers required for analysis of data and preparation of the progress report. I am thankful to Mr. Yogesh Sharma for type setting and giving final shape to this report. The help rendered for reproduction of adequate number of copies and binding of this report by Dr. Ajay Verma and his team consisting of Sh. Bhim Sain and Sh. Ronak Ram is duly acknowledged.

Thanks are due to the officers and staff of the Administration, Finance, Coordination, Farm Section and other units for their cooperation and support to the Social Sciences Programme.

The authors are thankful to all those who have helped directly or indirectly in effective execution of the Social Sciences Programme.

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



(Satyavir Singh)
Principal Investigator
(Social Sciences)

Dated : 7th August, 2021

CONTENTS

| S.No. | Particulars | Page |
|-------|---|--------|
| 1. | Frontline Demonstrations (FLDs) 2020-2021 | 1 |
| 2. | Barley Frontline Demonstrations (FLDs) 2020-2021 | 1 |
| 3. | Centre wise distribution of barley FLDs | 2 |
| 4. | State wise distribution of barley FLDs | 4 |
| 5. | Zone wise distribution of barley FLDs | 4 |
| 6. | State wise yield gain | 5 |
| 7. | Zone wise productivity over regional productivity | 5 |
| 8. | Centre wise performance of improved barley varieties | 6 |
| 9. | Variety wise performance of improved barley varieties | 7 |
| 10. | Yield potential of barley varieties in different zones | 8 |
| 11. | Barley varieties grown in different zones | 8 |
| 12. | Barley FLDs conducted at ICAR-IIWBR, Karnal centre | 8 |
| 13. | Constraints analysis in different barley producing zones of India | 9 |
| 14. | Suggestions by cooperating centres | 12 |
| 15. | Farmers' perception about FLDs | 12 |
| 16. | Monitoring of Barley FLDs, TSP Wheat Demonstrations and SCSP Wheat Demonstrations | 12 |
| 17. | Wheat Demonstrations conducted under SCSP Programme during 2020-2021 | 22 |
| 18. | District wise distribution of Wheat Demonstrations | 22 |
| 19. | State wise distribution of Wheat Demonstrations | 22 |
| 20. | District wise yield gain under Wheat Demonstrations | 23 |
| 21. | State wise yield gain under Wheat Demonstrations | 23 |
| 22. | Varietal performance under Wheat Demonstrations | 24 |
| 23. | Yield potential of Wheat variety DBW 222 under Wheat Demonstrations | 24 |
| 24. | Improved and check wheat varieties at farmers' field in Punjab and Haryana | 24 |
| 25. | Costs and returns for SCSP Wheat Demonstrations and Barley FLDs vis-à-vis check plots | 25 |
| 26. | Technology Outreach Programme | 28 |
| 27. | Annexure-I : Categorywise number of barley FLDs farmers | i-iii |
| 28. | Annexure-II : Information on barley varieties demonstrated in FLDs during 2020-21 | i |
| 31. | Package of Practices of Karan Narendra (DBW 222) | i |
| 32. | Annexure-IV : Guidelines for conducting Frontline Demonstrations (FLDs) | i-xiii |

Frontline Demonstrations (2020-2021)

Wheat is the most widely cultivated cereal in the world (224.49 million hectares) and barley has been under cultivation in 50.90 million hectares for the year 2020-21. As per the estimates from the United States Department of Agriculture (2021), the combined global production of wheat and barley hovers around 946 million tonnes (Wheat: 792.40 million tonnes and Barley: 153.47 million tonnes). In India, wheat and barley witnessed an acreage of 31.76 million hectares and 0.61 million hectares, respectively during the 2020-21 *rabi* season. The two nutri-rich cereals account for about 25 per cent of the total crop acreage contributing 36 per cent of the total foodgrains produced in India. During 2020-21, the wheat production reached 108.75 million tonnes with an average national productivity of 3424 kg/ha. Similarly, barley production reached 1.82 million tonnes with a productivity of 2988 kg/ha (III Advance Estimates of 2020-21, Directorate of Economics and Statistics, Ministry of Agriculture and Farmers' Welfare).

Frontline demonstrations (FLDs) carried out at farmers' field exhibited a significant yield gain across regions following the national trend. Yet, location-specific constraints and gaps (yield and information) arise across regions and it should be bridged through need-based interventions. ICAR-IWBR strives to make continuous efforts in popularizing the region-specific superior varieties as well as micro level strategies to enhance the wheat and barley productivity. Despite several outreach programmes, especially the challenges faced amidst COVID-19, there exists the need for increasing the crop productivity with more emphasis on seed as well as variety replacement, integrated crop (nutrient, pest & diseases, water, weed etc.) management, incorporation/retention of crop residues and soil health management. The farm advisory services through social media and rigorous training of field level extension functionaries or subject matter specialists by the institute has also played a key role in taking contingent management measures. Several other programmes have been initiated as well at the institute level to transfer the efficient technologies to farmers' field. Creation of awareness through mass and print media on seed treatment, seed and variety replacement, and crop management helped to increase the farmers' livelihood and welfare. Procurement by different authorized agencies has also motivated the farmers to retain the same or allot more area under the respective crop. Developing storage facilities both at farm level and national level is the need of the hour and it warrants for some policy interventions. The report for 2020-21 highlights the outcome of barley FLDs (conducted with the funding assistance from the MoA&FW) and wheat demonstrations (conducted under the SCSP programme), yield gain due to wheat demonstrations and barley FLDs, costs and returns as well as constraints in wheat and barley production.

Barley Frontline Demonstrations (2020-2021)

During the *rabi* crop season 2020-21, 250 Barley Frontline Demonstrations (BFLDs) of one acre each were allotted to 31 cooperating centers all over India in eight states/UT namely, Himachal Pradesh, Uttar Pradesh, Jammu & Kashmir, Punjab, Haryana, Rajasthan, Madhya Pradesh and Karnataka. Out of these, all 250 BFLDs were conducted by 31 centers, covering 262.38 acres area of 315 farmers (Table 1a). Improved barley varieties with complete package of practices (irrigation management, nutrient management, weed control, seed treatment etc.) were demonstrated.

Table 1a: Centre wise distribution of barley FLDs during *rabi* 2020-21 (in acres)

| S.No. | Zone and Centre | BFLDs Allotted | BFLDs Conducted | Area sown (acres) | No. of farmers/ locations |
|---|--|----------------|-----------------|-------------------|---------------------------|
| Northern Hills Zone (NHZ) | | | | | |
| 1. | CSKHPKV, HAREC, Bajaura, Kullu (HP) | 12 | 12 | 12.5* | 18 |
| 2. | ICAR-IARI, RS, Amartara Cottage, Shimla (HP) | 5 | 5 | 5 | 19 |
| 3. | KVK (YSPUH&F), Lahaul & Spiti -2, Tabo, Kaza, L&S (HP) | 5 | 5 | 5 | 25 |
| North Eastern Plains Zone (NEPZ) | | | | | |
| 4. | NDUA&T, Kumarganj, Ayodhya (UP) | 10 | 10 | 10 | 10 |
| 5. | KVK (IAS-BHU), Barkachha, Mirzapur (UP) | 10 | 10 | 10 | 10 |
| 6. | CSAUA&T, Kanpur (UP) | 10 | 10 | 10 | 10 |
| 7. | BHU, Varanasi (UP) | 12 | 12 | 16* | 16 |
| 8. | KVK, Gorakhpur-2, (Guru Gorakshnath Seva Sansthan), Chauk Mafi (Peppeganj), Jangal Kaudiya, Gorakhpur (UP) | 10 | 10 | 10 | 10 |
| North Western Plains Zone (NWPZ) | | | | | |
| 9. | KVK (SKUAST-Jammu), Rajhani, Kathua (J&K) | 8 | 8 | 8 | 19 |
| 10. | PAU, Ludhiana (Punjab) | 8 | 8 | 8 | 8 |
| 11. | KVK (PAU), Khokhar Khurd, Mansa (Punjab) | 10 | 10 | 10.38* | 13 |
| 12. | KVK (PAU), Kheri, Patran Road, Sangrur (Punjab) | 5 | 5 | 5 | 5 |
| 13. | KVK (PAU), Goneana, Mukatsar (Punjab) | 5 | 5 | 5 | 5 |
| 14. | KVK (PAU), Dabwali Road, Bathinda (Punjab) | 5 | 5 | 5 | 5 |
| 15. | CCSHAU, Hisar (Haryana) | 10 | 10 | 10 | 10 |
| 16. | KVK (BB Ashram), Rampura, Rewari (Haryana) | 8 | 8 | 8 | 7 |
| 17. | KVK (CCSHAU), Bhiwani (Haryana) | 10 | 10 | 13 | 13 |
| 18. | ICAR-IIWBR, Karnal (Haryana) | 5 | 5 | 5 | 5 |
| 19. | RARI (SKNAU), Durgapura, Jaipur (Rajasthan) | 10 | 10 | 10 | 10 |
| 20. | KVK (Pragati Trust), Chomu, Jaipur (Rajasthan) | 5 | 5 | 5 | 5 |
| 21. | KVK (AU-Kota), Akorashi, Dhindora, Hindauncity, Karauli (Rajasthan) | 8 | 8 | 11* | 11 |
| Central Zone (CZ) | | | | | |
| 22. | RCOA (MPUA&T), Udaipur (Rajasthan) | 10 | 10 | 10 | 10 |
| 23. | KVK (MPUA&T), Dhoinda, Rajasmand (Rajasthan) | 10 | 10 | 10 | 10 |
| 24. | KVK (JNKVV), Kuthulia Farm, Rewa (MP) | 8 | 8 | 8 | 8 |
| 25. | KVK (JNKVV), Purushottampur, Panna (MP) | 8 | 8 | 8 | 8 |
| 26. | KVK (JNKVV), Tikamgarh (MP) | 8 | 8 | 8 | 8 |
| 27. | KVK (RVSKVV), Biaora, Kothi Bagh, Rajgarh (MP) | 5 | 5 | 5 | 5 |
| 28. | COA (JNKVV), Ganj Basoda, Vidisha (MP) | 10 | 10 | 10 | 10 |
| 29. | KVK (BUA&T-Banda), Lalitpur (UP) | 5 | 5 | 6.5* | 7 |
| 30. | KVK (BUA&T-Banda), Bharari, Bhojla, Jhansi (UP) | 5 | 5 | 5 | 5 |
| Peninsular Zone (PZ) | | | | | |
| 31. | MARS, UAS, Dharwad (Karnataka) | 10 | 10 | 10 | 10 |
| Total | | 250 | 250 | 262.38 | 315 |

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

Table 1b: Centre wise distribution of barley FLDs during rabi 2020-21 (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, Kullu (HP) | 4.8 | 4.8 | 5* | 18 |
| 2. | ICAR-IARI, RS, Amartara Cottage, Shimla (HP) | 2 | 2 | 2 | 19 |
| 3. | KVK (YSPUH&F), Lahaul & Spiti -2, Tabo, Kaza, L&S (HP) | 2 | 2 | 2 | 25 |
| North Eastern Plains Zone (NEPZ) | | | | | |
| 4. | NDUA&T, Kumarganj, Ayodhya (UP) | 4 | 4 | 4 | 10 |
| 5. | KVK (IAS-BHU), Barkachha, Mirzapur (UP) | 4 | 4 | 4 | 10 |
| 6. | CSAUA&T, Kanpur (UP) | 4 | 4 | 4 | 10 |
| 7. | BHU, Varanasi (UP) | 4.8 | 4.8 | 6.4* | 16 |
| 8. | KVK, Gorakhpur-2, (Guru Gorakshnath Seva Sansthan), Chauk Mafi (Peppeganj), Jangal Kaudiya, Gorakhpur (UP) | 4 | 4 | 4 | 10 |
| North Western Plains Zone (NWPZ) | | | | | |
| 9. | KVK (SKUAST-Jammu), Rajhani, Kathua (J&K) | 3.2 | 3.2 | 3.2 | 19 |
| 10. | PAU, Ludhiana (Punjab) | 3.2 | 3.2 | 3.2 | 8 |
| 11. | KVK (PAU), Khokhar Khurd, Mansa (Punjab) | 4 | 4 | 4.15* | 13 |
| 12. | KVK (PAU), Kheri, Patran Road, Sangrur (Punjab) | 2 | 2 | 2 | 5 |
| 13. | KVK (PAU), Goneana, Mukatsar (Punjab) | 2 | 2 | 2 | 5 |
| 14. | KVK (PAU), Dabwali Road, Near Kheti Bhawan, Bathinda (Punjab) | 2 | 2 | 2 | 5 |
| 15. | CCSHAU, Hisar (Haryana) | 4 | 4 | 4 | 10 |
| 16. | KVK (BB Ashram), Rampura, Rewari (Haryana) | 3.2 | 3.2 | 3.2 | 7 |
| 17. | KVK (CCSHAU), Bhiwani (Haryana) | 4 | 4 | 5.2 | 13 |
| 18. | ICAR-IIWBR, Karnal (Haryana) | 2 | 2 | 2 | 5 |
| 19. | RARI (SKNAU), Durgapura, Jaipur (Rajasthan) | 4 | 4 | 4 | 10 |
| 20. | KVK (Pragati Trust), Chomu, Jaipur (Rajasthan) | 2 | 2 | 2 | 5 |
| 21. | KVK (AU-Kota), Akorashi, Dhindora, Hindauncity, Karauli (Rajasthan) | 3.2 | 3.2 | 4.4* | 11 |
| Central Zone (CZ) | | | | | |
| 22. | RCOA (MPUA&T), Udaipur (Rajasthan) | 4 | 4 | 4 | 10 |
| 23. | KVK (MPUA&T), Dhoinda, Rajasmand (Rajasthan) | 4 | 4 | 4 | 10 |
| 24. | KVK (JNKVV), Kuthulia Farm, Rewa (MP) | 3.2 | 3.2 | 3.2 | 8 |
| 25. | KVK (JNKVV), Purushottampur, Panna (MP) | 3.2 | 3.2 | 3.2 | 8 |
| 26. | KVK (JNKVV), Tikamgarh (MP) | 3.2 | 3.2 | 3.2 | 8 |
| 27. | KVK (RVSKVV), Biaora, Kothi Bagh, Rajgarh (MP) | 2 | 2 | 2 | 5 |
| 28. | COA (JNKVV), Ganj Basoda, Vidisha (MP) | 4 | 4 | 4 | 10 |
| 29. | KVK (BUA&T-Banda), Govt Agri Farm, Khiria Misra, Bamourikala, Devgarh Road, Lalitpur (UP) | 2 | 2 | 2.6* | 7 |
| 30. | KVK (BUA&T-Banda), Bharari, Bhojla, Jhansi (UP) | 2 | 2 | 2 | 5 |
| Peninsular Zone (PZ) | | | | | |
| 31. | MARS, UAS, Dharwad (Karnataka) | 4 | 4 | 4 | 10 |
| Total | | 100 | 100 | 104.95 | 315 |

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

Table 2a: State wise distribution of barley FLDs during rabi 2020-21 (in acres)

| S.N. | State/UT | BFLDs Allotted | BFLDs Conducted | Area Sown (acres) | No. of farmers/ Locations |
|--------------|-----------|----------------|-----------------|-------------------|---------------------------|
| 1. | HP | 22 | 22 | 22.5* | 62 |
| 2. | J&K | 8 | 8 | 8.0 | 19 |
| 3. | UP | 62 | 62 | 67.5* | 68 |
| 4. | Punjab | 33 | 33 | 33.38* | 36 |
| 5. | Haryana | 33 | 33 | 36.0* | 35 |
| 6. | Rajasthan | 43 | 43 | 46.0* | 46 |
| 7. | MP | 39 | 39 | 39.0 | 39 |
| 8. | Karnataka | 10 | 10 | 10.0 | 10 |
| Total | | 250 | 250 | 262.38 | 315 |

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

Table 2b: State wise distribution of barley FLDs during rabi 2020-21 (in hectares)

| S.N. | State/UT | BFLDs Allotted | BFLDs Conducted | Area Sown (hectares) | No. of Farmers/ Locations |
|--------------|-----------|----------------|-----------------|----------------------|---------------------------|
| 1. | HP | 8.8 | 8.8 | 9.0* | 62 |
| 2. | J&K | 3.2 | 3.2 | 3.2 | 19 |
| 3. | UP | 24.8 | 24.8 | 27.0* | 68 |
| 4. | Punjab | 13.2 | 13.2 | 13.35* | 36 |
| 5. | Haryana | 13.2 | 13.2 | 14.4* | 35 |
| 6. | Rajasthan | 17.2 | 17.2 | 18.4* | 46 |
| 7. | MP | 15.6 | 15.6 | 15.6 | 39 |
| 8. | Karnataka | 4.0 | 4.0 | 4.0 | 10 |
| Total | | 100 | 100 | 104.95 | 315 |

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

Table 3a: Zone wise distribution of barley FLDs during rabi 2020-21 (in acres)

| S.N. | Zone | BFLDs Allotted | BFLDs Conducted | Area Sown (acres) | No. of Farmers/ Locations |
|--------------|------|----------------|-----------------|-------------------|---------------------------|
| 1. | NHZ | 22 | 22 | 22.5* | 62 |
| 2. | NEPZ | 52 | 52 | 56.0* | 56 |
| 3. | NWPZ | 97 | 97 | 103.38* | 116 |
| 4. | CZ | 69 | 69 | 70.5* | 71 |
| 5. | PZ | 10 | 10 | 10.0 | 10 |
| Total | | 250 | 250 | 262.38 | 315 |

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

Table 3b: Zone wise distribution of barley FLDs during rabi 2020-21 (in hectares)

| Zone | BFLDs Allotted | BFLDs Conducted | Area sown (hectares) | No. of farmers/ locations |
|--------------|----------------|-----------------|----------------------|---------------------------|
| NHZ | 8.8 | 8.8 | 9.0* | 62 |
| NEPZ | 20.8 | 20.8 | 22.4* | 56 |
| NWPZ | 38.8 | 38.8 | 41.35* | 116 |
| CZ | 27.6 | 27.6 | 28.2* | 71 |
| PZ | 4.0 | 4.0 | 4.0 | 10 |
| Total | 100 | 100 | 104.95 | 315 |

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

Table 4: State wise yield gain during rabi 2020-21

| State | BFLDs yield (q/ha) | Check yield (q/ha) | Gain (%) |
|-----------|--------------------|--------------------|----------|
| HP | 24.63 | 18.25 | 34.93*** |
| J&K | 34.55 | - | - |
| UP | 36.70 | 25.18 | 45.78*** |
| Punjab | 37.68 | 34.80 | 08.26* |
| Haryana | 44.68 | 42.28 | 05.68* |
| Rajasthan | 53.38 | 44.70 | 19.41*** |
| MP | 38.60 | 29.00 | 33.10*** |
| Karnataka | 23.75 | - | - |

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

The highest gain in barley yield was recorded in UP (45.78 %) followed by HP (34.93%), MP (33.10 %), Rajasthan (19.41%) and Punjab (08.26 %). The lowest gain in yield was reported in Haryana (5.68 %) (Table 4).

Table 5: Zone wise productivity over regional productivity during rabi 2020-21

| Zone | BFLDs yield (q/ha) | Regional mean yield (q/ha) | Gain (%) |
|------|--------------------|----------------------------|----------|
| NHZ | 24.63 | 17.75 | 38.73*** |
| NEPZ | 36.05 | 23.10 | 56.06*** |
| NWPZ | 44.58 | 38.33 | 16.31*** |
| CZ | 40.43 | 30.33 | 33.31*** |
| PZ | 23.75 | - | - |

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

The yield gain due to improved varieties over regional mean yield was highest in NEPZ (56.06 %) followed by NHZ (38.73 %), CZ (33.31 %) and NWPZ (16.31 %) (Table 5).

Table 6: Zone wise productivity over check during rabi 2020-21

| Zone | BFLDs yield (q/ha) | Check mean yield (q/ha) | Gain (%) |
|------|--------------------|-------------------------|----------|
| NHZ | 24.63 | 18.25 | 34.93*** |
| NEPZ | 36.05 | 23.63 | 52.59*** |
| NWPZ | 44.58 | 41.93 | 06.32* |
| CZ | 40.43 | 32.00 | 26.33*** |
| PZ | 23.75 | - | - |

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

The yield gain due to improved varieties over check was highest in NEPZ (52.59 %) followed by NHZ (34.93 %), CZ (26.33 %) and NWPZ (06.32 %) (Table 6). Therefore, efforts should be made to increase barley yield in the NEPZ and CZ by promoting recent barley production technologies in collaboration with the state department of agriculture. The yield gain under barley FLD was highest at Mirzapur (132.12%) centre and lowest at Hisar (03.81%) center (Table 7).

Table 7: Centre wise performance of improved barley varieties during rabi 2020-21

| Zone and Centre | BFLDs yield (q/ha) | Check yield (q/ha) | Gain (%) |
|-------------------|--------------------|--------------------|---------------------|
| NHZ | | | |
| Bajaura | 24.58 | 18.18 | 35.21*** |
| Shimla | 25.00 | 19.00 | 31.58 ^{NS} |
| NEPZ | | | |
| Ayodhya | 35.63 | 27.75 | 28.38*** |
| Mirzapur | 47.88 | 20.63 | 132.12*** |
| Kanpur | 27.50 | 23.13 | 18.92** |
| Varanasi | 32.65 | 22.83 | 43.04*** |
| Gorakhpur | 38.58 | 24.25 | 59.07*** |
| NWPZ | | | |
| Kathua | 34.55 | - | - |
| Ludhiana | 44.63 | 42.63 | 04.69 ^{NS} |
| Mansa | 32.70 | 29.63 | 10.38** |
| Sangrur | 47.00 | 43.50 | 08.05 ^{NS} |
| Muktsar | 33.60 | 31.10 | 08.04*** |
| Bathinda | 39.80 | 37.00 | 07.57*** |
| Hisar | 47.63 | 45.88 | 03.81 ^{NS} |
| Rewari | 52.50 | 50.00 | 05.00*** |
| Bhiwani | 38.45 | 36.25 | 06.07*** |
| Karnal | 44.00 | 40.00 | 10.00 ^{NS} |
| Durgapura, Jaipur | 65.75 | 52.75 | 24.64*** |
| Chomu, Jaipur | 42.25 | 34.38 | 22.91** |
| Karauli | 63.50 | 55.05 | 15.35*** |
| CZ | | | |
| Udaipur | 44.98 | 38.20 | 17.74*** |
| Rajasmand | 43.78 | 36.90 | 18.63*** |
| Rewa | 37.63 | 23.63 | 59.26*** |
| Panna | 27.50 | 21.40 | 28.50*** |
| Tikamgarh | 34.65 | 23.50 | 47.45*** |
| Rajgarh | 41.25 | 35.60 | 15.87* |
| Vidisha | 50.13 | 40.48 | 23.84*** |
| Lalitpur | 37.78 | 29.43 | 28.38*** |
| Jhansi | 42.50 | 36.75 | 15.65*** |
| PZ | | | |
| Dharwad | 23.75 | - | - |

*** 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 2020-21

| Zone and Centre | Improved variety | Average yield (q/ha) | Check variety | Average yield (q/ha) | Yield gain over check (%) |
|-------------------|------------------|----------------------|----------------|----------------------|---------------------------|
| NHZ | | | | | |
| Bajaura | HBL 713 | 25.63 | HBL 316 | 19.63 | 30.57** |
| Bajaura | HBL 713 | 23.33 | Local | 17.00 | 37.21*** |
| Bajaura | HBL 713 | 25.58 | Sonu | 18.75 | 36.40*** |
| Shimla | HBL 713 | 25.00 | Local | 19.00 | 31.58 ^{NS} |
| NEPZ | | | | | |
| Ayodhya | RD 2907 | 37.50 | Narendra Jau-2 | 30.63 | 22.45* |
| Ayodhya | RD 2907 | 34.38 | Azad | 25.83 | 33.11*** |
| Mirzapur | RD 2907 | 47.88 | Azad | 20.63 | 132.12*** |
| Kanpur | RD 2907 | 27.50 | K 508 | 23.13 | 18.92** |
| Varanasi | RD 2907 | 32.65 | HUB 113 | 22.83 | 43.04*** |
| Gorakhpur | RD 2907 | 38.58 | RD 2660 | 24.25 | 59.07*** |
| NWPZ | | | | | |
| Kathua | RD 2907 | 34.55 | - | - | - |
| Ludhiana | RD 2907 | 44.63 | PL 807 | 42.63 | 4.69 ^{NS} |
| Ludhiana | PL 891 | 31.50 | - | - | - |
| Mansa | RD 2907 | 32.70 | Local | 29.63 | 10.38** |
| Sangrur | RD 2907 | 47.00 | PL 807 | 43.50 | 8.05 ^{NS} |
| Muktsar | RD 2907 | 33.60 | Local | 31.10 | 8.04*** |
| Bathinda | RD 2907 | 39.80 | Local | 37.00 | 7.57*** |
| Hisar | RD 2907 | 47.63 | BH 393 | 45.88 | 3.81 ^{NS} |
| Rewari | RD 2907 | 52.50 | BH 393 | 50.00 | 5.00*** |
| Bhiwani | RD 2907 | 38.45 | BH 393 | 36.25 | 6.07*** |
| Karnal | RD 2907 | 44.00 | BH 393 | 40.00 | 10.00 ^{NS} |
| Durgapura, Jaipur | RD 2907 | 66.25 | RD 2552 | 54.18 | 22.29*** |
| Durgapura, Jaipur | RD 2907 | 65.00 | RD 2660 | 50.63 | 28.40*** |
| Chomu, Jaipur | RD 2907 | 42.25 | RD 2035 | 34.38 | 22.91** |
| Karauli | RD 2907 | 63.50 | RD 2035 | 55.05 | 15.35*** |
| CZ | | | | | |
| Udaipur | DWRB 137 | 45.43 | RD 2035 | 39.13 | 16.10*** |
| Udaipur | RD 2899 | 44.55 | RD 2552 | 37.28 | 19.52*** |
| Rajasmand | DWRB 137 | 43.78 | Local | 36.90 | 18.63*** |
| Rewa | DWRB 137 | 35.98 | JB 58 | 23.25 | 54.73*** |
| Rewa | RD 2899 | 40.35 | JB 58 | 24.23 | 66.56*** |
| Panna | RD 2899 | 26.68 | JB 58 | 21.25 | 25.53*** |
| Panna | DWRB 137 | 28.00 | JB 58 | 21.50 | 30.23*** |
| Tikamgarh | RD 2899 | 36.53 | JB 58 | 22.50 | 62.33*** |
| Tikamgarh | DWRB 137 | 33.53 | JB 58 | 24.08 | 39.25*** |
| Rajgarh | RD 2899 | 41.25 | Local | 35.60 | 15.87* |
| Vidisha | RD 2899 | 50.50 | Local | 40.50 | 24.69*** |
| Vidisha | DWRB 137 | 41.25 | Local | 40.45 | 1.98*** |
| Lalitpur | DWRB 137 | 37.78 | Munda | 29.43 | 28.38*** |
| Jhansi | DWRB 137 | 42.50 | Munda | 36.75 | 15.65*** |
| PZ | | | | | |
| Dharwad | DWRB 137 | 23.75 | - | - | - |

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

The varieties HBL 713 (25.63 q/ha) at Bajaura centre in NHZ, RD 2907 (48.88 q/ha) at Mirzapur in NEPZ, RD 2907 (66.25 q/ha) at Durgapura Jaipur in NWPZ, RD 2899 (50.50 q/ha) at Vidisha in CZ and DWRB 137 (23.75 q/ha) at Dharwad in PZ were the highest average yielding. The huskless barley variety PL 891 yielded 31.50 q/ha at Ludhiana center, the huskless check was not reported. Checks were also not reported at Kathua and Dharwad centers. The demonstrated new barley varieties were introduced for first time in these areas (Table 8).

Table 9: Yield potential of barley varieties in different zones during *rabi* 2020-21

| Zone | Centre | Variety | Yield (q/ha) |
|------|------------------|----------|--------------|
| NHZ | Bajaura | HBL 713 | 29.10 |
| NEPZ | Mirzapur | RD 2907 | 53.53 |
| NWPZ | Durgapura Jaipur | RD 2907 | 70.00 |
| CZ | Vidisha | RD 2899 | 52.50 |
| PZ | Dharwad | DWRB 137 | 25.00 |

It is evident from table 9 that varieties HBL 713 (29.10 q/ha), RD 2907 (53.53 q/ha), RD 2907 (70.00 q/ha), RD 2899 (52.50 q/ha) and DWRB 137 (25.00 q/ha) performed better than other varieties at Bajaura, Mirzapur, Durgapura Jaipur, Vidisha and Dharwad centres in the NHZ, NEPZ, NWPZ, CZ and PZ, respectively (Table 9).

Table 10 : Barley varieties grown in different zones during *rabi* 2020-21

| Zone | Improved varieties | Check varieties | Popular varieties in the region |
|------|--------------------|---|--|
| NHZ | HBL 713 | HBL 316, Sonu, Local | Sonu, Dolma, HBL 276, HBL 316, Local |
| NEPZ | RD 2907 | Narendra Jau-2, K 125 (Azad), K 508, HUB 113, RD 2660 | K 125, K 409, K 508, K 551, K 560, K 1055, Rd 2552, RD 2660, RD 2794, HUB 113, Jyoti, Manjula, Narendra Jau-2, Narendra Jau-3, Lakhan, Local |
| NWPZ | RD 2907, PL 891 | PL 807, BH 393, RD 2035, RD 2052, RD 2660, Local | PL 807, BH 393, BH 902, BH 946, RD 2035, RD 2052, RD 2660, RD 2715, RD 2786, RD 2794, DWRUB 52, Local |
| CZ | DWRB 137, RD 2899 | JB 58, RD 2035, RD 2552, Munda, Local | RD 2035, RD 2552, RD 2715, RD 2660, RD 2786, JB 1, JB 58, Karan 201, Munda, Local |
| PZ | DWRB 137 | - | - |

Barley FLDs conducted at ICAR-IIWBR, Karnal centre

During the year 2020-21, Barley FLDs were conducted at ICAR-IIWBR, Karnal center using improved barley variety RD 2907, covering 5 acres area of five farmers, in villages Mehmoodpur in Karnal district; and villages Sikander Kheri and Hajwana in Kaithal district. The demonstrations were conducted with complete package of practices.

Constraints analysis in different barley producing zones of India (2020-21)

Variation in yield levels among different states, farmers and farms leads to yield gap in different states and different zones. There are many reasons of this yield gap which need to be addressed 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 well designed pre-structured questionnaire mailed to all the cooperating centres conducting barley FLDs. The responses were collected on a three point continuum viz.; most serious, serious and not serious. 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 have been assigned.

Northern Hills Zone (NHZ): In NHZ, high cost of inputs, yellow rust, lack of facility of canal irrigation, poor information delivery by state extension machinery, low price of barley grains, and poor participation in exposure visits, kisan mela and other extension activities were perceived as major constraints (Table 11).

Table 11: Constraints in NHZ

(n=20)

| Constraints | Score | Rank |
|---|-------|------|
| High cost of inputs | 36 | I |
| Yellow rust | 20 | II |
| Lack of facility of canal irrigation water | 20 | II |
| Poor information delivery by state extension machinery | 20 | II |
| Low price of barley grains | 20 | II |
| Poor participation in exposure visits arranged by various departments | 19 | III |
| Poor participation in kisan melas/field days/kisan gosthi/training | 19 | III |
| Lack of extension literature | 19 | III |
| Bathua (<i>Chenopodium album</i>) | 18 | IV |
| Lodging | 18 | IV |

North Eastern Plains Zone (NEPZ): In this zone, high cost of inputs, decline in water table, non availability of labour, mandusi (*Phalaris minor*), untimely rain, poor quality herbicides/pesticides, lodging, lack of facility of canal irrigation water, low price of grain and small land holding were identified as major constraints in NEPZ. Most of the constraints were administrative in nature which needs immediate attention by the state governments of this zone. Marketing of barley and ensuring good price is a concern for all the farmers in NEPZ (Table 12).

Table 12: Constraints in NEPZ**(n=56)**

| Constraints | Score | Rank |
|--|-------|------|
| High cost of inputs | 112 | I |
| Decline in water table | 102 | II |
| Non availability of labour | 76 | III |
| <i>Phalaris minor</i> (Mandusi) | 60 | IV |
| Untimely rain | 56 | V |
| Poor quality of herbicides/pesticides | 56 | V |
| Lodging | 56 | V |
| Lack of facility of canal irrigation water | 56 | V |
| Low price of barley grains | 50 | VI |
| Small land holding | 50 | 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 high cost of inputs, *Phalaris minor*, decline in water table, low price of barley grains, non-availability of labour as major constraints. In NWPZ barley is grown for industrial purpose on contract farming too. Hence, there is a need to address these constraints for the benefit of the farmers and for the area expansion under barley crop (Table 13).

Table 13: Constraints in NWPZ**(n= 112)**

| Constraints | Score | Rank |
|--|-------|------|
| High cost of inputs | 162 | I |
| <i>Phalaris minor</i> (Mandusi) | 126 | II |
| Decline in water table | 122 | III |
| Low price of barley grains | 100 | IV |
| Non-availability of labour | 99 | V |
| Small land holding | 98 | VI |
| Lack of facility of canal irrigation water | 87 | VII |
| Lodging | 77 | VIII |
| Temperature fluctuation during crop growth | 72 | IX |
| Poor information delivery by state extension machinery | 70 | X |

Central Zone (CZ): In CZ, high cost of inputs, decline in water table, small land holdings, lack of facility of canal irrigation, poor information delivery by state extension machinery, low price of barley grains, resistance against herbicides, *Phalaris minor*, powdery mildew and untimely rain were perceived as major production constraints of barley crop (Table 14).

Table 14: Constraints in CZ**(n=71)**

| Constraints | Score | Rank |
|--|-------|------|
| High cost of inputs | 118 | I |
| Decline in water table | 100 | II |
| Small land holdings | 64 | III |
| Lack of facility of canal irrigation water | 64 | III |
| Poor information delivery by state extension machinery | 62 | IV |
| Low price of barley grains | 53 | V |
| Resistance against herbicides | 53 | V |
| <i>Phalaris minor</i> (Mandusi) | 56 | VI |
| Powdery mildew | 45 | VII |
| Untimely rain | 45 | VII |

Peninsular Zone (PZ): During 2020-21 crop season, FLD on barley was introduced in PZ at UAS, Dharwad centre with DWRB 137 variety. The overall experience was encouraging in this zone. Spot blotch and resistance of weeds against herbicides were recorded as major constraints in this zone (Table 15).

Table 15: Constraints in PZ**(n=10)**

| Constraints | Score | Rank |
|--|-------|------|
| Spot blotch | 20 | I |
| Resistance of weeds against herbicides | 20 | I |

Major constraints impeding barley production in the country

Overall analysis of constraints in different zones clearly indicated that high cost of inputs, decline in water table, *Phalaris minor*, non-availability of labour, lack of canal irrigation facility, low price of barley grains, small land holding, lodging, poor information delivery by state extension machinery and poor participation in exposure visits arranged by various departments were identified as major constraints affecting barley production and productivity in the country (Table 16).

Table 16: Overall constraints impeding barley production in the country**(n=269)**

| Constraints | Score | Rank |
|---|-------|------|
| High cost of inputs | 428 | I |
| Decline in water table | 324 | II |
| <i>Phalaris minor</i> (Mandusi) | 244 | III |
| Non-availability of labour | 237 | IV |
| Lack of facility of canal irrigation water | 227 | IV |
| Low price of barley grains | 223 | V |
| Small land holding | 217 | VI |
| Lodging | 197 | VII |
| Poor information delivery by state extension machinery | 182 | VIII |
| Poor participation in exposure visits arranged by various departments | 162 | IX |

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

| Suggestions | Zone | | | | |
|--|------|------|------|----|----|
| | NHZ | NEPZ | NWPZ | CZ | PZ |
| • Release of funds should be before the start of sowing | √ | √ | √ | √ | √ |
| • Supply of seeds should be before time | √ | √ | √ | √ | √ |
| • Increase budget for POL/hiring of vehicle for monitoring of FLD sites and organizing field day | | √ | √ | √ | √ |
| • Number of demonstrations should be increased | √ | √ | √ | √ | √ |
| • Include barley varieties suitable for limited irrigation condition under FLD. | √ | | | √ | √ |
| • Provision of funds for training and extension literature should also be made | √ | √ | √ | √ | √ |
| • Increase overall budget of barley FLD | √ | √ | √ | √ | √ |

Farmers' perception about barley FLDs

- Farmers were highly satisfied with performance of improved barley varieties and production technologies demonstrated under FLDs. The improved varieties outperformed check varieties across locations.
- Neighboring farmers were enthusiastic to adopt technologies which were demonstrated in their vicinity and they have asked for seeds of improved variety from the FLD farmer.
- All the farmers were highly satisfied with the yield advantage of different varieties at their field and with their increased income due to higher yield.

Monitoring of Frontline Demonstrations (FLDs), TSP Wheat Demonstrations and SCSP Wheat Demonstrations

The ICAR-IIWBR team accompanied by the experts from the Ministry of Agriculture & Farmers Welfare and the concerned centres monitored the following FLDs and TSP Wheat Demonstrations and SCSP Wheat Demonstrations centres during the *rabi* crop season 2020-21.

| Team Leader | Centres Monitored | Dates of Monitoring |
|--------------------|-----------------------------------|---|
| Dr. Satyavir Singh | Dharwad Udaipur, Rajasmand | 21-27 February, 2021 3-6 March, 2021 |
| Dr. Anuj Kumar | Jhansi, Lalitpur, Tikamgarh | 4-9 March, 2021 |
| Dr. Raj Kumar | Hisar, Rewari, Bhiwani | 1-3 March, 2021 |
| Dr. Anil Khippal | Sangrur, Mansa, Bathinda, Muktsar | 22-25 February, 2021 |
| Dr. Sendhil R | Kanpur, Varanasi and Ayodhya | 16-22 March, 2021 |

Frontline Demonstrations (FLDs) and TSP Wheat Demonstrations Monitoring Report of UAS-Dharwad, MPUA&T-Udaipur and KVK-Rajasmad centers.

Monitoring Center: UAS, Dharwad (Karnataka)

Monitoring Date: 22-24.02.2021

Monitoring Team

1. Dr. Satyavir Singh, PS & PI (Social Sciences), ICAR-IIWBR, Karnal
2. Dr. Kumar D. Lamani, Agronomist & Head AICRP on Wheat, UAS, Dharwad (Karnataka)
3. Dr. Gurudatt Hegde, Sr. Scientist (Plant Patho.), AICRP on Wheat, UAS, Dharwad (Karnataka)
4. Dr. Uday Reddy, Jr. Wheat Agronomist, AICRP on Wheat, UAS, Dharwad (Karnataka)
5. Dr. Suresh Gattanatti, Technical Officer, AICRP on Wheat, UAS, Dharwad (Karnataka)
6. Mr. S. Srikanth, STO, MoA&FW, DoAC&FW, DOD, Hyderabad.

- The Team visited barley FLDs on 22nd February, 2021 at village-Honnapur. Taluka-Alnavar; village-Belavatagi. Taluka-Navalgund: and village-Sankadal. Taluka-Naragund in district-Dharwad, conducted using variety DWRB 137. The Team visited TSP Wheat Demonstrations on 23rd February, 2021 at Village-Manikatti conducted using variety UAS 375, at village-Honnakatti conducted using variety UAS 446 and village-Mallapur conducted using variety UAS 304 in Taluka and district-Bagalkot. The Team visited TSP Wheat Demonstrations on 24th February, 2021, conducted using variety UAS 304 at village-Yadahalli in Taluka-Mudhol, District-Bagalkot. Also visited barley FLD conducted using variety DWRB 137 at village-Badakundri, taluka-Hukkeri, district-Belgaum. The technology *i.e.* improved or newly released barley and wheat varieties with complete package of practices were demonstrated at farmers' fields.
- The weeds infestation in FLDs was negligible. The barley FLDs crop was free from diseases. 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 improved wheat varieties being popularized were UAS 304, UAS 375 and UAS 446. The check wheat varieties being used were Local, DWR 162 and Kirti. Wheat straw is good for domestic animals. The neighbour farmers of the TSP wheat demonstrations and barley FLDs were impressed by the performance of new wheat and barley varieties.
- No lodging was seen in demonstrations fields. Farmers expected more yield from the new varieties than the old varieties. FLD is good source of Transfer of Technology. The farmers appreciated the work done by barley FLDs/TSP wheat demonstrations cooperators.

Monitoring Center: MPUA&T, Udaipur (Rajasthan)

Monitoring Date: 04-05.03.2021

Monitoring Team

1. Dr. Satyavir Singh, PS & PI (Social Sciences), ICAR-IIWBR, Karnal, Haryana.
2. Dr. R.S. Choudhary, Assistant Professor (Agronomy), RCoA, MPUA&T, Udaipur (Rajasthan).
3. Dr. Abdul Majid Khan, Agriculture Supervisor, RCoA, MPUA&T, Udaipur (Rajasthan).
4. Mr. Ajay Swami, STA, MoA&FW, DoAC&FW, DMD, Jaipur (Rajasthan).
5. Mr. Shiv Dayal Meena, AAO, O/o Assit. Director Agri., Badgaon, Udaipur (Rajasthan).
6. Mr. Suresh Kumar, Nodal AAO Madar, O/o Assit. Director Agri., Badgaon, Udaipur (Rajasthan).

- The Team visited barley FLDs on 04th March, 2021 at seven farmers' fields at village-Dharti Devi. Tehsil-Jhadol, District-Udaipur conducted using barley varieties DWRB 137 and RD 2899. The Team visited TSP wheat demonstrations on 05th March, 2021 at six farmers' fields at village-Madar, tehsil-Badgaon, District-Udaipur conducted by MPUA&T, Udaipur using variety Raj 4238. The improved/newly released barley and wheat varieties with complete package of practices were demonstrated at farmers' fields.

Monitoring Center: KVK, Rajasmand (Rajasthan)

Monitoring Date: 05.03.2021

Monitoring Team

1. Dr. Satyavir Singh, PS & PI (Social Sciences), ICAR-IIWBR, Karnal
2. Dr. R.S. Choudhary, Assi. Prof. (Agronomy), RCoA, MPUA&T, Udaipur (Rajasthan)
3. Dr. P.C. Regar, Head, KVK (MPUA&T), Dhoinda, Rajasmand (Rajasthan)
4. Dr. Mani Ram, Assi. Professor (Soil Science), KVK, Rajasmand (Rajasthan)
5. Mr. Ajay Swami, STA, MoA&FW, DoAC&FW, DMD, Jaipur (Rajasthan).

- The Team visited barley FLDs on 05th March, 2021 at village-Natha Magri, post-Rajjawash, district-Rajasmand conducted by KVK-Rajasmand using variety DWRB 137 and RD 2899. The improved/newly released barley and wheat varieties with complete package of practices were demonstrated at farmers' fields
- The weeds infestation in FLDs and TSP wheat demonstrations was negligible. The barley FLDs crop was free from diseases. New wheat and barley varieties have good tillering. Good crop stand, long earhead, more number of grains per earhead and bold grains. The improved barley varieties being popularized were DWRB 137 and RD 2899. The improved wheat variety being popularized was Raj 4238. The check barley varieties being used were RD 2035, RD 2552 and Local. The check wheat varieties being used were Raj 4037 and Lok 1. Wheat straw is good for domestic animals.
- The neighbour farmers of the TSP wheat demonstrations and barley FLDs were impressed by the performance of new wheat and barley varieties. The neighbour farmers of the TSP wheat demonstrations and barley FLDs ask the demonstrations farmers for booking new variety seed for the next year.
- No lodging was seen in demonstrations fields. Farmers expected more yield from the new varieties. FLD is good source of Transfer of Technology. The farmers appreciated the work done by barley FLDs/TSP wheat demonstrations cooperators.

Frontline Demonstrations (FLDs) Monitoring Report of Rewari, Bhiwani and Hisar centers.

Monitoring Centres: Rewari, Bhiwani and Hisar (Haryana)

Monitoring Date: 01.03.2021 to 03.03.2021

Monitoring Team

- Dr. Raj Kumar, Principal Scientist, ICAR -IIWBR, Karnal (Haryana).
 Dr. Surendra Kumar Meena, STA, Directorate of Wheat Development, Gurugram (Haryana).
 Dr. Balbir Singh, SMS, KVK, Rewari (Haryana).
 Dr. Gulab Singh, SMS, KVK, Bhiwani (Haryana).

- In total, twenty-eight Frontline Demonstrations (FLDs) of newly released barley variety RD 2907, notified for the Indo-Gangetic regions of India for salinity conditions were allocated to Krishi Vigyan Kenders (KVKs) at Rewari, Bhiwani and Hisar districts (Haryana).
- The performance of these FLDs on barley variety RD 2907 demonstrated in different villages at farmers' field under the KVK Rewari, KVK Bhiwani and KVK Hisar were monitored by the designated monitoring team during 1-3rd March 2021.
- 6 FLDs of barley variety RD 2907 allocated to KVKs Rewari, were demonstrated at village Khatawali and sown during 1-6th Nov. 2020. These FLDs were monitored on 1st March, 2021.
- Considering Bawal the barley cultivation area, the FLDs allocated for demonstration by CCS HAU Hisar, were also planted at Jhurthal, Jhabua, Mamria, Dhani Jaitpur, Shahpur, Dulera Kalan, Tihara and Bawal villages of Distt Rewari during 6-10th Nov. 2020. These FLD's were monitored on 2nd March, 2021.
- 6 FLD's of barley variety RD 2907 demonstrated at village Binod under KVK Bhiwani were monitored on 3rd March 2021.
- All FLDs monitored were sown by seed drill with complete package of practices. The crop was at maturity stage and was ready to harvest. The farmers were very happy with the performance of this salt tolerant variety, especially on the saline soil in these two districts, where they were not able to harvest any crop.
- The farmers were demonstrated for the rogueing of off type plants to maintaining the availability of this new variety seed and guided for saving its seed for self and neighbouring farmers.
- A few farmers complaint about the blockage of seed drill during sowing due to its long awns.

Frontline Demonstrations (FLDs) and SCSP Wheat Demonstrations Monitoring Report of Sangrur, Mansa, Bathinda and Sri Muktsar Sahib centers

Monitoring Centre: KVK Sangrur (Punjab)

Monitoring Date: 22.02.2021

Monitoring Team

Dr. Anil Kumar Khippal, Principal Scientist, ICAR-IIWBR, Karnal (Haryana)

Dr. Vikrant Singh, Directorate of Wheat Development, Gurugram, Haryana.

Dr. Ravinder Kaur, KVK, Sangrur

Dr. GPS Grewal, Chief Agriculture Officer, Sangrur

Improved barley variety RD 2907 was demonstrated at farmers' fields in five acres at multiple locations by the KVK Sangrur centre against local check to popularize this variety. The following observations were made during the overall monitoring and discussion with the FLD beneficiaries'.

- The location of FLDs conducted was excellent and was on the main road.
- The board with all informations was installed.
- 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 before taking up sowing
- 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 KVK Sangrur was much appreciated by the beneficiaries and they are interested to continue.

Monitoring Centre: KVK Mansa (Punjab)

Monitoring Date: 23.02.2021

Monitoring Team

Dr. Anil Kumar Khippal, Principal Scientist, ICAR-IIWBR, Karnal (Haryana)

Dr. Vikrant Singh, Directorate of Wheat Development, Gurugram, Haryana.

Dr. BS Sekhon, KVK, Mansa

Dr. Bhim Avtar, Block Agriculture Officer, Bhikhi, Mansa

Improved barley variety RD 2907 was demonstrated at farmers' fields in ten acres at 13 locations by the KVK Mansa centre against local check to popularize this variety. The following observations were made during the overall monitoring and discussion with the FLD beneficiaries'.

- The location of FLDs conducted was excellent.
- The board with all informations was installed at the FLD site.
- Selection of beneficiaries had the combination and/or inclusive of general category, OBC and SC.
- Sowing of all the demonstrations was late due to rain.
- Line sowing by seed drill was the most common practice witnessed in the demonstrated plots with the recommended seed rate.
- Few farmers had done seed treatment before taking up sowing
- Around two 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 ear head initiation 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 and no herbicide was sprayed to control weeds.
- Technical assistance and advisories offered by the KVK Sangrur was much appreciated by the beneficiaries and they are interested to continue.
- The location of FLDs conducted were excellent and was on the main road.

Monitoring Centre: KVK Bathinda (Punjab)**Monitoring Date: 24.02.2021****Monitoring Team***Dr. Anil Kumar Khippal, Principal Scientist, ICAR-IIWBR, Karnal (Haryana)**Dr. Vikrant Singh, Directorate of Wheat Development, Gurugram, Haryana.**Dr. Vinay Singh, KVK, Bathinda**Dr. Bahadur Singh Sidhu, Chief Agriculture Officer, Bathinda*

Improved barley variety RD 2907 was demonstrated at farmers' fields in five acres at five locations by the KVK Bathinda centre against local check to popularize this variety. The following observations were made during the overall monitoring and discussion with the FLD beneficiaries'.

- The location of FLDs conducted was good.
- The board with all informations was installed at the FLD site.
- All the beneficiaries belong to general category.
- All the demonstrations were timely sown.
- Line sowing by seed drill was the most common practice witnessed in the demonstrated plots with the recommended seed rate.
- Few farmers had done seed treatment before taking up sowing
- Around two 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 ear head 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 incidence of loose smut in the monitored plot
- No weeds were present in some visited fields and no herbicide was sprayed.
- Technical assistance and advisories offered by the KVK Bathinda was much appreciated by the beneficiaries and they are interested to continue.

Monitoring Centre: KVK Sri Muktsar Sahib (Punjab)**Monitoring Date: 24.02.2021****Monitoring Team***Dr. Anil Kumar Khippal, Principal Scientist, ICAR-IIWBR, Karnal (Haryana)**Dr. Vikrant Singh, Directorate of Wheat Development, Gurugram, Haryana.**Dr. Chetak Bishnoi, KVK, Sri Muktsar Sahib**Dr. Gurpreet Singh, Block Agriculture Officer, Sri Muktsar Sahib*

Improved barley variety RD 2907 was demonstrated at farmers' fields in five acres at five locations by the KVK Sri Muktsar Sahib centre against local check to popularize this variety. The following observations were made during the overall monitoring and discussion with the FLD beneficiaries'.

- The location of FLDs conducted was good.
- The board with all informations was installed at the FLD site.
- The beneficiaries belong to general and BC category.
- Only two demonstrations were timely sown and others were late sown due to rain

- Line sowing by seed drill was the most common practice witnessed in the demonstrated plots with the recommended seed rate.
- Few farmers had done seed treatment before taking up sowing
- Around two 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 ear head initiation 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 insect and disease in the monitored plot
- No weeds were present in some visited fields and no herbicide was sprayed.
- Technical assistance and advisories offered by the KVK Sri Muktsar Sahib was much appreciated by the beneficiaries and they were interested to continue.

Front Line Demonstrations (FLDs) Monitoring Report of Tikamgarh, Lalitpur and Jhansi centers during crop season 2020-21.

Monitoring Centre: KVK, Tikamgarh (MP)

Monitoring Date: 05.03.2021

Monitoring Team

Dr. Anuj Kumar, Principal Scientist, ICAR-IIWBR, Karnal (Haryana).

Dr. SK Singh, Scientist, KVK Tikamgarh (MP)

Dr. US Dhakar, Scientist, KVK, Tikamgarh (MP)

- The team visited the barley FLDs sites on 5th March, 2021 conducted by KVK, Tikamgarh, MP center at villages Kanti, Jatara, Karmarai and Ganeshganj using barley variety RD 2899. The improved barley variety was demonstrated with complete package of practices at farmers' fields.
- The barley FLDs was free from weeds and diseases. New barley variety was having good tillering, good crop stand, long earhead, more number of grains per earhead and bold grains. Check variety was JB 58 which is a commonly grown barley variety in Bundelkhand region. The other farmers from the same village and neighbouring villages were highly impressed with the performance of Rd 2899.
- No lodging was observed in the field. Farmers expected better yield from this variety than JB 58. The farmers appreciated the work done by scientists of KVK, Tikamgarh.

Monitoring Centre: KVK Lalitpur (UP)

Monitoring Date: 06.03.2021

Monitoring Team

Dr. Anuj Kumar, Principal Scientist ICAR-IIWBR, Karnal (Haryana).

Dr. Nitin Kumar Pandey, SMS, KVK Lalitpur, UP

- The team visited the wheat FLDs on 6th March, 2021 conducted by KVK, Lalitpur (UP) center at villages Mirchwara, Silawan and Pathagori district Lalitpur using varieties DWRB 137. The improved barley variety was demonstrated with complete package of practices at farmers' fields.

- The barley FLDs was free from weeds and diseases. New barley variety was having good tillering, good crop stand, long earhead, more number of grains per earhead and bold grains. Check variety was Munda which is a traditionally grown variety in Bundelkhand region. The other farmers from the same village and neighbouring villages were highly impressed with the performance of DWRB 137.
- No lodging was observed in the field. Farmers expected better yield from this variety than Munda. The farmers appreciated the work done by scientists of KVK, lalitpur.

Monitoring Centre: KVK, Jhansi (UP)

Monitoring Date: 07.03.2021

Monitoring Team

Dr. Anuj Kumar, Principal Scientist ICAR-IIWBR, Karnal (Haryana).

Dr. Dr Vimal Raj Yadav Scientist, KVK, Jhansi (UP)

Dr. Nishi Roy, Head KVK, Jhansi (UP)

- The team visited the wheat FLDs on 7th March, 2021 conducted by KVK, Jhansi (UP) center at villages Dhikauli, Block Babina, district Jhansi using varieties DWRB 137. The improved barley variety was demonstrated with complete package of practices at farmers' fields.
- The barley FLDs was free from weeds and diseases. New barley variety was having good tillering, good crop stand, long earhead, more number of grains per earhead and bold grains. Check variety was Munda which is a traditionally grown variety in Bundelkhand region. The other farmers from the same village and neighbouring villages were highly impressed with the performance of DWRB 137.
- No lodging was observed in the field. Farmers expected better yield from this variety than Munda. The farmers appreciated the work done by scientists of KVK, Jhansi.

Monitoring Date: 08.03.2021

Monitoring Team

Dr. Anuj Kumar, Principal Scientist ICAR-IIWBR, Karnal (Haryana).

Dr. Dr Vimal Raj Yadav Scientist, KVK, Jhansi, UP

Dr. Nishi Roy, Head KVK, Jhansi, UP

- The team visited the wheat FLDs on 8th March, 2021 conducted by KVK, Jhansi (UP) center at villages Lakara, Block Badagaon, district Jhansi using varieties DWRB 137. The improved barley variety was demonstrated with complete package of practices at farmers' fields.
- The barley FLDs was free from weeds and diseases. New barley variety was having good tillering, good crop stand, long earhead, more number of grains per earhead and bold grains. Check variety was Munda which is a traditionally grown variety in Bundelkhand region. The other farmers from the same village and neighbouring villages were highly impressed with the performance of DWRB 137.
- No lodging was observed in the field. Farmers expected better yield from this variety than Munda. The farmers appreciated the work done by scientists of KVK, Jhansi.

Front Line Demonstrations (FLDs) Monitoring Report of Kanpur, Varanasi and Ayodhya centers during crop season 2020-21.

Monitoring Centre: CSAUAT, Kanpur

Monitoring Date: 17.03.2021

Monitoring Team

Dr. Sendhil R, Scientist, ICAR-IIWBR, Karnal (Haryana)

Dr. J.B. Khan, Wheat Pathologist, Section of Rabi Cereals, CSAUAT, Kanpur (UP)

Dr. A.K. Singh, Assitant Director, Directorate of Sugarcane Development, Lucknow (UP)

- Improved or newly released barley variety (RD 2907) was demonstrated in 10 acres of land at various farmers' field in Devpura village of Ghatampur block in Kanpur Nagar district of Uttar Pradesh. The following observations were made during the overall monitoring and discussion with the beneficiaries of FLD conducted by the CSAUAT, Kanpur Centre.
- Out of 10 beneficiaries (OBC farmers), 4 wheat FLD plots were monitored by the above team.
- As per the site visit of the beneficiaries' field, a majority of the crop near to maturity stage with evident crop canopy in the demonstrated plots.
- Urea has been applied at the rate of 40kg per acre.
- A few of the monitored plots were infested with weeds.
- The monitored plots were not infested with any insect-pests and diseases.
- The farmers reported that they have given only 2 irrigations.
- The crop growth was good in the region and they expect 10 quintals per acre.
- Farmers valued the demonstrations as the barley variety is new to their region
- The beneficiaries-majority of them are new cultivators of the crop-are interested to continue with the barley and reported that it has good demand for fodder.

Monitoring Centre: BHU, Varanasi

Monitoring Date: 19.03.2021

Monitoring Team

Dr. Sendhil R, Scientist, ICAR-IIWBR, Karnal (Haryana)

Prof. V.K. Mishra, Professor, BHU, Varanasi (UP)

Dr. A.K. Singh, Assitant Director, Directorate of Sugarcane Development, Lucknow (UP)

- Improved and newly released barley variety (RD 2907) was demonstrated in 16 acres of farmers' field at multiple locations (covering two districts) by the BHU Varanasi centre against check variety (HUB 113). The following observations were made during the overall monitoring and discussion with the FLD beneficiaries.
- Selection of beneficiaries had the combination and/or inclusive of male, female, general category, OBC and ST.
- In the visited plots there were a lot of weeds infestation and farmers are reluctant to continue barley cultivation.
- Of the four visited fields, farmers gave only 1-2 irrigations.
- A majority applied only urea at the rate of 100kg/ha.
- From FLDs, farmers expect yield around 10 quintals per acre and they doubt that the ongoing season would yield less than the past season owing to erratic weather.

Monitoring Centre: NDUAT, Ayodhya

Monitoring Date: 20.03.2021

Monitoring Team

Dr. Sindhil R, Scientist, ICAR-IIWBR, Karnal (Haryana)

Dr. A.K. Singh, Junior Agronomist, NDUAT, Ayodhya

Dr. A.K. Singh, Assitant Director, Directorate of Sugarcane Development, Lucknow (Uttar Pradesh)

- Improved or newly released barley variety (RD 2907) was demonstrated in 10 acres of land at various farmers' field in Ayodhya district of Uttar Pradesh. The following observations were made during the overall monitoring and discussion with the beneficiaries of FLD conducted by the NDUAT, Ayodhya Centre.
- Most of the farmers used broadcasting method against the advised line sowing.
- In the visited plots, the crop was at grain filling stage.
- Though farmers applied NPK but it was in a limited quantity like urea at 10kg, DAP at 20 kg and MOP at 10 kg per acre.
- A majority reported that they gave only 1-2 irrigations.
- From FLDs, farmers expect a yield around 10-12 quintals per acre.

Wheat Demonstrations conducted under SCSP Programme during 2020-2021

Under SCSP Programme, 160 varietal demonstrations of wheat variety DBW 222 (Karan Narendra) were organized during 2020-21 *rabi* crop season to assess the yield potential under high fertility condition so that its highest yield potential could be achieved. The demonstrations were carried out through KVKs of Punjab (6) and Haryana (4) benefitting 160 farmers (Table 17). The demonstrations were conducted in 6 aspirational districts (Sangrur, Mansa, Bathinda, Muktsar, Faridkot and Rupnagar) of Punjab covering 85 acres area and 85 farmers of SC category. In Haryana, the demonstrations were conducted in four aspirational districts (Ambala, Yamunanagar, Fatehabad and Sirsa) covering 75 acres of area and benefitting 75 SC farmers (Table 18). At all the locations yields were highly satisfactory. Improved wheat variety DBW 222 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 2020-21

| S.No. | State and District | Demonstrations Conducted | Area sown (acres) | Number of farmers |
|----------------|--------------------|--------------------------|-------------------|-------------------|
| Punjab | | | | |
| 1. | Sangrur | 15 | 15 | 15 |
| 2. | Mansa | 15 | 15 | 15 |
| 3. | Bathinda | 15 | 15 | 15 |
| 4. | Muktsar | 15 | 15 | 15 |
| 5. | Faridkot | 15 | 15 | 15 |
| 6. | Ropar | 10 | 10 | 10 |
| Haryana | | | | |
| 7. | Ambala | 25 | 25 | 25 |
| 8. | Yamunanagar | 25 | 25 | 25 |
| 9. | Fatehabad | 15 | 15 | 15 |
| 10. | Sirsa | 10 | 10 | 10 |
| Total | | 160 | 160 | 160 |

Table 18: State wise distribution of wheat demonstrations under SCSP programme during 2020-21

| Zone and State | Demonstrations Conducted | Area sown (acres) | Number of farmers |
|----------------------------------|--------------------------|-------------------|-------------------|
| Punjab | 85 | 85 | 85 |
| Haryana | 75 | 75 | 75 |
| North Western Plains Zone (NWPZ) | 160 | 160 | 160 |

Table 19: District wise yield gain in wheat demonstrations under SCSP programme for 2020-21

| State and District | Wheat Demonstrations yield (q/ha) | Check yield (q/ha) | Gain (%) |
|--------------------|-----------------------------------|--------------------|----------|
| Punjab | | | |
| Sangrur | 54.98 | 52.43 | 04.86** |
| Mansa | 54.60 | 47.60 | 14.71*** |
| Bathinda | 54.48 | 52.55 | 03.66*** |
| Muktsar | 55.98 | 52.78 | 06.06*** |
| Faridkot | 51.30 | 49.83 | 02.96*** |
| Ropar | 52.13 | 49.63 | 05.04*** |
| Haryana | | | |
| Ambala | 49.98 | 47.50 | 05.21*** |
| Yamunanagar | 53.30 | 50.30 | 05.96*** |
| Fatehabad | 61.83 | 57.00 | 08.46*** |
| Sirsa | 56.85 | 55.20 | 02.99* |

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

The yield gain due to improved variety under SCSP wheat demonstrations was highest in Mansa (14.71 %) district in Punjab state followed by Fatehabad (08.46 %) district in Haryana state. The lowest yield gain was in Faridkot (02.96 %) district in Punjab state (Table 19).

Table 20: State wise yield gain in wheat demonstrations under SCSP programme during 2020-21

| State and Zone | Wheat Demonstrations yield (q/ha) | Check yield (q/ha) | Gain (%) |
|----------------------------------|-----------------------------------|--------------------|----------|
| Punjab | 54.03 | 50.88 | 06.19*** |
| Haryana | 54.38 | 51.35 | 05.89*** |
| North Western Plains Zone (NWPZ) | 54.18 | 51.10 | 06.02*** |

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

Under SCSP wheat demonstrations, the yield gain was highest *i.e.* 06.19 % in Punjab state. The yield gain was 05.89 % in Haryana state. The zonal (NWPZ) yield gain was 06.02 % (Table 20).

Table 21: Varietal performance in wheat demonstrations under SCSP programme during 2020-21

| State and Centre | Improved variety | Improved variety mean yield (q/ha) | Check variety | Check variety mean yield (q/ha) | Yield gain over check (%) |
|------------------|------------------|------------------------------------|---------------|---------------------------------|---------------------------|
| Punjab | | | | | |
| Sangrur | DBW 222 | 58.33 | DBW 187 | 55.43 | 5.23*** |
| Sangrur | DBW 222 | 55.50 | HD 2967 | 52.25 | 6.22 ^{NS} |
| Sangrur | DBW 222 | 53.85 | HD 3086 | 51.55 | 04.46* |
| Mansa | DBW 222 | 55.33 | HD 2967 | 46.68 | 18.53* |
| Mansa | DBW 222 | 54.43 | HD 3086 | 47.83 | 13.80*** |
| Bathinda | DBW 222 | 54.13 | HD 2967 | 52.50 | 03.10 ^{NS} |
| Bathinda | DBW 222 | 54.58 | HD 3086 | 52.78 | 03.41*** |
| Bathinda | DBW 222 | 54.25 | PBW 725 | 50.00 | 08.50 ^{NS} |
| Muktsar | DBW 222 | 55.98 | HD 3086 | 52.78 | 06.06*** |
| Faridkot | DBW 222 | 51.30 | HD 3086 | 49.83 | 02.96*** |
| Ropar | DBW 222 | 52.83 | PBW 723 | 48.45 | 09.03*** |
| Ropar | DBW 222 | 51.68 | PBW 725 | 50.43 | 02.48 ^{NS} |
| Haryana | | | | | |
| Ambala | DBW 222 | 49.98 | HD 3086 | 47.50 | 05.21*** |
| Yamunanagar | DBW 222 | 53.40 | HD 2967 | 50.58 | 05.59*** |
| Yamunanagar | DBW 222 | 53.23 | HD 3086 | 50.05 | 06.34*** |
| Fatehabad | DBW 222 | 58.75 | HD 2967 | 51.25 | 14.63 ^{NS} |
| Fatehabad | DBW 222 | 62.30 | HD 3086 | 57.88 | 07.65*** |
| Sirsa | DBW 222 | 57.08 | HD 2851 | 55.50 | 02.84 ^{NS} |
| Sirsa | DBW 222 | 56.33 | HD 3086 | 54.50 | 03.35 ^{NS} |

*** 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 yield gain due to improved wheat variety DBW 222 over check mean yield was highest at Mansa (18.53 %). In Haryana state, the highest yield gain due to improved wheat variety DBW 222 was at Fatehabad (14.63 %), though it was non-significant (Table 21).

Table 22: Yield potential of wheat variety DBW 222 under wheat demonstrations

| State and Zone | District | Variety | Yield (q/ha) |
|----------------|-----------|---------|--------------|
| Punjab | Muktsar | DBW 222 | 62.00 |
| Haryana | Fatehabad | DBW 222 | 70.00 |

In Punjab, the highest yield potential of variety DBW 222 was 62.00 q/ha in Muktsar district. In Haryana, the highest yield potential of variety DBW 222 was 70.00 q/ha in Fatehabad district (Table 22).

Table 23: Improved and check wheat varieties at farmers' field in Punjab and Haryana during *rabi* 2020-21

| State | Improved Varieties | Check Varieties |
|---------|--------------------|---|
| Punjab | DBW 222 | HD 3086, HD 2967, DBW 187, PBW 725, PBW 723 (Unnat PBW 343) |
| Haryana | DBW 222 | HD 3086, HD 2967, HD 2851, |

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

Profitability is one of major factors influencing the adoption of any crop production technology. In this section, costs and returns analysis for wheat demonstrations and barley frontline demonstrations (FLDs) have been attempted across regions for the improved production technologies that were tested in the farmers' field during 2020-2021 *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 remains 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 with the FLDs. For wheat demonstrations conducted in Punjab and Haryana under the SCSP programme, the data were collected by the KVKs of the respective states. Personal interview and discussion method was adopted with the aid of pre-tested schedules designed exclusively for the purpose evaluating the technologies disseminated through wheat demonstrations and barley FLDs. The data collected pertained to the *rabi* season 2020-2021. 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 and inappropriate data reported from the cooperating centres/delayed reporting were not included for the costs and returns analysis.

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

Perusal of Table 24 indicates that on an average, demonstration of DBW 222 wheat variety at the farmers' field under the SCSP programme gave ₹3.24 per rupee of investment in comparison to the check varieties (₹3.03).

Table 24: Costs and returns from wheat during 2020-21

| Particulars | Cost of Cultivation (₹/ha) | | | | | | Returns per ₹ invested | | Cost of Production (₹/qtl) | |
|-------------|----------------------------|-------|---------------|--------|---------------|-------|------------------------|-------|----------------------------|-------|
| | Operational Costs | | Gross Returns | | Profit | | Demonstration | Check | Demonstration | Check |
| | Demonstration | Check | Demonstration | Check | Demonstration | Check | | | | |
| Haryana | 45063 | 45100 | 122414 | 115688 | 77351 | 70588 | 2.72 | 2.57 | 857 | 909 |
| Punjab | 30131 | 30827 | 115937 | 109686 | 85805 | 78860 | 3.85 | 3.56 | 568 | 617 |
| NWPZ | 36602 | 37012 | 118744 | 112287 | 82142 | 75275 | 3.24 | 3.03 | 694 | 744 |

A significant difference in returns per rupee of investment was noticed between the demonstrated and check plots in Haryana and Punjab. The profit per hectare in demonstrated plot was highest in Punjab (₹85805), followed by Haryana (₹77351). The difference in profit levels between demonstration and check plots was highest in the case of Punjab (₹6945 per hectare). Operational costs were found to be marginally lower in wheat demonstrations in comparison to the check plots, in both the states. Overall, by adopting a new wheat variety (DBW 222 in our case), a farmer earns ₹82142/ha in the NWPZ. Further, ₹694 have to be spent to produce a quintal of wheat through new variety against ₹744 (farmers' variety: check plots).

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

Table 25 indicates that on an average, improved barley varieties demonstrated at the farmers' field under the FLD programme gave around ₹47117 profit per hectare. A significant difference in returns per rupee of investment was noticed between the demonstration and check plots across states and zones.

Table 25: Costs and returns from barley during 2020-21

| Particulars | Cost of Cultivation (₹/ha) | | | | | | Returns per ₹ invested | | Cost of Production (₹/qtl) | |
|-----------------------|----------------------------|-------|---------------|-------|--------|-------|------------------------|-------|----------------------------|-------|
| | Operational Costs | | Gross Returns | | Profit | | FLD | Check | FLD | Check |
| | FLD | Check | FLD | Check | FLD | Check | | | | |
| State | | | | | | | | | | |
| Haryana | 35788 | 35198 | 88172 | 84527 | 52385 | 49330 | 2.46 | 2.40 | 822 | 853 |
| Himachal Pradesh | 54723 | 53019 | 95733 | 62822 | 41011 | 9803 | 1.75 | 1.18 | 2275 | 2978 |
| Jammu & Kashmir | 28932 | N.A. | 83379 | N.A. | 54448 | N.A. | 2.88 | N.A. | 857 | N.A. |
| Karnataka | 32357 | N.A. | 82128 | N.A. | 49771 | N.A. | 2.54 | N.A. | 1382 | N.A. |
| Madhya Pradesh | 32641 | 26711 | 82775 | 61727 | 50134 | 35015 | 2.54 | 2.31 | 899 | 977 |
| Punjab | 24487 | 24531 | 67076 | 62082 | 42589 | 37550 | 2.74 | 2.53 | 679 | 736 |
| Rajasthan | 36148 | 35262 | 94683 | 80395 | 58535 | 45133 | 2.62 | 2.28 | 704 | 823 |
| Uttar Pradesh | 36385 | 35176 | 72240 | 51100 | 35855 | 15924 | 1.99 | 1.45 | 1052 | 1479 |
| Zone | | | | | | | | | | |
| CZ | 32726 | 29221 | 82830 | 65172 | 50103 | 35951 | 2.53 | 2.23 | 848 | 957 |
| NEPZ | 37578 | 36030 | 70485 | 47978 | 32907 | 11948 | 1.88 | 1.33 | 1107 | 1582 |
| NHZ | 54723 | 53019 | 95733 | 62822 | 41011 | 9803 | 1.75 | 1.18 | 2275 | 2978 |
| NWPZ | 31891 | 26653 | 85073 | 64823 | 53183 | 38171 | 2.67 | 2.43 | 745 | 787 |
| PZ | 32604 | N.A. | 77805 | N.A. | 45201 | N.A. | 2.39 | N.A. | 1467 | N.A. |
| Technology | | | | | | | | | | |
| Improved Variety | 35010 | 30252 | 82127 | 58850 | 47117 | 28598 | 2.35 | 1.95 | 985 | 1205 |
| All Categories | | | | | | | | | | |
| India | 35010 | 30252 | 82127 | 58850 | 47117 | 28598 | 2.35 | 1.95 | 985 | 1205 |

N.A. refers to not applicable as in these regions check varieties were not existing.

Jammu & Kashmir registered the highest returns per rupee of investment (₹2.88) through demonstrations (without any check), followed by Punjab (₹2.74) and Rajasthan (₹2.62). The difference in returns per rupee of investment between demonstration and check plots was highest in Himachal Pradesh, followed by Uttar Pradesh and Rajasthan. The profit per hectare in FLDs was highest in Rajasthan (₹58535), followed by Jammu & Kashmir (₹54448) and Haryana (₹52385). The difference in profit between FLD and check plots ranged from ₹31207 in Himachal Pradesh to ₹3055 in Haryana. Interestingly, operational costs in Punjab were lower in FLDs than check plots. The probable reason might be reduction in the use of inputs based on the recommendation. The returns per rupee of investment across barley growing zones were highest in the NWPZ (₹2.67), followed by CZ (₹2.53) and PZ (₹2.39). Estimates of cost of production indicated that the cost incurred in producing a unit quantity of barley output was least (₹679 per quintal) in Punjab owing to less operational costs coupled with increased yield levels.

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 *rabi* season (2020-2021) and may not have a complete inter-year relevance as the demonstrations (improved varieties) 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.

Technology Outreach Programme (2020-2021)

Mera Gaon Mera Gaurav Scheme at ICAR-IIWBR, Karnal

The activities of the governments 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. Timely reports of monthly and quarterly activities were compiled at IIWBR and submitted to the Zonal Nodal Officer & Director, ICAR- Agricultural Technology Application Research Institute (ATARI), Zone-2, Jodhpur (Rajasthan), regularly. All the fourteen teams of scientists of different disciplines have been constituted including four to five scientists. Out of these each of the twelve teams have selected five different villages, one team has selected four different villages, one team has selected one village.

Extension Activities

Training programmes organised/conducted at ICAR-IIWBR, Karnal

| Date | Duration (days) | No of Trainees | Subject | Organized by |
|---|---------------------|---|---|--|
| 6-7 October, 2020 | 2 | 50 Farmers | Bundelkhand mein Gehoon aur Jau ki Tikau Kheti | ICAR-IIWBR, Karnal and SRIJAN, Bundelkhand |
| 13 th February, 2021 | 1 | 40 Farmers | Training on Seed Production at village-Phurlak, district-Karnal, Haryana | ICAR-IIWBR, Karnal |
| 22-24 February, 2021 | 3 | 48 Farmers | Gehoon Evam Jau Ki Unnat Kheti | ICAR-IIWBR and Project Director, ATMA Dehradun, Uttarakhand |
| 24 February to 02 March, 2021 | 7 | 34 Agriculture Officers | Gehoon Utpadan Ke Aawashyak Pahlu | ICAR-IIWBR and Deputy Director Agriculture, Department of Agriculture, Etah, UP. |
| 1-3 March, 2021 | 3 | 33 Farmers | Gehoon Evam Jau Ki Unnat Kheti | ICAR-IIWBR and Project Director, ATMA Dehradun, Uttarakhand |
| 17 December, 2019 | 1 | 100 Farmers | Roughing in Seed Production Plots | ICAR-IIWBR, Karnal |
| 5-6 October, 2021 13-14 October, 2021 1-2 November, 2021 15 November, 2021 25-26 November, 2021 1 & 3 December, 2021 15-16 December, 2021 24-25 February, 2021 | 1 Day each (8 Days) | 1000 farmers from Rajasthan and Haryana | Eight online training programmes were organised on various aspects of Malt Barley Cultivation | ICAR-IIWBR, Karnal and ABInBev Industries Gurugram, Haryana |
| 23 March, 2021 | 1 | 56 Farmers | Training in Agriculture at village Khudda Kalan, Ambala, Haryana, under SCSP programme. | ICAR-IIWBR, Karnal |
| On 24 th March, 2021 | 1 | 53 Farmers | Training in Agriculture at KVK, Damla, Yamunanagar, Haryana, under SCSP programme. | ICAR-IIWBR, Karnal |
| On 30 th March, 2021 | 1 | 30 Farmers | Training on Seed Production (Roughing) at village Phurlak, district Karnal, Haryana | ICAR-IIWBR, Karnal |

Kisan Mela/Farmers Day/Field Day etc.

| Date | Subject | Organized by |
|------------|--|----------------------|
| 15.10.2020 | Mahila Kisan Diwas at village Kohand, Karnal, Haryana. | ICAR-IIWBR, Karnal |
| 26.11.2020 | 70 th Constitution Day Celebration | ICAR-IIWBR, Karnal |
| 03.12.2020 | Agricultural Education Day at ICAR-IIWBR, Karnal, Haryana | ICAR-IIWBR, Karnal |
| 05.12.2020 | World Soil Day at village Nabipur, Karnal, Haryana | ICAR - IIWBR, Karnal |
| 18.12.2020 | Cleanliness and Sanitation Drive Under the Swachchha Bharat Abhiyaan at village Sikander Kheri, Kaithal, Haryana | ICAR - IIWBR, Karnal |
| 23.12.2020 | Kisan Diwas and Sanitation Drive at village Nabipur, Karnal, Haryana | ICAR - IIWBR, Karnal |
| 09.02.2021 | 7 th Foundation Day of ICAR-IIWBR, Karnal | ICAR-IIWBR, Karnal |
| 08.03.2021 | International Women's Day at village-Phurlak, Karnal, Haryana | ICAR-IIWBR, Karnal |
| 22.03.2021 | World Water Day at ICAR-IIWBR, Karnal. | ICAR-IIWBR, Karnal |

Coordination of visits at ICAR-IIWBR, Karnal during 2020-21

| S.No. | Date | Number of Visitors | From |
|-------|-------------------|----------------------|---------------------------------|
| 1 | November 20, 2020 | 50 Farmers | Basti, Uttar Pradesh |
| 2 | February 09, 2021 | 30 Farmers | Gautam Budhnagar, Uttar Pradesh |
| 3 | February 10, 2021 | 30 students+05 Staff | GMSSS School, Biana, Karnal |
| 4 | February 10, 2021 | 100 Farmers | Assandh, Karnal |
| 5 | February 11, 2021 | 100 Farmers | Nissing, Karnal |
| 6 | February 11, 2021 | 100 Farmers | Indri, Karnal |
| 7 | February 12, 2021 | 100 Farmers | Indri, Karnal |
| 8 | February 12, 2021 | 100 Farmers | Nissing, Karnal |
| 9 | February 12, 2021 | 100 Farmers | Gheed, Karnal |
| 10 | February 12, 2021 | 100 Farmers | Gharaunda, Karnal |
| 11 | February 18, 2021 | 12 Farmers | Sirsa, Haryana |
| 12 | March 10, 2021 | 45 Farmers | Shamli, UP |

Lectures delivered (Dr. Anuj Kumar)

| Date | Topic |
|------------|--|
| 03.07.2020 | "Management skills and leadership style for coping up with stress" in an online training programme of EEI Nilokheri. |
| 08.07.2020 | "Developing mass communication strategy for farmers" an online lecture was delivered in a training programme organized by EEI, Nilokheri. |
| 07.10.2020 | "Gehoon evam jau ki kheti se adhik munafa kaise kamaye" during two days online training programme on "Bundelkhand me gehoon evam jau ki tikau kheti ki nayi prodhyogii during 6-7 Oct., 2020 organised by IIWBR. |
| 09.10.2020 | "Effective writing for farm communications" at EEI, Nilokheri in an online training programme on "Agricultural journalism for extension professional during 5-9 Oct., 2020. |
| 20.10.2020 | "Nurturing and sustaining the entrepreneurship behavior" at EEI, Nilokheri in an online |

| Date | Topic |
|------------|---|
| | training programme on “Entrepreneurship development through diversification in agriculture” during 19-22 Oct., 2020. |
| 03.11.2020 | “Effective writing of success story, editing and publishing in print media” at EEI Nilokheri during a training programme on “Documentation of success stories with video component” during 2-6 Nov., 2020. |
| 24.10.2020 | “Wheat Crop Cultivation” in a Field Day organized by NDRI, Karnal in Farmer First project village Nagla Rodan. |
| 16.12.2020 | “Badalte paridrishy ke liye audhyogik asal ke roop me malt jau ki kheti” an online lecture delivered during a training organized by IIWBR and ABInBev, Gurugram for the farmers of Rajasthan and Haryana. |
| 24.12.2020 | “Formation of FPOs for entrepreneurship development in agriculture” at EEI, Nilokheri during an online training programme. |
| 08.01.2021 | “Managing extension in India: An analysis” at HTI Uchani for newly recruited HDOs and DHOs on Extension Methodology for newly appointed HDOs and DHOs of horticulture, Haryana during 06-11 January, 2021. |
| 08.01.2021 | “How to develop entrepreneurs in horticulture vis-a-vis agriculture” at HTI Uchani for newly recruited HDOs and DHOs on Extension Methodology for newly appointed HDOs and DHOs of horticulture, Haryana during 6-11 January, 2021. |
| 12.01.2021 | “Minimum Support Price (MSP): Booster or Deterrent?” An online invited lecture during three days webinar organized during 12-14 Jan, 2021 on Marketing of Agricultural Commodities: Challenges & Opportunities” organized by DESM Division of NDRI, Karnal. |
| 18.01.2021 | “Managing extension in India: An analysis” at HTI Uchani for newly recruited HDOs and DHOs on Extension Methodology for newly appointed HDOs and DHOs of horticulture, Haryana during 18-22 January, 2021. |
| 18.01.2021 | “Improving soft skills of horticultural professionals” at HTI Uchani for newly recruited HDOs and DHOs on Extension Methodology for newly appointed HDOs and DHOs of horticulture, Haryana during 18-22 January, 2021. |
| 19.01.2021 | “How to develop entrepreneurs in horticulture vis-a-vis agriculture” at HTI Uchani for newly recruited HDOs and DHOs on Extension Methodology for newly appointed HDOs and DHOs of horticulture, Haryana during 18-22 January, 2021. |
| 28.01.2021 | “Awareness about wheat crop” in a RKVY camp at village Sangohi |
| 02.02.2021 | “Improving soft skills of horticultural professionals” at HTI Uchani for newly recruited HDOs and DHOs on Extension Methodology for newly appointed HDOs and DHOs of horticulture, Haryana during 2-6 February, 2021. |
| 03.02.2021 | “How to develop entrepreneurs in horticulture vis-a-vis agriculture” at HTI Uchani for newly recruited HDOs and DHOs on Extension Methodology for newly appointed HDOs and DHOs of horticulture, Haryana during 2-6 February, 2021. |
| 24.02.2021 | “How to develop entrepreneurs in horticulture vis-a-vis agriculture” at HTI Uchani for newly recruited HDOs and DHOs on Extension Methodology for newly appointed HDOs and DHOs of horticulture, Haryana during 22-26 February, 2021. |
| 24.02.2021 | “Improving soft skills of horticultural professionals” at HTI Uchani for newly recruited HDOs and DHOs on Extension Methodology for newly appointed HDOs and DHOs of horticulture, Haryana during 22-26 February, 2021. |
| 26.02.2021 | “Managing extension in India: An analysis” at HTI Uchani for newly recruited HDOs and DHOs on Extension Methodology for newly appointed HDOs and DHOs of horticulture, Haryana during 22-26 February, 2021. |
| 18.03.2021 | “Career in Agriculture and Personality Development to NSS Volunteers” at CCSHAU Kaul. |
| 24.02.2021 | “How to develop entrepreneurs in horticulture vis-a-vis agriculture” at HTI Uchani for newly recruited HDOs and DHOs on Extension Methodology for newly appointed HDOs and DHOs of horticulture, Haryana during 22-26 February, 2021. |

Lectures delivered (Dr. Sendhil R)

| Date | Topic |
|-------------|---|
| 24.07.2020 | “Impact analysis and Project report writing” in the 2020 Summer Training Program on “Skill Development and Enhancing Research Capacity of Young Scholars” organized by the ICAR-IIWBR, Karnal from 16.07.2020 to 17.08.2020. |
| 20.08.2020 | “Risk in Agriculture: Sources, Types and Management” in the online training on “Risk management in agriculture & allied sectors” organized by the EEI, Nilokheri from August 18-21, 2020. |
| 01.10.2020 | “COVID-19 and Indian Agriculture – Effects and Recovery Strategies” in the Webinar organized by the DAV University. |
| 13.01.2021 | “Blockchain Technology in Agricultural Marketing – Scope and Implications” in the webinar on “Marketing of Agricultural Commodities-Challenges and Opportunities” organized by the ICAR-NDRI from January 12-14, 2021. |
| 04.02.2021 | “ICT tools in Horticultural Extension” in the training program on “Extension Methodology for Newly Appointed HDO of Department of Horticulture, Haryana” organized by the HTI, Uchani (Karnal) from 02.02.2021 to 06.02.2021. |
| 11.02.2021 | “Impact Assessment: Scientific Method, Results Analysis and Report Writing” in the online training on “Monitoring and Evaluation of Extension Programme” organized by the EEI, Nilokheri from 09.02.2021 to 12.02.2021. |
| 15.02.2021 | “Wheat procurement – Future policy options” in the 5-day virtual course on ‘Introduction to Flour Milling’ organized jointly by the NIFTEM and Voice & Vision from February 15-19, 2021. |
| 19.02.2021 | “Innovations in the Agri-business: Insights and Prospectus for Entrepreneurship” in the webinar organized by the Karunya University. |
| 22.02.2021 | “ICT tools in Horticultural Extension” in the training program on “Extension Methodology for Newly Appointed HDO of Department of Horticulture, Haryana” organized by the HTI, Uchani (Karnal). |
| 25.02.2021 | “Value Chain Assessment in Agriculture: Tools and Approach” in the training program on “Value Chain Oriented Extension Approaches for Maximizing Profitability of Tuber Crops” organized jointly by the MANAGE and ICAR-CTCRI, from February 22-26, 2021. |
| 09.03.2021 | “Importance of ICT in Transfer of Technology” in the training program organised by the EEI, Nilokheri. |

Lectures delivered (Dr. Anil Kumar Khippal)

| Date | Topic |
|-------------|--|
| 15.10.2020 | “Importance of barley crop” at Village Shekhpura, Kohand (Karnal district) |
| 03.11.2020. | “Nutrient, water & stubble management, Conservation agriculture under varying climate & temperature, Intercropping & Multi-Cropping” an online lecture delivered during a training organized by ICAR-IIWBR and ABInBev, Gurugram for the farmers of Rajasthan and Haryana. |
| 06.11.2020 | “Crop residue management” in district level Kisan Mela at KVK, Kaithal |
| 24.11.2020 | “Elucidation on seed production of Wheat and Barley” an online lecture delivered during a training organized by ICAR-IIWBR, Karnal |
| 18.12.2020 | “Importance conservation agriculture for cleanliness” at village Sikander Kheri (Kaithal) |
| 24.12.2020 | “IFS Model-Integrating Mushroom cultivation for sustainability and feasibility” at KVK (CCSHAU), Karnal |

| Date | Topic |
|------------|---|
| 14.01.2020 | "Hay and silage making and importance of barley as dual purpose crop" at KVK (CCSHAU), Karnal |
| 07.01.2021 | "Weed control in wheat crop" a lecture delivered during a training programme organized by KRIBHCO, Karnal |
| 13.02.2021 | "Management practices for seed production" at village Phurlak, district Karnal, Haryana |
| 19.02.2021 | "Bio-fertilizers and weed control in wheat crop" at village Saanch, Kaithal during a training programme organized by KRIBHCO, Karnal |
| 04.03.2021 | "Residue management and other burning issues in agriculture" |
| 06.03.2021 | "Crop diversification and opportunities in Conservation Agriculture" in the AICRP training programme organised by ICAR-IIWBR, Karnal |
| 08.03.2021 | "Importance of conservation agriculture" at village Phurlak (Karnal) |
| 23.03.2021 | "Package of practices of wheat, rice and sugarcane crop" at village Khudda Kalan (Ambala) during a training organised by ICAR-IIWBR, Karnal under SCSP programme. |
| 24.03.2021 | "Package of practices of wheat, rice and sugarcane crop" at KVK Yamunanagar during a training organised by ICAR-IIWBR, Karnal under SCSP programme. |
| 30.03.2021 | "Importance of roughing for seed production" at village Phurlak (Karnal), Haryana |

Awards and Recognition

- Satyavir Singh, Anuj Kumar, Sendhil R, Anil Kumar Khippal, Mangal Singh, Ramesh Chand and GP Singh awarded the **First Prize** for editing "Gheun Evam Jau Sandesh" (Hindi), January-June, 2019, Vol. 8 (1) in Newsletter category from Town Official Language Implementation Committee (TOLIC), Department of Official Language, MHA (Government of India), Karnal, Haryana.
- Satyavir Singh, Anuj Kumar, Sendhil R, Anil Kumar Khippal, Mangal Singh, Ramesh Chand and GP Singh awarded the **Second Prize** for editing "Gheun Evam Jau Sandesh" July-December, 2019, Vol. 8 (2) in Newsletter category from Town Official Language Implementation Committee (TOLIC), Department of Official Language, MHA (Government of India), Karnal, Haryana.

Annexures

Annexure-I: Category wise number of Barley Frontline Demonstrations (FLDs) Farmers during 2020-21

Annexure-II: Information on barley varieties demonstrated in Frontline Demonstrations (FLDs) during 2020-21

Annexure-III: Package of Practices of Karan Narendra (DBW 222)

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 : Category wise number of barley FLDs farmers during 2020-21

| S.N. | Name of Centre | Allocation | | Achievement | | Achievement Men, Area in ha, (No. of Farmers) | | | | Achievement Women, Area in ha, (No. of Farmers) | | | | Men | Women | Total |
|------|--|-------------|----------------------|-------------|----------------------|---|----------|-----------|-----------|---|----------|-----|-----------|---------------------------|---------------------------|---------------------------|
| | | No. of FLDs | Area under FLDs (ha) | No. of FLDs | Area under FLDs (ha) | SC | ST | OBC | Gen | SC | ST | OBC | Gen | Area(ha) (No. of Farmers) | Area(ha) (No. of Farmers) | Area(ha) (No. of Farmers) |
| | NHZ | | | | | | | | | | | | | | | |
| 1. | CSKHPKV, HAREC, Bajaura, Kullu (HP) | 12 | 12 | 12 | 12.5* | - | - | - | 12.5 (18) | - | - | - | - | 12.5 (18) | - | 12.5 (18) |
| 2. | ICAR-IARI, RS, Amartara Cottage, Shimla (HP) | 5 | 5 | 5 | 5 | 0.53 (02) | - | - | 3.42 (13) | - | - | - | 1.05 (04) | 3.95 (15) | 1.05 (04) | 5.0 (19) |
| 3. | KVK (YSPUH&F), Lahaul & Spiti -2, Tabo, Kaza, L&S (HP) | 5 | 5 | 5 | 5 | - | 4.6 (14) | - | - | - | 0.4 (01) | - | - | 4.6 (14) | 0.4 (01) | 5.0 (15) |
| | NEPZ | | | | | | | | | | | | | | | |
| 4. | NDUA&T, Kumarganj, Ayodhya (UP) | 10 | 10 | 10 | 10 | 1.0 (01) | - | - | 9.0 (09) | - | - | - | - | 10.0 (10) | - | 10.0 (10) |
| 5. | KVK (IAS-BHU), Barkachha, Mirzapur (UP) | 10 | 10 | 10 | 10 | - | - | 7.0 (07) | 3.0 (03) | - | - | - | - | 10.0 (10) | - | 10.0 (10) |
| 6. | CSAUA&T, Kanpur (UP) | 10 | 10 | 10 | 10 | - | - | 10.0 (10) | - | - | - | - | - | 10.0 (10) | - | 10.0 (10) |
| 7. | BHU, Varanasi (UP) | 12 | 12 | 12 | 16* | - | 1.0 (01) | 2.0 (02) | 13.0 (13) | - | - | - | - | 16.0 (16) | - | 16.0 (16) |
| 8. | KVK, Gorakhpur-2 (GGSS), Gorakhpur (UP) | 10 | 10 | 10 | 10 | - | - | 3.5 (04) | 6.5 (06) | - | - | - | - | 10.0 (10) | - | 10.0 (10) |
| | NWPZ | | | | | | | | | | | | | | | |
| 9. | KVK (SKUAST-Jammu), Rajhani, Kathua (J&K) | 8 | 8 | 8 | 8 | - | 0.4 (01) | - | 7.6 (18) | - | - | - | - | 8.0 (19) | - | 8.0 (19) |
| 10. | PAU, Ludhiana (Punjab) | 8 | 8 | 8 | 8 | 1.0 (01) | - | - | 7.0 (07) | - | - | - | - | 8.0 (08) | - | 8.0 (08) |
| 11. | KVK, (PAU), Khokhar Khurd, Mansa (Punjab) | 10 | 10 | 10 | 10.38 | 1.875 (02) | - | 1.0 (01) | 7.5 (10) | - | - | - | - | 10.375 (13) | - | 10.375 (13) |

| S.N. | Name of Centre | Allocation | | Achievement | | Achievement Men, Area in ha, (No. of Farmers) | | | | Achievement Women, Area in ha, (No. of Farmers) | | | | Men | Women | Total |
|------|---|-------------|----------------------|-------------|----------------------|---|----------|-----------|-----------|---|----------|----------|----------|---------------------------|---------------------------|---------------------------|
| | | No. of FLDs | Area under FLDs (ha) | No. of FLDs | Area under FLDs (ha) | SC | ST | OBC | Gen | SC | ST | OBC | Gen | Area(ha) (No. of Farmers) | Area(ha) (No. of Farmers) | Area(ha) (No. of Farmers) |
| 12. | KVK (PAU), Kheri, Patran Road, Sangrur (Punjab) | 5 | 5 | 5 | 5 | - | - | - | 5.0 (05) | - | - | - | - | 5.0 (5) | - | 5.0 (05) |
| 13. | KVK (PAU), Goneana, Mukatsar (Punjab) | 5 | 5 | 5 | 5 | - | - | 1.0 (01) | 4.0 (04) | - | - | - | - | 5.0 (05) | - | 5.0 (05) |
| 14. | KVK (PAU), Dabwali Road, Near Khedi Bhawan, Bathinda (Punjab) | 5 | 5 | 5 | 5 | - | - | - | 5.0 (05) | - | - | - | - | 5.0 (05) | - | 5.0 (05) |
| 15. | CCSHAU, Hisar (Haryana) | 10 | 10 | 10 | 10 | - | - | 2.0 (02) | 8.0 (08) | - | - | - | - | 10.0 (10) | - | 10.0 (10) |
| 16. | KVK (BB Ashram), Rampura, Rewari (Haryana) | 8 | 8 | 8 | 8 | - | - | 8.0 (07) | - | - | - | - | 8.0 (07) | - | 8.0 (07) | |
| 17. | KVK (CCSHAU), Bhiwani (Haryana) | 10 | 10 | 10 | 13 | 2.0 (02) | - | - | 11.0 (11) | - | - | - | - | 13.0 (13) | - | 13.0 (13) |
| 18. | ICAR-IIWBR, Karnal (Haryana) | 5 | 5 | 5 | 5 | - | - | - | 5.0 (05) | - | - | - | - | 5.0 (05) | - | 5.0 (05) |
| 19. | RARI (SKNAU), Durgapura, Jaipur (Rajasthan) | 10 | 10 | 10 | 10 | - | - | 8.0 (08) | 2.0 (02) | - | - | - | - | 10.0 (10) | - | 10.0 (10) |
| 20. | KVK (Pragati Trust), Tankarda, Chomu, Jaipur (Rajasthan) | 5 | 5 | 5 | 5 | - | - | - | 5.0 (05) | - | - | - | - | 5.0 (05) | - | 5.0 (05) |
| 21. | KVK (AU-Kota), Akorashi, Dhindora, Hindauncity, Karauli (Rajasthan) | 8 | 8 | 8 | 11* | - | 1.0 (01) | - | 7.0 (07) | - | - | 1.0 (01) | 2.0 (02) | 8.0 (08) | 3.0 (03) | 11.0 (11) |
| | CZ | | | | | | | | | | | | | | | |
| 22. | RCOA (MPUA&T), Udaipur (Rajasthan) | 10 | 10 | 10 | 10 | - | 9.0 (09) | - | - | - | 1.0 (01) | - | - | 9.0 (09) | 1.0 (01) | 10.0 (10) |
| 23. | KVK (MPUA&T), Dhoinda, | 10 | 10 | 10 | 10 | - | - | 10.0 (10) | - | - | - | - | - | 10.0 (10) | - | 10.0 (10) |

| S.N. | Name of Centre | Allocation | | Achievement | | Achievement Men, Area in ha, (No. of Farmers) | | | | Achievement Women, Area in ha, (No. of Farmers) | | | | Men | Women | Total |
|------|---|-------------|----------------------|-------------|----------------------|---|----------------|------------------|---------------------|---|-----------------|---------------|------------------|---------------------------|---------------------------|---------------------------|
| | | No. of FLDs | Area under FLDs (ha) | No. of FLDs | Area under FLDs (ha) | SC | ST | OBC | Gen | SC | ST | OBC | Gen | Area(ha) (No. of Farmers) | Area(ha) (No. of Farmers) | Area(ha) (No. of Farmers) |
| | Rajasmand (Rajasthan) | | | | | | | | | | | | | | | |
| 24. | KVK (JNKVV), Kuthulia Farm, Rewa (MP) | 8 | 8 | 8 | 8 | - | - | 2.0 (02) | 6.0 (06) | - | - | - | - | 8.0 (08) | - | 8.0 (08) |
| 25. | KVK (JNKVV), Purushottampur, Panna (MP) | 8 | 8 | 8 | 8 | - | - | 6.0 (06) | - | 1.0 (01) | - | - | 1.0 (01) | 6.0 (06) | 2.0 (02) | 8.0 (08) |
| 26. | KVK (JNKVV), Tikamgarh (MP) | 8 | 8 | 8 | 8 | - | - | - | 8.0 (08) | - | - | - | - | 8.0 (08) | - | 8.0 (08) |
| 27. | KVK (RVSKVV), Biaora, Kothi Bagh, Rajgarh (MP) | 5 | 5 | 5 | 5 | - | - | - | 5.0 (05) | - | - | - | - | 5.0 (05) | - | 5.0 (05) |
| 28. | COA (JNKVV), Ganj Basoda, Vidisha (MP) | 10 | 10 | 10 | 10 | - | - | 5.0 (05) | 3.0 (03) | - | - | 2.0 (02) | - | 8.0 (08) | 2.0 (02) | 10.0 (10) |
| 29. | KVK (BUA&T-Banda), Govt Agri Farm, Khiria Misra, Bamourikala, Devgarh Road, Lalitpur (UP) | 5 | 5 | 5 | 6.5* | - | - | 2.0 (02) | 4.5 (05) | - | - | - | - | 6.5 (07) | - | 6.5 (07) |
| 30. | KVK (BUA&T-Banda), Bharari, Bhojla, Jhansi (UP) | 5 | 5 | 5 | 5 | 2.0 (02) | - | 2.0 (02) | 1.0 (01) | - | - | - | - | 5.0 (05) | - | 5.0 (05) |
| | PZ | | | | | | | | | | | | | | | |
| 31. | MARS, UAS, Dharwad (Karnataka) | 10 | 10 | 10 | 10 | 2.0 (02) | 1.0 (01) | 1.0 (01) | 6.0 (06) | - | - | - | - | 10.0 (10) | - | 10.0 (10) |
| | Total | 250 | 250 | 250 | 262.38 | 10.41 (12) | 17 (27) | 70.5 (70) | 155.02 (183) | 1.0 (01) | 1.4 (02) | 3 (03) | 4.05 (07) | 252.93 (292) | 9.45 (13) | 262.38 (305) |

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

Annexure-II : Information on barley varieties demonstrated in Frontline Demonstrations (FLDs) during 2020-21

| 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) |
|------------------------------|-------------------------|---|------|-----------------------|-------------------------------------|-------------|------------------|----------|----------------------|-------------------|
| HBL 713 (Him Palam Jau 1) | Low and Mid Hills of HP | Rainfed/Irrigated | 2016 | SVRC | CSKHPKV, HAREC, Bajaura, Kullu (HP) | 70-90 | 170-180 | 40.30 | 30-35 | 51.00 |
| 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 | - |
| | CZ | Irrigated, Timely sown | 2018 | CVRC | IIWBR, Karnal, Haryana | 80.70 | 113 | 46.0 | 42.9 | - |
| RD 2794 | NWPZ NEPZ | Saline/Alkaline soils | 2016 | CVRC | RARI, Durgapura, Jaipur, Rajasthan | 69 | 121 | 41.45 | 29.90 | 49.60 |
| PL 891 (Huskless barley) | NWPZ | Timely sown, Irrigated, High fertility, Rabi season | 2019 | Both CVRC and SVRC | PAU, Ludhiana | 106 | 132 | 44.97 | 36.60 | 50.00 |

Annexure-III

Package of Practices of Karan Narendra (DBW 222)

Wheat variety for irrigated timely sown condition of Punjab, Haryana, Delhi, Rajasthan (except Kota and Udaipur divisions) and parts of Himachal Pradesh (Una and Paonta valley) and Uttarakhand (Tarai region)

| | | |
|-----|---|---|
| 1. | Selection of field and Land preparation | Flat fertile soil, pre-sowing irrigation followed by ploughing with disc harrow, tiller and leveller at field capacity for optimum field condition. |
| 2. | Seed Treatment | Vitavax (Carboxin) 2-3 g/kg seed |
| 3. | Sowing time | November 1-25 |
| 4. | Seed rate / sowing method | 100 kg/ha. Line sowing with spacing of 20 cm between the rows. |
| 5. | Fertilizer doses | For medium fertility soils : N :150, P : 60, K : 40 Fertilizer application should be based on soil test. |
| 6. | Weed control | Apply Pendimethalin @ 400g/acre pre- emergence herbicide at 0-3 days after sowing. <ul style="list-style-type: none"> • For the control of broad leaved weeds: 2,4-D @ 500g/ha or Metsulfuron @4g/ha or Carfentrazone @ 20g/ha can be sprayed using about 250 litres of water/ha • For the control of grasses: Isoproturon @1000g / Clodinafop @ 60g / Fenoxaprop @100g / Sulfosulfuron @ 25 g/ha should be used. In Isoproturon resistant <i>Phalaris minor</i> infested areas Clodinafop or Fenoxaprop or Sulfosulfuron can be used. • For the control of complex weed flora : Combination of isoproturon with 2,4- D / Metsulfuron or Sulfosulfuron with Metsulfuron can be applied at 30-35 DAS at sufficient soil moisture |
| 7. | Pest and Disease control | <ul style="list-style-type: none"> • If rust symptoms appear apply Propiconazole 0.1% (1 ml/L) at 15 days interval • For the control of foliar aphid, spray Imidacloprid 17.8 SL @ 40ml per acre |
| 8. | Irrigation | <ul style="list-style-type: none"> • 5-6 irrigations. (At CRI*, tiller completion, late jointing, flowering, milk and dough stages). |
| 9. | Harvesting | Harvest and thresh as soon as fully ripe. The grain should be thoroughly dried before storage. |
| 10. | Mean Yield | 24.5 q/acre |
| 11. | Potential Yield | 32.8 q/acre |

F. No. CPS 18-2/2020-NFSM (FTS-81129-E)

Government of India
Ministry of Agriculture & Farmers Welfare
Department of Agriculture, Cooperation & Farmers Welfare
(Crops Division, NFSM Cell)

Krishi Bhawan, New Delhi

Dated: 27th August, 2020

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 Small Millets
Improvement Project, Bengaluru (Karnataka)

6. Project Coordinator
ICAR-All India Coordinated Pearl Millet
Improvement Project, Jodhpur (Rajasthan)

Subject: Approval for organization of Front Line Demonstrations on Pulses, Coarse Cereals and Nutri-Cereals during the year 2020-21- reg.

Sir,

I am directed to convey that the competent authority of this Department has approved an outlay of **Rs. 264.00 lakh (Rupees Two hundred and sixty four lakh only)** for organization of FLDs of Barley, Pulses, Maize & Nutri-Cereals (Sorghum, Pearl Millet and Small Millets) during 2020-21. The crop specific Details of FLDs for 2020-21 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) | Financial allocation (Rs. In lakh) |
|-------|---|---------------|------------------------------|--------------------------------------|------------------------------------|
| 1 | IIW&BR, Karnal | Barley | 100 | 6000 | 6.00 |
| 2 | IIPR, Kanpur | Pulses | 2100 | 9000 | 189.00 |
| 3 | IIMR, Ludhiana | Maize | 300 | 6000 | 18.00 |
| 4 | AICSMIP, Bengaluru | Small Millets | 300 | 6000 | 18.00 |
| 5 | AICPMIP, Jodhpur | Pearl Millet | 350 | 6000 | 21.00 |
| 6 | IIMR, Hyderabad | Sorghum | 200 | 6000 | 12.00 |
| | Grand Total | | 3350 | | 264.00 |

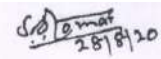
2. The above approval is subject to the following condition:

- Each implementing agency will constitute monitoring team with involvement of officials of Crop Development Directorates, DAC&FW, State Department of Agriculture and Scientists of ICAR/SAUs.
- The varieties Which are within 5 years (8 years For problematic areas viz: hills, Saline, Alkaline Soils etc.) either of own production or SAUs sources be used) period from the date of notification/release/identification should only be included in the demonstration purpose.
- 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 institutes.

Sd/-
28/8/20

- 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.
- The FLD programme should be conducted in cluster approach as per guidelines already circulated.
- Field days should be regularly organized and prior information should be sent to DAC&FW and Director, ATARIs of ICAR.
- The details of FLD beneficiary-farmers along with contact number should also be furnished to DAC&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.**
- 5% of FLDs on pulses and Nutri-cum-Coarse Cereals shall be conducted in North-Eastern States.
- All implementing agencies and their coordinating centers should involve agronomist/plant breeder to finalize technologies to be demonstrated in FLD programme and follow up visits to demonstration sites.
- The FLDs implementing agency will re-allocate the number of FLDs as per approval and intimate to DAC&FW.
- 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 2020-21 by each centre of FLD. The software information would be shared with each centre.**

Yours faithfully,



(Dr. S.S. Tamar)

Additional Commissioner (Crops)

Copy to:

1. ADG (FFC)/ADG (O&P), ICAR, Krishi Bhawan, New Delhi.
2. **Director, ICAR- IIW&BR, Karnal and Director, ICAR-IIRR, Hyderabad are informed that the ELDs on Wheat and Rice crops are not approved for 2020-21.**
3. Director, All Crops Directorate, DAC&FW.
4. Under Secretary (Finance)/ US(CA-V), DAC & FW, Krishi Bhawan, New Delhi.
5. PPS to Agriculture Commissioner (DAC&FW), Krishi Bhawan, New Delhi
6. PPS to JS (Crops & Oilseeds)/ADC (Crops) Krishi Bhawan, New Delhi.
7. AC (Pulses)/AC (Crops)/ JD (NFSM), DAC&FW, Krishi Bhawan, New Delhi.
8. Lead Programmer (NFSM), DAC Krishi Bhawan, New Delhi for uploading, in website.

Copy for information to:

PPS to DG, ICAR, Krishi Bhawan/DDG (Extn.), 1CAR, KAB-I, New Delhi.

GUIDELINES FOR FRONT LINE DEMONSTRATIONS UNDER NFSM

Front Line Demonstrations (FLDs) is a 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 form of applied research through ICAR/SAUs system on latest notified/released varieties along with full package of practices on selected farmers' fields with a view to demonstrate the potentiality of the technologies to (a) participating farmers (b) neighboring farmers and other agencies; (c) to analyze the production 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 10th 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 - 15 th July, Rabi - 15 th November |
| 2. | Crop stand and appropriate date for visit by the FLD monitoring team | Kharif - 15 th September Rabi - 15 th December |
| 3. | Tentative dates for organization of Farmer's Day. | Kharif - 30 th September Rabi - 25 th February |
| 4. | Report and complete data about FLDs conducted | Kharif - 15 th December Rabi - 15 th May |
| Wheat & Barley | | |
| 1. | Name and full addresses of the selected farmers, varieties used, area sown under the Demonstration and Technology demonstrated | 15 th December |
| 2. | Crop stand and appropriate date for visit by the FLD monitoring team | 15 th January |
| 3. | Organization of Farmer's Day | 30 th January |
| 4. | Report and complete data about FLDs conducted | 15 th 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 - 15 th July, |
| 2. | Crop stand and appropriate date for visit by the FLD monitoring team | Kharif - 15 th September |
| 3. | Tentative dates for organization of Farmer's Day | Kharif - 30 th September |
| 4. | Report and complete data about FLDs conducted | Kharif - 15 th December |
| Pulses-Rabi | | |
| 1. | Name and full addresses of the selected farmers, varieties used, area sown under the Demonstration and Technology demonstrated | 15 th December |
| 2. | Crop stand and appropriate date for visit by the monitoring team | 15 th January |
| 3. | Organization of Farmer's Day | 30 th January |
| 4. | Report and complete data about FLDs conducted | 15 th May |

(Signature)
24/5/18

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 :

| Implementing Center/Location | Grain yield (kg./ha.) | | | | Fodder yield (kg./ha.) | |
|------------------------------|----------------------------------|-------------------------------------|--------------------------------------|-------------------------------|--------------------------------------|-------------------------------|
| | 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