

# कार्यवृत्त Proceedings

अखिल भारतीय समन्वित खरपतवार प्रबंधन परियोजना की तैंतीसवीं वार्षिक  
समीक्षा बैठक

XXXIII Annual Review Meeting of All India Coordinated  
Research Project  
on Weed Management

स्थान

इंदिरा गाँधी कृषि विश्वविद्यालय, रायपुर

12-14 मई, 2026

Venue:

Indira Gandhi Krishi Vishwa Vidyalaya,  
Raipur, Chhattisgarh

12-14 May, 2026



ICAR-Directorate of Weed Research

Jabalpur - 482 004

भा. कृ. अनु. प. - खरपतवार अनुसंधान निदेशालय, जबलपुर

**Proceedings of XXXIII Annual Review Meeting**  
**All India Coordinated Research Project on Weed Management**  
**12-14 May, 2026 held at**  
**Indira Gandhi Krishi Vishwavidyalaya, Raipur (Chhattisgarh)**

**12 May, 2026**

**INAGURAL SESSION**

---

The XXXIII Annual Review Meeting of the All India Coordinated Research Project on Weed Management (AICRP-WM) was inaugurated on 12 May 2026 at the College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya (IGKV), Raipur. The three-day meeting was organized jointly by IGKV, Raipur and ICAR-Directorate of Weed Research, Jabalpur.

The inaugural session was graced by Dr. A. K. Nayak, DDG (NRM), ICAR, New Delhi, as the Chief Guest. The programme was chaired by Dr. Girish Chandel, Hon'ble Vice Chancellor, IGKV, Raipur. Dr. P. K. Rai, Director, ICAR-NIBSM, Raipur and Dr. Rakesh Kumar, ADG (Agro, AF & CC), ICAR, New Delhi, attended the session as Guests of Honour.

Welcoming the gathering, Dr. Vivek Kumar Tripathi, Director Research Services, IGKV, Raipur, highlighted the agricultural scenario of Chhattisgarh and emphasized the challenges of low average crop productivity, limited crop diversification, and low farm income. He provided a detailed account of the area under different crops and cropping systems in the state and noted that nearly two-thirds of the cultivated area is occupied by rice. He emphasized that weeds remain one of the major biotic constraints, causing annual crop losses estimated at ₹10,000–12,000 crore in rice. He also highlighted the robust rice procurement system of Chhattisgarh. Subsequently, Dr. V. K. Choudhary, In-Charge AICRP on WM, presented the salient achievements and major research accomplishments of AICRP-WM centres during the past year.

In his introductory remarks, Dr. J. S. Mishra, Director, ICAR-Directorate of Weed Research, Jabalpur, highlighted the pivotal contributions of AICRP-WM in developing and disseminating weed management technologies across diverse agro-ecological regions and cropping systems. He noted that crop losses due to weeds have declined by nearly 9 per cent over the past decade owing to sustained research efforts and increased awareness among farmers and policymakers. He emphasized emerging challenges such as climate change, herbicide resistance, crop diversification, and changing crop rotations, and stressed the need to develop weed management solutions compatible with natural farming, regenerative agriculture, and conservation agriculture. He also highlighted achievements related to herbicide-tolerant crops, weed management technologies for direct-seeded rice, and biological control of invasive weeds such as water hyacinth, *Salvinia*, and *Parthenium*. Further, he emphasized the integration of drones, artificial intelligence, and digital decision-support systems into weed management research, while also stressing the need to develop gender-friendly weed management technologies that reduce labour drudgery and enhance operational efficiency and inclusiveness in agriculture. He urged scientists to align technical programmes with national priorities, particularly the pulse and oilseed missions, while strengthening data management and analytical approaches.

Addressing the gathering, Dr. Rakesh Kumar congratulated the AICRP-WM centres for their scientific contributions and emphasized the need for systematic compilation, curation, and

preservation of research data generated over the past five decades in accordance with ICAR Data Policy. He also stressed the importance of addressing emerging challenges such as weed shifts under climate change and herbicide resistance through focused and domain-specific research.

Dr. P. K. Rai highlighted the evolving trends in weed management, particularly drone-based herbicide application and the introduction of non-GM herbicide-tolerant rice. He discussed the growing challenge of sustaining crop productivity under increasing biotic and abiotic stresses.

In his presidential remarks, Dr. Girish Chandel emphasized the need to critically evaluate the environmental implications of drone-based herbicide application and identify critical adoption gaps associated with this emerging technology. He stressed the importance of identifying unresolved research gaps that have emerged during the last five to six decades and called for improving the efficacy of weed management technologies under natural farming, organic farming, and regenerative agriculture systems.

Delivering the inaugural address, Dr. A. K. Nayak emphasized the importance of establishing robust data management systems involving data collection, storage, curation, and analysis for generating meaningful insights from long-term weed research datasets. He advocated making validated datasets available in the public domain after an appropriate period to enhance their wider utility and impact. He further highlighted critical knowledge gaps related to weed management under natural farming, organic farming, and regenerative agriculture. Referring to the increasing promotion of herbicide-tolerant rice, he stressed the need for dynamic stewardship guidelines for the judicious use of imazethapyr. He also underlined the importance of long-term data analysis for developing strategic approaches to address herbicide resistance in the context of emerging herbicides and herbicide combinations.

During the inaugural session, eleven publications related to weed science and weed management were formally released. The Punjab Agricultural University centre received the Best Centre Award for its performance during the past year. Eminent weed scientists Dr. S. S. Khole, Ex-Professor & DI, IGKV, Raipur and Dr. Samunder Singh, Ex-Professor and Head, CCSHAU, Hisar and Chairman, Research Advisory Committee, were felicitated in recognition of their distinguished contributions to weed science research and education.

The inaugural programme witnessed the participation of 62 delegates, including scientists from 24 AICRP-WM centres, scientists from ICAR-Directorate of Weed Research and Indira Gandhi Krishi Vishwavidyalaya, representatives from pesticide industries, and students.

## **Conclusion**

- Need for climate-resilient, location-specific, and economically viable weed management technologies for diverse cropping systems.
- Strengthening research on herbicide resistance, weed shifts, invasive weeds, and weed management under natural farming, organic farming, and regenerative agriculture systems.
- Integration of emerging technologies such as drones, artificial intelligence, digital decision-support systems, and precision agriculture tools for future weed management research.
- Development of gender-friendly weed management technologies aimed at reducing labour drudgery and improving operational efficiency.

- Systematic data generation, compilation, curation, preservation, and long-term analysis in accordance with ICAR Data Policy.
- Align research programmes with national priorities, particularly in relation to pulse and oilseed missions, crop diversification, and conservation agriculture.
- Need for dynamic stewardship guidelines for herbicide-tolerant crops and judicious herbicide use to minimize environmental and resistance-related concerns.
- Greater collaboration among researchers, policymakers, industry stakeholders, and farmers for addressing emerging weed management challenges.
- Emphasis was given on data-driven research, climate-resilient weed management strategies, sustainable agriculture, and integration of advanced technologies for future-ready weed management solutions.

## TECHNICAL SESSION-I

---

|                          |                                                                                                                                                    |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Chairman:</b>         | Dr. A. K. Nayak, DDG (NRM), ICAR, New Delhi                                                                                                        |
| <b>Co-Chairman:</b>      | Dr. J.S. Mishra, Director, ICAR-DWR, Jabalpur                                                                                                      |
| <b>External experts:</b> | 1. Dr. Samunder Singh, Ex Professor & Head, Agronomy, CCSHAU, Hisar<br>2. Dr. S. S. Kolhe, Ex. Professor Agronomy & DI, IGKV, Raipur, Chhattisgarh |
| <b>Rapporteurs:</b>      | 1. Dr. (Mrs.) Yogita Gharde, Sr Scientist, ICAR-DWR, Jabalpur<br>2. Dr. V. J. Patel, Agronomist & Principal Investigator, AAU, Anand               |

### Report of Technical session – I

During the session, 12 regular centres presented their salient research findings. No scientist from Palampur centre presented its findings for the year. Following are some of the salient research achievements presented by the centres:

#### PAU, Ludhiana

- Incorporation of paddy residues before sowing + Pyroxasulfone 100 g/ha PoE + hand weeding after first irrigation gave good control of weeds and highest grain yield in mustard.
- 5 weed management technologies were recommended for inclusion in the Package of practices.

#### CCSHAU, Hisar

- Penoxsulam + pendimethalin (RM) 625 PE *fb* fenoxaprop-ethyl + ethoxysulfuron (Tank-mix) (67 +18) PoE provided best weed management along with highest grain yield and B-C ratio in case of dry-DSR.
- Significantly higher infestation of *Echinochloa crus-galli* and *Cyperus rotundus* was recorded under conventional till with and without residue incorporation compared to zero till with and without residue conditions, in direct seeded rice during 4<sup>th</sup> year of study of rice-wheat-green gram cropping system under CA.
- Poultry manure 2.0 t/ha *fb* pendimethalin 30 EC 500 g/ha PoE gave higher grain yield and manage Orobanche in mustard crop.

#### GBPUAT, Pantnagar

- Stale seed bed-DSR + Sesbania- Vegetable pea-Sweet corn and Manual weeding (Two pass of CW) (25 & 45 DAS) was effective in suppressing the weed density to a greater extent in organic farming system.

- Florpyrauxifen-benzyl 2.13% w/w + cyhalofop-butyl 10.64% w/w EC (RM) 150 g/ha applied through drone technology provided highest weed control efficiency and grain yield as compared to others and as compared to knapsack treatments.

#### **SKUAST, Jammu**

- The lowest weed density, weed biomass, higher grain yield were recorded with pyroxasulfone 85% WG 127.5 g/ha as PE *fb* clodinafop-propargyl 15% WP 60 g/ha as PoE in the experiment for the management of *Phalaris minor* in wheat.
- In blackgram, pendimethalin + imazethapyr (RM) at 1000 g/ha as PE resulted in the lowest total weed density and weed biomass at 60 DAS and recorded the highest grain yield, net returns, and benefit–cost ratio.
- Under organic farming experiments, the lowest total weed density, weed biomass, higher WCE, higher yield of beetroot and B-C ratio were recorded in the treatment comprising twin wheel hoe at 20 DAS and 40 DAS as compared to others.

#### **RVSKVV, Gwalior**

- Atrazine 500 g/ha PE application with drone *fb* mechanical weeding at 30 DAS was found effective with higher WCE and grain yield and B-C ratio in sorghum crop.
- Under CA experiments in maize-based cropping system, zero tillage with residue reduce the narrow and broad leaved weed population and gave maximum grain yield, net returns and B-C ratio. Among weed management practices, the minimum population of weeds and the maximum yield with net returns was obtained where atrazine 1.0 kg/ha *fb* topramezone 25.2 g/ha *fb* hand weeding *fb* WSH was applied.

#### **PJTAU, Hyderabad**

- Florpyrauxifen- benzyl 2.13% w/w + cyhalofop-butyl 10.64% w/w EC applied with drone was found with highest WCE, however, this herbicide applied with knapsack sprayer provided highest grain yield and B-C ratio in rice.
- Poly mulch + intra row manual weeding at 20-25 DAS was effective in controlling weeds in greengram under organic agriculture.

#### **UAS, Bengaluru**

- Pendimethalin 38.4% + pyrazosulfuron ethyl 0.85% ZC 785 g/ha as PE *fb* florpyrauxifen-benzyl 2.13% w/w + cyhalofop- butyl 10.64% w/w EC 150 g/ha PoE (25 DAS) was effective with highest WCE and grain yield.
- For controlling *Rottboellia cochinchinensis* in maize, Pyroxasulfone 127.5 g/ha (PE) *fb* Isoxaflutole + thiencazone-methyl 90+36g/ha (EPoE) found effective with highest WCE.

#### **KAU, Thrissur**

- The treatments horse gram, horse gram + marigold and ploughing alone were superior in terms of weed control efficiency for weed management in coconut plantation under natural farming.
- 2,4-D Na salt 80 WP (5 g/L) as foliar spray was the effective treatment without any phytotoxicity to host for controlling *Loranthus* in mango orchards.

#### **TNAU, Coimbatore**

- Higher grain yield, net returns and B-C ratio were recorded with pretilachlor 30.0% + pyrazosulfuron ethyl 0.75% WG 615 g/ha PE *fb* florpyrauxifen-benzyl 2.13% + cyhalofop-butyl 10.64% EC 150 g/ha as PoE (25-30 DAS) in puddled wet direct-seeded rice.

- Application of different herbicides through drone or knapsack sprayer recorded comparable results with regard to WCE, yield and economics of transplanted rice. Hence, EPoE of florypyrauxifen - benzyl 2.13% + cyhalofop- butyl 10.64% EC (RM) 150 g/ha, EPoE of bispyribac sodium 25 g/ha, EPoE of penoxsulam + cyhalofop- butyl (RM) 135 g/ha could be recommended for drone application.

#### **PDKV, Akola**

- Application of diclosulam 26 g/ha PE and propaquizafop + imazethapyr 125 g/ha (RM) PoE through drone and power sprayer recorded comparable WCE, grain yield and economics in soybean.
- Among pre- and post-emergence herbicides (except imazethapyr 75 g/ha PoE) soybean equivalent yield across the treatments was found at par with each other. However, integration of pendimethalin 678 g/ha PE *fb* hoeing 30 DAS recorded higher net returns in the experiment on WM in pigeonpea + soybean intercropping.

#### **MPUAT, Udaipur**

- Herbicides sprayed through the drone also shown effective results in weed control at par with sprayed through knapsack sprayer treatment.
- Fenoxaprop-p-ethyl 7.77% + metribuzin 13.6% w/w EC 100+175 g/ha as PoE with high grain yield and B-C ratio for the management of *Phalaris minor* in wheat.

#### **AAU, Jorhat**

- Florypyrauxifen-benzyl 2.13% w/w + cyhalofop-butyl 10.64% w/w EC 150 g/ha as PoE at 25 DAS *fb* mechanical weeding through paddy weeder at 40 DAS was effective in puddled wet direct-seeded rice.
- Mulching of crop residue 5 t/ha at 0-3 DAS *fb* HW at 25 and 45 DAS was found as best treatment in wet DSR under natural farming system.

#### **Comments of Dr. A.K. Nayak, DDG (NRM), ICAR, New Delhi**

- Compile data on herbicide use over the last 25 years and compare it with the present-day herbicide use scenario at farmers' fields. Analyze changes in herbicide use patterns across different crops and cropping systems.
- Compile data on weed occurrence during the last 25 years and assess changes in weed dynamics, including shifts in weed flora, weed intensity, and the emergence of problematic weed species.
- Identify the best weed management practices adopted by farmers in five major crops during the last five years. Compare these practices with the recommendations provided by the respective research centres to determine the level of adoption and deviations, if any.
- Ensure uniformity in the treatment structure and methodology of networking trials addressing the same specific problem across all centres.
- Follow a common format for data presentation and reporting. Also, standardize the number of presentation slides for each centre to ensure consistency and ease of comparison.

#### **Expert comments:**

- Assess and document the impact of herbicide application on the soil microbiome.
- Ensure adequate soil moisture is available before the application of both pre-emergence and post-emergence herbicides.
- Clearly mention the number of weeding operations carried out under the weed-free treatment.

- Conduct drone-based herbicide application experiments strictly in accordance with the Standard Operating Procedures (SOPs) prescribed by the ICAR-Directorate of Weed Research, Jabalpur.
- Maintain uniform water volumes for herbicide application across all centres: 500 L/ha for pre-emergence herbicides and 375 L/ha for early post-emergence and post-emergence herbicides.
- Record the farming situation and soil type during weed surveillance to facilitate better interpretation of the results.
- For studying weed shifts, consider data spanning several years, preferably more than five years, to accurately capture long-term changes in weed dynamics.

## TECHNICAL SESSION-II

---

|                          |                                                                                                                                                         |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Chairman:</b>         | Dr. Rakesh Kumar, ADG (Agro., AF &CC), ICAR, New Delhi                                                                                                  |
| <b>Co-Chairman:</b>      | Dr. J.S. Mishra, Director, ICAR-DWR, Jabalpur                                                                                                           |
| <b>External experts:</b> | 1. Dr. Samunder Singh, Ex Professor & Head, Agronomy, CCSHAU, Hisar<br>2. Dr. S. S. Kolhe, Ex. Professor, Agronomy, IGKV, Raipur, Chhattisgarh          |
| <b>Rapporteurs:</b>      | 1. Dr. (Mrs.) Parvinder Kaur, Residue Chemist & Principal Investigator, PAU, Ludhiana<br>2. Dr. Todar Mal Poonia, Principal Investigator, CCSHAU, Hisar |

In the session, total 9 centres presented (4 regular centres and 5 volunteer centres) their findings, while 2 centres (BAU, Sabour and PAJNCOA&RI, Puducherry) were absent. The findings of the centres are as

### OUAT, Bhubaneswar

- Except one experiment on sustainable weed management in Dry DSR all other experiments were conducted by the centre.
- In wet direct-seeded rice (DSR), pretilachlor 30.0% + pyrazosulfuron ethyl 0.75% WG 615 g/ha PE *fb* florypyrauxifen-benzyl 2.13% w/w + cyhalofop-butyl 10.64% w/w EC 150 g/ha PoE (25-30 DAS) recorded significantly highest yield of 4.45 t/ha w.r.t partially weedy check (2.25 t/ha).
- In rice-maize-legume cropping system, The PE application of pendimethalin 678 g/ha at 2 DAS *fb* bispyribac sodium 25 g/ha at 20 DAS *fb* weed seed harvest (IWM) emerged as the most effective herbicide combination for managing the complex weed flora in direct-seeded rice. Among the establishment methods evaluated, the conventional tillage system combined with residue mulching proved superior to other tillage methods in ensuring better crop establishment and weed control.
- Weed management in finger millet, pyrazosulfuron-ethyl (PE) at 15 g/ha *fb* Bispyribac- Na as PoE and bensulfuron methyl + pretilachlor *fb* hand weeding at 30 DAT were at par with grain yield of 1.6 & 1.5 t/ha, respectively. The lowest yield of 0.7 t/ha was obtained in case of weedy check plot.
- Under varied nutrient management in dry direct-seeded rice (DDSR), Higher nutrient levels, particularly 125% STBFR, tended to favour weed growth, whereas 75% STBFR recorded comparatively lower weed density and dry weight, while in weed management, pendimethalin + penoxsulam (RM) 625 g/ha *fb* penoxsulam + cyhalofop butyl (RM) 135 g/ha as PoE (25-30 DAS) and pendimethalin + pyrazosulfuron (RM) 785 g/ha as PE *fb* triafamone + ethoxysulfuron (RM) 66.5 g/ha as PoE (25-30 DAS) recorded superior grain yield.

- 11% farmers adopted, application of penoxsulam + pendimethalin (RM) 625 g/ha as PE *fb* fenoxaprop ethyl 67 g/ha + ethoxysulfuron 18 g/ha (TM) as PoE 25 DAS with 4.5- 5.2 t/ha higher yield as compared to farmer practice.

### **BCKV, Kalyani**

- Under puddled wet direct-seeded rice, pendimethalin 38.4% + pyrazosulfuron ethyl 0.85% ZC 785 g/ha as PE *fb* bispyribac-sodium 25 g/ha + [(metsulfuron methyl + chlorimuron ethyl) (RM)] 4 g/ha as PoE (25 DAS) showed the best performance recording highest weed control efficiency (85.65% at 40 DAS and 80.32% at 60 DAS), grain yield (3.85 t/ha), straw yield (6.74 t/ha) and B:C (1.68).
- Weed management in sunflower, better weed suppression recorded in treatment pendimethalin 30% + imazethapyr 2% EC (RM) *fb* HW at 25-30 DAS provided significantly higher plant height (166.7 cm), 21.7% yield increase, seed yield (1.24 t/ha), higher net returns (Rs. 10847/ ha) and also the value of B:C (1.36).
- Weed management under natural farming systems direct seeded scented rice-cowpea (vegetable) cropping system highest yield components and grain yield was recorded in ICM practices. Soil mulch *fb* HW at 20 and 40 DAS yielded better than straw mulch incorporation of previous rice crop *fb* 1 HW at 25-30 DAS.

### **AAU, Anand**

- In dry DSR, penoxsulam 1% + pendimethalin 24% (RM) 625 g/ha as PE *fb* fenoxaprop 6.7% 67 g/ha + ethoxysulfuron 15% (TM) 18 g/ha as PoE (25 DAS) performed better with higher WCE and grain yield (4.63 t/ha).
- At the higher dose of topramezone (25.2 g a.i./ha), moderate phytotoxicity (Scale 2) was observed on chickpea leaves at 7 DAA in all the eight varieties and recovered at 14 DAA in all chickpea varieties, irrespective of the dose applied.
- In wheat crop, clodinafop propargyl 15%+ metsulfuron methyl 1% WP 60+4 g a.i./ha PoE provided higher grain yield
- Under weed management in turmeric under natural farming, stale seedbed *fb* HW + mulching of crop residue 5 t/ha at 30 DAP *fb* HW at 75 DAP resulted in higher rhizome yield (12.8 t/ha).
- Pyrazosulfuron, pendimethalin 38.4% + pyrazosulfuron ethyl 0.85% ZC 785 g a.i./ha PPI and pretilachlor 30% + pyrazosulfuron 0.75% WG 615 g a.i./ha PPI had phyto-toxicity on the mustard crop. No Orobanche was observed in mustard crop.
- In *rabi* maize, atrazine 500 g a.i./ha+ topramezone 25.2 g a.i./ha PoE was adopted by 13% while in groundnut imazethapyr 100 g a.i./ha EPoE *fb* IC + HW at 40 DAS was adopted by 45.6% farmers.

### **IGKV, Raipur**

- In puddled wet direct seeded rice, pretilachlor + pyrazosulfuron ethyl 615 g/ha PE *fb* florpyrauxifen-benzyl + cyhalofop-butyl 150 g/ha as PoE (25 DAS) with higher WCE (70%) and higher grain yield (6.11 t/ha).
- Irrigation immediately after sowing of direct seeded rice and applying PE herbicide within 1 DAS and *fb* florpyrauxifen-benzyl + cyhalofop-butyl at 25-30 DAS is most effective combination.
- Weed management by drone in DSR, the combination of florpyrauxifen-benzyl + penoxsulam for drone and knapsack was the most effective herbicidal treatment, keeping weed density and biomass low throughout the crop stages.

- WM in natural farming system in direct seeded rice- cowpea, The ICM practices treatment (GM + Ghan Jeevamrit + Jeevamrit) resulted in the highest grain yield of up to 3.10 and 3.24 t/ha and net returns.
- In rice-maize-legume CS, significantly higher cob/plant, grain yield with maximum NR and B:C was recorded under the ZT+ R- ZT+ R- ZT+ R, while in weed management, significantly higher grain yield and net returns was recorded in IWM option as compared to recommended and partially weedy.
- Two technologies were generated by the centre.

#### **Volunteer centres**

##### **SKUAST, Srinagar**

- In sweet corn, PE atrazine (250 g/ha) *fb* PoE tembotrione (120.75 g/ha) showed maximum WCE of 74%, significantly higher cob yield and maximum B:C.
- Among the herbicidal treatments, application of oxyfluorfen 23.5% EC 120 g/ha PE (2 DAT/DAP) *fb* pre-mixed formulation of oxyfluorfen 6% + quizalofop-p-ethyl 4% EC 100 g/ha PoE (140 DAT/DAP) was the best treatment showing higher bulb yields of onion and garlic and benefit: cost ratio
- In apple, pre-emergence application of tank mixed herbicides pendimethalin 30% EC + atrazine 50%WP (250 + 500 g/ha) in spring *fb* post-emergence application of glyphosate 41% SL (1.0 kg/ha) in summer is effective.

##### **UAS, Dharwad**

- For striga management in sugarcane, application of UAS-D AMF consortium *fb* 2,4-D sodium salt 44% + metribuzin 35% + pyrazosulfuron ethyl 1.0% WDG 2400 g a.i./ha as post-emergence reduced *Striga* emergence, while enhancing the chlorophyll content and plant growth at 120 DAP.
- In soybean crop, validation of herbicide tolerant consortium with diclosulam 26 g/ha as PE, recorded the highest relative chlorophyll content, proline accumulation, photosynthetic rate and reduced leaf temperature.

**Comment:** Report the Mechanism of striga control with coriander intercultivation with sugarcane

##### **BUAT, Banda**

- Chickpea cultivars were screened against the topramezone, the cultivar IPC-2024-98 found sensitive to topramezone. Topramezone 20 and 25.2 g/ha were at par with each other in terms of seed yield of chickpea cultivars.
- In dry DSR, penoxsulam + pendimethalin (RM) 625 g/ha as PE *fb* fenoxaprop-ethyl 67 g/ha + ethoxysulfuron 18 g/ha (Tank-mix) as PoE (25 DAS) had higher grain yield followed by pendimethalin 38.4% + pyrazosulfuron ethyl 0.85% ZC 785 g/ha as PE *fb* bispyribac-sodium 25 g/ha + [(metsulfuron methyl + chlorimuron ethyl) (RM)] 4 g/ha (TM) as PoE (25 DAS).
- In pigeonpea + blackgram (2:2), application of pendimethalin 30 EC 1000 g/ha as PE *fb* propaquizafop 100 g/ha provided higher yield of pigeonpea and more system productivity.

##### **ANGRAU, Guntur**

- In organically grown cotton, farmers practice (3 hoeings at 20 days interval *fb* 2 line weedings at 20 & 40 DAS) resulted in higher Kapas yield followed by plastic mulch at sowing on broad beds.
- Weed management in blackgram by drone, fluazifop p butyl 11.1 + fomesafen 11.1 % SL 250 g/ha as PoE at 20 DAS using drone performed better in terms of better WCE, yield and improved yield

components and it was on par with fluazifop p butyl 11.1 + fomesafen 11.1 % SL 250 g/ha as PoE at 20 DAS using Knapsack sprayer.

- No cultivar of chickpea had phyto-toxicity with application of topramezone at 20, 25 and 30 g ai/ha at 14 days after herbicide application.

**Comment:** Height of drone during spray was 60 cm. So, follow the SOPs of the drone spray

### **SKNAU, Jobner**

- In mustard crop, pendimethalin 38.7 CS (PE) @ 680 g ai/ha *fb* 1 hand weeding at 30-35 DAS resulted in higher seed yield and stover yield, however, the application of pendimethalin 38.7 CS (PE) @ 680 g ai/ha *fb* quizalofop-ethyl 5 % EC @ 40 g a.i./ha at 30-35 DAS fetched higher net returns.
- Post-emergence application (30-35 DAS) of 2,4-D 44% + metribuzin 35 % + pyrazasulfuron ethyl 1 % (Ready Mix) @ 300 g and 350 g a.i./ha resulted in higher grain yield as compare to lower and higher doses of the herbicide combination in wheat.
- In greengram, pre-emergence application of pendimethalin 35 + imazethapyr 2% (Ready mix) @ 750 g a.i./ha *fb* weeding with manually operated mechanical weeder at 30-35 DAS resulted in higher seed yield, however, post-emergence application of propaquizafop 2.5% + imazethapyr 3.75% w/w (RM) @ 125 ga.i./ha at 15-20 DAS fetched higher net returns and BC ratio.
- Early post-emergence application of mesotrione 2.27% + atrazine 22.7% SC (Ready mix) @ 800 g a.i./ha at 15-20 DAS found effective in pearl millet crop.
- Centre has given 7 recommendations for package of practices for different crops.

**Comment:** Compare the wheel hand hoe with other mechanical tools

- Line and histogram use should be at proper place

Comments were provided by the experts and chairman and co-chairman are

### **Dr Samunder Singh suggested that:**

1. Data on soil moisture, soil microbes should be recorded to correlate the weed control with herbicides
2. Instead of dry weight, fresh weight of weeds can also be recorded
3. Chlorophyll fluorescence can be measured for early detection of herbicides effect on weeds and crops.
4. Either use B:C or B-C ratio
5. Herbicide resistance study should be carried out as properly
6. Efficacy and cost of drone and knapsack sprayer should be checked
7. Crop injury, if any and recovery should be recorded
8. Use the common abbreviation of the herbicides in treatment details
9. Survey can also be carried out by qualitative method to cover more area
10. Weed biology and ecology can also be studied for the better weed management

### **Dr S. S. Kohle suggested that**

1. During weed survey, farming situation, soil type, rainfall, irrigated or rainfed should be taken into consideration
2. Weed shift should be recorded over longer period
3. Herbicides with surfactant or without should be mentioned

4. Mention the number of weeding in weed free conditions
5. Standard format of observation should be followed

Dr Rakesh Kumar ADG (Agronomy, AF and CC) advised the centres to follow the guidelines issued by the Directorate and incorporate the suggestion given by DDG, Co-chairman and external experts.

Dr Rakesh Kumar also advised the PIs to complete the assignments given to the centre within the time period

Dr. J.S. Mishra, Director and Project Coordinator, ICAR-DWR asked the centres to follow the guidelines for the presentations and the number of Slides should be kept 20-25 for better

The session was concluded with vote of thanks to the chairman

### **TECHNICAL SESSION-III (Formulation of network technical programme for 2026-27 & 2027-28)**

---

|                          |                                                                                                                                                |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Chairman:</b>         | Dr. Rakesh Kumar, ADG (Agro., AF &CC), ICAR, New Delhi                                                                                         |
| <b>Co-Chairman:</b>      | Dr. Deepark Chandrakar, Professor and Head, Department of Agronomy, IGKV, Raipur                                                               |
| <b>External experts:</b> | 1. Dr. Samunder Singh, Ex Professor & Head, Agronomy, CCSHAU, Hisar<br>2. Dr. S. S. Kolhe, Ex. Professor, Agronomy, IGKV, Raipur, Chhattisgarh |
| <b>Rapporteurs:</b>      | 1. Dr. K. N. Geetha, Principal Investigator, UAS, Bengaluru<br>2. Dr. S. P. Singh, Principal Investigator, GBPUAT, Pantnagar                   |

Session-III focused on the formulation of network technical programme for the years 2026-27 & 2027-28 under various work plans related to sustainable weed management. The session emphasized the development of location-specific, economically viable and environmentally sustainable weed management strategies for different agro ecosystems.

Dr. J. S. Mishra, Director, ICAR-DWR welcomed the session chairman, co-chairman and external experts and highlighted the importance of network research effort in addressing emerging challenges, including herbicide resistance.

#### **Technical presentations and deliberations**

##### **1. Weed management in major crops and cropping systems and station trials specific to the state**

**Presenter:** Dr. P. K. Muherjee presented the proposed technical programme focusing on weed management practices for major crops and cropping systems across different agro climatic regions. The house discussed the need for harmonization of experimental protocols across centres.

An extensive discussion was held among the chairman, co-chairman, experts, director and scientists regarding prioritization of research programmes for the forthcoming technical programme period.

The following are the salient recommendations under different research programmes.

- 1.1.1.1 Weed management in dry direct-seeded rice
- 1.1.1.2 Weed management in wet direct –seeded rice (DSR)
- 1.1.1.3 Weed management in puddle / transplanted rice (Excluded)

**Salient recommendation/ suggestions:**

1. Documentation of weed dynamics observations.
2. Fine tune the treatments to avoid quick weed shift and measure the moisture content during herbicide treatment imposition.
3. Incorporate a weedy check instead of a partially weedy check treatment
4. For all the experiments observations will be recorded at 40 and 60 DAS
5. Dehydrogenase activity (DHA) will be measured at initial (before) and 15 DAHA (days after herbicide application).
6. Include residue/succeeding crop in both dry- and wet-DSR
7. Include one mechanical weed management practice as integrated weed management
8. Collect area under dry- and wet-DSR
9. Outcome –output oriented research programme
10. No need to test pendimethalin 30 EC and 38.7 CS in wet DSR

**1.1.2 Weed management in crops through drone-based application of herbicides****Salient recommendations/ suggestions**

1. All the centres should follow the SOP's given by ICAR-DWR (Spraying height 2 m, Spray volume 25 L/ha, knapsack-375 L/ha for EPoE/PoE and 500 L/ha for pre-emergence and for power sprayer 250L/ha).
  2. Weed population, weed fresh weight and dry matter will be recorded just before spraying and 20 and 30 days after spraying for pre-emergence herbicide.
  3. For post emergence herbicides, the weed data should be collected before spraying and at 20 days after spraying only.
  4. Dehydrogenase activity should be recorded (before treatment imposition and 15 days after spray).
  5. In drone experiments, all the centres mention the nozzle specifications.
  6. Droplet size testing paper will be purchased and distributed by DWR to all the centres
  7. Workout the economics/ include the economic analysis
  8. Record the phytotoxicity (excess/over sprayed area) and record the weeds if the turning points/corners are not sprayed
  9. No succeeding/residue crop in drone experiment
  10. Use different subsequent herbicide and pre-emergence herbicide can't be post –emergent herbicide
- Presenter:** Dr. V. K. Choudhary, Pr. Scientist and In-charge, AICRP, DWR Dr. Choudhary elaborated on importance of sustainable weed management in pulses (Pigeonpea, blackgram, greengram, chickpea, lentil, field pea, etc.)

**Salient recommendations/ suggestions**

1. Focus should be given for developing integrated weed management in *Rabi* pulses by collaborating with pulses AICRP projects operating at different centres.
2. In pigeonpea research proposals use only herbicide mixtures for testing

3. Long persisting herbicides should be avoided in short duration pulses
4. In Orobanche experiment include pendimethalin 38.7% CS and 30.0% EC at recommended dose only
5. For management of Loranthus, Jorhat, Thrissur and Bangalore centres will quantify the technologies
7. PAU will study HT rice for *Phalaris* resistance due to imazethapyr- pot studies

Finally, greater emphasis should be given to integrated and sustainable weed management approaches.

Everyone emphasized the development of practical and adoptable integrated weed management technologies. The morning session concluded with a consensus on strengthening network trials.

### **Stakeholders and Farmers–Scientists interaction Session**

---

A dedicated Stakeholder and Farmer–Scientist Interaction Session was organized during the XXXIII Annual Review Meeting of the All India Coordinated Research Project on Weed Management (AICRP-WM) to facilitate interaction among scientists, industry representatives, and farmers for identifying field-level weed management challenges and exploring practical solutions.

#### **Industry interaction**

##### **Paryan:**

Mr. Manoj Singh highlighted several emerging concerns associated with traditional puddled transplanted rice (TPR), including:

- High labour requirement in rice cultivation
- Increased greenhouse gas (GHG) emissions
- Rapid depletion of groundwater resources
- Severe infestation of wild rice

To address these challenges, he discussed the introduction of FullPage, a non-GM IMI-tolerant hybrid rice technology jointly developed by RiceTec and Mahyco. The following advantages of the technology were highlighted:

- Better suitability under direct-seeded rice (DSR) systems
- Improved weed and wild rice management
- Reduction in crop establishment problems under DSR
- Low seed requirement (approximately 7 kg/acre)
- Higher economic returns with reported net income of nearly ₹52,923 per acre

He also highlighted the Freehit wheat technology developed by Mahyco, describing it as a non-GM IMI-tolerant and Zero-Tillage (ZT)-compatible wheat technology rather than a conventional wheat variety.

#### **Krishi Rasayan**

Mr. Satyendra Patel presented the product portfolio of Krishi Rasayan, covering:

- Herbicides
- Insecticides
- Fungicides
- Bio-fertilizers

He elaborated on the performance, utility, and field applicability of various products and discussed their role in integrated crop and weed management strategies.

### **Farmer–Scientist Interaction**

Farmers from nearby villages of Raipur actively participated in the interaction session and shared several practical constraints related to weed management in different cropping systems.

### **Major weed management problems highlighted by the farmers**

- Pretilachlor (pre-emergence) and bispyribac sodium (post-emergence) are no longer providing effective weed control in direct-seeded rice (DSR).
- Manual weeding has become highly expensive and labour-intensive, while severe crop–weed competition throughout crop growth stages substantially reduces rice productivity.
- Excessive weed emergence and rapid weed growth are commonly observed after the second top dressing of urea in rice fields.
- In mustard, pendimethalin is not effectively controlling broadleaf weeds such as Medicago, Chenopodium, and Melilotus. Farmers reported extremely high weed infestation, indicating that nearly 10 bags of Chenopodium seeds were harvested along with 50 bags of mustard produce.
- Farmers expressed confusion regarding the proper selection and purchase of herbicides due to inconsistent recommendations from dealers.
- Non-availability of quality rice transplanters was identified as a major constraint affecting timely crop establishment.

### **Suggestions and recommendations emerging from the interaction**

The following suggestions and recommendations have been made by the scientists for addressing the prevailing weed management issues:

- Conduct On-Farm Trials (OFTs) using herbicides such as oxadiargyl, oxyfluorfen, and isoproturon with pendimethalin as a comparative check treatment.
- Organize large-scale awareness programmes and hands-on training for farmers on:
  - ✓ Selection of appropriate herbicides
  - ✓ Correct dose and timing of application
  - ✓ Spray volume optimization
  - ✓ Selection and calibration of nozzles
- Strengthen regular monitoring of farmers' fields by scientists for early diagnosis and management of emerging weed problems.
- Promote crop diversification by introducing wheat in mustard-based systems to explore better herbicide options for broadleaf weed management.
- Encourage adoption of stale seedbed techniques before sowing mustard for reducing initial weed pressure.

The interaction session provided valuable insights into field-level constraints, technology adoption gaps, and emerging weed challenges under crops and cropping systems.

## PLENARY SESSION

---

|                     |                                                                                           |
|---------------------|-------------------------------------------------------------------------------------------|
| <b>Chairman:</b>    | Dr. Rakesh Kumar, ADG (Agro., AF &CC), ICAR, New Delhi                                    |
| <b>Co-Chairman:</b> | Dr. Vivek Kumar Tripathi, Director Research Services, IGKV, Raipur                        |
| <b>Rapporteurs:</b> | Dr. Jamaludheen A., Agricultural Economics, ICAR-DWR, Jabalpur<br>Dr. P. Jones Nirmalnath |

The plenary session of the XXXIII Annual Review Meeting (ARM) of the All India Coordinated Research Project on Weed Management (AICRP-WM) was held under the Chairmanship of Dr. Rakesh Kumar, ADG (Agro., AF&CC), ICAR, with Dr. V. K. Tripathi, Director of Research, IGKV, Raipur, serving as Co-Chairman. The session rapporteurs were Dr. Jamaludheen A. and Dr. Jones Nirmalnath. The plenary session commenced with the presentation of rapporteurs' reports from the inaugural session and various technical sessions conducted during the three-day Annual Review Meeting. Key deliberations, observations and recommendations emerging from different technical sessions were summarized and presented for consideration. Subsequently, the invited external expert shared feedback on the overall proceedings of the three-day programme and highlighted several technical and strategic issues requiring focused attention in weed management research and extension.

The invited expert, Dr. Samunder Singh, Former Professor and Head, Department of Agronomy, CCSHAU, emphasized several critical issues and future directions in weed management research and technology development. He noted that weed identification remains a major challenge and requires greater scientific attention. Herbicide efficacy was reported to vary across different soil types and ecological conditions, necessitating location-specific recommendations. He highlighted the importance of understanding the ecological factors influencing herbicide performance. Particular emphasis was placed on the timing of herbicide application, noting that soil moisture plays a critical role in the effectiveness of soil-applied herbicides, while foliar-applied herbicides exhibit maximum efficacy when applied during the succulent growth stage of weeds. It was also observed that hardy or moisture-stressed weeds generally exhibit lower herbicide absorption. In this context, the role of herbicide safeners in enhancing herbicide efficacy and minimizing crop injury was highlighted.

The deliberations stressed the importance of adopting an integrated weed management approach involving cultural, mechanical, biological and chemical methods rather than sole reliance on herbicides. Practices such as mulching, stale seed bed preparation, harvest weed seed destruction and local mechanical interventions were identified as important components of integrated weed management strategies. The need for strengthening research on weed biology was emphasized, particularly with respect to weed survival, dormancy and persistence under different ecological conditions. Concerns were also expressed regarding the continued use of older herbicides, suggesting the need for periodic reassessment of their efficacy, sustainability and environmental implications. Herbicide resistance was identified as an emerging challenge in weed management. In this regard, the importance of herbicide rotation and the development of rapid herbicide resistance detection methodologies was emphasized to minimize the development and spread of resistant weed biotypes. Emerging technologies in weed management were also discussed. Special attention was given to drone-based herbicide application and precision weed management tools. Innovative technologies such as the Kyminasi Plant Crop Booster, a non-chemical bio-physical technology designed to enhance plant metabolism, improve crop health, and increase agricultural productivity, were highlighted as promising future interventions. Drip-based herbicide application in horticultural and field crops was also discussed for its possible contribution toward enhanced efficiency, yield improvement and soil quality enhancement. The need for residue studies to assess the impact of herbicides on water bodies and

ecosystems was emphasized. It was also suggested that integrated weed management technologies should be accompanied by socio-economic assessments to evaluate their feasibility, profitability and adoption potential under farmers' field conditions.

The invited expert, Dr. Kolhe, observed that there is always scope for improvement in scientific interventions and emphasized the need for continuous refinement of weed management practices based on field realities and emerging evidence. In the context of natural farming, it was emphasized that prescribed protocols should be followed strictly without the use of chemical inputs wherever applicable. Simultaneously, integrated approaches involving local and mechanical methods should be strengthened. The Co-Chairman, Dr. V. K. Tripathi, congratulated the organizers and participants for the successful completion of the Annual Review Meeting and emphasized the need to integrate emerging tools such as artificial intelligence, drone technologies and improved data management systems into weed management research and extension. During the deliberations, concerns were raised regarding the declining contribution of agriculture, particularly the crop sector, relative to fisheries and animal husbandry. It was noted that horticultural output has overtaken conventional agricultural output, thereby necessitating innovative and adaptive approaches in crop production systems. Farmer-centric perspectives were also discussed, including alternate utilization of weeds and opportunities for converting biomass into value-added products under the "waste to wealth" concept. Scientists were encouraged to continuously update their knowledge and expand scientific interventions to contribute meaningfully toward enhanced agricultural productivity and farmer welfare. It was noted that farmers' income continues to remain lower than the national per capita income, underscoring the importance of developing practical and adoptable technologies.

Dr. J. S. Misra, Director, ICAR-DWR, emphasized that weed scientists should align weed management research with national agricultural priorities and programmes to improve the visibility and relevance of weed science. Areas such as natural farming, drone applications, artificial intelligence, oilseeds and pulse missions were cited as important national initiatives requiring stronger weed management integration. Although herbicide use in India remains comparatively lower than in several other countries, concerns were expressed regarding indiscriminate use in certain regions. Therefore, integrated weed management approaches should be promoted to minimize excessive dependence on herbicides. It was also emphasized that weed management recommendations should not be developed in isolation for a single crop but should account for succeeding crops in cropping systems. Direct Seeded Rice (DSR) was identified as an important national priority requiring focused weed management interventions. In line with the Hon'ble Prime Minister's emphasis on fertilizer reduction, it was noted that weeds significantly compete for nutrients, and effective weed management could contribute to improved nutrient-use efficiency and reduced fertilizer requirements. It was suggested that technical recommendations intended for State Departments should be adequately vetted through the DWR to ensure scientific accuracy and consistency before dissemination. The importance of assessing technology adoption was also emphasized. It was noted that weed management technologies should be recommended only after carefully considering field-level constraints and their practical feasibility under farmers' conditions, as the situations under which technologies are developed and validated in experimental settings may differ substantially from actual farm environments. Therefore, the complete package of practices, including the specific conditions and circumstances under which a technology performs effectively, should be clearly communicated to farmers to enhance its field performance, adoption, and impact.

The Chairman of the session, Dr. Rakesh Kumar, highlighted the increasing problem of herbicide resistance and advised that farmers should consult scientists for appropriate herbicide recommendations and application practices rather than depending solely on dealers. The issue of ineffective herbicide performance in mustard, as reported by invited farmers from Raipur, was discussed, and it was informed

that the issue would be addressed through testing trials by the AICRP team at IGKV, Raipur. All centres were requested to incorporate the comments and suggestions emerging from the plenary session into their future research programmes. The issue of anti-quality factors in fodder crops under stress conditions was also discussed. It was suggested that sampling should preferably be undertaken when weeds are not under stress to obtain reliable assessments. The plenary session culminated in a series of valuable insights and strategic recommendations for strengthening integrated, science-based, location-specific, and farmer-centric weed management approaches. The deliberations underscored the importance of incorporating emerging technologies and aligning future research efforts with national agricultural priorities to enhance the effectiveness, sustainability, and adoption of weed management strategies.

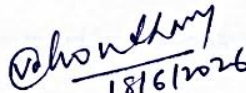
### **General Recommendations**

Based on the deliberations of the inaugural, technical, stakeholder and plenary sessions, the following recommendations are proposed for strengthening weed management research, technology validation and dissemination under AICRP-WM:

1. Research programmes should be aligned with climate change concerns, national agricultural priorities and mission-mode programmes, particularly pulses, oilseeds, direct-seeded rice, conservation agriculture, crop diversification, natural farming, organic farming and regenerative agriculture.
2. All centres should develop climate-resilient, location-specific, economically viable and farmer-adoptable integrated weed management technologies for major crops and cropping systems rather than crop-wise recommendations in isolation.
3. Future experiments should clearly account for the entire cropping system, including succeeding/residue crops wherever relevant, and the conditions under which a technology performs effectively should be clearly documented for wider adoption.
4. Greater emphasis should be given to natural farming, organic farming and regenerative agriculture by strictly following prescribed protocols and strengthening non-chemical, local, cultural, mechanical, biological and integrated weed management approaches.
5. Research on weed flora shift, weed biology, weed ecology, weed persistence, dormancy and long-term weed dynamics should be strengthened using multi-year datasets, preferably of more than five years, to identify emerging problematic weed species.
6. Herbicide resistance studies should be strengthened through systematic monitoring, herbicide rotation strategies, rapid resistance detection methods, and testing of recommended and higher doses along with new herbicides and herbicide combinations.
7. Herbicide-tolerant crops should be evaluated with dynamic stewardship guidelines, especially for judicious use of imazethapyr, to minimize resistance development, crop injury and environmental concerns.
8. Data on herbicide use and weed occurrence during the last 25 years should be compiled, curated and analysed to assess changes in herbicide use patterns, weed intensity, weed flora composition and emergence of problematic weeds across crops and regions.
9. All centres should adopt a common format for presentation and reporting. The presentations should include weed flora composition, weed density, weed biomass, weed control efficiency, crop injury and recovery, yield, economics, B:C, residue/toxicity information and relevant soil and environmental observations.

10. In experiments involving two or more factors, interaction effects should be statistically analysed and interaction tables should be included at least for yield and other key parameters wherever relevant.
11. In long-term experiments, current year, cumulative and pooled results should be reported along with trends of weed shift, yield sustainability, soil health and other relevant indicators.
12. Crop yields should be reported in kg/ha or t/ha only, and extremely low or non-representative yield data should not be reported as standard crop performance.
13. Networking trials addressing the same problem should maintain uniform treatment structure, methodology, observations and presentation standards across centres to enable meaningful comparison and pooled interpretation.
14. Drone-based herbicide application experiments should strictly follow ICAR-DWR SOPs, including spray height of 2 m, spray volume of 25 L/ha for drone application, 375 L/ha for knapsack early/post-emergence herbicides, 500 L/ha for knapsack pre-emergence herbicides and 250 L/ha for power sprayers.
15. In drone experiments, centres should mention nozzle specifications, use droplet-size testing paper, record phytotoxicity in oversprayed areas, document unsprayed corners/turning points, work out economics and compare efficacy and cost with knapsack/power sprayer methods.
16. Weed observations in drone and herbicide experiments should be recorded as per the agreed schedule. For pre-emergence herbicides, weed population and dry matter should be recorded at 20 and 30 days after spraying; for post-emergence herbicides, observations should be taken before spraying and 20 days after spraying.
17. Soil moisture at the time of herbicide application should be recorded, and adequate soil moisture should be ensured for both pre-emergence and post-emergence herbicides. Soil type, rainfall, irrigated/rainfed situation and farming situation should also be recorded during weed surveillance and field trials.
18. Soil health and environmental observations should be strengthened by recording dehydrogenase activity before treatment imposition and 15 days after herbicide application, and by assessing herbicide effects on soil microbiome wherever feasible.
19. Treatment-wise residue analysis should be carried out for experiments having direct bearing on soil, plant parts, succeeding crops, water bodies and ecosystems.
20. Weed-free treatments should clearly mention the number and timing of weeding operations. Herbicide treatments should mention whether surfactants or adjuvants were used and should follow common abbreviations in treatment details.
21. Integrated weed management practices such as stale seedbed, mulching, mechanical weeding, harvest weed seed destruction, crop residue management, cover crops and locally suitable mechanical tools should be evaluated for practical field adoption.
22. For direct-seeded rice, centre-wise results should continue to be interpreted separately wherever treatment responses are not uniform, and dry- and wet-DSR area, weed dynamics and location-specific adoption constraints should be documented.
23. For pulses, greater focus should be given to integrated weed management in *rabi* pulses in collaboration with AICRP pulse projects. Long-persisting herbicides should be avoided in short-duration pulses.

24. For parasitic and invasive weeds, research should focus on mechanism of control, host safety, long-term suppression, validation of promising practices and location-specific recommendations.
25. On-Farm Trials and Front-Line Demonstrations should include proper geotagging, location details, field conditions, farmer practice, economic analysis and impact assessment. OFT technologies should show at least 5% yield advantage over farmers' practice before recommendation.
26. Impact assessment should be strengthened by quantifying monetary gain, labour saving, input saving, nutrient-use efficiency, adoption level, practical feasibility and farmers' constraints in different crops and regions.
27. Large-scale farmer awareness and hands-on training programmes should be organized on correct herbicide selection, dose, timing, spray volume, nozzle selection, calibration, safety precautions and integrated weed management practices.
28. All centres should expedite development of Weed Atlas and strengthen systematic data generation, digitization, storage, curation, preservation and long-term analysis in accordance with ICAR Data Policy.
29. Technical recommendations intended for State Departments or farmers should be adequately vetted through ICAR-DWR to ensure scientific accuracy, consistency and clarity before dissemination.
30. All centres should submit results in the prescribed online format within the stipulated time and complete assigned tasks as per the timelines decided during the Annual Review Meeting.

  
(V. K. Choudhary)

In-Charge, AICRP on Weed Management

  
(J. S. Mishra)  
18/6/2026

Director, ICAR-DWR, Jabalpur

**XXXIII ANNUAL REVIEW MEETING OF  
ALL INDIA COORDINATED RESEARCH PROJECT ON WEED MANAGEMENT**

**ICAR - DIRECTORATE OF WEED RESEARCH, JABALPUR**

**12<sup>th</sup> May, 2026 (Tuesday) Registration: 8:45 AM**

|                                                         |                                                                                                                                                 |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>09:00-11:00 hrs</b>                                  | <b>INAUGURAL SESSION</b>                                                                                                                        |
| <b>Lighting of lamp</b>                                 |                                                                                                                                                 |
| <b>Welcome address</b>                                  | Dr. J.S. Mishra, Director, ICAR - DWR, Jabalpur                                                                                                 |
| <b>Introductory remarks</b>                             | Director Research, IGKV, Raipur                                                                                                                 |
| <b>Presentation on achievements and recommendations</b> | Dr. V.K. Choudhary, Pr. Scientist and In-charge, AICRP-WM                                                                                       |
| <b>Remarks by Guests of Honour</b>                      | Dr. Rakesh Kumar, ADG (Agro., AF & CC), ICAR, New Delhi<br>Dr. P.K. Rai, Director, ICAR-NIBSM, Raipur (CG)                                      |
| <b>Release of publications</b>                          | By the honorable dignitaries                                                                                                                    |
| <b>Remarks by Chairman</b>                              | Prof. (Dr.) Girish Chandel, Vice-chancellor, IGKV, Raipur                                                                                       |
| <b>Address by Chief Guest</b>                           | Dr. A.K. Nayak, Director, DDG (NRM), ICAR, New Delhi                                                                                            |
| <b>Vote of thanks</b>                                   | Dr. Shrikant Chitale, Professor & Principal Investigator, AICRP-WM, IGKV, Raipur                                                                |
| <b>Rapporteurs</b>                                      | 1. Dr. P. K. Mukherjee, Pr. Scientist, ICAR-DWR, Jabalpur<br>2. Dr. (Mrs.) S . Radhamani, Principal Investigator, AICRP-WM, PJTSAU, Hyderabad   |
| <b>11:00-11:15 hrs</b>                                  | High Tea                                                                                                                                        |
| <b>TECHNICAL SESSION – I</b>                            |                                                                                                                                                 |
| <b>Chairman</b>                                         | Dr. A.K. Nayak, DDG (NRM), ICAR, New Delhi                                                                                                      |
| <b>Co-Chairman</b>                                      | Dr. Rakesh Kumar, ADG (A, AF&CC), ICAR, New Delhi                                                                                               |
| <b>External Expert</b>                                  | 1. Dr. Samunder Singh, Ex. Professor & Head, Agronomy, CCSHAU, Hisar<br>2. Dr. S. S. Kolhe, Ex. Professor, Agronomy, IGKV, Raipur, Chhattisgarh |
| <b>Rapporteurs</b>                                      | 1. Dr. Yogita Gharde, Sr. Scientist, ICAR-DWR, Jabalpur<br>2. Dr. V. J. Patel, Agronomist & Principal Investigator, AAU, Anand                  |
| <b>11:15-13:30 hrs</b>                                  | <b>Presentation of salient findings by Principal Investigators of AICRP-WM centres (10 min. for each centre)</b>                                |
|                                                         | PAU, Ludhiana: Dr. Parvinder Kaur                                                                                                               |
|                                                         | CCSHAU, Hisar: Dr. Todar Mal Poonia                                                                                                             |
|                                                         | GBPUAT, Pantnagar: Dr. S.P. Singh                                                                                                               |
|                                                         | SKUAST, Jammu: Dr. B.R. Bazaya                                                                                                                  |
|                                                         | RVSKVV, Gwalior: Dr. Janmejay Sharma                                                                                                            |
|                                                         | PJTSAU, Hyderabad: Dr. T. Anjaiah                                                                                                               |
|                                                         | UAS, Bengaluru: Dr. K.N. Geetha                                                                                                                 |
|                                                         | KAU, Thrissur: Dr. Savitha Antony                                                                                                               |
|                                                         | TNAU, Coimbatore: Dr. S. Radhamani                                                                                                              |
|                                                         | PDKV, Akola: Dr. V.V. Gaud                                                                                                                      |
|                                                         | MPUAT, Udaipur: Dr. Ramawatar                                                                                                                   |
|                                                         | AAU, Jorhat: Dr. Milon Jyoti Konwar                                                                                                             |

|                               |                                                                                                                                                  |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
|                               | Remarks by Chairman, Co-Chairman and External Expert                                                                                             |
| <b>13:30- 14:30 hrs</b>       | <b>LUNCH BREAK</b>                                                                                                                               |
| <b>TECHNICAL SESSION – II</b> |                                                                                                                                                  |
| <b>Chairman</b>               | Dr. Rakesh Kumar, ADG (Agro., AF & CC), ICAR, New Delhi                                                                                          |
| <b>Co-Chairman</b>            | Dr. J.S. Mishra, Director, ICAR – DWR, Jabalpur                                                                                                  |
| <b>External Expert</b>        | 1. Dr. Samunder Singh, Ex. Professor & Head, Agronomy, CCSHAU, Hisar<br>2. Dr. S. S. Kolhe, Ex. Professor, Agronomy, IGKVV, Raipur, Chhattisgarh |
| <b>Rapporteurs</b>            | 1. Dr. Parvinder Kaur, Residue chemist & Principal Investigator, PAU, Ludhiana<br>2. Dr. Todar Mal Poonia, Principal Investigator, CCSHAU, Hisar |
| <b>14:30-16:30 hrs</b>        | OUAT, Bhubaneswar: Dr. Sarika Jena                                                                                                               |
|                               | BCKV, Kalyani: Dr. Bikash Mandal                                                                                                                 |
|                               | AAU, Anand: Dr. V. J. Patel                                                                                                                      |
|                               | IGKV, Raipur: Dr. Shrikant Chitale                                                                                                               |
|                               | SKUAST, Srinagar: Dr. Ahmad Abdullah Saad                                                                                                        |
|                               | UAS, Dharwad: Dr. P. Jones Nirmalnath                                                                                                            |
|                               | BUAT, Banda (U.P.): Dr. Dinesh Sah                                                                                                               |
|                               | ANGRAU, Guntur: Dr. S. Prathibha Sree                                                                                                            |
|                               | SKNAU, Jobner: Dr. Shweta Gupta                                                                                                                  |
| <b>16:30-17:00 hrs</b>        | Remarks by Chairman, Co-Chairman and External Expert                                                                                             |

12-14 May, 2026 PROGRAMME

### 13<sup>th</sup> May, 2026 (Wednesday)

|                                               |                                                                                                                                                                                              |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>09:30-17:00 hrs</b><br><b>(9:30-13:30)</b> | <b>TECHNICAL SESSION – III -Formulation of Network Technical Programme for 2026-27 &amp; 2027-28</b><br><i>(WP-1 Development of location-specific sustainable weed management practices)</i> |
| <b>Chairman</b>                               | Dr. Rakesh Kumar, ADG (Agro., AF & CC), ICAR, New Delhi                                                                                                                                      |
| <b>Co-Chairman</b>                            | Dr. J.S. Mishra, Director, ICAR – DWR, Jabalpur<br>Dr. D.K. Chandrakar, Head of Department, Agronomy, IGKV, Raipur                                                                           |
| <b>External Expert</b>                        | 1. Dr. Samunder Singh, Ex. Professor & Head, Agronomy, CCSHAU, Hisar<br>2. Dr. S. S. Kolhe, Ex. Professor, Agronomy, IGKVV, Raipur, Chhattisgarh                                             |
| <b>Rapporteurs</b>                            | 1. Dr. K.N. Geetha, Principal Investigator, UAS, Bengaluru<br>2. Dr. S. P. Singh, Principal Investigator, GBPUAT, Pantnagar                                                                  |
| Dr. P.K. Mukherjee                            | Weed management in major crops and cropping systems and Station trials specific to the state                                                                                                 |
| Dr. V. K. Choudhary                           | Weed Management under conservation tillage-based cropping system                                                                                                                             |
|                                               | Weed management strategies in organic agriculture/natural farming                                                                                                                            |
|                                               | Management of herbicide resistance in weeds/Invasive weeds                                                                                                                                   |
| Dr. P. Jones Nirmalnath                       | Management of parasitic weeds                                                                                                                                                                |
|                                               | <i>(WP-2/WP-3 Management of weeds in non-cropped and aquatic areas &amp; Fate of herbicide residues in different agroecosystems)</i>                                                         |
| Dr. Aarchana Anokhe                           | Management of weeds in non-cropped and aquatic areas                                                                                                                                         |
| Dr. Shobha Sondhia                            | Fate of herbicide residues in different agroecosystems                                                                                                                                       |
|                                               | Remarks by Chairman, Co-Chairman and External Expert                                                                                                                                         |
| <b>13:30- 14:30 hrs</b>                       | <b>LUNCH BREAK</b>                                                                                                                                                                           |

|                        |                                                                                                               |
|------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>14:30-16:00 hrs</b> | <i>(WP-4 Demonstration and impact assessment of weed management technologies &amp; SCSP)</i>                  |
| <b>Chairman</b>        | Dr. Rakesh Kumar, ADG (Agro., AF & CC), ICAR, New Delhi                                                       |
| <b>Co-Chairman</b>     | Dr. Anil Dixit, Joint Director, ICAR – NIBSM, Raipur                                                          |
| <b>Rapporteurs</b>     | Dr. Parvinder Kaur, Residue chemist & Principal Investigator, PAU, Ludhiana<br>Dr. D.D. Choudhary, AAU, Anand |
| Dr. A. Jamaludheen     | OFR, FLD and impact assessment of weed management technology                                                  |
| Dr. Yogita Gharde      | SCSP, WoNI, Digitization of Aquatic Weed Map                                                                  |
|                        | On-line AICRP-WM data management system                                                                       |
| Dr. V. K. Choudhary    | New initiatives as suggested by the QRT/RAC                                                                   |
|                        | Remarks by Chairman, Co-Chairman and External Expert                                                          |

|                        |                                                                                                                                                                                                                                                                                    |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>16:00-17:30 hrs</b> | <b>PLENARY SESSION</b>                                                                                                                                                                                                                                                             |
| <b>Chairman:</b>       | Dr. Rakesh Kumar, ADG (Agro., AF & CC), ICAR, New Delhi                                                                                                                                                                                                                            |
| <b>Co-Chair:</b>       | Dr. Vivek Kumar Tripathi, Director of Research, IGKV, Raipur                                                                                                                                                                                                                       |
| <b>Rapporteurs:</b>    | Dr. A. Jamaludheen and Dr. P. Jones Nirmalnath                                                                                                                                                                                                                                     |
|                        | Rapporteur's reports<br>Remarks by External Expert<br>Remarks by Director of Research, IGKV, Raipur<br>Remarks by Director, ICAR-DWR, Jabalpur<br>Remarks by ADG (Agro., AF & CC), ICAR, New Delhi<br>Vote of thanks by Dr. Shrikant Chitale, Principal Investigator, IGKV, Raipur |

#### 14<sup>st</sup> May, 2026(Thursday)

|                         |                                                                                                    |
|-------------------------|----------------------------------------------------------------------------------------------------|
| <b>09:30- 11:30 hrs</b> |                                                                                                    |
| <b>Chairman:</b>        | Dr. Rakesh Kumar, ADG (Agro., AF & CC), ICAR, New Delhi                                            |
| <b>Co-Chairman:</b>     | Dr. J.S. Mishra, Director, ICAR – DWR, Jabalpur                                                    |
| <b>Rapporteurs:</b>     | Dr. Shobha Sondhia, Pr, Scientist Residue and Dr. PK Mukherjee, Pr. Scientist Agronomy             |
|                         | General discussion, financial and administrative issues, interaction with herbicide industry, etc. |
| <b>11:30-17:00 hrs</b>  | Visit to experimental fields and OFR/FLD at farmers' fields.                                       |

**XXXIII Annual Review Meeting  
All India Coordinated Research Project on Weed Management  
ICAR-Directorate of Weed Research, Jabalpur-482004**

**Venue:** Indira Gandhi Krishi Vishwavidyalaya, Krishak Nagar, Raipur,  
Chhattisgarh 492012.

**Date :** 12 to 14 May, 2026

**LIST OF INVITEES  
INDIAN COUNCIL OF AGRICULTURAL RESEARCH, NEW DELHI**

- |    |                   |                                                                                                                                                      |
|----|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | Dr. Mangi Lal Jat | Secretary (DARE) & Director General Indian Council of Agricultural Research Krishi Bhavan, New Delhi 110 001.                                        |
| 2. | Dr. A. K. Nayak   | Deputy Director General (NRM), Indian Council of Agricultural Research, Krishi Anusandhan Bhawan-II, Pusa, New Delhi – 110 012.                      |
| 3. | Dr Rakesh Kumar   | Asstt. Director General (Agronomy, AF & CC) (Act)<br>Indian Council of Agricultural Research, Krishi Anusandhan Bhawan-II, Pusa, New Delhi – 110 012 |

**EXTERNAL EXPERT**

- |    |                    |                                                     |
|----|--------------------|-----------------------------------------------------|
| 1. | Dr. Samunder Singh | Ex. Professor & Head, Agronomy, CCSHAU, Hisar       |
| 2. | Dr. S. S. Kolhe    | Ex. Professor, Agronomy, IGKV, Raipur, Chhattisgarh |

**ICAR-DIRECTORATE OF WEED RESEARCH, JABALPUR**

- |     |                      |                                               |
|-----|----------------------|-----------------------------------------------|
| 1.  | Dr. J. S. Mishra     | Director                                      |
| 2.  | Dr. V.K. Choudhary   | Pr. Scientist (Agronomy) & In-charge AICRP-WM |
| 3.  | Dr. P.K Singh        | Pr. Scientist, (Agril Extension)              |
| 4.  | Dr. Shobha Sondhia   | Pr. Scientist (Organic Chemistry)             |
| 5.  | Dr. P. K. Mukherjee  | Pr. Scientist (Agronomy)                      |
| 6.  | Dr. Yogita Gharde    | Sr. Scientist (Agril. Statistics)             |
| 7.  | Dr A Jamaludheen     | Scientist (Agril. Economics)                  |
| 8.  | Dr. Archana Anokhe   | Scientist (Agril. Entomology)                 |
| 9.  | Mr. Pankaj Shukla    | Asst. Chief Technical Officer                 |
| 10. | Dr. Pavan Kumar Para | Young Professional-II                         |

## INVITEES FROM AICRP-WM CENTRES

Regular Centre's

PROFESSOR JAYASHANKAR TELANGANA STATE AGRICULTURAL UNIVERSITY (PJTSAU),  
HYDERABAD

- |    |                       |                                               |
|----|-----------------------|-----------------------------------------------|
| 1. | Dr. (Mrs.) B. Padmaja | Pr. Scientist (Agro) & Principal Investigator |
| 2. | Dr. T. Anjaiah,       | Principal Scientist (SS&AC)                   |

### ANAND AGRICULTURAL UNIVERSITY, ANAND

- |    |                   |                                     |
|----|-------------------|-------------------------------------|
| 3. | Dr. V.J. Patel    | Agronomist & Principal Investigator |
| 4. | Mr. D.D Chaudhari | Agronomist                          |

### TAMILNADU AGRICULTURAL UNIVERSITY, COIMBATORE

- |    |                         |                                             |
|----|-------------------------|---------------------------------------------|
| 5. | Dr. (Mrs.) S. Radhamani | Principal Investigator & Professor Agronomy |
| 6. | Dr. (Mrs.) C. Bharathi  | Jr. Residue Chemist                         |

### CCS HARYANA AGRICULTURAL UNIVERSITY, HISAR

- |    |                      |                                                        |
|----|----------------------|--------------------------------------------------------|
| 7. | Dr. Todar Mal Poonia | Assistant Scientist, Agronomy & Principal Investigator |
| 8. | Dr. Paras Kamboj     | Sr. Scientist, Agronomy                                |

### RAJMATA VIJAYARAJE SCINDIA KRISHI VISHWA VIDYALAYA, GWALIOR

- |     |                      |                                              |
|-----|----------------------|----------------------------------------------|
| 9.  | Dr. Janmejaya Sharma | Scientist, Agronomy & Principal Investigator |
| 10. | Dr. Nisha Singh      | Scientist, Agronomy                          |

### ODISHA UNIVERSITY OF AGRICULTURE & TECHNOLOGY, BHUBANESHWAR

- |     |                     |                                     |
|-----|---------------------|-------------------------------------|
| 11. | Dr. Dr Sariska Jena | Agronomist & Principal Investigator |
|-----|---------------------|-------------------------------------|

### PUNJAB AGRICULTURAL UNIVERSITY, LUDHIANA

- |     |                          |                                          |
|-----|--------------------------|------------------------------------------|
| 12. | Dr (Mrs.) Parvinder Kaur | Residue Chemist & Principal Investigator |
| 13. | Dr. Jasvir Singh Gill    | Jr. Agronomist                           |

### G.B. PANT UNIVERSITY OF AGRICULTURE & TECHNOLOGY, PANTNAGAR

- |     |                |                                     |
|-----|----------------|-------------------------------------|
| 14. | Dr. S.P. Singh | Agronomist & Principal Investigator |
|-----|----------------|-------------------------------------|

### CSK HIMACHAL PRADESH KRISHI VISHVAVIDHYALAYA, PALAMPUR

- |     |                   |                                              |
|-----|-------------------|----------------------------------------------|
| 15. | Dr. Pankaj Chopra | Scientist, Agronomy & Principal Investigator |
|-----|-------------------|----------------------------------------------|

### KERALA AGRICULTURAL UNIVERSITY, THRISSUR

- |     |                           |                     |
|-----|---------------------------|---------------------|
| 16. | Dr. (Mrs.) Savitha Antony | Assistant Professor |
|-----|---------------------------|---------------------|

### ASSAM AGRICULTURAL UNIVERSITY, JORHAT

- |     |                        |                                         |
|-----|------------------------|-----------------------------------------|
| 17. | Dr. Milon Jyoti Konwar | Jr. Agronomist & Principal Investigator |
|-----|------------------------|-----------------------------------------|

### UNIVERSITY OF AGRICULTURAL SCIENCES, BENGALURU

- |     |                        |                                    |
|-----|------------------------|------------------------------------|
| 18. | Dr. (Mrs.) K.N. Geetha | Professor & Principal Investigator |
| 19. | Dr. Anand S.R.         | Jr. Agronomist                     |

### I.G. KRISHI VISHVA VIDYALAYA, RAIPUR

- |     |                      |                                    |
|-----|----------------------|------------------------------------|
| 20. | Dr. Shrikant Chitale | Professor & Principal Investigator |
| 21. | Dr. Nitish Tiwari    | Jr. Agronomist                     |

**MAHARANA PRATAP UNIVERSITY OF AGRICULTURE AND TECHNOLOGY, UDAIPUR**

22. Dr. Arvind Verma Professor (Agronomy) & Principal Investigator

**PANJABRAO DESHMUKH KRISHI VIDYAPEETH, AKOLA**

23. Dr. V.V Gaud Agronomist & Principal Investigator

**SHER-E-KASHMIR UNIVERSITY OF AGRICULTURAL SCIENCES AND TECHNOLOGY,  
JAMMU**

24. Dr. B.R. Bazaya Professor (Agronomy) & Principal Investigator  
25. Dr. (Mrs.) Manpreet Kaur Asstt. Professor (Agronomy)

**BIDHAN CHANDRA KRISHI VISWAVIDYALAYA, KALYANI**

26. Dr. Bikas Mandal Associate Professor (Agronomy) & Principal Investigator

**Volunteer Centre's**

**SHER-E-KASHMIR UNIVERSITY OF AGRICULTURE AND TECHNOLOGY - KASHMIR  
SHALIMAR, SRINAGAR**

27. Dr. Ahmad Abdullah Saad Professor & Principal Investigator

**P.J. NEHRU COLLEGE OF AGRICULTURE & RI, KARAIKAL, U.T. OF PONDICHERRY BIHAR**

28. Dr. P. Saravanane Professor & Principal

**AGRICULTURAL UNIVERSITY, SABOUR, BHAGALPUR BIHAR**

29. Dr. Birendra Kumar Asstt. Professor & Principal Investigator

**UNIVERSITY OF AGRICULTURAL SCIENCES, DHARWAD**

30. Dr. P. Jones Nirmalnath Professor & Principal Investigator

**BANDA UNIVERSITY OF AGRICULTURE & TECHNOLOGY, BANDA**

31. Dr. Dinesh Sah Professor & Principal Investigator

**ACHARYA N.G. RANGA AGRICULTURAL, UNIVERSITY, GUNTUR SRI**

32. Dr. S. Prathibha Sree Pr. Scientist (Agronomy) & Principal Investigator

**KARAN NARENDRA AGRICULTURE UNIVERSITY, JOBNER**

33. Dr. Shweta Gupta Asstt. Professor (Agronomy) & Principal Investigator

## INVITEES FROM HERBICIDE INDUSTRY

1. Dr. R.K.S. Rathaur  
State Marketing manager -IFFCO,  
State office,  
IFFCO, Sector-2, plot No. A-42,  
Kamal Vihar, Raipur (C.G.)
2. President  
Dhanuka Agritech Limited  
14th Floor, Building 5A, Cyber City, DLF Phase-III, Gurgaon – 122 002 Haryana
3. Managing Director and CEO  
PI Industries Limited  
ML Batra Enterprises Compound, C – 21, Meerut Road Industrial Area,  
Ghaziabad – 201 003
4. President  
Syngenta India  
Ltd  
Invoicing Processing Cell (CC-4700)  
Amar Paradigm, S. No. 110/11/3, Baner Road, Pune 411045
5. Vice President - International Marketing & Development  
Gharda Chemicals Limited  
48, Hill Road,  
Bandra (West), Mumbai-400 050
6. Vice President- Public & Government Affairs  
Bayer Crop Science Limited Delta Square, Ground Floor, Sector-25 M.G  
Road Gurgaon – 122002
7. ASPEE Group of Companies  
4th floor, Aspee House  
Aspee Enclave, Opp. I.O.B.  
Bank Marve Road, Malad West  
Mumbai - 400064
8. Krishi Rasayan Group  
410 & 411, Dev Arcade,  
Near Naranpura Rly Crossing,  
Naranpura, Ahmedabad-380 013
9. Managing Director & CEO  
Rallis India Limited, 156/157, 15th Floor, Nariman Bhavan, 227, Nariman Point,  
Mumbai 400 021
10. Sumitomo Chemical India Pvt. Ltd.  
7th, Moti Mahant, 195, J. Tata Road  
Churchgate, Mumbai 400020
11. General Manager (Research Tech. Development)  
M/s GODREJ AgroVet Ltd. Pirojshnagar  
Eastern Express High Way Vikhroli (East),  
Mumbai 400 079
12. General Manager  
ADAMA India Pvt. Ltd.  
Located in IKP Knowledge Park, Plot No: DS -13, IKP Knowledge Park, Sy. No. 542/2,  
Genome Valley, Turkapally, Shameerpet Medchal-Malkajgiri district, Hyderabad, Telangana,  
500101
13. Crystal Crop Protection  
Limited B-95, Wazirpur  
Industrial Area Wazirpur  
New Delhi, Delhi 110052, IN
14. Tropical Agrosystem India Pvt. Ltd.  
Jhaver Centre, IV th Floor,  
72, Marshalls Road,  
Chennai, Tamilnadu, India  
600008
15. UPL Pvt. Ltd.  
3-11, G.I.D.C., Vapi, Distt. Valsad, Gujarat 396195 India, Tel. No.: 0260-2432716

16. Manager- Company Secretarial  
BASF Chemicals India Private Limited  
The Capital, A Wing, 1204-C, 12th Floor, Plot No. C-70 G Block, Bandra Kurla Complex,  
Bandra (East) Mumbai City MH 400051 IN.
17. SWAL CORPORATION LTD.  
UPL House, 4th Floor, CTS No. 610B/2, Bandra Village, Off Western Express Highway,  
Behind Teachers Colony, Bandra (East), Mumbai 400 051.
18. CORTEVA Agri Science.  
ATRIA Building, The V Park ASCENDAS IT Park, Plot # 17, Madhapur, Gate No.5, Software  
Units Layout, Hyderabad, Telangana - 500081
19. Business Lead  
Paryan Alliance 101144  
Tower 10 Prestige high fields ISB Road  
Financial District Nanakramgunda, Hyderabad-500032, Telangana
20. GM-Product Development  
Tagros Chemicals India Private Limited  
Tagros House, No. 4 Club House Road, Anna, Salai,  
Chennai-600002, Tamilnadu, India
21. Product Manager-herbicides  
Willowood chemicals Limited  
4<sup>th</sup> Floor, Salcon Aurum, District Center, Jasola,  
New Delhi-110025
22. GM-Marketing Development  
JU Agri Science Pvt. Ltd.  
2302, 3rd Floor, Express trade tower-2  
B-36, Sektore-132, Noida-201301 (UP) India