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कार्यवृत
Proceedings

अखिल भारतीय समन्वित खरपतवार प्रबंधन परियोजना

की XXVIII वार्षिक समीक्षा बैठक

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

वीडियो कॉन्फ्रेंसिंग
18–19 जून, 2021

Video Conferencing
18-19 June, 2021

भा.कृ.अनु.प.–खरपतवार अनुसंधान निदेशालय
जबलपुर–482 004 (म.प्र.)
ICAR-Directorate of Weed Research
Jabalpur - 482 004 (M.P.)
(*ISO 9001:2015 Certified*)

Proceedings
of
XXVIII Annual Review Meeting of All India Coordinated Research Project on Weed Management held during 18-19 June, 2021 through Video Conferencing

18th June, 2021
INAUGURAL SESSION

XXVIII Annual Review Meeting of All India Coordinated Research Project on Weed Management was organized at ICAR-DWR, Jabalpur during 18-19 June, 2021 through video conferencing. Dr. S. K. Chaudhari, DDG (NRM), ICAR graced the inaugural session as Chief Guest and Dr. S. Bhaskar, ADG (AAF & CC), ICAR as Guest of Honour. The inaugural session was started with lighting of lamps followed by playing of ICAR theme song. Dr. J. S. Mishra, Director, ICAR-DWR in his opening remarks welcomed Dr. S. K.Chaudhari, Dr. S. Bhaskar, Dr. A. K. Singh, Director, ICAR-IARI, Dr. Samunder Singh, Ex. Prof & Head Agronomy, CCS HAU, Hisar and President of International Weed Science Society, Dr, R. M. Kathiresan, Professor, Department of Agronomy, Annamalai University, Annamalainagar, Tamil Nadu, Directors of other ICAR institutes, scientists of ICAR-DWR, PIs and associated scientists of AICRP centres and other delegates and participants. Dr. Samunder Singh and Dr. R. M. Kathiresan were invited as expert for this meeting. In his address Dr. Mishra made a brief presentation on the salient research findings of 2020-21 of different AICRP-WM centres. In the presentation, he highlighted the economic impact of weeds on field crops and average yield loss due to weed in different field crops. After the welcome address by the Director following publications were released by the Chief Guest and Guest of Honour.

- Integrated weed management in the context of present agriculture and environmental condition published by Udaipur Centre.
- Integrated weed management in sweet corn published by Udaipur Centre.
- Gujarati book and Gujarati folder on weed management published by Anand Centre.

In every ARM one centre is recognized as the Best Centre and this time AICRP-WM centre at Anand Agricultural University, Anand, Gujarat received the Best Centre Award (2020).

In his address, Dr S. Bhaskar, ADG (AAF & CC), ICAR made the following observations and comments:

- Direct-seeded rice (DSR) and Conservation Agriculture (CA) are picking up in the Indo-Gangetic Plains and Central India. Therefore, there is a need to intensify research particularly on weed control aspect of DSR and strengthen monitoring system on shift in weed flora in CA wherever the technology is being adopted.
- Mapping of invasive weeds, parasitic weeds and aquatic weeds is very much required as these weeds are region specific, location specific and even the technologies being used are also location specific. There is a need to adopt biological method of weed control, however, multiplication of bio-agents is a limitation in each and every centre. Emphasis should be given across the AICRP centres. Areas and localities where specific weeds (*Parthenium*, *Orobanche*, aquatic weeds etc.) are a problem need to be identified, mapped and coordinating centres should focus their activities on these aspects.
- Collaboration with plant breeders is required to identify herbicide tolerance in major crops which are showing heavy losses due to weed infestation although there is a limitation of introducing herbicide resistant varieties of the crops in India.
- Evaluation and testing of new emerging chemicals in a time bound manner and their timely utilization in field is also required as there is a lag between developing the chemical and its testing

and by the time it is used in farmers' field, the chemical would have been withdrawn by the industry. This is also being expressed by the herbicide industry.

- Training and awareness on safe use of herbicide and adoption of advanced techniques for application of herbicide like drone-based application technique need to be strengthened at each centre.
- Herbicide regulation, policy issues so far drafted at National level for sustainable weed management need to be adopted by every state and also to be integrated in their policy. PI of the respective centre can take up this issue with the policy makers of the respective states.

Dr. A. K. Singh, Director, ICAR-IARI informed the house about the development of two basmati background herbicide tolerant rice varieties against imazethapyr for which label claim of these varieties needs to be expanded. He urged that public sector institute or ICAR-DWR to make an application for expansion of label claim or it has to be from some company, one of the manufacturers, who can make the application in this context. He acknowledged the help received from ICAR-DWR while developing these varieties and also looking forward to get collaboration in preparation of the complete dossier. He also mentioned that good number of technologies have emerged through experiments in AICRP-WM centres. He requested DDG (NRM) to develop a system and mechanism in NRM section so that these technologies can be identified, released and notified in state package of practices and researchers involved in generation of these technologies should get due recognition and credit.

Dr S.K. Chaudhari, DDG (NRM) made the following observations and comments:

- There is a need to minimize the losses caused by the weeds and for which it is essential to find out the best possible strategies which are environmental friendly and not adding many chemicals in soil and ecosystems so that losses could be reduced from 33% to below 10% level. Integrated approach of using high yielding varieties, high input agriculture and agriculture intensification need to be adopted to solve weed problems. In altered agronomy like mulching in zero tillage technology, conservation agriculture and direct-seeded rice, weeds pose serious challenge. Therefore, concerted efforts need to be made to find out matching strategies and technologies to combat weed problems under altered agronomic practices.
- Major focus needs to be given to study weed dynamics, biology and eco-physiology of crop-weed interaction and shift in weed flora in different agro-ecosystems especially in high input intensive agriculture under climate change regime in terms of increasing temperature, erratic rainfall and occurrence of extreme events. These studies are essential to devise strategies for managing weeds. Quality human resources for the research projects under climate change regime need to be created in the country.
- Emergence of herbicide resistance in weeds is a big problem and for which finding of new molecules is very much essential to manage these weeds. Finding of new molecules should be based on the data that depict interaction of new molecules with environment. Intensified research is required for monitoring and management of herbicide resistant weeds.
- Herbicide residue hazard needs to be fully understood and in this context he urged the Directorate and AICRP-WM centers to make concerted efforts. In addition to this, efforts should also be made to study rate of consumption of herbicides and rate of increasing food grain production.
- Weedy rice, parasitic weeds, aquatic weeds, alien invasive weeds especially *Lanata camara, Parthenium* and other obnoxious weeds are also posing threat because of their fast spreading nature in several ecosystems. Therefore, emphasis should be given to find out the technologies to manage these weeds not only in agro-ecosystems but also in other ecosystems.
- Accumulated information for years together from each AICRP centre and study of literature especially published papers could facilitate to find out the methodologies and kind of support and collaboration required from the different agencies including Government for weed risk analysis.

- There is a need to develop location specific robust technology for managing weeds in CA, DSR and organic agriculture.
- The data on environmental impact of herbicides are essentially required to develop a robust regulatory mechanism in the country. Herbicide consumption needs to be linked with quality control of the molecules, which are available. In this context he urged the AICRP centres to develop a strong monitoring system on use of herbicide so that entry of spurious products can be prevented and also to provide a policy support to the Government so that a robust regulatory mechanism can be developed.
- He said that very recently a stakeholder consultation was jointly organized by Trust for Advancement of Agricultural Science (TAAS), ICAR, ICAR-DWR and ISWS in which herbicide regulation and enabling policy was discussed at length. In this discussion, several weaknesses in regulatory mechanism were highlighted and how best these weaknesses can be removed for developing a strong regulatory system. Government needs policy support and technical backstopping to make the system very robust. Therefore, ICAR-DWR with the help of AICRP centres can provide information to the Government for developing and enabling policy in the country. He also suggested that for improving productivity, there is a need to develop linkage with industry and consider industries perspective. Greater attention should be given on safe use of herbicide for which correct information should be provided to the Government for enabling the policy and large scale implementation.
- He mentioned that traditionally the scientist are working with the fixed objectives and therefore, he urged the Directorate and all the AICRP centres to have well defined objectives for avoiding repetition of same experiments and to find out some R&D issues on priority basis. He also suggested that there is a need to shift our focus and it is important to work on Public-Private Partnership (PPP) mode. Focused research projects should be taken up on climate change issues.

At the end of the inaugural session, Dr R. P. Dubey, In-charge, AICRP-WM proposed the vote of thanks.

Presentation of salient findings of research work done during *Rabi* 2019-20 and *Kharif* 2020 by AICRP-WM Centres under the following four research programmes:

WP 1: Development of location-specific sustainable weed management practices
WP 2: Management of weeds in non-cropped and aquatic areas
WP 3: Fate of herbicide residues in different agro-ecosystem
WP 4: Demonstration and impact assessment of weed management technologies

TECHNICAL SESSION - I

Chairman:	**Dr. S. Bhaskar**, Assistant. Director General (AAF&CC), ICAR, New Delhi
Co-Chairman:	**Dr J.S. Mishra**, Director, ICAR-DWR, Jabalpur
	Dr R.P. Dubey, Pr. Scientist (Agronomy) & In-charge, AICRP-WM, ICAR-DWR, Jabalpur
Rapporteur:	**Dr T. Ramprakash**, Pr. Scientist & PI, AICRP-WM, PJTSAU, Hyderabad
	Dr V.K. Choudhary, Sr. Scientist (Agronomy), ICAR-DWR, Jabalpur

Dr. J.S. Mishra, Director, ICAR-DWR, Jabalpur, welcomed the external experts, Dr. Samundar Singh and Dr. R.M. Kathiresan.

In this session, Principal Investigator's of six AICRP-WM centres viz. Ludhiana, Palampur, Hisar, Pantnagar, Jammu and Gwalior presented the salient findings.

PAU, Ludhiana

Dr. M.S. Bhullar, Principal Investigator, presented the salient findings.

- The shift in weed flora with the predominance of *Dactyloctenium, Eragrostis, Leptochloa, Cyperus rotundus* etc. was observed in DSR.
- In maize, the application of pyroxasulfone 127.5 g/ha provided effective weed control and led to higher grain yield.
- No difference in grain yield between TPR and DSR was recorded. However, DSR recorded significantly lower production cost. Retention of crop residues on soil surface significantly increased the soil dehydrogenase and urease activity.
- In DSR *Dactyloctenium* seed bank is increasing whereas, in TPR *Echinochloa* seed bank is increasing. Adoption of IWM has resulted in decreasing strength of seed bank.
- In wheat, under DSR-ZT+R wheat recorded similar yield on TPR – ZT+R based system. However, *Phalaris minor* density reduced under MB ploughed plots, whereas ZT plots considerably reduced the *Rumex dentatus* and *Poa annua*.
- In organic agriculture, the application of FYM+ vermicompost coupled with paddy straw mulch and plastic mulch (25 microns) and hand weeding have resulted in higher yield of brinjal. In pea, vermicompost with one hand weeding, paddy straw mulch and plastic mulch provided higher yield than others.
- Aclonifen+diflufenican at 1000+200 g/ha and pyroxasulfone at 127.5 g/ha provided excellent control on resistance biotypes of *P. minor* in wheat.
- Samples of grain, straw, soil and groundwater were collected from the farmers' field and no herbicide residues (Butachlor, pretilachlor, clodinafop, sulfosulfuron, pyroxasulfone) were found.
- Pyroxasulfone degraded 35 days after application and it was found to have transient effect on soil microbes. Halosulfuron dissipation increased with the increase in soil temperature from 5^0C to 25^0C.
- With adoption of Tar-Wattar sowing of DSR first irrigation can be delayed upto 21 days and provided comparable yield to transplanted rice with higher returns.
- Adopting lucky seed drill seeding and pre-emergence herbicides can be applied together and with press wheel adjustment crust formation can be avoided during rains.

Comments of Chairman, Co-Chairman and Experts

- The success story of tar-wattar technology needs to be compiled and sent to the PC unit.
- It was suggested for close monitoring of weed shift in DSR fields and for the occurrence of *Echinochloa glabrescens*
- Advancing the sowing of DSR from 1st of June to May second fortnight may further reduce the weed severity.
- Copy of all the videos, literature, bulletins generated by the center should be sent to the PC Unit for uploading in the ICAR-DWR website.
- Network project on DSR should be formulated with similar ecology involving the states where DSR is gaining popularity.

CSKHPKV, Palampur

Dr. Neelam Sharma, Principal Investigator of the centre, presented the salient findings.

- *Erigeron canadensis* was recorded as newly emerging weed of importance.
- *Avena ludoviciana, Lolium temulentum* and *Poa annua* were the important weed species in wheat in maize-wheat cropping system under CA.
- In CA-based wheat-mustard system higher gross returns, net returns and B:C was recorded in CT-ZT among different tillage treatments followed ZTR-ZTR, CT-CT and ZT-ZTR.
- ZTR-ZTR system recorded higher population of fungi, actinomycetes and bacteria compared to other conventional tilllage treatments.
- Butachlor and bispyribac-sodium residues in soil were found below the detectable limit at the time of harvest of rice crop.
- More than 95% of applied ethalfluralin in the soil dissipated within 25 days after herbicide application at recommended and double doses.
- Weed management technologies in wheat, maize, rice, turmeric, pea and soybean and fodder sorghum were demonstrated at farmers' field.

Comments of Chairman, Co-Chairman and Experts

- It was suggested to adopt eco-friendly weed management practices in cropping system.
- The scientific names of the weeds should be presented correctly.
- Mobile app should be developed in local language.
- The crop residues should be incorporated into the field *in-situ*.
- Weed seed bank analysis of the FYM/vermicompost should be carried out.
- Data on persistence of the herbicide being used in a study should also be mentioned while presenting the residue results.

CCSHAU, Hisar

Dr. Todar Mal Poonia, Principal Investigator of the centre, presented the salient findings.

- In rice wheat CA experiment, under zero tillage, *Phalaris minor* density was low but recorded high density of *Rumex dentatus*.
- In pigeonpea, PE application of pendimethalin+imazethapyr 1000 g/ha followed by hand weeding at 45 DAS or pyraxosulfone 127.5 g/ha *fb* imazethapyr 100 g/ha provided excellent weed control and higher yield.
- *Coronopus didymus*, *Anagallis arvensis* and *Polypogon monspeliensis* were showing the increasing trend in their population in wheat. Whereas, *C. rotundus*, *E. colona*, *Leptochloa chinensis*, *Dactyloctenium aegyptium* were found to be the most problematic weeds in DSR.
- Pyraxosulfone +pendimethalin 127.5+1500 g/ha PE *fb* pinoxaden + metsulfuron 50+4 g/ha PoE provided excellent control of *P. minor* in wheat crop.
- Use of sulfosulfuron 25 g/ha at 60 DAT and 50 g/ha at 90 DAT provided good control on *Orobanche* in tomato crop.
- Glyphosate 25 g/ha at 30 DAS and 50 g/ha at 50 DAS provided excellent control of *Orobanche* in irrigated mustard.

Comments of Chairman, Co-Chairman and Experts

- Herbicide resistance is a major issue whereas no new molecules are coming up therefore; focused work needs to be carried out.
- Geo-coordinates data should be collected using GPS or mobile phone while conducting weed surveys.

- GIS should be used for developing weed maps.
- High grain yield of 8.7 t/ha recorded in DSR need to be verified.
- *Orobanche* research and extension work needs to be continued in view of its wider acceptance and spread of the weed to newer areas.
- Correct abbreviation of herbicides name should be mentioned.
- Based on the performance of DSR, it is suggested to include DSR in the future technical programme.
- It was suggested to compile the document on the findings of *Orobanche* management in mustard crop and release this as a technology.
- Appropriate units should be used while reporting the yield data.

GBPUA&T, Pantanagar

Dr. V. P. Singh, Principal Investigator of the centre, presented the salient findings.

- In litchi+ peach-balckgram /maize agri-horti system, imazethapyr 100 g/ha provided excellent weed control in blackgram. Topramezone 33.6 g/ha provided efficient control of weeds in maize.
- Topramezone 25 g/ha *fb* hand weeding in paired row planting of maize in sugarcane provided excellent weed control.
- In sugarcane, sulfentrazone 720 g/ha (PE) followed by hand weeding at 45 days after planting *fb* 2,4-D 1000 g/ha at 60 DAP or atrazine 2 kg/ha, hoeing at 45 DAP *fb* topramezone 25 g/ha at 60 DAP provided broad-spectrum weed control and higher cane yield.
- In resource conservation experiment, conventional tillage with crop residues and application of clodinafop+metsulfuron at 64 g/ha *fb* hand weeding provided excellent weed control, higher yield and more returns.
- In organic rice-vegetable pea-sweet corn cropping system, stale seedbed in DSR with brown manuring, mechanical weeding (one pass of cono-weeder) followed by one hand weeding at 45 DAS provided excellent weed control and higher yield.
- OFR on wheat (clodinafop+metsulfuron 64 g/ha and sulfosulfuron+metsulfuron 32 g/ha), rice (pretilachlor 750 g/ha *fb* cyhalofop+penoxsulam 135 g/ha), maize (atrazine 500 g+topramezone 25 g/ha) were found better than farmers' practice in managing weeds.

Comments of Chairman, Co-Chairman and Experts

- It was suggested to include new herbicide molecules in wheat to avert herbicide resistance problem.
- The Centre should publish the research work in high rated journals.
- If more than one species is found under one genus then spp need to be mentioned or otherwise sp.
- Weed control efficiency should be drawn from weed density, and weed control index should be from weed dry biomass.
- All the experiment approved in the technical program need to be executed without any deviation.
- Statistical analysis and data transformation should be done carefully.
- Numbering of the experiments given by PC unit should be followed scrupulously while reporting the data.

SKUAST, Jammu

Dr. B.R. Bazaya, Principal Investigator of the centre, presented the salient findings.

- In the TPR-wheat cropping system, *Sesbania* green manuring and triafamone+ethoxysulfuron 66.5 g/ha (PoE) and in direct-seeded rice, *Sesbania* with pendimethalin 1 kg/ha *fb* triafamone+ ethoxysulfuron 66.5 g/ha provided effective weed control, higher yield and returns.

- In the maize-chickpea cropping system, PoE of topramezone+atrazine (25.2 + 500 g/ha) provided comparable maize yield to two mechanical weeding at 20 & 40 DAS.
- In basmati rice-knolkhol cropping system, *Sesbania* green manuring *fb* hand weeding at 30 DAT resulted in lower weed infestation, higher yield and more return.
- In basmati rice-broccoli-*Sesbania* cropping system, plastic mulch, and paddy straw mulch at 6 t/ha *fb* 1 hand weeding provided good weed control and higher yield.
- In greengram, tillage was comparable, but acifluorfen+clodinafop 245 g/ha provided better weed control, higher yield and more B:C.
- The performance of *Neochetina* was not satisfactory in controlling water hyacinth.
- Pendimethalin 1 kg/ha *fb* bispyribac-sodium+ethoxysulfuron (25+20 g/ha) in DSR and clodinafop+metsulfuron 64 g/ha and sulfosulfuron+carfentrazone (25+20 g/ha) in wheat were better than farmers' practice.

Comments of Chairman, Co-Chairman and Experts

- *Sesbania* followed by hand weeding treatment need to be verified.
- *Azolla* must be grown with adequate water in organic farming. Research opportunities on rice-fish system and inclusion of lotus as intercrop may be explored.
- Weed shift data must be supported with phyto-sociological survey with IVI ratio and summed dominance ratio.
- Monitoring of herbicide resistance and their management need to be conducted.

RVSKVV, Gwalior

Dr. D.S. Sasode, Principal Investigator of the centre, presented the salient findings.

- In the pearlmillet-mustard-cowpea system, ZTR-ZTR-ZTR had lower weed parameters, higher yield and B:C.
- Atrazine 500 g/ha *fb* HW in pearlmillet, oxyfluorfen 230 g/ha+HW in mustard provided excellent weed control and higher yield.
- In the sweet corn-potato-greengram cropping system, soil solarization *fb* plastic mulch increased the potato tuber yield, higher net returns and more weed control.
- *Cuscuta* in berseem was managed through the application of imazethapyr 40 g/ha at 1st cut and imazethapyr at 40 g/ha at the last cut for seed production.
- OFR in wheat, sulfosulfuron+metsulfuron 32 g/ha and clodinafop+metsulfuron 64 g/ha provided 28-30% more yield than farmers' practice.

Comments of Chairman, Co-Chairman and Experts

- In solarized plot, soil temperature measurement is important and weeds which are getting controlled need to be documented.
- Standard abbreviations of herbicides should be used in presentations.
- In Pearl millet-mustard-cowpea CA experiment, happy seeder must be used for sowing and PE herbicide application. Otherwise, experiment should be dropped.
- Implementation of the OFDs under SCSP should be monitored and data should be recorded.
- Soil solarization *fb* black polythene mulch will adversely impact the tuber formation; this treatment needs to be critically evaluated.
- Combined population of *Neochetina eichhorniae* and *N. bruchi* needs to be released, instead of a single species for sustainable control of water hyacinth. Weather data should also be recorded after release of weevil.
- Partial budgeting model for calculation should be adopted while computing the economics for plastic mulches.

- Residue analysis of berseem needs to be done.
- If any centre has conducted a particular experiment for 3-4 years, those experiments should be concluded and new experiments should be formulated.

TECHNICAL SESSION - II

Chairman:	**Dr. Samunder Singh**, Ex. Prof. & Head Agronomy, CCS HAU Hisar
Co-Chairman:	**Dr J.S. Mishra**, Director, ICAR-DWR, Jabalpur
Rapporteur:	**Dr. B.D. Patel**, Principal Investigator, AAU, Anand
	Er. Chethan CR, Scientist, ICAR - DWR, Jabalpur

During this session PIs of six AICRP-WM centres *viz.*, Hyderabad, Bengaluru, Thrissur, Coimbatore, Akola and Udaipur presented their salient findings.

PJTSAU, Hyderabad

Dr. T. Ramprakash, Principal Investigator of the centre, presented the salient findings.

- *Leptochola chinensis* was found to be emerging as a new weed of economic importance in rice fields, especially in DSR fields, in South Telangana Zone (STZ) also under Nagarjuna Sagar Project Left Canal command. Earlier, the infestation was observed only in Central Telangana Zone.
- Long-term study for six years in CA with rice-maize and green manure cropping system showed that, higher system productivity, net returns and B:C was observed under Conventional tillage (CT) *kharif* rice followed by maize under zero tillage (ZT) and CT practices, respectively.
- Inter-row rice straw mulch (5 tons/ha) fb intra row weeding at 30 DAS or mulching with poly-sheet (250 micrometers) followed by intra-row HW at 30 DAS or cultural practice involving mechanical weeding at 20 & 40 DAS can be recommended for efficient weed control and higher yield in okra.
- Residues of bispyribac sodium and pretilachlor (in transplanted rice), pendimethalin (in DSR) in the soil samples, rice grain and rice straw samples collected at the time of harvest were below the respective detection limits.
- Residues of atrazine in the soil samples, maize grain and straw samples at harvest were below the detectable limit of 0.05 ppm irrespective of tillage treatments.

Comments of Chairman, Co-Chairman and Experts

- During last year they have received 80% more rainfall than the average annual rainfall and because of this reason the experiments were badly affected.
- It was suggested to verify the treatment where mechanical weeder was used for IWM in CA cotton-maize experiment.
- The type of straw mulch used needs to be mentioned in the presentation.
- The effect of rice straw mulch on the weeds needs to be studied.
- The LSD values are varied too much in the reported results and this need to be verified.
- The height of crop needs to be considered while applying the PoE herbicide through robot.
- Analyze the atrazine content in water bodies like ponds, tube wells, water channels etc.
- Videos uploaded to the PJTSAU website needs to be sent to ICAR-DWR to upload in website.
- Weed seed bank and weed biology needs to be studied in long-term experiments.
- Phyto-sociological studies need to be conducted on DSR.

UAS, Bangalore

Dr. K.N. Geetha, Principal investigator of the centre, presented the salient findings.

- Among tillage practices, adopting permanent bed tillage recorded significantly higher yield and lower weed emergence *fb* conventional tillage in maize-greengram cropping system under conservation agriculture.
- In non-chemical methods of weed management in *Kharif* foxtail millet and *Rabi* greengram, hand weeding at 20 and 40 DAS recorded significantly higher foxtail millet grain yield (1.39 t/ha) and greengram grain yield (1.04 t/ha) which was on par with stale seed bed technique followed by inter-cultivation at 25 days after sowing + 1 hand weeding at 45 days after sowing (1.32 t/ha and 0.975 t/ha respectively).
- Under SCSP programme, weed management hand tools like Varavri, Spade, Rake, sickle and Cycle weeder were distributed to the beneficiaries.

Comments of Chairman, Co-Chairman and Experts

- The transformed weed dry weight data was presented. If the values are above 0 and below 100, then there is no need to transfer the data. Care needs to be taken while presenting the data.
- The CV values of weed density and weed dry weight is very less and these values need to be verified.
- Under non-chemical weed management, the straw mulching is used as a standalone treatment, whereas other treatments were used in combination. The effect may be differed and treatment effect will be biased.
- It was suggested to review the experiment to control weeds by alligator weed.
- The system yield should be presented when experiment is conducted in cropping system mode.
- The crop yield should be expressed in t/ha.
- Only 7 experiments were conducted out of 12 allotted experiments. It was suggested to conduct all the experiments.
- Non-chemical methods may be tried to control the weeds instead of herbicide in coriander.

KAU, Thrissur

Dr. P. Prameela, Principal investigator of the centre, presented the salient findings.

- A new weed of family Poaceae identified as *Rottboellia cochinchinensis* was found to be distributed near FCI godowns, warehouses, public distribution shops and furniture shops.
- Cyhalofop-butyl+penoxusulam 135 g/ha 15-20 days after sowing/transplanting was best for weed control in wet-seeded rice and transplanted rice.
- Herbicidal management of alien invasive weed *Sphagneticola trilobata* is very effective by sparying either glyphosate 2 kg/ha or metsulfuron-methyl +chlorimuron-ethyl 10 g/ha or metsulfuron- methyl 10 g/ha
- In organic production of cassava, intercropping of a legume - cowpea/green gram/horsegram, followed by one earthing up at 60 DAP was found effective weed management technique and resulted increase of 29% yield.
- For non-cropped areas, a combination spray of 2,4-D (1.25 kg/ha) + glyphosate (2 kg/ha) gave 100% control of *Sphagnetticola trilobata* after 10 days of spraying.

Comments of Chairman, Co-Chairman and Experts

- Mulching with fresh *Eichhornia crassipes* is very dangerous and it should be dried completely and or decomposed properly before using it as mulch. However, centre reported that there was no problem during the experiment.

- BC ratio should be verified while comparing between the polythene and straw mulch.
- Data on weedy rice was not presented in the presentation. It should be included.
- For data on problematic weeds in forest and non-cropping area, a survey needs to be taken up and data should be reported.
- Under ginger crop experiment there was no control or check treatment taken. Thus, comparison of results will be difficult. Control treatment needs to be taken along with other treatments.
- The dose of glyphosate should be calculated with respect to the acid equivalent.
- Kerala state banned the glyphosate, however, it has been used in the experiment. The house informed the centre not to recommend the glyphosate in package of practice of the state at this juncture.
- At farmers' field problem of *Leptochloa* was observed and it was controlled by intervention of different advanced weed management practices by the centre. It was suggested to bring out this achievement in the form of a success story.

TNAU, Coimbatore

Dr. P. Murali Arthanari, Principal investigator of the centre, presented the salient findings.

- Higher weed control efficiency of 79.5% was recorded in CT+ZT+ZT cotton-baby corn based cropping system under conservation agriculture. Among weed management practices, PE pendimethalin (CS) 680 g/ha followed by directed spray of paraquat 0.6 kg/ha recorded higher weed control efficiency (80.7%) and yield of cotton.
- In blackgram and greengram, pre-emergence application of pendimethalin 0.75 kg on 3 DAS followed by early post-emergence application of imazethapyr 60 g/ha on 15 DAE of weeds (2 - 3 leaves stage of weeds) and quizalofop-ethyl 50 g /ha on 20 DAE of weeds (2 - 3 leaves of weeds) are recommended for controlling broad leaved and grassy weeds, respectively.
- Post-emergence application of glyphosate 1.5 kg/ha + 2,4-D Na salt 1.25 kg/ha + wetting agent 2 ml/litre of water was found to be effective in reducing density and dry weight of *Solanum elagaenifolium* and with no regeneration even after 60 days after herbicide application.
- Post-emergence tank mix directed application of glyphosate 10 ml/ha + 2, 4-D sodium salt 5 g/litre of water was found best to control *Portulaca quadrifida* in cropped fields.
- Application of PE pendimethalin + imazethapyr 900 g/ha (PM) or EPOE fluazifop-p-butyl + fomesafen 250 g/ha (PM) or EPOE propaquizafop + imazethapyr 125 g/ha (PM) could be best way to manage *Cuscuta* in onion.
- Residues of atrazine and oxyfluorfen used in maize, tomato and onion were below detectable limits in soil and plant matrices in the farmers' field.

Comments of Chairman, Co-Chairman and Experts

- Centre covered the left over 2 experiments from last season and they have totally conducted 15 experiments.
- Phyto-sociological parameters, weed density, dry weight, frequency and other parameters needs to be considered to express the weed shift data.
- The effect of straw mulch on soil microorganism needs to be studied in long-term experiments.
- The dosage of herbicides needs to be mentioned while presenting the data.
- Weed seed bank study in long-term experiments needs to be done.
- Weed survey and surveillance needs to be done to identify new weeds and weed shift.
- The house requested the centre to standardize the nozzles and other parameters for drone-based application technique of herbicide.
- Pendimethalin + paraquat as tank mix may be applied in cotton for better control of weed.

- Success stories and videos needs to be developed in both Tamil and English language and should be submitted to DWR.

PDKV, Akola

Dr. V. V. Gaud, Principal Investigator of the centre, presented the salient findings.

- Diclosulam 26 g/ha as pre-emergence *fb* propaquizafop 50 g + imazethapyr 75 g/ha at 20 DAS was the most remunerative and effective herbicide in sole soybean for controlling the weed flora and getting higher yield and economic returns.
- Tembotrione 120 g/ha at 20 DAS was the most remunerative and effective herbicide in maize.
- Imazethapyr + imazomox 70 WG 70 g/ha 20 DAS was the most remunerative and effective herbicide in groundnut.

Comments of Chairman, Co-Chairman and Experts

- The results of all the experiments were not presented during the presentation. It needs to be presented.
- Only 4 experiments were conducted out of allotted 12 experiments.
- Using of same herbicide i.e. paraquat for two time application needs to be avoided and combination of herbicides may be used.
- Two hand weeding in cotton is not economical and should not go as recommendation hence, revisit the recommendation made for cotton.
- Spelling mistake of some weeds was observed. It needs to be corrected before presenting the presentation.
- Prepare a success story/video clip of *Parthenium* replacement by *Cassia tora.*
- Economics of the experiments was not presented during the presentation. It was informed to include it in the presentation.
- Very less number of FLDs were conducted. It was suggested to conduct more number of field demonstrations.

MPUAT, Udaipur

Dr. Arvind Verma, Principal Investigator of the centre, presented the salient findings.

- In organic sweet corn-fennel cropping system, maximum seed yield (1440 kg/ha) of fennel was recorded with crop sown with treatment of stale seed bed with plastic mulch, which was at par with plastic mulch with soil-solarization(1230 kg/ha) and summer ploughing(1130 kg/ha) and pre-emergence application of pendimethalin 1000 g/ha with straw mulch (1110 kg/ha).
- In organic baby corn-fenugreek cropping system, maximum green cob yield (2.18 t/ha) was recorded with treatment in which babycorn field prepared with soil-solarization followed by plastic mulching.
- Maximum seed yield (755.7 kg/ha) of blackgram was recorded with IC *fb* hand weeding at 20 and 40 days after sowing which was found at par with application of imazethapyr + quizalofop-ethyl 60 g/ha (Tank Mix) at 15- 20 DAS) and realized with early post-emergence application of imazethapyar + imazamox 60 g/ha. The magnitude of increase by these treatments were to the tune of 109.6, 103.7 and 97.0 % over weedy check (357.7kg/ha).

Comments of Chairman, Co-Chairman and Experts

- Weed species name and their spelling needs to be checked and corrected.
- Mention the retention of crop residue in soil under conservation agriculture experiment.
- Hand weeding at 50-55 DAS is crossing the critical period of crop-weed competition. The weeding duration may be altered accordingly.

- The dose of herbicide should be decided on the basis of soil type. The data of soil physico-chemical properties should be given.
- Correct notation for BC ratio should be used.
- Propaquizafop is more effective in controlling the grass than quizalofop. However, in presentation it has been presented in reveres way. It needs to be verified.
- Mention the phytotoxicity values clearly in Isabgol experiment.
- Initiate the work on control of *Orobanche* in mustard.
- Also initiate the work for controlling *Asphodelus tenuifolius in oilseeds and pulses.*
- Follow proper practice and safe use of herbicide application.
- Creating awareness about selection of proper herbicides, its doses and time of application by imparting the training and educating the farmers.
- Right amount and effective management of inputs needs to be devised properly to control the weeds.
- Weed seed bank study, weed biology, crop-weed competition under changing climate etc. are needs to be studied.

19th June, 2021
TECHNICAL SESSION - III

Chairman: **Dr. RM. Kathiresan**, Professor, Department of Agronomy, Annamalai University Annamalainagar, Tamil Nadu
Co-Chairman: **Dr. Sushilkumar**, Principal Scientist, ICAR - DWR, Jabalpur
Rapporteur: **Dr. M.S. Bhullar**, Principal Investigator, PAU, Ludhiana
Dr. Deepak Pawar, Scientist, ICAR - DWR, Jabalpur

During this session PIs of five AICRP-WM centres *viz.*, Anand, Bhubaneswar, Jorhat, Raipur and Kalyani presented their salient findings.

AAU, Anand

Dr. B. D. Patel, Principal Investigator of the centre, presented the salient findings.

- *Rumex dentatus* was one of the emerging weed in cropped field especially wheat.
- In DSR, ready-mix of pretilachlor plus pyrazosulfuron-ethyl provided the best weed control.
- In cotton-greengram system, sequential application of pendimethalin 900g *fb* ready mix of quizalofop + pyrithiobac-sodium 112.5 g/ha provided best weed control in cotton, and in greengram, PoE application of imazethapyr at 75 g/ha was found as best treatment.
- In organically raised turmeric-summer greengram sequence, application of paddy straw mulch at 5t/ha in turmeric and wheat straw mulch in greengram along with three hand weeding provided best weed control and crop productivity.
- For *Cuscuta* management, in case of lucerne, early PoE application (10 DAS) of pendimethalin (CS) at 680 g/ha, and in onion, oxyfluorfen 120 g/ha provided best control.
- For *Orobanche* management in tomato, sulfosulfuron at 25 g and 50g/ha at 60 and 90 DAT and in brinjal, glyphosate 25g/ha each at 25 and 60 DAT provided best control.
- The Centre is also working on weed utilization with the use of microorganisms through composting.
- Conducted demonstration in soybean, summer groundnut, *Rabi* maize and wheat crops and passed on six new recommendations on summer groundnut in the state package of practices.
- Centre plan to work more on weed management in organic agriculture, parasitic weeds and management of herbicide resistant weeds.

Comments of Chairman, Co-chairman and Experts

- In weed shift studies assessment of summed dominance ratio (SDR) is essential for determining actual weed shift.
- Verify the efficacy of plastic and straw mulch for organic weed management experiment.
- Continue *Neochetina* biocontrol experiment for taking observations on long-term basis.

OUAT, Bhubaneswar

Dr. M.M. Mishra, Principal Investigator of the centre, presented the salient findings.

- *Mikania micrantha* and *Parthenium* were reported as emerging weeds in cropped areas.
- In rice-maize-cowpea system under CA, CT-ZT-ZT system recorded the best productivity and returns.
- In rice-tomato organically raised system, nutrition through mixture of FYM, *Sesbania* green manuring, neem cake in integration with hand weeding provided the best weed control in both the crops.
- In maize-green gram sequence, in case of maize, tank mix application of tembotrione 120 g/ha+ atrazine 500 g/ha and in case of greengram, tank mix of fluazifop+fomesafen 125 g/ha provided best weed control and yields.
- For *Orobanche* management in brinjal, sulfosulfuron 25 g/h at 25 and 50 DAT and 200 kg Neem Cake plus pendimethalin 1.0 kg/ha were found effective..
- Broadcasting of 40 kg/ha seeds of *Cassia sericea* in February 2018 replaced *Parthenium* by 85% by August 2020.
- Centre has made two recommendations on weed management in maize and greengram; in maize, tembotrione+ atrazine 120 + 500 g/ha and topramezone+ atrazine 25 + 500g/ha as early post-emergence.
- Centre conducted FLD on rice and brinjal.

Comments of Chairman, Co-chairman and Experts:

- It was suggested to use the word 'herbicide' instead of 'new generation herbicide'
- In *Azospirillum* experiment it was suggested to record the competitive weed growth in the FYM treatment.
- For experiments involving replacing *Parthenium hysterophorus* L. with *Cassia sericea,* it was suggested to restrict the spread of *Cassia sericea,* otherwise it may become a competitive weed.

AAU, Jorhat

Dr. Khagen Kurmi, Principal Investigator of the centre, presented the salient findings.

- *Butomopsis latifola* and *Polygonum* sp. were listed as emerging weeds in deep water paddy.
- In rice-rice system, pyrazosulfuron-ethyl 25 g/ha *fb* 2,4-D 500 g or bispyribac-sodium 25 g/ha integrated with 75% fertilization through inorganic sources and 25% from organic source provided best control on weed and higher productivity.
- In potato-maize system, in case of potato, paddy straw mulch at 6 t/ha and atrazine 500 g/ha in maize provided highest weed control efficiency and crop yields. In CA *Sesbania*- rice-mustard sequence, in case of mustard, CT-CT-CT in integration with pendimethalin+ HW and in case of rice MT-CT-MT with pretilachlor were found as best treatments.
- Centre has passed on two recommendations, one on rice and another on chilli. In case of chilli, plastic film and paddy straw mulch provided best weed control and chilli yield.

- Centre has made the plan to work on taxonomic studies on weeds and weed management in high value crops.

Comments of Chairman, Co-chairman and Experts

- The recommendations given to State Department should be based on herbicides, time of application and doses, not in terms of experimental details.
- It was suggested to mention 'grasses and sedges' instead of 'narrow leaf weeds'

IGKV, Raipur

Dr. Shrikant Chitale, Principal Investigator of the centre, presented the salient findings.

- In rice-chickpea system, pretilachlor+bensulfuron 660 g/ha as EPoE *fb* penoxsulam+cyhalofop butyl 135 g/ha as PoE provided best control on diverse weed flora in rice.
- In CA based rice-wheat-cowpea system, in rice ZT (DSR)-ZT-ZT with residue gave highest returns while highest yield was recorded in CT-CT-CT.
- In wheat as well as in cowpea, ZT-ZT-ZT recorded the highest yield and returns.
- In organically raised aromatic rice-sweet corn sequence, combination of 50% fertilization through FYM and 50% through PM and black polythene mulch was found as best combination.
- For controlling *Cuscuta* in onion, stale seedbed + pendimethalin 750 g/ha has been revealed as the best combination.

Comments of Chairman, Co-chairman and Experts:

- It was suggested to verify the yield data of wheat and rice mentioned in all the experiments.
- Revisit the experiment to verify whether pendimethalin actually control *Cuscuta.*
- It was also suggested to take observations in terms of 'weed density' instead of 'weed count'
- It was advised to take the observations as per the protocol given for conducting bio-control experiments in which bio-agent *Neochetina* is used. More observation needs to be taken on trend of growth reduction of water hyacinth due to bio-agent and status of leftover seeds.

BCKV, Kalyani

Dr. Bikash Mandal, Principal Investigator of the centre, presented the salient findings.

- *Alternanthera phyloxeroids, Cyperus rotundus* in crop area and *Parthenium* and *Mikania micrantha* in non-crop area were reported as emerging weeds.
- In CA based rice-rapeseed-greengram experiment, CT (PTR)-MT-MT has been considered as the best tillage and residue management combination for the system.
- In case of organic capsicum, intercropping with *Sesbania* (25 kg seed/ha) and its incorporation at 30 days after sowing and one hand weeding at 45 days after sowing of capsicum provided best control over weeds.
- In case of maize, tank mix of topramezone 25 g/ha + atrazine 500 g/ha as EPoE provided broad spectrum weed control.
- Centre conducted FLDs on jute and rice.
- Centre passed on four recommendations.

Comments of Chairman, Co-chairman and Experts

- Application of quizalofop at 20 DAS is too early to get good control over weeds and therefore, it was advised to verify its time of application beyond 20 DAS.

- In organic guava experiment involving mulching+intercropping, focus should be given on weed control along with B:C.
- It was suggested to use mulches having allelopathic effects instead of using plant extracts. IWM has many components apart from the combination of herbicide and hand weeding.

TECHNICAL SESSION - IV

Chairman: **Dr. J.S. Mishra**, Director, ICAR - DWR, Jabalpur
Co-Chairman: **Dr. P. K. Singh**, Principal Scientist, ICAR-DWR, Jabalpur
Rapporteur: **Dr. Arvind Verma**, Principal Investigator, MPUAT, Udaipur
Dr. P. MuraliArthanari, Principal Investigator, TNAU, Coimbatore

During this session PIs of seven AICRP-WM voulantry centres *viz.*, Srinagar, Banda, Puducherry, Dharwad, Sabour, Guntur and Jobner presented their salient findings.

SKUAST, Srinagar

Dr. M. Anwar Bhat, Principal Investigator of the centre, presented the salient findings.

- Application of penoxsulam 22.4g/ha, bispyribac sodium 25 g/ha and metsulfuron 10% +chlorimuron 10%+0.2% surfactant 4 g/ha each used as PoE were found more effective in controlling weeds.
- In maize, application of pendimethalin + atrazine (0.75+0.75 kg/ha) as PE *fb* one hand hoeing at 35 DAS was found more effective in comparison to atrazine 1.0 kg/ha *fb* tembotrione 120 g/ha at 35 DAS.
- Pre-emergence herbicides were found effective viz., prometryn 500 g/ha as PE *fb* imazethapyr 40 g/ha as PoE recorded lesser total weed density, dry weight and higher yield in lentil crop under temperate conditions.
- Weed flora study and weed management in nursery and high density orchard of apple was presented.

Comments of Chairman, Co-chairman and Experts

- Transformation of weed data should be done with care.
- No need to calculate Weed Index for competition studies.
- Scientific name mentioned as *Echinocloa colonum* has to be corrected as *E. colona*.
- Include mechanical weeding along with herbicide for rice experiment.

BUAT, Banda

Dr. Dinesh Sah, Principal Investigator of the centre, presented the salient findings.

- Conducted experiment on mustard-based cropping system in conservation agriculture
- In chickpea experiment maximum WCE was recorded in PE pendimethalin + HW and imazethapyr + HW.

Comments of Chairman, Co-chairman and Experts

- Imazethapyr + imazamox ready mix herbicide may be tried.
- It was suggested to verify the weed-free plot data.

PAJANCOA & RI, Puducherry

Dr. P. Saravanane, Principal Investigator of the centre, presented the salient findings.

- In weed management experiment of transplanted finger millet, it has been observed that either stale seedbed or one HW with bensulfuron methyl + pretilachlor 660 g/ha was found more effective in reducing weed pressure and increasing grain yield.
- The dry direct-seeded rice cultivar ADT 46 performed well and application of pendimethalin 1 kg/ha *fb* bispyribac-sodium 20 g/ha recorded lowest weed density that ultimately resulted in higher yield and more net returns.
- This centre has passed on two weed control recommendations of fingermillet and rice to state package of practices.

Comments of Chairman, Co-chairman and Experts

- Laboratory study conducted on effect of leachates of *Parthenium* has to be verified at field condition.
- Time of application of herbicides has to be mentioned.
- Experiment should be conducted on competition of *Cassia tora* with *Parthenium.*
- Weed index is not necessary for weed competition trials.

UAS, Dharwad

Dr. P. Jones Nirmalnath, Principal Investigator of the centre, presented the salient findings.

- Conducted experiment on weed management with herbicides in maize and its residual effect on succeeding wheat. Higher enzymatic activities, maize root colonization and yields of maize were recorded with topramezone + atrazine (25.2 +500g/ha) EPOE *fb* IC + HW at 30 DAS.
- Conducted experiment on weed management in soybean – chickpea cropping system under conservation agriculture.Conventional tillage + residue with herbicide recorded higher enzymatic activities and AMF root colonization in soybean.
- Conducted one OFR evaluation of mycorrhizal consortium for management of parasitic weed *Striga* in sugarcane.

Comments of Chairman, Co-chairman and Experts

- B:C ratio has to be mentioned as B:C or BC ratio.
- Yield data should be presented as kg/ha and weed control data have to be mentioned.
- It was suggested to verify and confirm the role of arbuscular mycorrhiza fungi on root strength and *Striga* management.

BAU, Sabour

Dr. Birendra Kumar, Principal Investigator of the cenre, presented the salient findings.

- Application of topramezone 35 g/ha at 25 DAS in chickpea GCP 105 variety was found effective in reducing weed pressure and resulted in higher yield.
- Application of pendimethalin 1.0 kg/ha as PE *fb* 1 HW at 30 DAS and oxyfluorfen 100 g/ha as PE *fb*1 HW at 30 DAS recorded higher yield in chickpea.

Comments of Chairman, Co-chairman and Experts

- No need to transform weed dry weight data.

ANGRAU, Guntur

Dr. B Prameela Rani, Principal Investigator of the centre, presented the salient findings.

- The centre reported emergence of three new weeds (*Sphaeranthus indicus*, *Heliotropium ovalifolium* and *Stemodia viscosa*) in the College campus.
- In chickpea application of pendimethalin 0.75 kg/ha + imazethapyr 50 g/ha PE was more effective to control the weeds and recorded higher yield.
- Application of pendimethalin 0.75 kg/ha PE or pendimethalin + imazethapyr 750 + 50 g/ha PE wasfound effective for controlling *Cuscuta* in blackgram in rice-fallows of Krishna zone.

Comments of Chairman, Co-chairman and Experts

- No need to transform weed dry weight data.
- It was suggested to verify the yield data.

SKNAU, Jobner

Dr. Shweta Gupta, Principal Investigator, presented the salient findings.

- Highlighted the problematic weed flora of SKNAU jurisdiction and weed museum established.
- Presented extension activities carried out by the centre.

Comments of Chairman, Co-chairman and Experts

- Fungicide, insecticide and herbicide three way compatibility is not possible.
- It was suggested to verify the spellings of weeds before presentation.

General discussion and interaction with herbicide Industry

Chairman: **Dr. J.S. Mishra**, Director, ICAR - DWR, Jabalpur

Convener: **Dr. R.P. Dubey**, Principal Scientist and In-charge AICRP-WM, ICAR-DWR, Jabalpur
Dr. Shobha Sondhia, Principal Scientist, ICAR - DWR, Jabalpur

Rapporteur: **Dr. P.K. Mukharjee**, Principal Scientist, ICAR - DWR, Jabalpur
Dr. Yogita Gharde, Scientist, ICAR - DWR, Jabalpur

General discussion was held on submission of annual progress report, online submission of experimental data, research priorities for 2021 to 2026, budget and other issues. Findings and decisions of the discussion held during this session have been summarized as under:

- Chairman led the discussion on submission of Annual Progress Report. He mentioned that timely submission of Annual Progress Report is mandatory. He also mentioned that Directorate is sometimes facing problems in compiling the Annual Progress Report of 17 regular centres and 7 voluntary centres as the reports from the centres are received at different times. Therefore, it has been decided to submit the report in six monthly interval containing salient findings with one or two data tables and one or two good quality photographs and recommendation emerged out of the study. The tables will only include the important parameters of weed, yields and economics with proper statistical analysis. After thorough discussion with the PIs, it has been decided that report of the experiments conducted during *Rabi* season needs to be submitted within 31st July and report of

the experiments conducted during *Kharif* season needs to be submitted within 31st December. Some other experiments, which are not season bound, can also be clubbed accordingly. As soon as these experiments are completed, the report can be submitted within shortest possible time. As Council has fixed the cut-off date 31st December, therefore, reporting period will be up to 31st December. The AICRP centres can submit their complete Annual Report within 15th January as the date has been fixed earlier.

- Chairman requested all PIs to submit the research projects and plan of work that centre want to work so that in due course these research projects will be compiled to develop a common programme.
- On other issues, Chairman stressed on the need to submit the AUC in correct format, which was considered while developing the MoU. He also mentioned that next funds will be released after getting the AUC in that correct format.
- Chairman urged the centres for timely submission of SCSP reports for their onward transmission to the Council. As it is a flagship programme of Government of India, therefore, centres should take utmost care for timely submission of the report in terms of training organized, number of FLDs, number of beneficiaries etc. and it should be in measurable and quantifiable terms.
- Chairman emphasized the importance of impact analysis on weed management technologies in terms of monitory gain. Some of the centres are functioning since inception of AICRP (1978) and how best these centres could develop the methodology on impact analysis in collaboration with other Departments like Economics and Extension of their Universities. In this context he suggested to take one or two districts for validation of the methodology and after that it will be extended in other areas under the jurisdiction of the centre. He again mentioned that impact analysis in terms of monitory gain is very important for the visibility and sustainability of AICRP-WM.
- Dr. R.P. Dubey mentioned that there is a need to conduct the experiments in networking mode. The experiments should not be taken in isolation. As DG, ICAR and DDG (NRM) have already expressed their concern on weed problem in DSR, therefore, all the centres where DSR is possible in different ecologies, the common treatments will be formulated. He urged the centres not to deviate from the technical programme so that a strong recommendation can be passed on to the State Government regarding weed problem in DSR. He also mentioned that before conducting next ARM a virtual meeting will be conducted with all PIs to priorities the research projects and plan of work for the period of 2022 to 2026. He further urged the centres to maintain the coding of the experiments given under the technical programme while submitting their reports.
- Dr Dubey requested all the PIs to take immediate action on the general and centre-specific recommendations made by the QRT (2012-17). In this context the Chairman also said that QRT is reviewing and monitoring the performance of the centres very critically. He mentioned that based on the QRT recommendation, AICRP-WM centres in UP, Bihar and Jharkhand were closed. QRT recommendation plays an important role for taking decision by the Council. He also expressed his concern that some of the centres could not perform up to the mark in this review meeting.
- Dr. Yogita Gharde, Scientist, ICAR-DWR made a presentation on online data submission and explained in detail about mode of operation, data entry and submission of individual experiment, analysis part, several benefits, final status of the experimental data, pending experiment etc. She sensitized the participants about all the features of online submission-AICRP- WM information system. This process will be continued to empower the scientists in handling online data submission.
- During the discussion Dr I C Barua, AAU, Jorhat suggested to develop collaborative linkages with other agencies for dissemination of technologies. Dr V. P. Singh, GBPUAT, Pantnagar proposed possible intervention of ICAR-DWR at the University level on distribution of bio-efficacy trials on weed management funded by Industries. Dr P Murali Arthanari, TNAU, Coimbatore, enlightened the house about the methodology of impact analysis developed by TNAU. He will be sharing the methodology with the Directorate.

- Interaction with the herbicide Industries could not be taken up as no representative from the Industry side participated in this session.

CONCLUDING/PLENARY SESSION

Dr. S. Bhaskar, ADG (AAF&CC) was the Chief Guest of the Concluding/Plenary session. Rapporteurs of different technical sessions presented their report on technical sessions. Invited Expert, Dr. Samunder Singh stressed more on survey and identification of new emerging weeds. He also suggested publishing the good work and make public aware about the work being done by centres. Further, he suggested having more field knowledge as they are very much required to gain more insight into the weed management. Dr. R.M. Kathiresan congratulated the centres for doing good work and suggested to work more on weeds of significance for e.g. in aquatic, cropped and non-cropped areas. He also suggested doing more on mapping of weeds.

Dr. J.S. Mishra, Director, ICAR-DWR mentioned the importance of weed seed bank and weed biology studies in weed management trials. He suggested the centres to present their findings and economic analysis in system mode as experiments are conducted in a system and also to include the interaction table in future presentations. He urged the centres to carry out publication in high NAAS rated journals. Director asked centres to collaborate with other division in the University for studies such as weed seed bank, use of mechanical tools in the experiments etc. He asked centres to develop ICT tools such as video films, mobile apps etc. and also to upload them in university website as well as in DWR website.

In his remarks, Dr. S. Bhaskar congratulated DWR for nicely organizing the ARM in two days. He suggested for effective monitoring of the centres activities by the monitoring team for each region. He mentioned about the need of human resource development in weed science. Dr. Bhaskar asked DWR to develop network project on some weeds of national importance with scientists from the centres where the same weed problem is present and asked to submit these project proposals for external funding such as RKVY, extra mural funding. He asked centres to publish their data in high impact factor journal.

Dr. B.D. Patel, PI, AAU, Anand, Dr. Neelam Sharma, PI, CSKHPKV, Palampur and Sh. O.N. Tiwari, ACTO, PC unit, ICAR-DWR were felicitated on their superannuation for their commendable contribution in the AICRP-WM.

At the end, vote of thanks was proposed by Dr. P.K. Mukherjee, Principal Scientist, ICAR-DWR.

General recommendations

1. Concerted efforts need to be made to find out matching strategies and technologies to combat weed problems under altered agronomic practices like mulching in zero tillage technology, conservation agriculture, organic agriculture and direct-seeded rice
2. Studies on weed management in direct-seeded rice should be undertaken by the coordinating centres in a network mode.
3. Weedy rice, parasitic weeds, aquatic weeds, alien invasive weeds especially *Lanata camara*, *Parthenium* and other obnoxious weeds are also posing threat because of their fast spreading nature in several ecosystems. Therefore, emphasis should be given to find out the technologies to manage these weeds not only in agro-ecosystems but also in other ecosystems.

4. Multiplication of bio-control agents of *Parthenium, Eichhornia* and *Salvinia* may be taken up at relevant centres.
5. While reporting weed shift, new appearance of weeds the relative density, IVI and summed dominance ratio should be reported along with the geo-coordinates.
6. Weed seed bank and weed biology needs to be studied in long-term experiments.
7. Analyze the atrazin content in water bodies like ponds, tube wells, water channels etc.
8. While conducting the allotted experiments, all the observations must be recorded as per the approved technical program.
9. Weed species name and their spelling needs to be checked and corrected.
10. The economic analysis of the experiments should bring out the contribution of the weed management component separately against the overall economics which includes other management practices also.
11. The centres should make concerted efforts to publish the research results generated under AICRP-WM in high impact journals.
12. All the centres must follow the guidelines provided from the head quarter while submitting the information, data, annual report etc.
13. The standard guidelines while conducting OFR and FLD should be followed.
14. All the centres should work in tune with the recommendations of the QRT (2012-17) and timely prepare the ATR of the general as well centre-specific recommendations.
15. The centres shall submit six monthly progress report containing salient findings with one or two data tables and one or two good quality photographs and recommendation emerged out of the study. It has been decided that report of the experiments conducted during *Rabi* season needs to be submitted within 31st July and report of the experiments conducted during *Kharif* season needs to be submitted within 31st December. Some other experiments, which are not season bound, can also be clubbed accordingly. As soon as these experiments are completed, the report can be submitted within shortest possible time. As Council has fixed the cut-off date 31st December, therefore, reporting period will be up to 31st December. The AICRP centres can submit their complete Annual Report within 15th January as the date has been fixed earlier.
16. While recommending herbicides for weed management to the state government care must be taken to recommend only those herbicides which have label claim in that crop.
17. Training and awareness on safe use of herbicide and adoption of advanced techniques for application of herbicide like drone-based application technique need to be strengthened at each centre.
18. All the centres shall submit success stories of the promising weed management technologies developed at their place.
19. Mobile apps should be developed by each centre in their local language. Copy of all the videos, literature, bulletins generated by the centers should be sent to the PC Unit for uploading in the ICAR-DWR website.
20. The centres should submit the AUC in correct format, which was considered while developing the MoU. The next release of funds will be made after getting the AUC in that correct format.

07/07/21

Dr R.P. Dubey
Pr. Scientist & In-charge, AICRP-WM

Dr J.S. Mishra
Director, ICAR-DWR

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

ICAR - DIRECTORATE OF WEED RESEARCH
JABALPUR

18-19 JUNE, 2021

PROGRAMME

MODE: VIDEO CONFERENCING (Zoom Platform)

Link: https://zoom.us/j/8301254726?pwd=SDJtWFNxcFZoQlpOMGxXUVgrM2RyQT09

Meeting ID: 830 125 4726
Passcode: dwr@123

18th June, 2021 (Friday)

1015-1100 hrs	**INAUGURAL SESSION**
Welcome address and presentation of salient achievements	Dr. J.S. Mishra, Director, ICAR - DWR, Jabalpur
Introductory remark by Guest of Honour	Dr. S. Bhaskar, ADG (Agro., AF & CC), ICAR, New Delhi
	Best AICRP-WM Centre Award - 2021
Address by Chief Guest	Dr. S.K. Chaudhari, DDG (NRM), ICAR, New Delhi
Vote of thanks	Dr. R.P. Dubey, Pr. Scientist and In-charge AICRP-WM
	Presentation of salient achievements of *Rabi* 2019-20 and *Kharif* 2020 by Principal Investigator. **Regular centres- 15 minutes presentation followed by discussion for 5 minutes.** **Volunteer centres – 10 minutes presentation.**
1100-1330 hrs	**TECHNICAL SESSION - I**
Chairman	Dr. S. Bhaskar, ADG (Agro., AF & CC), ICAR, New Delhi
Co-Chairman	Dr. J.S. Mishra, Director, ICAR - DWR, Jabalpur Dr. R.P. Dubey, Pr. Scientist and In-charge AICRP-WM
Rapporteurs	Dr. T. Ramprakash, Principal Investigator, PJTSAU, Hyderabad Dr. V.K. Choudhary, Sr. Scientist, ICAR - DWR, Jabalpur
	Dr. M.S. Bhullar, PAU, Ludhiana
	Dr. Neelam Sharma, CSKHPKV, Palampur
	Dr. Todar Mal Poonia, CCSHAU, Hisar
	Dr. V. Pratap Singh, GBPUAT, Pantnagar
	Dr. B.R. Bazaya, SKUAST, Jammu
	Dr. Deep Singh Sasode, RVSKVV, Gwalior
	Remarks by Chairman, Co-Chairman and Special Invitees

1330- 1430 hrs	LUNCH BREAK

1430-1700 hrs	TECHNICAL SESSION - II
Chairman	Dr. Samunder Singh, Ex. Prof. & Head Agronomy, CCS HAU Hisar
Co-Chairman	Dr. J.S. Mishra, Director, ICAR - DWR, Jabalpur
Rapporteurs	Dr. B.D. Patel, Principal Investigator, AAU, Anand Er. Chethan CR, Scientist, ICAR - DWR, Jabalpur
	Dr. T. Ramprakash, PJTSAU, Hyderabad
	Dr. K.N. Geetha, UAS, Bengaluru
	Dr. P. Prameela, KAU, Thrissur
	Dr. P. Murali Arthanari, TNAU, Coimbatore
	Dr. V.V. Gaud, PDKV, Akola
	Dr. Arvind Verma, MPUAT, Udaipur
	Remarks by Chairman, Co-Chairman and Special Invitees

19th June, 2021 (Saturday)

1000-1210 hrs	TECHNICAL SESSION - III
Chairman	Dr. RM. Kathiresan, Professor, Department of Agronomy, Annamalai University Annamalainagar, Tamil Nadu
Co-Chairman	Dr. Sushilkumar, Principal Scientist, ICAR - DWR, Jabalpur
Rapporteurs	Dr. M.S. Bhullar, Principal Investigator, PAU, Ludhiana Dr. Deepak Pawar, Scientist, ICAR - DWR, Jabalpur
	Dr. B.D. Patel, AAU, Anand
	Dr. M.M. Mishra, OUAT, Bhubaneswar
	Dr. Khagen Kurmi, AAU, Jorhat
	Dr. Shrikant Chitale, IGKV, Raipur
	Dr. Bikash Mandal, BCKV, Kalyani
	Remarks by Chairman, Co-Chairman and Special Invitees

1210-1330 hrs	TECHNICAL SESSION - IV
Chairman	Dr. J.S. Mishra, Director, ICAR - DWR, Jabalpur
Co-Chairman	Dr. P.K. Singh, Principal Scientist, ICAR - DWR, Jabalpur
Rapporteurs	Dr. Arvind Verma, Principal Investigator, MPUAT, Udaipur Dr. P. Murali Arthanari, Principal Investigator, TNAU, Coimbatore
	Dr. M. Anwar Bhat, SKUAST, Srinagar
	Dr. Dinesh Sah, BUAT, Banda
	Dr. P. Saravanane, PAJNCOA&RI, Puducherry
	Dr. P. Jones Nirmalnath, UAS, Dharwad

	Dr. Birendra Kumar, BAU, Sabour
	Dr. B. Prameela Rani, ANGRAU, Guntur
	Dr. Shweta Gupta, SKNAU, Jobner
	Remarks by Chairman, Co-Chairman and Special Invitees
1330- 1430 hrs	**LUNCH BREAK**

1430-1600 hrs	**General discussion and interaction with herbicide Industry**
Chairman	Dr. J.S. Mishra, Director, ICAR - DWR, Jabalpur
Conveners	Dr. R.P. Dubey, Pr. Scientist and In-charge AICRP-WM Dr. Shobha Sondhia, Principal Scientist, ICAR - DWR, Jabalpur
Rapporteurs	Dr. P.K. Mukharjee, Pr. Scientist, ICAR - DWR, Jabalpur Dr. Yogita Gharde, Scientist, ICAR - DWR, Jabalpur
	Discussion on annual report submission, online data submission, priorities for 2021-26, budget etc.

1600-1700 hrs	**CONCLUDING / PLENARY SESSION**
	Highlights of presentations by Rapporteurs of different sessions
	Remarks by Special Invitees
	Remarks by Director, ICAR-DWR, Jabalpur
	Remarks by DDG (NRM)/ADG (Agro., AF & CC), ICAR, New Delhi
	Vote of thanks by Dr. P.K. Mukharjee, Pr. Scientist, ICAR-DWR, Jabalpur