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XXII वार्षिक समीक्षा बैठक

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

स्थान
प्रोफेसर जयशंकर तेलंगाना राज्य कृषि विश्वविद्यालय
हैदराबाद (तेलंगाना)

17–18 अक्टूबर, 2015

Held at

Professor Jayashankar Telangana State Agricultural University
Hyderabad (Telangana)

17-18 October, 2015

भा.कृ.अनु.प.–खरपतवार अनुसंधान निदेशालय
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Proceedings of XXII Annual Review Meeting
All India Coordinated Research Project on Weed Management
17-18 October, 2015
Venue: PJT State Agricultural University, Hyderabad

17 October, 2015

INAUGURAL SESSION

Inaugural session was graced by the presence of Chief Guest, Dr. V. Praveen Rao, Registrar & Special Officer, PJTSAU, Hyderabad; Guests of Honour, Dr. N.T. Yaduraju, Former Director, ICAR-DWR, Jabalpur; Dr. D. Raji Reddy, Director of Research, PJTSAU, Hyderabad; Dr. P.C. Rao, Dean Agriculture & PG Studies, PJTSAU, Hyderabad, Dr. A.R.Sharma, Director, ICAR-Directorate of Weed Research and Dr. Shobha Sondhia, Incharge, All India Coordinated Research Project on Weed Management, DWR, Jabalpur. The scientists of 23 coordinating centres, 1 volunteer centre and 3 ICAR Institutes attended the meeting. After lighting of the lamp by the Chief Guest, Dr. A.R. Sharma, Director, ICAR-DWR welcomed the participants and highlighted the role of AICRP-WM in managing weeds. He made a brief presentation of salient research achievements of ICAR-DWR, Jabalpur. Dr. Shobha Sondhia presented salient research achievements of AICRP-WM.

Dr. P.C Rao, Dean, PJTSAU in his remarks mentioned the use of bioagents for weed control, which has not made much impact on controlling weeds. He emphasized use of remote sensing, GIS and GPS for weed control. Modeling may be helpful for predicting herbicide resistance. He urged that emphasis should be on developing methods for preventing the toxic effect of excessive use of herbicide after spray. Dr. D. Raji Reddy, Director of Research, PJTSAU said that combination of different herbicides are tried by different scientists but there is a need to confirm the synergistic effects, if any. He said that already many technologies are available for weed control, which needs to be refined according to the situations. He was of the opinion that emphasis should be made on IWM, including farm mechanization with small equipments, crop modelling and weed shift.

Dr. V. Praveen Rao expressed his concern on constraints to agriculture like small holdings, labour shortage, timely cultural operation, declining water etc. We need to optimize our weed management strategy taking into consideration all these constraints. Nowadays GM crops, biotechnology, precision farming are evolving. Number of cases of herbicide resistance are increasing. He urged that any new technology should have gone through the risk analysis. Bioagents should be used for controlling weeds and these should be integrated with other methods of weed control. Creation of knowledge and database is very important to develop weed management.

In the inaugural session, 'Best AICRP-WC Centre Award' was presented to GBPUAT, Pantnagar for significant achievements in weed management in the state of Uttarakhand. A

special grant of Rs. 1.0 lakh will be provided to this centre for development of suitable facility for weed science research.

During the meeting, two books '*Pramukh Pasalo mein Kharpatwar Niyantran'* written by the scientists of GBPUAT, Pantnagar and 'Illustrative Guide for Detection and Identification of Regulated Weeds' by NIPHM, Hyderabad were released.

Inaugural session ended with presentation of vote of thanks by Dr M. Yakadri, Principal Investigator, PJTSAU, Hyderabad.

TECHNICAL SESSION – I

Presentation of salient findings of AICRP-WM Centres in North Zone

Chairman	**:**	Dr. A.N. Rao, Visiting Scientist, IRRI & ICRISAT
Co-chairman	**:**	Dr. A.R. Sharma, Director, ICAR - DWR, Jabalpur
Rapporteurs	**:**	Dr. J. Deka, AAU, Jorhat
		Dr. S.K. Guru, GBPUAT, Pantnagar

The session started with an introduction of all the participants of the ARM. Dr. Shobha Sondhia presented the action taken report on the recommendations of 21st ARM held at Jabalpur.

Dr. Bhumesh Kumar, Nodal Officer presented research highlights of north zones centres viz., Jammu, Palampur, Ludhiana, Pantnagar and Hisar.

SKAUST, Jammu centre

At the Jammu centre, in rice-wheat cropping system, herbicides butachlor and isoproturon were very effective. Among tillage methods, CT provided better weed management than zero tillage. Herbicide consumption pattern revealed that butachlor (5% GR) constituted 68% of total herbicide consumption.

CSKHPKV, Palampur

CSKHPKV, Palampur reported weedy rice infestation in Mandi and Kangra districts. There were no weed shift and herbicide resistance development in any cropping systems. IWM was most effective in maize-wheat cropping system, while there was no residual toxicity of imazethapyr used in blackgram on succeeding mustard. HPLC method has been developed for detection of secondary metabolites of metsulfuron-methyl.

PAU, Ludhiana

There is increasing infestation of *Sphenoclea zeylanica* in transplanted rice and *Ipomoea* species in cotton and C*uscuta* in berseem. Major weed shifts have also been reported in wheat and maize, such as *Poa* and *Aveana* in wheat and *Ammania* and *Leptochloa* in rice. Resistance of *Phalaris minor* to clodinafop and fenoxaprop has been observed. Isoproturon resistant *Phalaris*

minor was successfully controlled by metribuzin, sulfosulfuron and combination of mesosulfuron + idosulfuron. In the long-term trials in rice-wheat cropping system, number of weed species increased from 8 to 12, in 30 years in wheat crop. Successful biological control of water hyacinth was found by *Alternaria alternata* (Talc formulation). Invention of "Lucky" seed-drill mounted automatic sprayer by the centre was appreciated.

GBPUAT, Pantnagar

New weed species were observed in sugarcane which need identification. Mechanism of *Phalaris minor* resistant to isoproturon was conformed as enhanced metabolism of herbicide (by way PBO, Mono oxigenase inhibitor). Integrated weed management in conservation agriculture was effective. No herbicide resistant weed was detected with respect to 2, 4-D and butachlor.

At Pantnagar and Ludhiana centres, glyphosate as well as combination of 2, 4-D + glyphosate at a lower dose were effective to control *Cyperus rotundus*.

CCSHAU, Hisar centre reported *Orobanche* infestation in new areas, appearance of *Lolium* in wheat and *Ipomoea* species in cotton.

Solanum nigrum infestation in wheat, *Malva* and *Phalaris minor* infestation in pea were found increasing. Isoproturon and clodinafop resistant biotypes of *Phalaris minor* were effectively controlled by ready-mix combinations of mesosulfuron + iodosulfuron, and sulfosulfuron + metsulfuron-methyl as well as pinoxaden. *Trianthema* was not controlled by ready mix combination of imazethapyr and Imazomox in green gram, but was successfully controlled by pendimethalin in cotton. Sulfosulfuron residues were detected in the soil at 8 out of 17 sites at farmers' field.

Dr A.N. Rao appreciated the work done by all the centres. He suggested use of standardizing and uniform units for reporting weed density, biomass as well as uniformity in methodologies. Collection of more data from the experiments can help publication in international journals. Farmer-oriented research should be conducted.

Dr. C.M. Singh emphasized more research in conservation agricultural system as well as weed management in direct-seeded rice. States like J&K, Himachal Pradesh and Uttatakhand favour organic farming; thus much reliance and chemicals should be avoided. He also emphasized on the development of bioherbicides. Alleopathic studies have been done which should blead to identification of allelo-chemicals for their possible use as herbicides.

Dr. Gita Kulshreshtha advised that while reporting herbicide residues in soil, soil depth should be mentioned. The minimum detectable limits of the herbicides should be mentioned in the reports. Atrazine residues should be mentioned in turmeric crop. Technology on *Orobanche* management developed by CCSHAU, Hisar should be adopted by other centres. Dr Gita Kulsherestha suggested that don't repeat butachlor continuously. Behaviour and persistence of butachlor should be studied along with soil heath. Cause of resistance at Hisar and Punjab need to be sorted out.

Dr. A.R. Sharma remarked that all the five north zone centres are doing good work. However, the ATRs by the centres could be still be more precise and compiled with more precision.

TECHNICAL SESSION – II

Presentation of salient findings of AICRP-WM Centres in South Zone

Chairman	**:**	Dr. M. Devender Reddy, Former Director, Water Technology Centre, PJTSAU, Hyderabad
Co-chairman	**:**	Dr. A.R. Sharma, Director, ICAR - DWR, Jabalpur
Rapporteurs	**:**	Dr. M.S. Bhullar, PAU, Ludhiana
		Dr. Neelam Sharma, CSKHPKV, Palampur

Dr. Sushil Kumar presented annual progress report of five centres, viz. Hyderabad, Bangaluru, Thrissur, Coimbature and Raichur.

New invasive weeds *Tithonia diversifolia, Ludwigia peruviana* and *Sphagneticola* in high ranges were reported from Thrissur. Hyderabad centre reported 2, 4-D sodium not controlling *Merremia emarginata* in sugarcane. In puddle transplanted rice, pyrazosulfuron /pretilachlor *fb* chlorimuron + metsulfuron / bispyribac; in DSR, pendimethalin/ pyrazosulfuron *fb* bispyribac + chlorimuron + metsulfuron; WSR- pendimethalin/ oxadiargyl *fb* bispyribac/ azimsulfuron; turmeric- pendimethalin/atrazine *fb* two HW; garlic- oxadiargyl/ oxyfluorfen; cotton- pendimethalin *fb* pyrithiobac-sodium + quizalofop- p- ethyl; Ginger- glyphosate 30 DAP *fb* oxyfluorfen; blackgram- imazethapyr + imazamox; beetroot- alachlor/oxadiargyl *fb* HW were found effective. Neem cake with metribuzin or sulfosulfuron recorded effective control of *Orobanche* in tomato. In CA systems, IWM performed better than herbicides alone, and performance of ZT+R improved with time. Hyderabad centre reported good control of water hyacinth by *Neochetina bruchi.* The residues of commonly used herbicides in different crops and cropping systems in short- and long-term trials at the time of crop harvest in soil and crop produce were reported to be BDL.

Dr Sharma took serious note of the casual approach in presenting the data by some centres without statistical analysis. The chairperson suggested that before formulating technical programme, the earlier work should be revisited and also asked the centres to publish in the refereed journals. Dr. Sharma asked the scientists of Hyderabad centre to make their campus *Parthenium* free. KAU Thrissur centre should collect replicated data from large plots in CA trial and analyze statistically. He suggested to publish success stories of cleaning of lakes of this zone and highlight in the media.

TECHNICAL SESSION – III

Presentation of salient findings of AICRP-WM Centres in Central Zone

Chairman : Dr. A.R. Sharma, Director, ICAR - DWR, Jabalpur
Rapporteurs : Dr. S.S. Punia, CCSHAU, Hisar
Dr. K.M. Durga Devi, KAU, Thrissur

Dr. Raghwendra Singh, Nodal Officer, central zone presented the highlights of achievement made by centers, viz. Gwalior, Faizabad, Raipur and Pusa.

At Gwalior, no new weed species was found during weed survey and surveillance. Due to increase in irrigation facilities, *Orobanche* infestation in mustard was found decreasing. No case of herbicide resistance in any crop was reported from the region. Pre-emergence application of pendimethalin + imazethapyr (RM) 1000 g/ha and imazethapyr+ imazamaox (RM) 80 g/ha exhibited excellent control of weeds in blackgram without any residual effect on succeeding crop. For the control of *Orobanche* in mustard, application of glyphosate twice at 25 and 50 g/ha along with 1% ammonium sulphate at 25 and 55 DAS respectively, proved very effective.

At Faizabad, no new weed was noticed in any crop particularly in rice-wheat cropping system during the survey. *Echinochloa colona*, *E. crus-galli*, *Commelina benghalensis* and *C. rotundus* were found as major weeds in infesting transplanted rice. Wild rice was observed in lowlying rice growing areas of Shravasti and Balrampur districts but with low density. During *Rabi,* infestation of *Rumex dentatus* was observed in all crops. Application of ready mixture of imazethapyr + pendimethalin 1000 g/ha (PE) and imazethapyr + imazamox 80 g/ha (PE) provided excellent control of weeds and recorded higher grain yield of blackgram with no residual toxicity to succeeding mustard. *Neochetina* weevil released in ponds caused 50% damage to water hyacinth.

At Raipur, heavy infestation of *Alternanthera triandra* was recorded under DSR. No weed shift and herbicide resistance were reported from long-term herbicide trial after five years of experimentation. Oxadiargyl combined with bispyribac persisted in soil up to harvest stage. Pyrazosulfuron was rather safe and persisted in soil for shortest period among all the applied herbicides. It completely degraded before 50 DAS under rice-chickpea cropping system.

At Pusa, no new weed species was reported. Weed shift was observed in transplanted rice, when *Echinochloa* was replaced by *Caesulia* a*xillaris* and *Cleome viscosa.* In turmeric, pre-emergence application of metribuzin at 0.70 kg/ha *fb* 2 HW and in ginger protected spray of glyphosate at 0.80 kg + oxyfluorfen 0.2 kg/ha gave good control of weeds. In conservation agriculture, CT-ZT-ZT gave highest net returns with recommended herbicides.

Publication record of centres of this zone was not good. Dr. A.R. Sharma suggested to give more emphasis on publication of the data being generated. Dr Kulsheresthat suggested that standardized the microbial/enzymatic activates, linear equation etc. for evaluating herbicide residues at Raipur.

18 October, 2015

TECHNICAL SESSION – IV

Presentation of salient findings of AICRP-WM Centres in West Zone

Chairman	**:**	Dr. P. Chandrasekhar Rao, Dean, College of Agriculture, PJTSAU, Hyderabad
Co-chairman	**:**	Dr. A.R. Sharma, Director, ICAR-DWR, Jabalpur
Rapporteurs	**:**	Dr. T. Girija, KAU, Thrissur
		Dr. A.P. Singh, IGKV, Raipur

Dr. R.P. Dubey, Principal Scientist (Agronomy) and Nodal Officer, West Zone presented the salient research findings of Anand, Dapoli, Udaipur and Akola centres.

AAU, Anand

- Seed yield of blackgram was significantly higher under hand weeding carried out at 20 and 40 DAS (1.34 t/ha) which was at par with imazethapyr + imazamox 60 g/ha at 20 DAS (3-4 leaf stage) (1.27 t/ha). There was no carryover effect on succeeding mustard crop.
- Application of pendimethalin 0.50 kg/ha (sand-mix) as PE to control *Cuscuta* in lucerne showed phytotoxic effect. Very poor plant stand and growth, only 10% plants survived after germination in pendimethalin applied plots.
- Butachlor as PE and foliar spray of metalaxyl MZ 0.2 % at 20 DAS was not effective to control *Cuscuta* in lucerne**.**

DBSKV, Dapoli

- Application of pendimethalin (PE) *fb* manual weeding was the most effective and economical treatment (WCE 85.5%, 3.83 t/ha, B: C ratio 1.33) followed by weed free check (HW at 20, 40, and 60 DAS) (WCE 83.9%, 4.06 t/ha, B: C ratio 1.24) to control weeds effectively in direct-seeded drilled rice during *kharif* season.
- Incorporation of green manures and application of fixed herbicide pretilachlor for *kharif* rice and pendimethalin for *rabi* groundnut reduced weed growth and increased the total REY (18.68 t/ha) of the rice-groundnut cropping system.

PDKV, Akola

- Weed-free treatment was the best and at par with combination of imazethapyr 100 g/ha PoE + quizalofop- ethyl 50 g/ha PoE 15 DAS (tank mix) for controlling weeds, weed dry

matter accumulation (8.3 g/m^2), weed control efficiency (74.7%) seed yield (2.20 t/ha) and B:C ratio (2.39) in soybean.

- Three HWs at 20, 40 and 60 DAS were at par with treatment combination of pyrithiobac sodium 0.062 kg/ha + quizalofop-ethyl 0.050 kg /ha PoE 20 DAS (tank mix) *fb* HW 50 DAS.

MPUAT, Udaipur

This centre has started functioning since April 2015, and initiated weed survey and field experiments, results of which will be presented in the next ARM in 2016.

Dr. Sharma opined that the weed biology studies conducted at AAU, Anand are not satisfactory. The conservation trial on pearlmillet-mustard should be changed to a major cropping system of the area such as cotton. Though, they have an excellent residue lab unless a residue chemist is posted the post may be withdrawn. The TSP fund available with the centre should be utilized for some visible developmental program which will benefit the community there and no more funds will be provided by the centre. Weed physiology work at Anand need to be improved and more basic research need to be done. Moisture conditions to be specified in the experiments.

DBSKV, Dapoli presented good result on shift on weed flora and microbiological studies. However, Dr. Sharma said that this is a problematic centre and unless some visible output comes out of the centre, its existence may be questioned. It was advised to generate quality data and research publications.

Dr. Sharma cautioned the Udaipur centre not be very ambitious and start with less trials but produce quality results.

TECHNICAL SESSION–V

Presentation of salient findings of AICRP-WM Centres in East Zone

Chairman	**:**	Dr. A. Srinivas, Associate Director of Research, Palem, PJTSAU
Co-chairman	**:**	Dr. A.R. Sharma, Director, ICAR - DWR, Jabalpur
Rapporteurs	**:**	Dr. B.D. Patel, AAU, Anand
		Dr. P. Janaki, TNAU, Coimbatore

Dr. P.K. Singh, Nodal Officer presented an overview of research highlights, constraints and suggestions of the centres under East Zone. Centre-wise specific observations were as follows:

BAU, Ranchi

- Application of odyssey (imazethapyr 35%+ imazamox 35% (RM) 80 g/ha POE was found most productive (1.1 t/ha) and profitable owing to reduced grassy and broad leaved weed density as well as reduced weed dry matter in blackgram.
- Zero tillage along with crop residue of previous wheat crop recorded higher grain yield (3.1 t/ha), net returns (Rs. 41,630), and B: C ratio (2.91) compared to conventional

tillage. Integrated weed management recorded higher grain yield (3.09 t/ha), net returns (Rs. 34844) however B: C ratio (2.51) with the application of atrazine 0.75 kg/ha PE in weed management in maize – wheat system under conservation agriculture.

- Application of pendimethalin 1.0 kg/ha and stale seedbed *fb* pendimethalin 1.0 kg/ha reduced appearance of *Cuscuta* in Niger.

AAU, Jorhat

- Mechanical weeding at 20, 40 & 60 DAS and pendimethalin 1000 g/ha *fb* weeding 25 DAS resulted in lowest weed growth and grain yield of direct-seeded upland rice.
- Metribuzin 700 g/ha + hoeing 30 and 60 DAP resulted in lowest density and dry weight of weeds and highest rhizome yield of turmeric.

OUAT, Bhubaneswar

- Application of imazethapyr + pendimethalin (RM) 1000 g/ha as pre-emergence stage i.e. 1-2 DAS was found to be the best herbicide combination product for control of complex weed flora in blackgram and gave an yield advantage of 21, 41 and 64% over sole pendimethalin(1000 g), imazethapyr(70 g) and weedy check, respectively.
- Application of neem cake 200 kg/ha at sowing *fb* pendimethalin 1.0 kg/ha as pre-emergence at 3 DAP found to be the best treatment in reducing the population of O*robanche*.
- Stale seed bed followed by application of pendimethalin 1 kg /ha recorded the lowest *Cuscuta* density (3 /m^2) and highest yield in niger crop (1020 kg /ha).
- The residues of pretilachlor in soils when applied at recommended dose of 1.0 kg/ha were recorded up to 45 days (0.016 ppm) and at 2. 0 kg/ha were observed up to 60 days (0.022 ppm**).**

Dr Kulsheresthat said that very little work was done on residue of herbicide in Eastern region. Critical observations should be made in the experiments of *N. bruchi.* When applying post emergence herbicides, residue analysis must be done, especially for vegetable crops (Ginger, turmeric etc.). More options should be searched for weed management in organic farming. In zinger and turmeric crop, upon application of atrazine, herbicide residue studies must be conducted. There should be some program on control of *Azola* in rice field.

TECHNICAL SESSION–VI

Presentation of salient findings of volunteer centres and Information System by Dr. Yogita Gharde

Chairman	**:**	Dr. C.T. Abraham, Former Professor & Head (Agronomy), KAU, Thrissur
Co-chairman	**:**	Dr. A.R. Sharma, Director, ICAR-DWR, Jabalpur
Rapporteurs	**:**	Dr. Anil Kumar, SKUAST, Jammu Dr Anil Duhan, CCSHAU, Hisar

The presentation was made by Dr. Yogita Gharde for the following volunteer centres; viz. SVBPUAT, Meerut; SKUAST, Kashmir; PJNCA&RI, Karaikal; BAU, Sabour; ICAR-CIARI, Port Blair; ICAR-IVRI, Izatnagar.

SVPUAT, Meerut

- Among the herbicide treatments, the lowest weed population and dry weight were recorded in treatment atrazine + pendimethalin with the highest weed control efficiency (89.5%).
- Highest grain yield (4.30 t/ha) was recorded in two hand weeding closely followed treatment sulfosulfuron + metsulfuron methyl (4.13 t/ha) and clodinafop + 2, 4-D (4.05 t/ha) in wheat.

PAJANCOA & RI, Karaikal

- Penoxsulam + cyhalofop (RM) and triafamone+ethoxysulfuron (RM) effectively controlled weeds and resulted in higher rice yield.
- Leaf leachates of *Leucaena* and *Eucalyptus* were found to be promising against *Parthenium*.

BAU, Sabour

- Among the herbicidal treatments, maximum weed dry matter in wheat was recorded with sulfosulfuron 0.025 kg/ha as post- emergence, while minimum weed dry matter was recorded with pinoxaden 0.06 kg/ha + metsulfuron (Premix) 0.004 kg/ha as PoE followed by clodinafop 0.06 kg/ha + metsulfuron (Premix) (Vesta) 0.004 kg/ ha as PoE.
- Maximum grain yield of wheat was also recorded with application of pinoxaden 0.06 kg/ha + metsulfuron (Premix) 0.004 kg/ha as PoE followed by clodinafop 0.06 kg/ha + metsulfuron.
- Application of pendimethalin *fb* bispyribac- sodium with one hand weeding recorded lowest weed count, weed dry matter and higher weed control efficiency followed by penoxsulam + cyhalofop in DSR in drought prone ecology.

SKUAST-Kashmir

- Weed management efficiency and the highest yield of brown sarson by various extracts was in the order, rice straw at 140 DAS (0.94 t/ha) > *Amaranthus viridis* at 140 DAS (0.80 t/ha) > *Chenopodium album* at 140 DAS (0.76 t/ha) > *Trifolium pretense* at 140 DAS (0.66 t/ha) > *Utrica urens* at 140 DAS (0.60). However least yield was recorded under farmers practice (0.43 t/ha) and it resulted in 69.77% reduction in grain yield of brown sarson.

ICAR-IVRI, Izatnagar

- Dominant weeds in berseem were: 1st cutting: *Coronopus didymus*; 2nd and 3rd cutting: *Rumex dentatus, Cichorium intybus, Poa annua*; 4th cutting: *Rumex dentatus*, *Cichorium intybus* and Dominant weed flora in oats fodder were *Poa annua* and *Rumex dentatus*.

Dr Yogita also presented the functioning of information system on AICRP-WM trials which is being developed by ICAR-DWR. It was suggested to have the facilities for analysis of Strip Plot Design and graphs in the information system.

TECHNICAL SESSION–VII

1. **Discussion on herbicide residues and long-term herbicide trials**
2. **Technical programme, financial issues, interaction with herbicide industry etc.**

Chairman : Dr. Gita Kulshreshtha, Retired Head & Professor, Division of Agril. Chemicals (IARI)

Co-chairman : Dr. A.R. Sharma, Director, ICAR-DWR, Jabalpur

Rapporteurs : Dr. Yogita Gharde, ICAR-DWR, Jabalpur
Dr. M.M. Mishra, OUAT, Bhubaneswar
Dr. J.P. Deshmukh, PDKV, Akola

In this session, a detailed discussion on herbicide residues under long-term herbicide trials was done. It was suggested that herbicide residue analysis should be done in crops like turmeric and vegetables. Dr Shobha Sondhia informed that some information on herbicide residues data from all chemists have received but these require more refinement. It was decided to bring this publication during next ARM meeting. It was suggested that herbicide residue work should be extended to the fodder crops also.

Financial issues of AICRP-WM centres were also discussed. Dr Sharma informed the house that as such no fund has been given by the ICAR under capital head and there are meagre chances that any fund under this head will come. He asked to all PI's to submit externally funded projects under EXTRA-MURAL, NASF and NICRA. Basic facilities such as bore well, computer, construction etc. should be provided by the university.

PLENARY SESSION

Chairman : Dr. D. Raji Reddy, Director of Research, PJTSAU, Hyderabad

Co-Chairman : Dr. A.R. Sharma, Director, DWR, Jabalpur

Convener : Dr. Shobha Sondhia, ICAR-DWR, Jabalpur

In the plenary session, Dr. D. Raji Reddy showed his concern on excessive use of herbicides. Apart from herbicides, other methods of weed control especially mechanical methods should be incorporated in this project. He said that agriculture is facing lots of constraints due to weeds, climate change, soil related hazards and other similar issues. He said that weed problems are different at farmers' field than at the research station, and we need to go to the real field situations to solve these problems. He emphasized on studies related to weed seed

bank to minimize weed problem. He also urged that good publication should be brought-out from this scheme.

Dr Sharma urged all PIs to follow deadlines and guidelines during submission of annual reports and other information being asked by the headquarter. He said funding should not be a concern for good quality work. A decision was taken that all PIs should submit compilation of long-term experiments under various crop and cropping systems by 31December, 2015.

General comments

1. The results on *Orobanche* control should be reviewed and reported properly.
2. The economics of conservation agriculture should also be worked out.
3. Basic studies on herbicide residue on microflora, chemical properties of soil etc. should be taken up and development of prediction models would help to predict the herbicide residues.
4. Studies on effect of climate change on weed shift should be encouraged.
5. Develop specific recommendation for weed control in aerobic rice.
6. Emphasis should be given on developing weed flora maps also.
7. Phytoremediation studies using aquatic weed should be included in the technical program.
8. Possibilities of sand mix application of herbicides in dryland areas should be explored.
9. Compatibility of different agrochemical inputs should be studied.
10. There should be alternate option for *Zygogramma* for *Parthenium* control as it is not working effectively in many places.
11. Uniformity should be observed in reporting the results.

Recommendations

1. It was realized that specific recommendations for some individual centers and most of the general recommendations made in the earlier review meetings in 2012, 2013 and 2014 have not been fully acted upon. Therefore, all such points should be duly considered and a convincing ATR should be presented in the next meeting in 2016.
2. Publication record of most centers has not shown any improvement over the last 5 years despite repeated emphasis and recommendations by the QRT. This issue will also be thoroughly discussed in the next meeting.
3. Long-term trials on tillage and herbicides have been conducted for 15-20 years or even more at some centres, which have yielded a vast volume of data. An article on each experiment as per the guidelines should be prepared by each centre and submitted by 31st December, 2015.
4. An article on herbicide residues data generated over the years has been submitted by most centers but it is not in the required format / shape. A thoroughly revised version should be submitted by 15 November, 2015 so that this publication can be released at the next ARM in April, 2016.

5. Long-term experiments which have been conducted for more than 10 years should be terminated. Based on the information generated, new experiments should be proposed and presented at the next meeting. Such experiments should include the latest available herbicide molecules / mixtures for a given crop / situation.
6. Data recording, analysis and presentation needs considerable improvement. PIs should check / verify the data carefully and should be clear about the reported results.
7. Annual report must be presented as per the guidelines uniformly. Nodal officers should go through the reports critically and present their observations in the meeting.
8. A farm pond infested with aquatic weeds like water hyacinth should be selected in the city or in the village, and a success story on weed eradication should be developed and widely publicized. Similarly, *Parthenium* eradication programme must be undertaken in the campus. Such centers showing visible impact of weed control technology will be suitably recognized at the ARM and provided additional grants for infrastructure development.
9. An exercise should be initiated by each centre from now onwards to plan the Technical Programme for the next biennium 2015-16 and 2016-17). This should be based on the results obtained previously, resources / manpower available, collaboration with other AICRPs, emerging weed problems and farm-oriented problem-solving research. Emphasis should be on fewer experiments but on generation of quality data with visible outputs.
10. Economic analysis has still not been standardized despite development of a common protocol. Dr. P.K. Singh and Dr. Yogita Gharde should develop an MS EXCEL sheet for economic analysis, which must be uniformly followed by all centres from the current year. Dr. Yogita Gharde will finalize the Information System for data acquisition/ analysis of the AICRP trials before the next meeting.
11. Work on herbicide residues is missing from most presentations. This should be adequately highlighted during discussion / presentation, annual report as well as in publications.
12. Studies on herbicide residues must be conducted in high-value crops, vegetables, spices and fodder crops; and must specify the soil depth, moisture, minimum detectable limits / limit of detection.
13. Formulation of *Alternaria alternata* should be tested at all centres for the control of water hyacinth. Shelf-life of the product should be tested.
14. Studies on weed management in organic farming may be conducted at the centers located in hilly regions such as Jammu & Kashmir, Himachal Pradesh and Uttarakhand. Extract of weeds/plants can be used to control weeds.
15. Technology on *Orobanche* management developed at HAU centre should be demonstrated on a large scale at all other centres including Gwalior, Udaipur and others, for which additional funding support can be provided from the HQ.
16. Directorate will process the specific cases received from the centers, which are related to herbicide recommendations not included in the label claim, and submit to the DPPQS / CIRBC for consideration.

17. Center which still do not have adequate facilities for estimation of herbicide residues can continue with herbicide/enzyme bioassay studies to generate practical information on residual effect of herbicides.
18. Preliminary studies on weed biology / ecology for which the results are well established need not be conducted. It is essential that only meaningful studies on problem weeds of the area are conducted on a scientific basis.
19. Some centers have not shown any progress in herbicide residue research over the last many years despite the availability of good facilities and posting of a residue chemist. The post of residue chemist will be withdrawn from such centers.
20. TSP funds still left unutilized at some of the centers should be spent only for the specified purpose in the identified districts, preferably for development of permanent assets in the area. No revalidation of such funds is required from the HQ.
21. Work on crop modelling should be taken up at centers which have the requisite expertise, e.g. Hyderabad under the guidance of Dr. D. Raji Reddy, Director of Research and an expert in this field.
22. Fund availability in the AICRP has been curtailed by the ICAR in the XII Plan, but the better performing centers will be given special consideration under resource constraints.
23. Centers graded as 'Average' and 'Below average' must improve their performance as per the criteria / guidelines issued earlier, failing which the QRT may recommend closure / shifting of these centers in the next plan as done during this plan.
24. Project proposals for external funding in the identified priority area like herbicide residues, aquatic weeds, conservation agriculture, climate change should be submitted by the centres for funding under the NICRA, NASF, Extra-Mural programme of the ICAR and others.
25. It should be attempted not to hold the ARM and the ISWS Conference together, rather these should be held in the early and later part the given year, respectively. The next ARM will be held at the Jain Irrigation Systems, Jalgaon or at AAU, Jorhat during April, 2016.

(Dr. Shobha Sondhia)
I/c AICRP-Weed Management

4/11/2015
(Dr. A.R. Sharma)
Director

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