

PREFACE

The National Group Meet, *Kharif 2014* of All India Coordinated Research Project on Forage Crops was organized with the objectives to review the accomplishments of technical programme executed during *Kharif 2013* at different coordinating and cooperating centers, in-house research activities and forage technology demonstrations (FTDs) conducted and to formulate the technical programme for *Kharif 2014* as well as to discuss future thrust areas for fodder research. The meeting was jointly organized by Indian Council of Agricultural Research and SKRAU, Bikaner during March 7-8, 2014.

The meeting was attended by the scientists engaged in forage research working under coordinating and collaborating centers located at different SAUs, ICAR institutes and NGOs. The important stakeholders from other sections also contributed in the development of programme, future linkages and collaborations to strengthen future course of action keeping in view the changing agricultural needs of the farmers. The local participants included scientists and staff members from SKRAU, Bikaner and electronic and print media of the region.

This compilation contains brief report of the National Group Meet, *Kharif 2014* covering highlights on forage crop improvement, production and protection technologies generated; proceedings of different technical sessions and approved technical programme for the coming *Kharif 2014*. The national group meet members discussed and planned future strategies for improving the forage productivity, quality, nutritive value and soil health to address the regional and national forage security with sustainability for ever increasing livestock population. The finalized technical programme on forage crop improvement, forage crop production and forage crop protection for *Kharif 2014* have been given in annexure(s).

The All India Coordinating Research Project on Forage Crops sincerely acknowledges guidance and help rendered by authorities and scientists of ICAR, IGFRI, SKRAU, Bikaner. We are also thankful to the participating scientists, other participants, organizers at SKRAU, Bikaner for their technical assistance and cooperation to make the event successful.

The authorities and organizing committee of SKRAU is specially thanked for successful conductance of the meeting. Indian Council of Agricultural Research is gratefully acknowledged for scientific guidance, financial and administrative approval.

A.K. Roy
Project Coordinator

INAUGURAL SESSION

The inaugural session of the National Group Meet, *Kharif* 14 of AICRP on forage crops was organized at SKRAU, Bikaner during March 7-8, 2014. The meeting was chaired by Dr. A. K. Dahama, Hon'ble Vice Chancellor, SKRAU, Bikaner. Dr. R. P. Dua, ADG (FFC), ICAR, New Delhi was the chief guest. The other dignitaries on the dais were Dr. Govind Singh, Director of Research, SKRAU, Bikaner, Dr. A. K. Roy, Project Coordinator (Forage Crops) and Dr. S. L. Godara, Organizing Secretary.

Dr. S. L. Godara, Zonal Director Research, SKRAU, Bikaner extended welcome to the chief guest, dignitaries, participating scientists, team of NGM organizers, SKRAU staff, representative of press and media and farmers of the region.

Dr. A. K. Roy, Project Coordinator (Forage Crops) presented Coordinator's report for *Kharif* 2013. He highlighted the progress of research activities and the targets achieved as per the technical programme under the project. During *Kharif* 2013, the research activities were conducted at 38 centres located in five zones i.e. Hill, North West, North East, Central and South Zone, on aspect of forage crop improvement, forage crop production and plant protection. He also highlighted the thrust areas for XIIth plan.

Dr. A. K. Dahama, Vice Chancellor, SKRAU, Bikaner emphasized to focus the forage research towards less favoured niches like rainfed areas, problem soils and degraded lands by efficient harnessing of the soil and water resources in mixed farming situation. He also stressed upon the need of pasture development programme especially in Rajasthan.

Dr. Govind Singh, Director of Research, SKRAU, Bikaner highlighted the programme undertaken for overall development of forage crop production in the state. He also presented the highlights of University activities.

Dr. R. P. Dua, ADG (FFC), ICAR, New Delhi in his remark highlighted the overall scenario of fodder production including seed production. He mentioned that our country is ranked first in milk production. He also suggested that research should be focussed on improving genetic potential of fodder species with aim to develop short duration biotic and abiotic resistant varieties.

The inaugural function ended with vote of thanks by Dr. S. S. Shekhawat, OIC, AICRP-FC, SKRAU, Bikaner to the dignitaries, participants and different committees for their support in organization of NGM *Kharif* 2014 of AICRP on Forage Crops and for their valuable presence in inaugural session.

Highlights: Technology Generated

Forage Crop Improvement

Entries identified for release as variety

- **MFC-09-1 (Cowpea):** Proposal for MFC-09-1 in Cowpea was submitted by UAS, Bangalore. It was seen that this variety has excelled consistently during 2010-2012 giving higher GFY and DMY. This variety out yielded the best check by 13.60 per cent in case of GFY and 9.11 per cent in DMY. Therefore, the variety is identified for release in South zone in the states of Andhra Pradesh, Tamil Nadu, Karnataka and Kerala.
- **RRB-07-1 (Lucerne):** RRB-07-1 was developed by SKRAU, Bikaner. The entry performed well for GFY, DMY and per day productivity for NW zone comprising states of Punjab and Rajasthan. Hence, it is identified for release in the states of Punjab and Rajasthan.

Forage Protection Technology:

- Seed treatment with *Trichoderma viride* @ 5 g/kg seed (CFU 10⁶ / gm of formulation) + FYM @ 2 t/ha is effective to control Root rot disease of cowpea.

TECHNICAL SESSION-I
PRESENTATION OF DISCIPLINE WISE REPORT

Chairman : Dr. R. P. Dua, ADG (FFC), ICAR
Co-Chairman : Dr. A. K. Roy, Project Coordinator (FC)
Rapporteurs : Drs. A K Mehta & D. K. Banyal

The session started with the introductory remarks of the Chairman. He requested PI's to give outcome of the trials conducted during *Kharif* 2013.

Crop Improvement: Crop improvement trials report of *Kharif* 2013 was presented by Dr. A. K Mall, PI (PB). During the season, 14 trials of annual and perennial forage species comprising of 66 entries with their national and zonal checks were conducted at 38 locations in five zones. The forage species evaluated were maize, pearl millet, cowpea and rice bean in annual and *Lasiurus sindicus*, *Cenchrus setigerus*, *Sehima*, *Dichanthium*, *Cenchrus ciliaris*, *Clitoria ternatea* and BN hybrid in perennials. Promising entries in hybrid maize, pearl millet and cowpea were proposed for further testing in advanced trials at those zones, where the performance of entries was better over checks in IVT and AVT-1 trials.

- In perennial range grass trial, it was decided that data should not be reported or included in the report for the trials having less than 70 per cent population.
- The monitoring team should critically evaluate the trials and give clear cut report about rejection of any trial with proper justification.

Crop Production: Dr. S. R. Kantwa, PI (Agronomy) presented the results of crop production trials undertaken at 19 locations. In total 20 experiments, 9 in network mode (8 coordinated and 1 AVT based) and 11 in location specific mode were conducted. The major thrust of the trials were to generate technological interventions on resource conservation, tillage and nutrients management in forage crops *vis-à-vis* food–fodder cropping systems, intercropping studies, production and quality of fodder under trees shades, cutting management in relation to dual purpose performance of pearl millet seed rate and micronutrients studies in forages.

- In AST-2 plant sample for biochemical analysis should be drawn from maximum shaded area of the trial.
- In AST-4, it was pointed out that Guinea grass is not suitable for low land condition hence Jabalpur centre should explore possibility of replacing guinea grass with suitable material in consultation with AAU, Assam.

Crop Protection: The report on plant protection trials conducted at 7 locations was presented by Mr. R. B. Bhaskar, Sr. Scientist (PP). The experiments aimed to study the occurrence and abundance of major diseases and pests in forages, screening of breeding material and development of management technologies for the control of diseases and pests in maize, sorghum, pearl millet and cowpea. The most prevalent pest and diseases in *Kharif* forage crops reported through the monitoring trials was presented. During the period under report, zonate leaf spot of sorghum, leaf blight of maize and root rot and yellow mosaic of cowpea were the major diseases at various locations. Screening of breeding material at various locations resulted in the identification of resistant to moderately resistant sources in different crops.

The session ended with a thank note by the chairman

TECHNICAL SESSION – II BREEDER SEED PRODUCTION

Chairman : Dr. R. P. Dua, ADG (FFC), ICAR
Co-Chairman : Dr. A. K. Roy, Project Co-ordinator (FC)
Rapporteurs : Dr. T. Shashikala

The session started with presentation of Dr. A. K. Mall, PI (PB), AICRP-FC coordinating unit IGFRI, Jhansi. In *Kharif* 2013 the indent for Breeder Seed Production was received from DAC, GOI for 29 varieties in six forage crops viz., Maize, Cowpea, Pearl Millet, Sorghum, Guar and Rice bean.

1. The total indent for Breeder Seed Production was 152.22 q and was allocated to thirteen SAUs/ ICAR/ NGO institutes.
2. The overall breeder seed production was 178.26 q against the allocation of 152.22 q, which was 26.04 q surplus or 17.11 per cent higher than the quantity allocated.
3. Among quantity allocated for different forage crops, the maximum was for Maize (89.00 q) followed by Sorghum (33.35 q), Cowpea (20.05 q), Guar (4.10 q), Rice bean (3.00 q) and minimum was for Pearl Millet (2.72 q).
4. In crops like Cowpea, Sorghum and Guar, the breeder seed production was less than the allocated quantity.

The Chairman opined that for those varieties released long back and not having any indents, the parent institutions are responsible for their production and maintenance. The chairman also suggested that in case of non-lifting of breeder seed by the indenter within the given time, the surplus breeder seed should be disposed as per demand after completing the necessary formalities as applicable in their respective institutions.

The session ended with vote of thanks to the chair.

**TECHNICAL SESSION III (CONCURRENT)
FORMULATION OF TECHNICAL PROGRAMME**

FORAGE CROP IMPROVEMENT

Chairman: Dr. D. K. Garg, Professor, Department of PBG, SKRAU, Bikaner

Rapporteurs: Drs. V. K. Sood and A. H. Sonone

Finalization of varietal trials: Dr. A K Mall

At the outset, the chairman welcomed the delegates. Dr. A. K. Mall, PI (PB) presented the highlights of 14 breeding trials conducted during *Kharif* 2013 on 11 different forage crops for finalization of the technical programme for *Kharif* 2014. After thorough discussion, following breeding trials were formulated.

Maize

- AVTM-1: Four entries viz., AFM-1, AFM-2, AFM-3 and PFM-7 were promoted to AVTM-1 from IVT.
- AVTHM-2: Four entries viz., PMH-1, PMH-3, DHM-117 and IHTFM (PAC-745) were promoted from AVTHM-1 to AVTHM-2. Same entries will also be evaluated for seed yield under AVTHM-2 (Seed).

Pearl Millet

- AVTPM-1: Four entries viz., NDFB-939, AFB-9, DFMH-30 and RBB-4 were promoted from IVTPM to AVTPM-1.
- AVTPM-2: Three entries namely AFB-8, NDFB-936 and APFB-09-1 were promoted from AVTPM-I to AVTPM-2. Same entries will also be evaluated for seed yield under AVTPM-2 (Seed).

Cowpea

- AVTC-1: Three entries viz., MFC-09-9, TNFC-0926 and UPC-1301 were promoted from IVTC to AVTC-1 to be conducted in HZ, NEZ and SZ.

New trials

- IVTM constituted with seven entries contributed by Mandya-2, Jhansi-1, Anand-1, BAIF-1, Udaipur-1 and Advanta-1.
- IVTPM constituted with five entries contributed by one each from Bikaner, Anand, Advanta, Hisar and Hyderabad.
- IVTC constituted with 4 entries contributed by one each from Jhansi, Mandya, Hyderabad and Hisar.

Perennial grass trials

- Five trials namely VTBN-2013, VT *Sehima*-2013, VT *Dichanthium*-2013, VT *Cenchrus ciliaris*-2013 and VT *Clitoria*-2013 to be continued as per technical programme.
- The Co-Chairman suggested to consider *Kharif* 2014 (2nd year) of VT *Sehima*-2013 as establishment year due to poor crop stand at many locations. At Mandya and Hyderabad centres, the trial was dropped due to poor germination of many entries.
- A trial of inter-specific hybrids (new plant types) derived from *Pennisetum glaucum* x *P. squamulatum* grass from IGFRI-Jhansi, will be conducted in coming *Kharif* with general mean as check under rainfed condition. The released varieties of perennial grasses such as *Cenchrus ciliaris*, *Chrysopogon fulvus* etc. will also be grown to make a general comparison of yield potential and other agronomic parameters.

The chairman suggested to initiate new quality experiment on nutritional evaluation of routinely fed forage crops and common fodder trees of the region. He also advised the breeders to strengthen their ongoing breeding programme. The session was ended with vote of thanks to the chair.

**TECHNICAL SESSION III (CONCURRENT)
FORMULATION OF THE TECHNICAL PROGRAMME**

FORAGE CROP PRODUCTION

Chairman	: Dr. P.S. Rathore, Head, SKRAU, Bikaner
Rapporteurs	: Dr. A.K. Jha and Dr. R. Shuseela
Finalization of trials	: Dr. U. S. Tiwana and Dr. S. R. Kantwa

In the introductory remarks chairman expressed satisfaction over on-going agronomic programme. Discussion was held on new trials proposed by the different centres for *Kharif* 2014. Chairman further requested to all the agronomist to send the data of trials conducted in system mode as per schedule already finalized. Based on the discussions and advices of the Chairman the following recommendations emerged.

Continuation of ongoing trials

- Nine coordinated and eleven location specific trials will be continued in *Kharif* 2014.

New Experiments:

Coordinated trials: One new coordinated trial has been formulated for different zones.

1. Study of intercropping system of pigeonpea with different forage crops

New location specific trials: Three location specification trials have been formulated for different zones

1. Study of intensive annual fodder crop based cropping system
2. Study of intercropping system of different vegetable with forage maize
3. Impact of Mg and B on nutrient uptake, quality and yield of BN hybrid

Advanced varietal trial: Two advanced varietal trials (AVT) on pearl millet and maize has been finalized and allotted to different centres for agronomic evaluation.

Modification: AST12. Effect of nutrient management on productivity of perennial grass under low land condition: The Jabalpur centre will evaluate the Dol grass (replacing guinea grass) with help of Jorhat centre.

Dr. A. K. Roy suggested that agronomist of forage production should work in close collaboration with animal husbandry department of respective universities.

The session ended with vote of thanks to the chair.

**TECHNICAL SESSION III (CONCURRENT)
FORMULATION OF THE TECHNICAL PROGRAMME
FORAGE CROP PROTECTION**

Chairman : Dr. S. Gangopadhyay, Head, Dept. of Plant Pathology, SKRAU, Bikaner
Rapporteur : Dr. Upasana Rani and Dr. D. P. Awasthi
Finalization of trials : Dr. R. B. Bhaskar and Dr. Ritu Mawar

Crop Protection Scientists of the Forage group discussed in detail the results of the last *Kharif* season along with the ongoing technical programme. The results of last *Kharif* season along with the technical programme were presented before the house. The Chairman appreciated the work done by this small group and gave valuable suggestions. He emphasized on the importance of monitoring and surveillance of diseases and insect pests. He also suggested that residual analysis of chemical treatments being used in different trials should be carried out at the time of harvesting of fodder crops depending upon the facilities available. In coming days, major problem will be of insect pests and diseases which will create a gap in fodder production, plant protection group can play an important role in minimizing this gap. Future emphasis should be given to genetical and bio-chemical aspects as well as mode of action of different bio-pesticides.

Based on the discussions and advices of the Chairman the following recommendations emerged.

1. The trials PPT-1, PPT-2, PPT-14 and PPT-15 will continue as such in *kharif* 2014.
2. The PPT-10 has been validated on large field (500m²) and recommendation proposed as: "Seed treatment with *Trichoderma viride* @ 5 g/kg seed (CFU 10⁶ / gm of formulation) + FYM @ 2 t/ha" for management of root rot of cowpea.
3. New trials PPT-16 and PPT-17 for the management of aphids and defoliators in cowpea were formulated.

The session ended with vote of thanks to the chair.

TECHNICAL SESSION IV REVIEW OF CENTRE-WISE ACTIVITIES

Chairman : Dr. R. P. Dua, ADG (FFC), ICAR
Convener : Dr. A. K. Roy, Project Coordinator (FC)
Rapporteurs : Drs. K. K. Sharma and C. Babu

The session started with the introductory remarks by the Chairman, Fifteen centres from different zones have presented the activities.

Hill zone:

- The Chairman suggested to devise work plan for maximizing the fodder production in the fodder deficit districts.
- Palampur centre has identified some *Setaria* germplasm accessions with low oxalic acid content. These material should be evaluated further.
- Srinagar centre has been asked to undertake exploration of germplasm on *Lolium*, *Medicago* spp. and range grasses in collaboration with Palampur centre.

North West Zone:

- Ludhiana centre highlighted the in-house breeding programme on hybrid fodder Bajra. The Chairman suggested to effectively utilize promising Bajra male sterile lines in hybridization for higher biomass.
- Hisar centre were suggested to take up action for filling up of vacant post immediately.
- Pantnagar centre has been instructed to concentrate on breeding activities.
- CAZRI centre has been asked to focus on evaluation of germplasm for specific traits in *Lasiurus*.

North East Zone:

- Faizabad centre is having good collection of fodder Bajra and Cowpea and their work was appreciated.
- Ranchi centre presented status on germplasm collection and other activities. However, the Chairman expressed dissatisfaction over its poor performance and advised them to concentrate on crop improvement programme.
- Kalyani centre has been suggested to take up breeding programme on fodder Maize, BN hybrid and Lathyrus.
- Bhubaneswar centre has been asked to undertake breeding work on BN hybrid, fodder Cowpea and Rice bean. The Chairman expressed deep concern over the non participation of the Breeder and Agronomist of this centre in the NGM.
- The in-house breeding activities on Rice bean and fodder Maize taken up by the Jorhat centre were appreciated by the Chairman.

Central Zone:

- Anand centre has good collection of fodder Maize, Sorghum and Bajra germplasm. These should be effectively utilized.
- Jabalpur centre has been requested to prepare a status report on fodder soybean. The Chairman suggested undertaking fodder Maize breeding programme.
- Rahuri centre has highlighted in-house breeding programme on multi cut fodder Sorghum, Maize and BN hybrid.

South Zone:

- The in-house breeding programme on multi cut fodder Bajra by Hyderabad centre has been appreciated by the Chairman.
- In house breeding activities of Coimbatore and Mandya centres were also appreciated.

The session ended with the thanks to the chair.

TECHNICAL SESSION – V
FTD & TSP FORMULATION

Chairman: Dr. A. K. Roy

Rapporteurs: Dr. Ritu Mawar & Dr. A. K. Mall

At the outset, the chairman welcomed all the participants. Dr. S. R. Kantwa presented the status of the FTD's allotted to AICRP (FC) centres for *Kharif* 2014.

A total of 722 FTD's were allotted to 21 AICRP centres and one co-operating centre during *Kharif* 2014 for the crops viz., BN hybrid, Rice bean, Maize, Maize+Cowpea, Setaria, Bajra, Guinea grass, Cowpea and Guar. Out of 722 FTD's, 225 were allocated to BN Hybrid, 22 to Rice bean, 145 to Maize, 10 to Maize+Cowpea, 35 to Setaria, 130 to Bajra, 105 to Cowpea, 45 to Guinea grass and 5 to Guar.

In this session, chairman emphasized that in case of TSP, centres can take help through KVK's and NGO's for effective execution of TSP programme. In this programme centres can use the budget for forage technology demonstration on fodder production and conservation, livestock development and distribution of small tools to tribal rural people etc. All the centers were advised to follow strictly the guidelines of TSP already circulated to them and also available on web site of 'Tribal welfare ministry, GOI'.

In case of TSP, quarterly report must be submitted before 15th day of last month of particular quarter (eg. Before 15th March of Jan-March quarter, 15th June of April-June quarter, 15th September of July-September quarter and 15th Dec of Oct-Dec quarter). The centers must also submit month-wise activity planning for 2014-15 in the given format already circulated.

The session ended with vote of thanks to the chair.

RECOMMENDATIONS OF THE VARIETAL IDENTIFICATION COMMITTEE

The meeting of the Varietal Identification Committee of the AICRP-FC was held under the Chairmanship of Dr. R. P. Dua, ADG, (FFC), ICAR, New Delhi on 8th March, 2014 during the National Group Meeting (*Kharif 2014*) of AICRP (FC) at SKRAU, Bikaner.

Three proposals of two forage crops *viz.*, Cowpea and Lucerne were submitted by different institutions, the proposal were discussed thoroughly. The recommendations of the committee are as following:

- **MFC-09-1 (Cowpea):** Varietal Identification Committee considered the proposal MFC-09-1 in Cowpea submitted by UAS, Bangalore, ZARS, Mandya for South zone states, Andhra Pradesh, Tamil Nadu, Karnataka and Kerala. It was seen that this variety has excelled consistently during 2010-2012 giving higher GFY and DMY. This variety out yielded the best check by 13.60 per cent in case of GFY and 9.11 per cent in DMY. Therefore, the variety is identified for release in South zone in the states of Andhra Pradesh, Tamil Nadu, Karnataka and Kerala.
- **RR-3 (Cowpea):** Varietal Identification Committee considered the proposal of RR-3 for NE zone. It was revealed that this variety has only excelled the national check during 2011 and in the other two years it has given GFY and DMY less than checks. Hence the variety is not identified.
- **RRB-07-1 (Lucerne):** Varietal Identification Committee considered the proposal of RRB-07-1. It was submitted for all India. However it was felt that variety did not perform consistently superior to check at all India level. However it did well for GFY, DMY and per day productivity for NW zone comprising state Punjab and Rajasthan. Hence, identified for release in the states of Punjab and Rajasthan.

The varietal proposal for release and notification should be submitted in the proper format to CVRC with a copy to AICRP Forage Crops after completing all the formalities.

TECHNICAL SESSION-VI

BRAIN STORMING SESSION ON MICRO-NUTRIENT DEFICIENCY IN FODDER CROPS IN WESTERN INDIA

Chairman : Dr. R. P. Dua, ADG (FFC), ICAR New Delhi
Chief Guest : Dr. A. K. Dahama, Vice Chancellor, SKRAU, Bikaner
Convener : Dr. R. V. Kumar, Head GSM, IGFRI, Jhansi

Western Regional Research Station of Indian Grassland and Fodder Research Institute, Avikanagar organized a Brainstorming Session on "Micro-nutrient deficiency in fodder crops in western India' on 08.03.2014 at SKRAU, Bikaner (Rajasthan).

Dr. R. V. Kumar, Head, Grassland and Silviculture Management, IGFRI, Jhansi and Coordinator, WRRS-IGFRI, Avikanagar, Rajasthan presented the genesis of organizing the event. Formal welcome to all the dignitaries on the dais and introductory remarks were given by Dr. Sunil Kumar, Head, Crop Production, IGFRI, Jhansi.

Four theme papers were presented highlighting the micronutrients status in soil crop-animal continuum with respect to western region of country.

- Dr. S. S. Meena, Pr. Scientist (Plant Breeding), WRRS, Avikanagar, presented the fodder production scenario and forage resources of the region.
- Dr. I. J. Gulati, Dean, College of Agriculture, SKRAU, Bikaner highlighted the role of various micro-nutrients in fodder crops.
- Dr. M. L. Soni, Pr. Scientist (Soil Science) RRS, CAZRI, Bikaner presented the status of micro-nutrients in different districts of Rajasthan.
- Dr. S. K. Mahanta, Pr. Scientist (Animal Nutrition), IGFRI, Jhansi presented the role of micro-nutrients in animal system. He suggested that an area specific mineral mixture needs to be formulated to overcome the problem of specific micro-nutrient deficiency.

During the discussion, it was felt that detailed analysis of soil - fodder – animal micronutrient continuum is required to address this important aspect which is affecting the livestock productivity and health.

Dr. R. P. Dua, ADG (FFC), ICAR emphasized on the need of integrated research programme to address the issues of micro-nutrient deficiency in soil-plant-animal system continuum.

The session ended with vote of thanks to the chair.

**TECHNICAL SESSION -VII
PLENARY SESSION**

Chairman : Dr. R. P. Dua, ADG (FFC), ICAR
Chief Guest : Dr. A. K. Dahama, Vice Chancellor, SKRAU
Convenor : Dr. A. K. Roy, Project Coordinator (FC)
Rapporteurs : Dr. S. R. Kantwa & Dr. A K Mall

Chairman in his introductory remarks highlighted the fodder shortage in the country and emphasized upon need based fodder development programme, compact dry feed blocks etc. He stressed upon the need to utilize modern and conventional breeding tools to develop new cultivars.

Dr. A. K. Dahama emphasized on need to focus more on extension activities for effective transfer of forage production technologies and their adoption for increasing the forage resources.

The rapporteurs of different technical sessions presented proceedings of respective sessions. Dr. A. K. Roy, PC (FC) presented the recommendations of Varietal Identification committee. The aspects and major issues related to *Kharif-2014* programme in specific and forage research in general were discussed. The recommendation of technical session were discussed and accepted by the house.

Chairman appreciated the efforts of forage scientists across the country despite several limitations in terms of resources. He suggested that a forage development map and scenario of each state should be prepared and a road map of development should be kept ready. He stressed upon the need of germplasm enrichment, variability creation and development of superior cultivars. Post harvest conservation and fodder bank concept should be given priority in meeting natural calamities.

Keeping in view the future challenges, some specific recommendations were also made for strengthening of forage research and development in the country.

- Non lifted breeder seed may be sold to farmers / other agencies after following the norms and regulations as applicable in respective institutions.
- New entries for evaluation will be accepted along with station trial data.
- Two new experiments on grasses on *Lasiurus indicus* and *Cenchrus ciliaris* and one on Pearl millet is to be formulated for micronutrient studies at Bikaner centre.
- For validation purpose pathological trials should be conducted in 250 m² area
- In the experiment on effect of shade on BN hybrid, observations must be collected from maximum shaded area
- Some micronutrient based experiments should be planned for micronutrient deficit areas.
- Newly released varieties should be popularized in FTD programme.

Dr. S. L. Godara, Zonal Director Research, SKRAU, Bikaner extended vote of thanks to the ICAR authorities, Project Coordinator and his team, participants, local team and media for successful conductance of National Group meet at the end of session.

Dr. A. K. Roy, Project coordinator, AICRP Forage crops thanked the authorities at ICAR and SKRAU, Bikaner for organization of the event and warm hospitalities by the host.

**TECHNICAL PROGRAMME FOR FORAGE CROP IMPROVEMENT
KHARIF-2014**

Abbreviations: HZ: Hill Zone, NWZ: North West zone, NEZ: North East Zone, CZ: Central Zone, SZ: South Zone

1. IVTM: Initial Varietal Trial in Forage Maize (New)

Entries No.	:	7+2 checks
Entries Name	:	1-BAIF, 2-Mandya, 1-Jhansi, 1-Anand, 1-Advanta, 1-Udaipur
Checks	:	African Tall, J-1006
Design	:	RBD with 3 replications
Plot size	:	4m x 1.8m accommodating 4m long 6 rows at 30 cm
Seed rate	:	75 Kg/ha (60g/Plot)
Fertilizers	:	80:40 kg/ha (N:P) 40:40 kg/ha (N:P) basal+40 N after 30 days
Seed requirement	:	4.5 Kg/ha
Location: 23	:	HZ- Palampur, Srinagar, Almora; NWZ- Ludhiana, Hisar, Udaipur, Pantnagar, Jalore; NEZ- Faizabad, Bhubaneswar, Ranchi, Jorhat; CZ- Anand, Raipur, Jabalpur, Rahuri, Urulikanchan, Jhansi; SZ- Hyderabad, Coimbatore, Mandya, Vellyani, Raichur

2.AVTM-1: First Advanced Varietal Trial in Forage Maize

Entries No.	:	5+2 checks
Entries Name	:	AFM-1, AFM-2, AFM-3, PFM-7, JHM-13-1 for NWZ, HZ, NEZ & CZ
Checks	:	African Tall, J-1006
Design	:	RBD with 3 replications
Plot size	:	4 m x 3.0 m accommodating 4 m long 10 rows at 30 cm
Seed rate	:	75 Kg/ha (90g/Plot)
Fertilizers	:	80:40 kg/ha (N:P) 40:40 kg/ha (N:P) basal+40 N after 30 days
Seed requirement	:	5.5 Kg/ha
Location: 18	:	HZ- Palampur, Srinagar, Almora; NWZ- Ludhiana, Hisar, Udaipur, Pantnagar, Jalore; NEZ- Faizabad, Bhubaneswar, Ranchi, Jorhat; CZ- Anand, Raipur, Jabalpur, Rahuri, Urulikanchan, Jhansi

3.AVTHM-2: Second Advanced Varietal Trial in Forage Hybrid Maize

Entries No.	:	4+2 checks
Entries Name	:	PMH-1, PMH-3, DHM-117, IHTFM (PAC-745)
Checks	:	African Tall, J-1006
Design	:	RBD with 4 replications
Plot size	:	4 m x 3.0 m accommodating 4 m long 10 rows at 30 cm
Seed rate	:	75 Kg/ha (90g/Plot)
Fertilizers	:	80:40 kg/ha (N:P) 40:40 kg/ha (N:P) basal+40 N after 30 days
Seed requirement	:	4.50 Kg/entry
Location: 10	:	HZ- Palampur, Srinagar, Almora; NWZ- Ludhiana, Hisar, Udaipur; NEZ- Faizabad, Bhubaneswar, Ranchi, Jorhat

4.AVTHM-2 (Seed): Second Advanced Varietal Trial in Forage Hybrid Maize

Entries No.	:	4+2
Entries Name	:	PMH-1, PMH-3, DHM-117, IHTFM (PAC-745)
Checks	:	African Tall, J-1006
Design	:	RBD with 4 replications
Plot size	:	4 m x 3.0 m accommodating 4 m long 10 rows at 30 cm
Seed rate	:	75 Kg/ha (90g/Plot)
Fertilizers	:	80:40 kg/ha (N:P) 40:40 kg/ha (N:P) basal+40 N after 30 days
Seed requirement	:	4.50 Kg/entry
Location: 10	:	HZ- Palampur, Srinagar, Almora; NWZ- Ludhiana, Hisar, Udaipur; NEZ- Faizabad, Bhubaneswar, Ranchi, Jorhat

5. IVTPM: Initial Varietal Trial in Forage Pearl millet (NEW)

Entries No.	:	5+3
Entries Name	:	1-Anand, 1-Advanta, 1-Hyderabad, 1-Hisar, 1-Bikaner
Checks	:	Raj Bajra Chari-2, Giant Bajra, AVKB-19
Design	:	RBD with 3 replications
Plot size	:	4 m x 1.8 m accommodating 4 m long 6 rows at 30 cm
Seed rate	:	15 Kg/ha (12g/Plot)
Fertilizers	:	40:20 kg/ha (N:P) basal
Seed requirement	:	1.0 Kg/entry
Location: 20	:	NWZ - Ludhiana, Hisar, Bikaner, Jalore, Meerut; NEZ - Faizabad, Pusa, Bhubaneswar, Ranchi; CZ - Anand, Jamnagar, Jabalpur, Rahuri, Urulikanchan, Jhansi, Jamnagar; SZ - Coimbatore, Hyderabad, Mandya, Raichur

6. AVTPM-1: First Advanced Varietal Trial in Forage Pearl millet

Entries No.	:	4+3
Entries Name	:	NDFB-939, AFB-9, DFMH-30, RBB-4 in NWZ, NEZ, SZ & CZ
Checks	:	Raj Bajra Chari-2, Giant Bajra, AVKB-19
Design	:	RBD with 3 replications
Plot size	:	4 m x 3.0 m accommodating 4 m long 10 rows at 30 cm
Seed rate	:	15 kg/ha (18g/plot)
Fertilizers	:	40:20 kg/ha (N:P) basal
Seed requirement	:	1.25 Kg/entry
Location: 18	:	NWZ - Ludhiana, Hisar, Bikaner, Jalore; NEZ - Faizabad, Pusa, Bhubaneswar, Ranchi; CZ - Anand, Jabalpur, Rahuri, Urulikanchan, Jhansi, Jamnagar; SZ -Hyderabad, Coimbatore, Mandya, Karaikkal

7. AVTPM-2: Second Advanced Varietal Trial in Pearl millet

Entries No.	:	3+3
Entries Name	:	AFB-8, APFB-09-1 & NDFB-936
Checks	:	Raj Bajra Chari-2, Giant Bajra, AVKB-19
Design	:	RBD with 4 replications
Plot size	:	4 m x 3.0 m accommodating 4 m long 10 rows at 30 cm
Seed rate	:	15 kg/ha (20 g/plot)
Fertilizers	:	40:20 kg/ha (N:P) basal
Seed requirement	:	0.75 Kg/entry
Location: 7	:	NEZ - Faizabad, Pusa, Bhubaneswar, Ranchi, Jorhat, Imphal, Kalyani

8. AVTPM-2 (Seed): Second Advanced Varietal Trial in Pearl millet

Entries No.	:	3+3
Entries Name	:	AFB-8, APFB-09-1 & NDFB-936
Checks	:	Raj Bajra Chari-2, Giant Bajra, AVKB-19
Design	:	RBD with 4 replications
Plot size	:	4 m x 3.0 m accommodating 4 m long 10 rows at 30 cm
Seed rate	:	15 kg/ha (20 g/plot)
Fertilizers	:	40:20 kg/ha (N:P) basal
Seed requirement	:	0.75 Kg/entry
Location: 7	:	NEZ - Faizabad, Pusa, Bhubaneswar, Ranchi, Jorhat, Imphal, Kalyani

9. IVTC: Initial Varietal trial in Forage Cowpea (New)

Entries No.	: 4+2+1
Entries Name	: 1-Jhansi, 1-Mandya, 1-Hyderabad & 1-Hisar
Checks	: National checks: Bundel Lobia-1, UPC-5286 Bundel Lobia-2 (NWZ), UPC-622 (NEZ/HZ), UPC-9202 (CZ/SZ)
Design	: RBD with 3 replications
Plot size	: 4 m x 1.8 m accommodating 4 m long 6 rows at 30 cm
Seed rate	: 35.0 kg/ha (30 g/plot)
Fertilizers	: 20:40 kg/ha (N:P) basal
Seed requirement	: 3.0 Kg/entry
Location: 26	: HZ- Palampur, Srinagar; NWZ- Ludhiana, Hisar, Pantnagar, Bikaner, Udaipur, Jalore, Meerut; NEZ- Faizabad, Bhubaneswar, Ranchi, Jorhat, Kalyani; CZ- Anand, Rahuri, Urulikanchan, Jhansi, Kanpur; SZ- Coimbatore, Vellayani, Mandya, Hyderabad, Dharwad, Karaikkal, Raichur

10 AVTC-1: First Advanced Varietal Trial in Cowpea

Entries No.	: 3+2+1
Entries Name	: MFC-09-9, TNFC-0926, UPC-1301 in HZ, NEZ, SZ
Checks	: National checks: Bundel Lobia-1, UPC-5286 Zonal checks: UPC-622 (NEZ/HZ), UPC-9202 (SZ)
Design	: RBD with 4 replications
Plot size	: 4 m x 3.0 m accommodating 4 m long 10 rows at 30 cm
Seed rate	: 35.0 kg/ha (45 g/plot)
Fertilizers	: 20:40 kg/ha (N:P) basal
Seed requirement	: 3.0 Kg/entry
Location: 13	: HZ- Palampur, Srinagar; NEZ- Faizabad, Bhubaneswar, Ranchi, Jorhat, Kalyani; SZ- Coimbatore, Vellayani, Mandya, Hyderabad, Dharwad, Karaikkal

11. IVT Rice bean: Initial Varietal Trial in Rice bean (New)

Entries No.	: 5+3
Entries Name	: 2-Jabalpur, 2-Jorhat & 1-Bhubaneswar
Checks	: K-1 (Bidhan-1), Bidhan-2, RBL-6
Design	: 4 m x 1.8m accommodating 4 m long 6 rows at 30 cm
Plot size	: RBD with 3 replications
Seed rate	: 35.0 kg/ha (30 g/plot)
Fertilizers	: 20:40 kg/ha (N:P) basal
Seed requirement	: 1.50 Kg/ha
Location: 11	: Kalyani, Ranchi, Bhubaneswar, Jorhat, Pusa, Vellayani, Jabalpur, Shillong, Imphal, Raipur, Palghar

12. VTBN-2013 (IInd Year): Varietal Trial in Bajra Napier Hybrid (Perennial)

Entries No.	: 8 +3 checks
Entries Name	: TNCN-1076, TNCN-1078, PBN-342, PBN-346, RBN-2004-03, RBN-2010-Y-1, RBN-2011-12, DHN-15
Checks	: CO-3, NB-21, PBN-233
Design	: RBD with 3 replications
Plot size	: 4.2 m x 3 m (50 rooted slips)/60 x 50 cm
Seed rate	: 42 rooted slips/rep/entry
Fertilizers	: 150:50:40 kg N, P ₂ O ₅ , K ₂ O/ha in split doses
Seed requirement	: 1000 rooted slips/entry
Location: 18	: HZ- Palampur, Almora; NWZ- Ludhiana, Hisar, Bikaner; NEZ- Bhubaneswar, Ranchi, Jorhat; CZ- Anand, Rahuri, Urulikanchan, Jhansi, Jabalpur, Palghar; SZ- Coimbatore, Mandya, Hyderabad, Dharwad,

13. VT Sehima-2013 (IInd Year): Varietal Trial in Sehima (Perennial) IInd year also establishment year

Entries No.	: 6 + 1 check
Entries Name	: JHS-13-1, JHS-13-2, JHS-13-3, JHS-13-4, JHS-13-5, RSN-12-1
Checks	: Bundel Sen Ghas-1 (IGS 9901)
Design	: RBD with 4 replications
Plot size	: 4 x 3 m (48 rooted slips)/50 x 50 cm
Seed rate	: 48 rooted slips/rep/entry
Fertilizers	: 90:50:40 kg N, P ₂ O ₅ , K ₂ O/ha in split doses
Seed requirement	: 0.4 kg/entry (0.15 kg)
Location: 15	: NWZ - Ludhiana, Hisar, Bikaner; NEZ - Bhubaneswar, Ranchi, Kalyani; CZ - Anand, Rahuri, Urulikanchan, Jhansi, Jabalpur; SZ - Coimbatore, Mandya, Hyderabad, IGFRI RRS Dharwad

14. VT Dichanthium-2013 (IInd Year): Varietal Trial in Dichanthium (Perennial)

Entries No.	: 7 + 1check
Entries Name	: JHD-13-1, JHD-13-2, JHD-13-3, Marvel-09-1, Marvel-09-3, Marvel-09-4, Marvel-06-40
Checks	: Marvel-8
Design	: RBD with 3 replications
Plot size	: 4 x 3 m (48 rooted slips)/50 x 50 cm
Seed rate	: 48 rooted slips/rep/entry
Fertilizers	: 90:50:40 kg N, P ₂ O ₅ , K ₂ O/ha
Seed requirement	: 0.15 kg/entry
Location: 15	: NWZ - Ludhiana, Hisar, Bikaner; NEZ - Bhubaneswar, Ranchi, Kalyani; CZ - Anand, Rahuri, Urulikanchan, Jhansi, Jabalpur; SZ - Coimbatore, Mandya, Hyderabad, IGFRI RRS Dharwad

15. VT Cenchrus ciliaris -2013 (IInd Year): Varietal Trial in Cenchrus ciliaris (Perennial)

Entries No.	: 7 + 2 check
Entries Name	: RCCB-03-23, RCCB-04-64, RCC-10-6, RCC-10-8, RCC-CS-10-4, RCC-CS-10-5, RCC-CS-10-8
Checks	: IGFRI 3108, CAZRI 75
Design	: RBD with 3 replications
Plot size	: 4 x 3 m (6 rows of 4.0 m at 50 cm)
Seed rate	: 5 kg/ha (6 g/plot)
Fertilizers	: 90:50:40 kg N, P ₂ O ₅ , K ₂ O/ha
Seed requirement	: 0.15 kg/entry
Location:	: NWZ - Ludhiana, Hisar, Bikaner; CZ - Anand, Rahuri, Urulikanchan, Jhansi, Jabalpur; SZ - Coimbatore, Mandya, Hyderabad

16. VT Clitoria-2013 (IInd Year): Varietal Trial in Clitoria ternatea (Perennial)

Entries No.	: 7
Entries Name	: TJCT-4, TJCT-6, JGCT-2013-1, JGCT-2013-2, JGCT-2013-3, JGCT-2013-4, JGCT-2013-5
Checks	: As there is no released variety, General mean will be taken as check
Design	: RBD with 4 replications
Plot size	: 4 m x 3 m (6 rows of 4.0 m at 50 cm)
Seed rate	: 30 kg/ha (36g/plot)
Fertilizers	: 20:40 (N:P) kg/ha Basal
Seed requirement	: 1.5 kg/entry
Location:	: NWZ - Ludhiana, Hisar, Bikaner; CZ - Anand, Rahuri, Urulikanchan, Jhansi, Jabalpur

17. VT Pennisetum hybrids – 2014 (1st year): (P. gluacum x P. squamulatum) (Perennial)

Entries No.	: 7
Entries Name	: IGPISH -1, IGPISH -2, IGPISH -3, IGPISH -4, IGPISH -5, IGPISH -6, IGPISH -7
Checks	: As there is no released variety, General mean will be taken as check and it will be evaluated in rainfed condition. Performance of released varieties of <i>Cenchrus ciliaris</i> , <i>Dichanthium annulatum</i> , <i>Chrysopogon fulvus</i> will also be noted along with the trial.
Design	: RBD with 4 replications
Plot size	: 4 m x 3 m (6 rows of 4.0 m at 50 cm)
Planting	: 50 x 50 cm planting 48 rooted slips/replication/entry
Fertilizers	: 90:50:40 kg N, P ₂ O ₅ , K ₂ O/ha (with half N as basal and rest in subsequent cuts
Seed requirement	: 500 rooted slips/ entry. The coded material will be multiplied by testing locations in July and trials will be constituted in September 2014. Data will be recorded from kharif 2015.
Location:	: Ludhiana, Hisar, Anand, Rahuri, Urulikanchan, Jhansi, Jabalpur, Bhubaneswar, Palampur, Jorhat, Kalyani,

CHARACTERS TO BE OBSERVED

(A) GENERAL: FOR EACH TRIAL

1. Days to 50% flowering
2. Green fodder yield (q/ha)
3. Dry matter yield (q/ha)
4. Production efficiency (q/ha/day)
5. Dry matter percentage (DM %)
6. Seed yield (q/ha) of AVT-2 (Seed) trials.
7. In perennial crops seed yield is to be recorded only in final year.
8. Plant height (cm) (In case of Ricebean and Cowpea, vine length should be recorded)
8. Leaf/ Stem ratio
9. Quality attributes
 - (a) Crude protein yield (q/ha)
 - (b) Crude protein content (%)
 - (c) ADF and NDF estimates (%)
 - (d) IVDMD%

Note. The cut for green forage is to be taken at 50% flowering stage and per day productivity of each entry is to be reported.

Note:

1. Green fodder yield data to be recorded at 50% flowering stage.
2. For multi cut perennial crops it has to be recorded as per local agronomic practice (first cut at 50 days, subsequent cuts at 40 days).
3. All Kharif trials except seed trials are to be conducted strictly under rain-fed conditions.
4. Any Breeding trial comprising of the lesser entries due to missing of seed packets/damage of seed etc. should be compensated by increasing of replication or inclusion of the local checks/variety/strain so that the Degree of Freedom may not be less than 12.

(B) Yield conversion Factor:

$$\text{Yield (q/ha)} = \frac{\text{Yield (Kg /plot)}}{\text{Net plot size (m}^2\text{)}} \times 100$$

$$\text{Yield q/ha/day} = \frac{\text{Yield (q/ha)}}{\text{No. of days to harvest}}$$

- (C) 1. The Centres are expected to provide experimental details as per format given herewith.
2. Each Centre must communicate trials at a glance as per columns given below:

AICRP ON FORAGE CROPS			
FORAGE BREED TRIALS/RANGE GRASSES & LEGUMES EVALUATION TRIALS AT A GLANCE			
S. No.	Trials allotted (No. & Name)	Trials conducted (No. & Name)	Trials not conducted/failed, also give reasons for not conducting the trials/failure (No. & Name)
1.			
2.			

DATA SHEET FOR PROVIDING POOLED DATA (OVER CUTS) OF THE BREEDING TRIALS

Name of the Trial : _____
Location : _____
Soil type : _____
Date of sowing : _____
Plot size (Unit) : Gross: _____ Net: _____
Replications (No.): _____ Design: _____
Character : _____

Entry Code	R ₁	R ₂	R ₃	R ₄	Total	Mean	Rank

Mean =

SE (m) ± =

CD at 5% =

CV% =

Note:

1. Data for each character and trial must be provided in separate sheet.
2. For green fodder and dry matter yield, data for all the cuts taken must be provided replication-wise in the format. A Table showing summation over the cuts replication-wise is also required. For other characters, such as plant height, etc. average of cuts taken must be provided.
3. Please also provide data cut-wise in case of multicut entries as per data sheet given separately.
4. For quality parameters, data for crude protein (%) and crude protein yield (q/ha) must be supplied replication-wise for one cut only & for second cut in multicut crops. For IVDMD, NDF & ADF, a composite sample of all the replications may hold good for the cut specified above.

WORKING SCHEDULE FOR KHARIF-2014

1. Seed supply from contributors to PC Unit, Jhansi: Before May 10, 2014
2. Trials seed dispatch from PC Unit Jhansi: Before May 25, 2014
3. Trials sowing report to PC (FC): Within 7 days of sowing
4. Information on trials failure, etc. be communicated immediately to PC (FC) through the Director of Research/Director ICAR Institute
5. Submission of *Kharif* trials analyzed data (except seed and quality traits) before November 30, 2014; however, data on seed and quality are to be submitted before December 20, 2014.
6. Reporting of Breeder seed (BSP-IV): January 10, 2015.

FORAGE CROP PRODUCTION (AGRONOMY) Kharif 2014

Forage Crop Production Technical Programme Kharif 2014 (Trials details, codes etc)

Sr. No.	Current Trial Name	Previous Year Number	Title of trial
1	PS-11-AST-1	AST-2 (kharif 2013)	Effect of growing environment and nitrogen levels on production and quality of BN Hybrid
2	PS-11-AST-2	AST-12 (kharif 2013)	Effect of levels of nitrogen on productivity of perennial grasses with and without tree shade
3	PS-12-AST-1	AST-4 (kharif 2013)	Effect of nutrient management on productivity of perennial grasses under lowland condition
4	PS-12-AST-2	AST-18 (kharif 2013)	Performance of Bajra Napier hybrid grass as influenced by micronutrients under irrigated conditions
5	PS-12-AST-3	AST-15 (kharif 2013)	Enhancing the production potential of various forage crops in coconut gardens through nutrient management
6	PS-13-AST-1	AST-21 (kharif 2013)	Effect of herbicides on the weed control in Bajra Napier hybrid
7	PS-14-AST-1	AST-8 (kharif 2013)	Effect of straw mulch on the water requirement, weeds and productivity of BN hybrid
8	PS-14-AST-2	-	Impact of Mg and B on nutrient uptake, quality and yield of bajra napier hybrid
9	CS-12-AST-1	AST-5 (kharif 2013)	Effect of stubble management and INM on forage productivity in Rice-Oat cropping system
10	CS-13-AST-1	AST-6 (kharif 2013)	Study on different models for year round green fodder production under irrigated condition
11	CS-13-AST-2	AST-7 (kharif 2013)	Evaluation of fodder crops under different rice fallow system
12	CS-13-AST-3	AST-9 (kharif 2013)	Evaluation of different varieties of grasspea (<i>Lathyrus sativus</i> L.) as forage crop under different sowing methods in rice based cropping system
13	CS-13-AST-4	AST-19 (kharif 2013)	Residual effect of P applied to wheat on the succeeding summer fodders in sorghum-wheat-summer fodders cropping system
14	CS-14-AST-1	AST -20 (NT) Rabi 2013	Studies on intensive fodder cropping systems for yield maximization
15	CS-14-AST-2	-	Study of intensive annual fodder crop based cropping system
16	K-12-AST-1	AST-3 (kharif 2013)	Performance of dual purpose pearl millet as influenced by different cutting management practices and nitrogen levels
17	K-12-AST-2	AST-13 (kharif 2013)	Effect of time of sowing and seed rate on performance of fodder maize (<i>Zea mays</i> L.) under rainfed condition
18	K-12-AST-3	AST-14 (kharif 2013)	Performance of fodder rice bean as influenced by dates of sowing and spacing
19	K-12-AST-4	AST16 (kharif 2013)	Cropping system studies in fodder maize with legume intercropping
20	K-12-AST-5	AST-17 (kharif 2013)	Effect of varying seed rate of forage legumes on productivity of fodder maize
21	K-13-AST-1	AST-20 (kharif 2013)	Weed management in multicut sorghum
22	K-14-AST-1	-	Effect of nitrogen levels on forage yield of promising entries of pearl millet (AVTPM-2)
23	K-14-AST-2	-	Effect of nitrogen levels on forage yield of promising entries of forage hybrid maize (AVTM-2)
24	K-14-AST-3	-	Study of intercropping system of pigeon pea with different annual fodder crops
25	K-14-AST-4	-	Study of intercropping system of different vegetable with forage maize

K: Kharif **CS:** Cropping sequence **PS:** Perennial system **AST:** Agronomy & Soil Trial

(A) FORAGE CROP PRODUCTION (AGRONOMY) Kharif 2014**(A) ON-GOING COORDINATED TRIALS****PS-11-AST-1: Effect of growing environment and nitrogen levels on production and quality of BN Hybrid**

Objectives : To study the effect of shade and N levels on yield, quality and anti-nutritional components

Design: RBD **Replications:** Three **Year of start:** Kharif 2011 (Establishment year)

Duration: 3 years **Treatments:** 10

Growing environments: 1. Shaded 2. Unshaded

Nitrogen levels : 1. 50% of recommended dose of N 2. 75% of recommended dose of N
3. 100% of recommended dose of N 4. 125% of recommended dose of N
5. Control

Observations:**Crop growth and development**

- Plant height, shoot no./tussock, leaf stem ratio
- Green fodder and dry fodder yields (q/ha)

Quality studies

- Crude protein content and yield, NDF and ADF content, Nitrate and Oxalate contents

Soil studies

- Available NPK, pH and OC content –initial and after completion of each season

Economic studies

- Net returns (₹/ha), B:C ratio

Locations (5): Palampur, Ludhiana, Anand, Rahuri, Hyderabad

Note: Package of practices i.e. variety, spacing and fertilizers (NPK), etc. to be followed as per location specific recommendations, data will be reported in kharif.

Initially with respect to layout and planting the experiment will be managed by Agronomist and thereafter further samplings etc for analysis will be managed by the concerned biochemist of the centre.

K-12-AST-1: Performance of dual purpose pearl millet as influenced by different cutting management practices and nitrogen levels**Objectives:**

- To study the effect of cutting management on green fodder and grain yield
- To study the economics of the system

Treatments

Varieties (3) 1. BAIF Bajra-1 2. AVKB 19 3. GFB-1

Cutting management (3): 1. No cutting 2. First cut (40 DAS) for green fodder & leave for grain
3. Two cuts for green fodder (1st at 40 DAS, 2nd 40 days after 1st cut) & leave for grain production

Nitrogen levels (2): 1. 100 % of RDN 2. 150% RDN

*N will be given in three splits (40 % basal, 30 % at 30 DAS, and remaining 30 % at 60 DAS)

Design : FRBD **Replications** : Three **Year of start** : Kharif 2012

Duration: 3 years **Treatments** : 18 **Plot size** : 4 x 3.60 m

Observations to be recorded:

(a) Crop growth and development: 1. Plant height 2. Leaf stem ratio 3. No. of tillers/ m row length
4. Green fodder yield 5. Dry matter yield 6. Grain yield 7. Stover yield

(b) Quality studies: 1. Crude protein content, 2. Crude protein yield

(c) Economics: Net monetary returns, benefit cost ratio and cost of cultivation

(d) Soil studies: Soil fertility status before and after crop season and N uptake by the crop

Locations (6): Anand, Urulikanchan, Bikaner Mandya, Hyderabad, IGFRI RRS Dharwad

Data will be reported in Kharif

PS-12-AST-1: Effect of nutrient management on productivity of perennial grasses under lowland condition

Objectives:

1. To evaluate the performance of lowland perennial grasses in relation to crop establishment and forage productivity
2. To study the response of different lowland grasses over nutrient management.

Treatments (12):

A. Main plot- Grasses:

- G₁**- Para grass (*Brachiaria mutica*) **G₂**- Humidicola (*Brachiaria humidicola*)
G₃- Predominant Local grass

B. Sub-plot- Nutrient management

- M₁**-100% NPK (Inorganic fertilizer) **M₂**-50% NPK through inorganic fertilizer + FYM @ 5 t ha-1
M₃- FYM @ 10 t ha-1 **M₄**-Farmer's practice (No nutrient- control)

Note: Dol grass for Jorhat, Bhubaneswar and Kalyani.

Ranchi and Jabalpur centre will take Predominant local grass suited for low land condition

Design: FRBD **Year of start** : Kharif 2012 (establishment year) **Duration:** Three years

Replication: 3 **Plot size:** 4 m x 5 m **Spacing:** 50 cm x 50 cm

Observation to be recorded:

- Initial and final fertility status of the soil after each season
- Green fodder yield and dry fodder yield
- Crude protein yield and crude protein content (%)
- Economics: Net returns, BC ratio and cost of cultivation
- Nutrient uptake (NPK) by the grasses

Location (5): Bhubaneswar, Jorhat, Kalyani, Ranchi and Jabalpur

CS-12-AST-1: Effect of stubble management and INM on forage productivity in Rice-Oat cropping system

Objectives:

- To study the effect of different cutting height of rice stubble on crop establishment and forage productivity of oat
- To evaluate the relative performance of different stubble management and INM treatment on Productivity of Rice -Oat cropping system.

Treatments: 12

Main Plot- Rice Stubble management

- S1- Cutting of rice stubble at ground level
- S2- Cutting of rice stubble at 30cm height
- S3- Normal cultivation

Sub Plot- INM treatment

- M1- 100% NPK (Inorganic fertilizer)
- M2-50% N through FYM+50%NPK through inorganic fertilizer
- M3-25% N through FYM+Green manure+50% NPK through inorganic fertilizer+Biofertilizer
- M4 -50% N through FYM +GM+ PSB+ Biofertilizers

Design: Split Plot Design **Replication:** 3 **Plot size:** 4mx3m **Year of Start:** Kharif 2012

- INM treatment will be given to Rice crops
- 50% RDF will be given to oat crop
- In stubble management practices except normal cultivation system oat will be sown behind the plough

Observations to be recorded:

- Initial and final fertility status of soil , Yield of component crop, Equivalent yield, Economics
- Soil fertility before and after harvesting of crop cycle

Locations: Jorhat and Bhubaneswar

Data reporting: Rabi

CS-13-AST-1: Study on different models for year round green fodder production under irrigated condition

Objectives

1. To study the different combinations of perennial and seasonal fodder crops for productivity and identify suitable crop combination
2. To study economics of different models
3. To study effect of different models on soil chemical properties

Treatments: Crop combinations-models

- T1 - Maize+cowpea – oat+berseem – bajra+cowpea
- T2 – Sorghum+cowpea – maize+berseem – bajra+cowpea
- T3 – Hybrid napier+cowpea - hybrid napier+berseem - hybrid napier+cowpea
- T4 – Hybrid napier + lucerne
- T5 – Hybrid napier + *Desmanthus*

Design: RBD Replications: 4 Plot size: 6 x 5 m

Duration of the experiment: 3 years (Starting from Kharif 2013)

Observations to be recorded:

Growth: Plant height, Leaf stem ratio, Plant population per m row length

Yield and quality: Green fodder yield, dry matter yield, Crude protein yield, CP (%), CF (%)

Economics: Net monetary returns, benefit cost ratio

Soil studies: Initial soil status and after completion of sequence for pH, EC, OC, N, P & K

Note: Recommended package of practices will be followed for each crop.

The ratio of cereal to legume will be 2:1 for seasonal crops.

In hybrid napier + lucerne and hybrid napier + *Desmanthus*: Two rows of hybrid napier spaced at 4.8 meter (60 cm from boarder) and in between two lines of hybrid napier 12 lines of legumes at 30 cm spacing.

Locations: (4): Urulikanchan, Anand, Rahuri, and Bikaner

(Data reporting: Rabi)

CS-13-AST-2: Evaluation of fodder crops under different rice fallow system

Objective: (1) to assess the impact of different methods of rice cultivation on fodder establishment, yield and economics

(2) to study the physio-chemical properties of soil before and after cropping sequence

No. of Treatments: 12 Design: Split plot Replications: 3 Plot size: 6 x 5 m

Duration of the experiment: 3 years (Starting from Kharif 2013)

Treatment details:

Main plot- Systems of rice establishment methods (4)

M1- Conventional method M2- SRI (raised bed)

M3- SRI (flat bed) M4- Aerobic rice

Sub Plot: Forage crops (3)

C1- Oat

C2- Berseem

C3- Lathyrus

Observations to be recorded:

- Biometrics, yield attributes and yield studies of rice and fodder crops
- Physiochemical properties of soil
- Net monetary returns, benefit cost ratio

Note: Package of practices: IPNM to rice crop: FYM @ 5t/ha + RD@ 80-40-40 kg M, P₂O₅ and K₂O/ha

Water management in rice:

- Conventional method- puddled and transplanted standing water through out the season.
- SRI (raised bed)- puddled and transplanted water only in channel
- SRI (flat bed)- puddled and transplanted, beds to be kept from moist to saturated condition
- Aerobic- non-puddled, direct sown, irrigation as and when required

Locations (4): Ranchi, Jabalpur, and Bhubaneswar

(Data reporting: Rabi)

PS-14-AST-1: Effect of straw mulch on the water requirement, weeds and productivity of BN hybrid

Objectives:

- To study the effect of mulch on water requirement and weed density in BN hybrid
- To study the effect of mulch on forage yield, and quality of BN hybrid
- To study the effect of mulch on physico – chemical properties of soil

Year of start: Summer 2014 **Duration:** Three years

Treatments

Main-plot: Irrigations (3): 0.8, 1.0 and 1.2 IW/CPE

Sub-plot: Straw mulch (4): Control, 5.0, 7.5 and 10 t/ha

Variety : PBN 233 **Seed rate :** 27500 root slips/stem cutting/ha
Spacing: 60 cm x 60 cm **Fertilizers :** 50 t FYM + 75 kg N/ha/cut
Design : Split-plot **Replication(s) :** 3

Observations:

- Crop growth: Plant population, Plant height, L:S
- Yield (q/ha): Green fodder, dry matter
- Quality: Crude protein content & yield
- Economics: Cost of cultivation, Gross monetary return, Net returns, Benefit : cost ratio
- Weed density, weed dry weight and WCE
- Soil studies: Soil fertility status before and after completion of the sequence, i.e., pH, OC (%), EC, available NPK before and after the completion of experiment.

Locations (4): Ludhiana, Hisar, Bikaner and Raipur

(Data reporting – Kharif)

CS-13-AST-3: Evaluation of different varieties of grasspea (*Lathyrus sativus* L.) as forage crop under different sowing methods in rice based cropping system

Objective: To compare the biomass and grain yield production among different variety of grass pea under different sowing methods

Design: Split Plot Design; **Replication:** 3 **Number of treatment:** 24; **Date of sowing:** Before 15 Nov.

Treatment details:

A. Main plot: Methods (4)

- Recommended practices with 125% more seed rate
- Recommended practices with 150% more seed rate (Planting 20x10)
- Zero seed Drill with 125% more seed rate
- Zero seed Drill with 150% more seed rate (Planting 20x10)

B. Sub plot: Varieties (6)

1. Pusa-24
2. Mahateora
3. Prateek
4. Ratan
5. Nirmal
6. One line of Chhattisgarh i.e. RLS which is already in IVT mode of AICRP on MuLLaRP

Fertilizer: Recommended dose of nutrient and spray 2% urea as foliar application at 60 DAS;

Seed treatment: Rhizobium and PSB

No. of cutting: Single (50 DAS)

Observations to be recorded:

Plant height, leaf stem ratio, Green forage yield, dry matter yield, Crude protein content, Crude protein yield and seed and stover yield

Location (2): Raipur and Jorhat

(Data reporting: Rabi)

B- LOCATION SPECIFIC TRIALS

PS-11-AST-2: Effect of levels of nitrogen on productivity of perennial grasses with and without tree shade

OBJECTIVES:

- To study the effects of levels of nitrogen on productivity of perennial grasses under open and under tree shade conditions.
- To study the economics & quality of perennial grasses as influenced by varying levels of nitrogen under open and under tree shade conditions.

Year of start: Kharif 2011 (Establishment year); **Duration:** Three years; **Design:** Split-Plot;

Replications: 3

Plot size (Gross): 5 m x 3 m

Treatments:

A. **Main Plot-(S-2):** S1- Open Condition and S2-Under Tree Shade

B. **Sub Plot: (a) Grass (2): P1. Setaria (*Setaria anceps*) P2. Congosignal (*Brachiaria brizantha*)**

(b) Fertilizer level (3):

1. F₁-25% less than recommended dose of N
2. F₂ – Recommended dose of N
3. F₃ – 25% higher than recommended dose of N

(Recommended dose of fertilizer for perennial grass: N: P₂O₅: K₂O, 120:60:40)

Total treatment combination 2 x 2 x 3 = 12

Observations:

- Initial fertility status of soil and fertility status at final harvest; Yield attributes- Plant height, tiller/tussock; Leaf - stem ratio; Green forage and dry matter yield (q/ha); Crude protein content and crude protein yield (q/ha) and Economic indices.

Location-Jorhat

(Data will be reported in kharif)

K-12-AST-2: Effect of time of sowing and seed rate on performance of fodder maize (*Zea mays* L.) under rainfed condition

Objectives:

1. To standardize the seed rate of fodder maize in the hill areas of Manipur state
2. To identify the suitable date of sowing of fodder maize for maximization of green fodder yield

Design of experiment: FRBD; **Year of start:** Kharif 2012; **Duration:** 3 years and

Treatments: (A) Date of sowing (3): D₁-26 May, D₂- 4th June and D₃-14th June

(B) Seed rate (3) (kg ha⁻¹): S₁-60, S₂-70 and S₃-80.

Number of replication: 3 (three); **Number of Treatments** : 9 (nine); **Plot size:** 5.5 m x 5.0 m

Spacing: 30 cm (R x R) and **Manure and fertilizer:** as per recommended dose

Observation to be taken (Harvest stage)

I. **Growth & Yield parameters:** Plant height (cm); Plant population (per row meter length); Leaf-Stem ratio; Green forage yield (q ha⁻¹) and dry matter yield (q ha⁻¹)

II. **Quality:** Crude protein content (%); Crude protein yield (kg ha⁻¹); Crude protein content (%)

III. **Economics-** net returns, BC ratio and cost of cultivation

Data will be reported in Kharif

Location: Imphal

K-12-AST-3: Performance of fodder rice bean as influenced by dates of sowing and spacing

Objective:

- To standardize the suitable date of sowing and spacing for maximization of fodder yield of rice bean

Design of experiment: FRBD;

Year of start: Kharif-2012 and

Duration: 3 years

Treatments

(A) **Date of sowing (3):** D₁-26 May, D₂- 4th June and D₃-14th June

(B) **Spacing (3):** S₁-farmer practice, S₂-30 cm and S₃-40 cm

Number of replication: 3; **Number of Treatments:** 9 **Plot size:** 4.5 m x 4 m and **Seed rate:** 35 kg ha⁻¹

Manure and fertilizer application: N: P₂O₅: K₂O @ 20 kg/ha, 60 kg/ha and 20 kg/ha, respectively.

Observation to be taken (Harvest stage)

I. Growth and yield parameters: Plant height (cm); Plant population (per row meter length); Leaf-Stem ratio; Green forage yield (q ha⁻¹) and dry matter yield (q ha⁻¹)

II. Quality: Crude protein content (%); Crude protein yield (kg ha⁻¹)

III. Economics: Net returns; cost of cultivation and BC ratio

Data will be reported in Kharif

Location: Imphal

PS-12-AST-3: Enhancing the production potential of various forage crops in coconut gardens through nutrient management

Objectives:

- To know the performance of different forage crops in coconut garden under different nutrient levels
- To Identify suitable forage crop.

Year of start: Kharif 2012 (Establishment year);

Duration: Three years;

Location: ZARS, Mandya

Design: RCBD;

Replication: Three;

Plot size: 5.4 × 4.0 m

Treatments: 9; Fertilizer : As per treatments

Treatment details

1. Hybrid napier bajra + 100% RDF

2. Hybrid napier bajra + 125% RDF

3. Hybrid napier bajra + 150% RDF

4. Guinea grass + 100% RDF

5. Guinea grass + 125% RDF

6. Guinea grass + 150% RDF

7. Signal grass + 100 % RDF

8. Signal grass + 125 % RDF

9. Signal grass + 150 % RDF

Observations to be recorded

Plant height (cm); Leaf stem ratio; Green forage yield (q/ha); dry matter yield (q/ha); Crude protein yield (q/ha); Light interception studies; Economics: Net returns, cost of cultivation and BC ratio and Initial and final fertility status (OC, pH, EC and NPK) of soil before and after completion of the experiment

Data will be reported in Kharif

Location: Mandya

K-12-AST-4: Cropping system studies in fodder maize with legume intercropping

Objectives:

- To evaluate forage production potential of maize and legume intercropping in terms of total dry matter production and maize forage quality.

Technical details:

Design: RBD; **Replication:** 4; **Year of start:** Kharif 2012; **Duration:** 3 Years

Treatment details:

T1 - Sole maize (30cm spacing); **T2** - Sole cowpea (30cm spacing); **T3** - Sole soybean (30cm spacing);
T4 - Maize + cowpea (1:1); **T5** - Maize + cowpea (2:1); **T6** - Maize + soybean (1:1);
T7 - Maize + soybean (2:1); **T8** - Maize + cowpea mixed cropping **T9** - Maize + soybean mixed cropping

Note:

Seed rate for sole crops: 80 kg/ha for maize; 40 kg/ha for cowpea; 60 kg/ha for soybean

Mixed cropping: 50% less seed rate for both the crops

Inter cropping: Recommended seed rate for sole crops

Observation to be recorded:

- Crop Growth:** Plant population at harvest/m²; Plant height at harvest and Leaf stem ratio
- Yield (q/ha):** Green fodder; dry fodder and Forage equivalent yield
- Quality Parameters:** Crude protein content (%) and Crude protein yield (q/ha)
- Nutrient studies:** Nitrogen content and uptake by each crop and Soil fertility states before and after completion of system.

Location: Srinagar

Data will be reported in Kharif

K-12-AST-5: Effect of varying seed rate of forage legumes on productivity of fodder maize

Objective:

To study the effect of seed rate and mixed cropping on the yield and economics of fodder maize

Technical details:

Design: RBD; **Replication:** 4; **Year of start:** Kharif 2012; **Duration:** 3 Years

Treatment details:

T1 - Sole maize (30cm spacing); **T2** - Sole cowpea (30cm spacing); **T3** - Sole soybean (30cm spacing)
T4 - Maize + cowpea @ 20kg/ha; **T5** - Maize + cowpea @ 40kg/ha; **T6** - Maize + cowpea @ 60kg/ha
T7 - Maize + soybean @ 40kg/ha; **T8** - Maize + soybean @ 60kg/ha **T9** - Maize + soybean @ 80kg/ha

Note:

Recommended seed rate of maize is 80 kg/ha. However the seed rate of maize will be adjusted as per the row proportion i.e. being replacement series the seed rate will be 40 kg/ha.

Fertilizer for sole crops: 100 kg/ha for maize; 25 kg/ha for cowpea and 25 kg/ha for soybean

Inter cropping: N @ 80 kg/ha, P2O5 @60 kg/ha and K2O @ 40 kg/ha

Observation to be recorded:

- Crop Growth:** Plant population at harvest/m²; Plant height at harvest and Leaf stem ratio
- Yield (q/ha):** Green fodder yield; dry fodder yield and Forage equivalent yield
- Quality Parameters:** Crude protein content (%) and Crude protein yield (q/ha)
- Nutrient studies:** Nitrogen uptake by each crop and soil fertility status before and after completion of experiment
- Economics:** Net returns, BC ratio and cost of cultivation

Data will be reported in Kharif

Location: Srinagar

K-13-AST-1: Weed management in multicut sorghum

Objective: To study the effect of herbicides on weed density, forage yield and quality of multicut sorghum

Technical details:

Year of start: Kharif 2013; **Duration:** Three years; **Variety:** PSC 1;
Seed rate: 37.5 kg/ha; **Row spacing:** 30 cm; **Fertilizers:** 100 kg N + 20 kg P₂O₅/ha;
Design: RBD; **Replication(s):** 3

Treatments

- | | |
|--|--|
| 1. Control | 8. Vallore (Imaze. + pendi.) 0.750 kg/ha Pre-emergence |
| 2. Hand weeding (21 DAS) | 9. Pinoxaden 0.0375 kg/ha Post-emergence |
| 3. Atrazine 0.5 kg /ha Pre-emergence | 10. Pinoxaden 0.0500 kg/ha Post-emergence |
| 4. Pendimethalin 0.75 Pre-emergence | 11. Propaquizalofop 0.0625 kg/ha Post-emergence |
| 5. Atrazine 0.25 + pendi. 0.75 kg/ha Pre-emergence | 12. Propaquizalofop 0.0750 kg/ha Post-emergence |
| 6. Atrazine 0.375 + pendi. 0.75 kg/ha Pre-emergence | 13. Oxyflorfen 0.088 kg/ha Pre-emergence |
| 7. Vallore (Imaze. + pendi.) 0.560 kg/ha Pre-emergence | 14. Oxyflorfen 0.146 kg/ha Pre-emergence |

Observations:

Crop growth: Plant population, Plant height, L S ratio

Yield (q/ha): Green fodder, dry matter

Quality: Crude protein content & yield

Economics: Cost of cultivation, Gross monetary return, Net returns, Benefit : cost ratio

Weeds: Weed density, weed dry weight and WCE

Location: Ludhiana

(Data reporting: Kharif)

PS-13-AST-1: Effect of herbicides on the weed control in Bajra Napier hybrid

Objective: To study the effect of herbicides on weed density, forage yield and quality of Napier-bajra hybrid

Technical details

Year of start: Kharif 2013; **Duration:** Two years; **Variety** : PBN 233
Seed rate: 27500-root slips/stem cutting/ha; **Spacing:** 60 cm x 60 cm; **Fertilizers:** 50 t FYM + 75 kg N/ha/cut
Design: RBD; **Replication(s):** 3

Treatments

- | | |
|--------------------------------------|--|
| 1. Control | 9. Atrazine 0.75 kg/ha+ pendi. 0.560 kg/ha |
| 2. Atrazine 0.5 kg /ha | 10. Atrazine 0.75 + pendi 0.75 kg/ha |
| 3. Atrazine 0.75 kg/ha | 11. Atrazine 1.0 kg/ha +pendi. 0.560 kg/ha |
| 4. Atrazine 1.0 kg/ha | 12. Atrazine 1.0 + pendi. 0.75 kg/ha |
| 5. Pendimethalin 0.560 kg/ha | 13. NBH + Cowpea |
| 6. Pendimethalin 0.75 | 14. NBH + Maize |
| 7. Atrazine 0.5 + pendi. 0.560 kg/ha | 15. NBH + pearl millet |
| 8. Atrazine 0.5 + pendi. 0.75 kg/ha | 16. Hand weeding |

Observations to be recorded:

Crop growth: Plant population, Plant height, L: S

Yield (q/ha): Green fodder, dry matter

Quality: Crude protein content & yield

Economics: Cost of cultivation, Gross monetary return, Net returns, Benefit : cost ratio

Weeds: Weed density, weed dry weight and WCE

Location: Ludhiana

(Data reporting: Kharif)

CS-14-AST-1: Studies on intensive fodder cropping systems for yield maximization

Objectives:

- To find out the appropriate cropping system for maximum fodder production
- To study the effect of cropping systems on soil fertility, nutrient use and water use efficiency

Year: Summer/Kharif 2014

Design : RBD

Duration: Three years

Replications: Three

Plot size (Gross): 6.0 m x 5.0 m

Treatments:

1. BN Hybrid + Lucerne
2. Setaria + Lucerne
3. BN Hybrid + Cowpea (summer) / Lucerne (winter)
4. Setaria + Cowpea (summer)/ Lucerne (winter)
5. BN Hybrid + Berseem (winter)
6. Setaria + Berseem (winter)
7. BN Hybrid + Cowpea (summer)/ Berseem (winter)
8. Setaria + Cowpea (summer)/ Berseem (winter)

Observations to be recorded:

1. **Growth attributes:** Plant height, Leaf: stem ratio
2. **Yield:** GFY, DMY and CPY
3. **Economics:** Cost of cultivation, Net returns and BC ratio
4. **System productivity:** Equivalent yields
5. **Other yearly observations:** WUE, NUE, soil fertility after crop cycle

Location: Raipur

(Data reporting in Rabi)

C. AVT BASED TRIAL

K-14-AST-1 (NT): Effect of nitrogen levels on forage yield of promising entries of pearl millet (AVTPM-2)

Objective: to see the effect of nitrogen levels and promising entries on growth and yield of pearl millet

Technical details

Year : Kharif 2014; **Design :** FRBD; **Replications :** Three
Plot Size: 4m x 3m (RXR = 30 cm); **Seed rate:** 15 kg/ha (20 g/plot)

Treatments

Entries: 6 (3+3): 3 (AFB-8; APFB-09-1 and NDFB-936); 3 checks (Raj Bajra Chari-2, AVKB-19 and Giant bajra)

N- levels: 4 (0,30, 60 & 90 kg /ha) (half N as basal and half N after 30 DAS; 40 kg P₂O₅ /ha as basal to all treatments)

Observations:

- Plant population/m², Plant length and Leaf: stem ratio
- Green fodder, dry matter yields (q/ha)
- Crude protein content and crude protein yield (q/ha)

Locations (6):

NEZ – Faizabad, Bhubaneswar, Ranchi, Jorhat, Imphal and Kalyani

(Seed requirement per entry = seed of each entry will be supplied by contributing centre to coordinating unit)

K-14-AST-2 (NT): Effect of nitrogen levels on forage yield of promising entries of forage hybrid maize (AVTM-2)

Objective: to see the effect of nitrogen levels and promising entries on growth and yield of forage hybrid maize

Technical details:

Year : Kharif 2014 **Design:** FRBD **Replications:** Three
Plot Size: 4m x 3m (10 rows at RXR spacing= 30 cm) **Seed rate:** 75 kg/ha (90g/plot)

Treatments

Entries: 6 (4+2): PMH-1, PMH-3, DHM-117, and IHTFM (PAC-745); African Tall and J-1006 (Checks)

N-levels: 4 (0, 40, 80 and 120 kg N/ha) (half N as basal and half N after 30 DAS and 40 kg P₂O₅ /ha as basal to all treatments)

Observations:

- Plant population/m², Plant length and Leaf: stem ratio
- Green fodder and dry matter yields (q/ha)
- Crude protein content and crude protein yield (q/ha)
- (Seed requirement per entry = kg seed of each entry will be supplied by contributing centre to coordinating unit.)

Locations (8) **HZ:** Palampur and Srinagar; **NWZ:** Ludhiana and Hisar;
NEZ: Faizabad, Ranchi, Bhubaneswar and Jorhat

D. New research trials

K-14-AST-3 (NT): Study of intercropping system of Pigeon pea with different annual fodder crops

Objectives:

- To find out the appropriate inter cropping system for maximum yield of pigeon pea as well as biomass of fodder.
- To find out the best economics for different intercropping system.

Experiment details

Technical details:

Year of start: Kharif 2014

Design: Randomized block design

Replication: Three

Plot size: Gross plot size- 6m x 5m = 30m²

Duration: Three years

Technical details (Additive series two row of pigeon pea at 45 cm)

1. Pigeon pea + Sorghum (2:1)
2. Pigeon pea + Maize (2:1)
3. Pigeon pea + Pearl millet (2:1)
4. Pigeon pea + Soybean (2:1)
5. Pigeon pea + Rice bean (2:1)
6. Pigeon pea + Cowpea (2:1)
7. Pigeon pea + Cluster bean (2:1)

Note- The recommended package of practices for all crops or according to main crop will be adopted.

Observations

- Green fodder yield (q/ha)
- dry fodder production (q/ha)
- Green fodder yield per day (q/ha)
- Dry fodder production per day (q/ha)
- Crude protein content
- Crude protein yield
- Plant height (cm)
- Leaf : stem ratio
- Economics: Cost of cultivation, Net return, B:C ratio

Other related yearly observation

- Nutrient use efficiency
- Soil pH, organic carbon, available nitrogen

Locations (2): Ranchi and Raipur

(Data will be reported in Kharif)

CS-14-AST-2: Study of intensive annual fodder crop based cropping system

Objectives

- To find out the appropriate system for maximum fodder production
- To study the effect of maximum forage production on soil fertility, nutrient use efficiency and water use efficiency.

Technical details:

Year of start: Kharif 2014

Design: Randomized block design

Replication: Three

Plot size: Gross plot size- 6m x 5m = 30m²

Duration: Three years

Treatment details

1. Sorghum multi cut + Cowpea (2:1) - Lucerne
2. Maize + Cowpea (2:1) - Lucerne
3. Pearl millet multi cut + Cowpea (2:1) - Lucerne
4. Maize + Rice bean (2:1) – Berseem – Sorghum multi cut + Cowpea (2:1)
5. Maize + Rice bean (2:1) – Oat multi cut - Sorghum multi cut + Cowpea (2:1)
6. Pearl millet multi cut + Rice bean (2:1) – Oat multi cut – Maize + Cowpea (2:1)
7. Pearl millet multi cut + Rice bean (2:1) – Berseem – Maize + Cowpea (2:1)
8. Pearl millet multi cut + Rice bean (2:1) – Berseem – Sorghum multi cut + Cowpea (2:1)
9. Pearl millet multi cut + Rice bean (2:1) – Oat multi cut – Sorghum multi cut + Cowpea (2:1)

Note- The recommended package of practices for all crops or according to main crop will be adopted.

Observations

- Green fodder yield (q/ha)
- Dry fodder production (q/ha)
- Green fodder yield per day (q/ha)
- Dry fodder production per day (q/ha)
- Crude protein content
- Crude protein yield
- Plant height (cm)
- Leaf : stem ratio
- Economics Cost of cultivation
- Net return, B:C ratio

Other related yearly observation

- Nutrient use efficiency
- Soil pH, organic carbon, available nitrogen

Location: Raipur

(Data will be reported in Rabi season)

K-14-AST-4: Study of intercropping system of different vegetable with forage maize

Objectives

- To find out the appropriate inter cropping system for getting vegetable and fodder yield
- To find out the best economics for different intercropping system

Experiment details

Design: RBD

Replication: Four

Year of start: Summer 2014

Duration: Three years

Treatment details

- | | | |
|--------------------------------|--------------------------------|-------------------------------|
| 1. Maize + Cowpea (1:1), | 2. Maize + Bean (1:1), | 3. Maize + Smooth Guard (1:1) |
| 4. Maize + Cucumber (1:1), | 5. Maize + Bitter Guard (2:2), | 6. Maize + Cowpea (2:2) |
| 7. Maize + Bean (2:2) | 8. Maize + Smooth Guard (2:2) | 9. Maize + Cucumber (2:2) |
| 10. Maize + Bitter Guard (2:2) | | |

Note- The recommended package of practices for all crops or according to main crop will be adopted.

Observations:

- Green fodder yield (q/ha) Dry fodder production (q/ha) Green fodder yield per day (q/ha)
- Dry fodder production per day (q/ha) Crude protein content Crude protein yield
- Plant height (cm) Leaf : stem ratio Economics:
Cost of cultivation Net return, B:C ratio

Other related yearly observation:

- Nutrient use efficiency, soil pH, organic carbon, available nitrogen

(Data will be reported in kharif)

Location: Raipur

AST-25 (NT): Impact of Mg and B on nutrient uptake, quality and yield of bajra napier hybrid

Objective: to assess the influence of Mg and B nutrition on the performance of bajra napier hybrid

Technical details:

Design:- Factorial RBD

Number of replication:- Three

Plot size: 4 m x 4 m

Duration of study:- 3 years

Treatments:-

A. Field condition (2)

1. Open situation
2. Coconut garden

B. Nutrient levels (5)

1. POP recommendation (200:50:50 kg NPK/ha and 25 t/ha of Farm yard manure) + MgSO₄ 80 kg/ha + Borax, 10 kg/ha
2. POP(200:50:50 kg NPK/ha and 25 t/ha of Farm yard manure) + MgSO₄, 80kg/ha
3. POP (200:50:50 kg NPK/ha and 25 t/ha of Farm yard manure) +Borax, 10 kg/ha
4. POP alone((200:50:50 kg NPK/ha and 25 t/ha of Farm yard manure)
5. POP without FYM (200:50:50 kg NPK/ha)

POP- Package of practices recommendation, Kerala (200:50:50 kg NPK/ha and 25 t/ha of FYM

General recommendation for deficient soils in Kerala is 80 kg/ha of Mg SO₄ and 10 kg/ha of Borax.

Observations

- | | | |
|---------------------------------|-------------------------------|-------------------------|
| A. Biometric characters: | Plant height at harvest (cm), | Leaf /stem ratio |
| B. Yield characters: | Green fodder yield (q/ha), | Dry fodder yield (q/ha) |
| C. Quality characters: | Crude protein content (%) | Crude fibre content (%) |

D. Nutrient studies

1. Soil analysis:- pH, EC, organic carbon, Mg, B and NPK status before and after the conduct of the experiment
2. Plant analysis- N,P,K, Mg and B.

E. Light intensity studies

(Data will be reported in kharif)

Location: Vellayani

GENERAL SUGGESTIONS

- The technical programme must not be changed without prior approval of the Project Coordinator (FC). The data are to be recorded as per technical programme and reported to the Project Coordinator (FC) accordingly well in time scheduled. A hard copy with CD in MS-Word 2003 and also through E-mail must be provided to the Project Coordinator (FC). **In case of location – specific trials, the text of the trial should also be supplied by the Centre concerned.**
 - Data must be analyzed factor-wise statistically (with two-way tables) having SEm±, CD at 5% and CV %.
 - In case of interaction, two-way tables must be reported.
 - Following (statistically analyzed) data with yield data must be reported for comparisons and making valid conclusions.
 - Net monetary return (Rs./ha/yr) of the complete sequence (Crop sequences trial).
 - Component-wise and total green fodder and dry matter yield (q/ha), net monetary return (Rs./ha/yr) and Land Equivalent Ratio (LER) (Intercropping trial)
 - Component-wise and total crude protein yield (q/ha) as well as crude protein (%)
 - Initial and final fertility status of the soil, i.e., after completion of trial which should essentially include pH, EC, OC (%), available N, P & K (Crop sequences and fertility trials).
 - In trials on problematic soils, initial and final fertility status of the soil, i.e., after completion of trial and uptake of NPK by the crop(s) in each season is to be provided.
 - In multi-cut crop(s)/variety(s), data on growth and quality parameters (i.e., plant population / m row length, L:S ratio, No. of tillers / m row length, No. of branches/plant and crude protein content (%) are to be recorded as per schedule given below :
 - In Cereals and grasses, growth observations, in general, are to be recorded for first and last harvest. However, in cutting management trials or in trials with split application of N, the observations are to be taken for each cut.
 - Data on dry matter estimation and crude protein analysis are to be recorded for each cut
 - Centres / Locations are advised to send complete information on soil characteristics, variety (ies), agronomic recommendations, No. of cuts, etc., for the experiments in the prescribed format.
 - **Submission of Kharif trials analyzed data before 20th November, 2014**
 - In case of net monetary return, current market price (Rs./q) must be indicated.
- Centres /Locations are advised to provide trials at a glance in one sheet mentioning trials allotted, trials conducted, data reported (character-wise-analyzed) and trials not conducted (with valid reasons) while supplying data to the Project Coordinator (FC). The format is attached herewith.

AICRP ON FORAGE CROPS AGRONOMY TRIALS AT A GLANCE

Year: Kharif 2014

Centre/Location:

Trials Allocated (No. & Name)	Trials conducted No. & Name	Trials not conducted/failed, also give reason for not conducting the trial/failure (No. & name)

**FORAGE CROP PROTECTION COORDINATED TRIALS
PROPOSED TECHNICAL PROGRAMME FOR KHARIF 2014**

PPT 1: Monitoring of diseases and insect pests in Kharif forage crops ecosystem.

Locations: Bhubaneswar, Hyderabad, Jhansi, Palampur, Rahuri & Ludhiana

PPT 2: Evaluation of kharif breeding materials for resistance to diseases and insect pests.

Locations: Bhubaneswar, Hyderabad, Jhansi, Palampur, Rahuri & Ludhiana

PPT 14: Management of foliar diseases of forage sorghum

Locations: Palampur, Ludhiana, Bhubaneswar and Jhansi

Design: RBD

Replication: 3

Plot size: 2 x 2 m²

Treatments:

- T₁ = Seed treatment with carbendazim @ 2 g/kg seed
- T₂ = Seed treatment with *T. Viride* @ 5g/kg
- T₃ = Two foliar sprays of *T. Viride* @ 0.5%
- T₄ = Two foliar sprays of propiconazole @ 0.1%
- T₅ = Two foliar sprays of copper oxychloride @ 0.3%
- T₆ = T₁ + Two foliar sprays of propiconazole @ 0.1%
- T₇ = T₂ + Two foliar sprays of propiconazole @ 0.1%
- T₈ = T₁ + Two foliar sprays of copper oxychloride @ 0.3%
- T₉ = T₂ + Two foliar sprays of copper oxychloride @ 0.3%
- T₁₀ = Control

Note: Spray the crop at 30 and 45 DAS.

Seed of highly susceptible variety SL-44 will be supplied by Ludhiana center.

Observations:

Incidence and severity of diseases will be recorded.

Recording of yield at 50 % flowering

PPT 15. Integrated management of root rot and foliar diseases of forage cowpea.

Locations: Bhubaneswar, Palampur, Ludhiana and Jhansi

Design: Split plot

Replication: 3

Plot size: 2 x 2 m²

Variety: Local Susceptible Variety

Treatments:

Main plot: 3 (Date of Sowing)

T_A = 1st Date of sowing i.e. 15 days before Normal Days of Sowing

T_B = 2nd Date of sowing i.e. Normal Days of Sowing

T_C = 3rd Date of sowing i.e. 15 days after Normal Days of Sowing

Sub plot: 4 (Treatments)

T₁ = No treatment

T₂ = Seed treatment with *Trichoderma viride* + *Paecilomyces lilacinus* @ 5 g/kg seed each followed by foliar sprays of propiconazole @ 1ml/l at 15 days interval.

T₃ = Seed treatment with tebuconazole 2DS @ 1g/kg seed + NSKP(50 g/kg seed) followed by foliar spray of propiconazole @ 1ml/l at 15 days interval.

T₄ = Seed treatment with metalaxyl 8% + Mancozeb 64% @ 2.5g/kg seed + NSKP(50 g/kg seed) followed by foliar spray of propiconazole @ 1ml/l at 15 days interval.

Target Diseases:

- i. Root rot/wilt (*Fusarium/Rhizoctonia/Phytophthora*)
- ii. Anthracnose (*Colletotrichum*)
- iii. Leaf blight (*Cercospora/Phomopsis* etc.)
- iv. Nematodes

Observations:

1. Incidence and severity of diseases will be recorded.
2. GFY and DMY.
3. Correlation of weather variable with disease (s) development.
4. Nematode population before sowing and at harvest.

PPT16: Efficacy of different bio-pesticides against aphids on forage sorghum**Location:** Rahuri**Design:** RBD**Variety:** Ruchira**Plot size:** 3X 4 m²**Treatments:**

- T1- Foliar application of *Verticillium lecani* @ 10⁸ CFU/g (5 g/lit)
- T2- Foliar application of *V. Lecani* @ 10⁸ CFU/g (7.5 g/lit)
- T3- Foliar application of *Beuveria bassiana* @ 10⁸ CFU/g (5 g/lit)
- T4- Foliar application of *B. Bassiana* @ 10⁸ CFU/g (7.5 g/lit)
- T5- Foliar application of *Metarhizium anisopliae* @ 10⁸ CFU/g (5 g/lit)
- T6- Foliar application of *M. Anisopliae* @ 10⁸ CFU/g (7.5 g/lit)
- T7- NSE 5%
- T8- Azadirachtin 1% (Commercial neem product)
- T9- Untreated control

Observations:

1. Survival population of aphids 5 and 7 days after treatment
2. Count of natural enemies 5 & 7 days after spray treatment
3. Crude protein content
4. Green forage and dry matter yield (q/ha)

PPT 17: Biological management of defoliators on cowpea.**Replication:** 4**Design:** RBD**Plot size:** 3 x 4 m²**Locations:** Jhansi, Dharwar, Rahuri and Ludhiana**Treatments:**

- T1: *Beauveria basiana* @ 5 g (cfu 10⁶)/lt
- T2: *Nomurae relyi*@ 5 g (cfu 10⁶)/lt
- T3: NSE 5%
- T4: *Pseudomonas fluorescence* @5 g (cfu 10⁶)/lt
- T5: Untreated control

Note: Bio-pesticides to be used in PPT 16 will be supplied by Rahuri center.**Observations:**

1. Survival population of defoliators 5 and 7 days after treatment
2. Count of natural enemies at 5 & 7 days after spray treatment
3. Green forage and Dry matter yield (q/ha)

List of Delegates attended National Group Meeting Kharif-2014 of AICRP on Forage Crops held at SKRAU, Bikaner during 7-8 March, 2014

SN	Name	Designation and Institute
1	Dr. M. R. Krishanppa	Sr. Sci. Gen., (PB) & OIC, UAS (Bangalore) ZARS, VC Farm, Mandya-571 405
2	Dr. B. G. Shekara	Scientist (Agronomy), UAS (Bangalore) ZARS, VC Farm, Mandya-571 405
3	Dr. Durga Prasad Awasthi	Jr. Pathologist, Orissa University of Agril. & Tech. Bhubaneswar-751-003 (Orissa)
4	Dr. D. H. Desai	Asst. Res. Sci. (Biochem), Anand Agril. University, Anand Campus, Anand-388110
5	Dr. M. Sayiad	Asso. Res. Sci. , Anand Agril. University, Anand Campus, Anand-388110
6	Dr. Naveen Kumar	Principal Agronomist & OIC, CSK HPKV, Palampur-176 063
7	Dr. V. K. Sood	Sr. Plant Breeder, CSK HPKV, Palampur-176 063
8	Dr. D. K. Banyal	Sr. Plant Pathologist, CSK HPKV, Palampur-176 063
9	Dr. Rajan Katoch	Asstt. Analytical Chem. (Biochemist), CSK HPKV, Palampur-176 063
10	Dr. M. S. Pal	Professor (Agro.), G. B. Pant University of Agril. & Tech., Pantnagar-263 145
11	Mrs. Ashisan Tuti	Breeder & OIC, Birsa Agricultural University, Kanke, Ranchi-834 006
12	Mr. Birendra Kumar	Jr. Agronomist, Birsa Agricultural University, Kanke, Ranchi-834 006
13	Dr. S. S. Shekhawat	Prof. (PBG)& OIC, S. K. Rajasthan Agricultural University, Bikaner
14	Dr. S. M. Kumawat	Prof. (Agron.), S. K. Rajasthan Agricultural University, Bikaner
15	Dr. M. Abraham	Forage Breeder, Kerala Agricultural University, Vellayani-669522 Thiruvananthapuram
16	Dr. Usha C. Thomas	Agronomist, Kerala Agricultural University, Vellayani-669 522 Thiruvananthapuram
17	Dr. T. Shashikala	Sr. Scientist (PB), ANGRAU, Livestock Research Institute, Hyderabad-500 030
18	Dr. R. Shuseela	Scientist (Agron.), ANGRAU, Livestock Research Institute, Hyderabad-500 030
19	Dr. M. Shanti	Scientist (Soil Science), ANGRAU, Livestock Research Institute, Hyderabad-500 030
20	Dr. C. K. Kundu	Agronomist & OIC, Bidhan Chandra Krishi Vishwavidyalaya, Kalyani-741 235
21	Dr. A. Velayutham	Prof. (Agronomy) & OIC, Tamil Nadu Agricultural University, Coimbatore-641 003
22	Dr. C. babu	Prof. (PBG), Tamil Nadu Agricultural University, Coimbatore-641 003
23	Dr. L. K. Midha	Sr. Sci. (Agron.), C.C.S. Haryana Agricultural University, Hisar-125 004
24	Dr. D. S. Phogat	Asstt. Sci. (PB), C.C.S. Haryana Agricultural University, Hisar-125 004
25	Dr. U.N. Joshi	Sr. Sci. (Biochemistry), C.C.S. Haryana Agricultural University, Hisar-125 004
26	Dr. R.S. Yadav	Agronomist, N.D. University of Agril & Tech., Kumarganj, Faizabad-224 221
27	Dr. U.S. Tiwana	Sr. Agronomist & OIC, Punjab Agril. University, Ludhiana-140 004
28	Dr. Upasana Rani	Asstt. Plant Pathologist, Punjab Agril. University, Ludhiana-140 004
29	Dr. Meenakshi Goyal	Asstt. Biochemist, Punjab Agril. University, Ludhiana-140 004
30	Dr. A.K. Mehta	Pr. Scientist (PB)& OIC, Jawahar Lal Nehru Krishi Vishwavidyalaya, Jabalpur-482 004
31	Dr. S. K. Bilaiya	Pr. Scientist, Jawahar Lal Nehru Krishi Vishwavidyalaya, Jabalpur-482 004
32	Dr. Amit Jha	Scientist, Jawahar Lal Nehru Krishi Vishwavidyalaya, Jabalpur-482 004 (MP)
33	Dr. Noor-ul-Saleem	Forage Breeder, SKUAST, Srinagar-190121, Kashmir
34	Dr. Ansar-ul-Haq	Agronomist, SKUAST, Srinagar-190121, Kashmir
35	Mr. Nitish Tiwari	Scientist, Agronomy, Indira Gandhi Krishi Vishvidyalaya, Raipur 492006
36	Dr. S.A. Kerkhi	Plant Breeding, SVBP University of Agriculture & Technology, Meerut 250110
37	Dr. J.K. Bisht	Pr. Sci. (Agron.) & OIC Forage Research, VPKAS Almora 263601
38	Dr. K.K. Sharma	Principal Scientist, Assam Agricultural University, Jorhat
39	Dr. A.H. Sonone	Scientist II, Mahatma Phule Krishi Vidyapeeth, Rahuri
40	Dr. A.B. Tambe	Scientist I, Mahatma Phule Krishi Vidyapeeth, Rahuri
41	Dr. S.V. Damame	Scientist I, Mahatma Phule Krishi Vidyapeeth, Rahuri
42	Sh. Y.K. Singh	AM (Production), National Seed Corporation, New Delhi
43	Sh. Narayan Kolekar	Advanta Company
44	Dr. A.K. Singh	Dairy Specialist, J K Trust, Raipur
45	Dr. S. Mala	Pandit Jawahar Lal Nehru College of Agril & Research Institute Karaikal-609603
46	Dr. M. P. Rajora	CAZRI, Jodhpur, Rajasthan
47	Sh. Ramniwas Yadav	SFCI, Suratgarh, Rajasthan
48	Dr. H. Choudhary	NRC Pig (ICAR) Rani Guwahati, Assam
49	Dr. G.C. Shekar	Scientist, Plant Breeding UAS, Raichur, Karnataka
Participants of ICAR, New Delhi; IGFRI, Jhansi ; AICRP coordinating unit		
50	Dr. R. P. Dua	Assistant Director General (FFC), ICAR, New Delhi
51	Dr. A. K. Roy	Project Coordinator, IGFRI, Jhansi

52	Dr. S. R. Kantwa	Sr. Scientist and PI, Agro. , IGFRI, Jhansi
53	Dr. A. K. Mall	Sr. Scientist (PBG), IGFRI, Jhansi
54	Dr. Ritu Mawar	Sr. Scientist (PI. Path), IGFRI, Jhansi
55	Dr. Sunil Kumar	Principal Scientist and Head, IGFRI, Jhansi
56	Dr. R. V. Kumar	Principal Scientist and Head, IGFRI, Jhansi
57	Dr. A. K. Mishra	Principal Scientist and Head, IGFRI, Jhansi
58	Dr. Nagesh Shah	Principal Scientist, IGFRI, Jhansi
59	Dr. R. B. Bhaskar	Sr. Scientist, IGFRI, Jhansi
60	Dr. B. G. Shivakumar	Principal Scientist & OIC, IGFRI Regional Station, Dharwar, Karnataka
61	Dr. A. K. Singh	Sr. Scientist, IGFRI, Jhansi
62	Dr. Kumar Durgesh	Scientist, IGFRI, Jhansi
63	Dr. Gitanjali Sahay	Sr. Scientist, IGFRI, Jhansi
64	Dr. D. R. Malaviya	Principal Scientist and Head, IGFRI, Jhansi
65	Dr. S. S. Meena	Principal Scientist & OIC, IGFRI Regional Station, Avikanagar, Rajasthan
66	Dr. R.P. Nagar	Sr. Scientist, IGFRI Regional Station, Avikanagar, Rajasthan
67	Dr. V. K. Yadav	Principal Scientist, IGFRI, Jhansi
local participants		
68	Dr. A. K. Dahama	Hon'ble Vice-Chancellor, SKRAU, Bikaner
69	Dr. Govind Singh	Director Research, DOR, SKRAU, Bikaner
70	Dr. R.S. Shekhawat	Assistant Professor, DOR, SKRAU, Bikaner
71	Sh. Gautam Singh	TA, DOR, SKRAU, Bikaner (Rajasthan)
72	Sh. Durga Shankar	Computer Programmer, DOR, SKRAU, Bikaner
73	Sh. S. K. Vyas	Asstt. Registrar, DOR, SKRAU, Bikaner
74	Sh. Sundresan,	PA to Director Research, DOR, SKRAU, Bikaner
75	Dr. P. S. Rathore	Director, DHRD, SKRAU, Bikaner
76	Dr. S. S. Pareek	Professor, DHRD, SKRAU, Bikaner
77	Dr. (Mrs.) Anita Singh	Assoc. Professor, DHRD, SKRAU, Bikaner
78	Sh. R. S. Shekhawat	Photographer, DHRD, SKRAU, Bikaner
79	Dr. S. L.Godara	ZDR., Agricultural Research Station, SKRAU, Bikaner
80	Dr. B. L.Kumawat	Professor, Agricultural Research Station, SKRAU, Bikaner
81	Dr. R. S.Yadav	Professor, Agricultural Research Station, SKRAU, Bikaner
82	Dr. N. S. Yadava	Professor, Agricultural Research Station, SKRAU, Bikaner
83	Dr. P. S. Shekhawat	Professor, Agricultural Research Station, SKRAU, Bikaner
84	Dr. P. C. Gupta	Professor, Agricultural Research Station, SKRAU, Bikaner
85	Dr. S. R. Yadav	Professor, Agricultural Research Station, SKRAU, Bikaner
86	Dr. A. R. Naqvi	Professor, Agricultural Research Station, SKRAU, Bikaner
87	Er. A. K. Singh	Asstt. Prof., Agricultural Research Station, SKRAU, Bikaner
88	Dr. S. P. Singh	Asstt. Prof., Agricultural Research Station, SKRAU, Bikaner
89	Dr. N. K. Pareek	Asstt. Prof. Agricultural Research Station, SKRAU, Bikaner
90	Mr. Vikas Sharma	Asstt. Prof. Agricultural Research Station, SKRAU, Bikaner
91	Dr. Susheel Kumar	Asstt. Prof. Agricultural Research Station, SKRAU, Bikaner
92	Dr. R. C. Bairwa	Asstt. Prof. Agricultural Research Station, SKRAU, Bikaner
93	Sh. Surgyan Singh	TA, Agricultural Research Station, SKRAU, Bikaner
94	Sh. S. S. Rathore	TA, Agricultural Research Station, SKRAU, Bikaner
95	Sh. R. L. Sharma	TA, Agricultural Research Station, SKRAU, Bikaner
96	Dr. Shiv Narayan	TA, Agricultural Research Station, SKRAU, Bikaner
97	Sh. B. S. Meena	TA, Agricultural Research Station, SKRAU, Bikaner
98	Dr. Deepak Gupta	TA, Agricultural Research Station, SKRAU, Bikaner
99	Sh. S. K. Bazad	TA, Agricultural Research Station, SKRAU, Bikaner
100	Sh. Ramawtar	Agri. Supervisor, Agricultural Research Station, SKRAU, Bikaner
101	Sh. S. R. Bhakar	ASO, Agricultural Research Station, SKRAU, Bikaner
102	Sh. G. S. Pareek	Agri. Supervisor, Agricultural Research Station, SKRAU, Bikaner
103	Sh. A. S. Qureshi	Agri. Supervisor, Agricultural Research Station, SKRAU, Bikaner
104	Sh. Kuldeep Singh	Agricultural Research Station, SKRAU, Bikaner
105	Sh. Ram Niwas	Agricultural Research Station, SKRAU, Bikaner
106	Sh. Manohar Singh	Agricultural Research Station, SKRAU, Bikaner

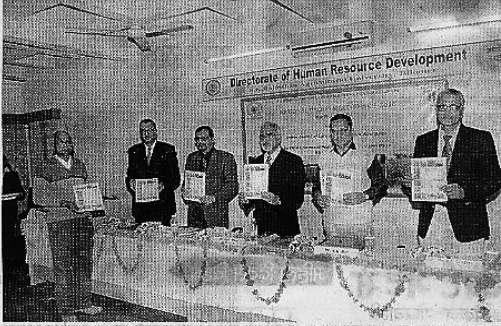
107	Sh. Prahalad Devra	SRF, Agricultural Research Station, SKRAU, Bikaner
108	Sh. Narendra Kumawat	SRF, Agricultural Research Station, SKRAU, Bikaner
109	Sh. Pramendra Singh	SRF, Agricultural Research Station, SKRAU, Bikaner
110	Sh. Brijesh Mittal	SRF, Agricultural Research Station, SKRAU, Bikaner
111	Sh. R. K. Jakhar	SRF, Agricultural Research Station, SKRAU, Bikaner
112	Sh. Harish Kumar	SRF, Agricultural Research Station, SKRAU, Bikaner
113	Sh. Dushyant Singh	SRF, Agricultural Research Station, SKRAU, Bikaner
114	Sh. R. C. Sanwal	SRF, Agricultural Research Station, SKRAU, Bikaner
115	Sh. Suresh Kumar	SRF, Agricultural Research Station, SKRAU, Bikaner
116	Sh. Sunil Saraswat	SRF, Agricultural Research Station, SKRAU, Bikaner
117	Sh. Virendra Pal	SRF, Agricultural Research Station, SKRAU, Bikaner
118	Sh. Baljor Singh	SRF, Agricultural Research Station, SKRAU, Bikaner
119	Sh. Rajendra Bhanwaria	SRF, Agricultural Research Station, SKRAU, Bikaner
120	Dr. R. D. Jat	Professor, Directorate of Extension Education, SKRAU, Bikaner
121	Dr. P. N. Kalla	Director of Extension, Directorate of Extension Education, SKRAU, Bikaner
122	Dr. N. K. Khatri	Controller of Examination, SKRAU, Bikaner
123	Dr. Vishnu Agrawal	Asstt. Prof., DOR, SKRAU, Bikaner
124	Dr. Rajesh Sharma	Director, Institute of Agri Business Management, SKRAU, Bikaner
125	Dr. Madhu Sharma	Director, PME, SKRAU, Bikaner
126	Dr. Aditi Mathur	Asstt. Prof., Institute of Agri Business Management, SKRAU, Bikaner
127	Dr. Archana Raj Singh	Dean, College of Home Science, SKRAU, Bikaner
128	Dr. I. J. Gulati	Dean, College of Agriculture, SKRAU, Bikaner
129	Dr. D. K. Garg	Professor, Plant Breeding and Genetics, College of Agriculture, SKRAU, Bikaner
130	Dr. S. Gangopadhyay	Dean, Post Graduate Studies, SKRAU, Bikaner
131	Dr. N. S. Dahiya	Professor, Animal Husbandry, College of Agriculture, SKRAU, Bikaner
132	Dr. O. P. Chaudhary	Manager, RCDF Seed Unit, Rampura, Bikaner
133	Dr. I. P. Singh	Professor, Agriculture Economics, College of Agriculture, SKRAU, Bikaner
134	Dr. P. K. Yadav	Professor, Horticulture, College of Agriculture, SKRAU, Bikaner
135	Dr. V. K. Gaur	Professor, Plant Pathology, College of Agriculture, SKRAU, Bikaner
136	Dr. H. L. Deshwal	Assoc. Prof., Entomology, College of Agriculture, SKRAU, Bikaner
137	Dr. A. K. Sharma	Professor, Animal Husbandry, College of Agriculture, SKRAU, Bikaner
138	Dr. S. K. Sharma	Professor, Animal Husbandry, College of Agriculture, SKRAU, Bikaner
139	Sh. Md. Rizwan	SRF, PBC, SKRAU, Bikaner
140	Sh. Vinay Mehra	SRF, PBC, SKRAU, Bikaner
141	Er. J. K. Gaur	Assoc. Prof., Agriculture Engineering, College of Agriculture, SKRAU, Bikaner
142	Sh. O. P. Mali	Research Fellow, Non Plan Forage Scheme, SKRAU, Bikaner

चारागाह विकसित करने पर जोर

■ डीएनआर रिपोर्ट, वीकानेर

स्वामी केशवानंद राजस्थान कृषि विश्वविद्यालय व भारतीय कृषि अनुसंधान परिषद, आई दिल्ली के संयुक्त तत्त्वधान में चारा फसलों पर दो दिवसीय राष्ट्रीय कार्यशाला 'खरीफ-2014' शुक्रवार को मानव संसाधन विकास निदेशालय के सभा कक्ष में शुरू हुई। जिसमें अखिल भारतीय चारागाह व चारा फसल अनुसंधान संस्थान, झांसी तथा देश के विभिन्न प्रदेशों के 65 कृषि वैज्ञानिक शामिल हुए हैं। क्षेत्रीय निदेशक अनुसंधान व संचित डॉ. शंकर लाल गोदर अतिथियों का स्वागत किया तथा बताया कि केन्द्र पर चारा फसलों के अन्तर्गत दो किस्मों के विकास के साथ करीब 15 उन्नत तकनीकें किसानों के लिए विकसित की गई हैं। साथ ही शुष्क जलवायु परिस्थिति के अनुकूल खास की उन्नत प्रजातियों के चारागाह विकसित करने पर जोर दिया जा रहा है। जिसमें सेवण घास प्रमुख है। चारा प्रबंधन केन्द्र, एस.के.आर.ए.यू. के डॉ. सागर मल क्रमवत् (प्रोफेसर शायद विज्ञान) ने डॉ. आर.पी. दुआ सहायक महानिदेशक, एवं परियोजना समन्वयक डॉ. ए.के. रॉय को कृषि अनुसंधान केन्द्र में स्वागत एवं चारा प्रबंध पर फसल प्रयोग-रिपोर्ट 2014 का भ्रमण कराया।

परियोजना समन्वयक ने गत वर्ष इस परियोजना के अन्तर्गत देश के सभी केन्द्रों पर किए गए अनुसंधान कार्यों की प्रगति रिपोर्ट



कृषि विश्वविद्यालय में कार्यशाला में पंचांग का विमोचन करते अधिकारी।

प्रस्तुत की। उन्होंने बताया की परियोजना में देश के 5 राज्य जलवायु खंडों में 21 सम्मिश्रित केन्द्रों पर 195 वैज्ञानिक चारा फसलों पर अनुसंधान कर रहे हैं। डॉ. रॉय ने बताया कि अब तक चारा फसलों की 180 किस्में विकसित हुई हैं।

सहायक महानिदेशक डॉ. आर.पी. दुआ ने कहा कि देश में पशुधन के लिए आहार एवं पोषण की सुरक्षा के लिए चारा उत्पादन जरूरी है। वर्तमान में 131 मिलियन टन दुग्ध का उत्पादन हो रहा है और भारत विश्व में प्रथम स्थान पर है। उन्होंने बदलती जलवायु की

परिस्थितियों और सूखा रोधी किस्मों के विकास के साथ साथ उन्नत प्रौद्योगिकी के विकास, ऐसी फसलों व चारों के जिनोमिक अध्ययन पर कार्य करने की आवश्यकता जताई। विशिष्ट अतिथि अनुसंधान निदेशक (कृषि) डॉ. गोविन्द सिंह ने चारे की गुणवत्ता और सतृप्त आहार के लिए अनाज कुल की चारा फसलों व हलहनी फसलों को एकसाथ उगाकर नई तकनीक के विकास पर जोर दिया। इस अवसर पर चारा फसल अनुसंधान व पशुधन विकास व ह्य चारा उत्पादन पंचांग सफलता की कहानी, किसानों की चुनौती का विमोचन किया गया। कृषि विश्वविद्यालय के कुलपति डॉ. अनिलकुमार दाहमा ने अध्यक्षता की।

उन्होंने चारा फसलों के महत्व व आवश्यकता पर प्रकाश डाला। उन्होंने पूरे देश में वर्षभर हरा चारा प्रगति के लिए लक्ष्यी अवधि आधारित चारा फसल प्रयोग की बात कही तथा कहा कि दो दिवसीय कार्यशाला में वैज्ञानिक-गहन विचार-विमर्श कर भविष्य की सराफ चारा तकनीकों के विकास को त्वरित किया जा सके। डॉ. एस.एस. शेखवत ने कार्यशाला को ज्ञान कोशल में वृद्धि का आधार बताया हुए आभार व्यक्त किया।

वेगन राजस्थान - 08 मार्च, 2014