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फरवरी 26-27, 2019

PROCEEDINGS

National Group Meeting : Kharif 2019
Indira Gandhi Agricultural University, Raipur
February 26-27, 2019

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(भारतीय कृषि अनुसंधान परिषद)

**All India Coordinated Research Project
on Forage Crops & Utilization**
(Indian Council of Agricultural Research)

Project Coordinating Unit
ICAR-IGFRI, Jhansi-284 003 (U.P.)
<http://www.aicrponforagecrops.res.in>

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Proceedings of the National Group Meeting: Kharif-2019

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February, 2019

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TECHNOLOGIES DEVELOPED

Varieties identified

Setaria Grass (*Setaria anceps*) entry S-25: Developed by CSKHPKV, Palampur and submitted as Him Palam Setaria grass-2. It was identified for cool sub-tropical and sub-temperate grasslands/pasture lands under rainfed conditions of Himachal Pradesh and Uttarakhand.

***Cenchrus setigerus* entry TNCS 265:** Developed by TNAU, Coimbatore and submitted as CO-2. It was identified for pasture land under rainfed condition as perennial grass for the states of Tamil Nadu, Karnataka, Telangana and Andhra Pradesh.

***Cenchrus setigerus* entry IGFRI-96-706:** Developed by ICAR-IGFRI, Jhansi and submitted as Bundel Dhaman -1. Identified for pasture land under rainfed condition as perennial grass in arid zones particularly for the state of Rajasthan.

***Cenchrus ciliaris* entry IG-67-365:** Developed by ICAR-IGFRI, Jhansi and submitted as Bundel Anjan -4. It was identified for pasture land under rainfed condition as perennial grass in arid and semi-arid zones particularly for the states of Gujarat, Maharashtra, Madhya Pradesh and Uttar Pradesh.

Pennisetum hybrid (*P. glaucum* x *P. squamulatum*) entry VTPH-3: Developed by ICAR-IGFRI, Jhansi and submitted as BBS hybrid-1. Identified for cultivation under rainfed condition in the states of Punjab, Haryana, Gujarat, Maharashtra, Himachal Pradesh and Assam.

Forage Maize entry TSFM-15-5: Developed by PJTSAU, Hyderabad and identified for cultivation for the states of Telangana, Andhra Pradesh, Tamil Nadu, Puducherry and Karnataka in rainfed kharif season.

Fodder Bajra (pearl millet) entry TSFB-15-4: Developed by PJTSAU, Hyderabad and identified for cultivation for the states of Telangana, Andhra Pradesh, Tamil Nadu and Karnataka in kharif season under rainfed condition.

Fodder Bajra (pearl millet) entry TSFB-15-8: Developed by PJTSAU, Hyderabad and identified for cultivation in the states of Telangana, Andhra Pradesh, Tamil Nadu and Karnataka in rainfed kharif season.

Hedge Lucerne (*Desmanthus virgatus*) entry TND 1308: Developed by TNAU, Coimbatore and submitted as CO-2. It was identified for cultivation for all India in *Desmanthus* growing states particularly Punjab, Rajasthan, Maharashtra, Gujarat, Uttar Pradesh, Telangana, Karnataka, Kerala, Tamil Nadu and West Bengal as perennial legume.

Hedge Lucerne (*Desmanthus virgatus*) entry TSLH-1: Developed by PJTSAU, Hyderabad. It was identified for cultivation for central zone in *Desmanthus* growing states particularly Maharashtra, Gujarat and Uttar Pradesh, as perennial legume.

Bajra Napier Hybrid entry PBN-351: Developed by PAU, Ludhiana. It was identified for cultivation in Maharashtra, Gujarat, Uttar Pradesh, Madhya Pradesh and Chhattisgarh states as perennial crop under irrigated and multicut condition.

Bajra Napier Hybrid entry TNCN 1280: Developed by TNAU, Coimbatore and submitted as CO-6. It was identified for cultivation in Punjab, Haryana, Rajasthan, Maharashtra, Gujarat, Uttar Pradesh, Madhya Pradesh and Chhattisgarh states as perennial crop under irrigated and multicut condition.

Bajra Napier Hybrid entry BNH-14: Developed by BAIF, Uralikanchan and submitted as 'BAIF Napier Hybrid-14'. It was identified for cultivation in Punjab, Haryana, Rajasthan, Tamil Nadu, Karnataka, Kerala, Andhra Pradesh and Telangana states as perennial crop under irrigated and multicut condition.

Bajra Napier Hybrid entry BNH-11: Developed by BAIF, Uralikanchan and submitted as 'BAIF Napier Hybrid-11'. It was identified for cultivation in Punjab, Haryana, Rajasthan, Tamil Nadu, Karnataka, Kerala, Andhra Pradesh, Telangana, Maharashtra, Gujarat, Uttar Pradesh, Madhya Pradesh and Chhattisgarh states as perennial crop under irrigated and multicut condition.

CROP PRODUCTION TECHNOLOGIES

- **Fodder Bajra for sodic soil of UP:** Fodder bajra germplasm NDFB-939 is recommended for higher fodder production of fodder bajra under sodic soil of U.P. It has potential to produce upto 430q green fodder, 130q dry matter and 11.0q crude protein yields per hectare. The technology produced 6.0 q green fodder per day and recorded higher net return (Rs. 42000) per hectare and B: C ratio (02.95). (NDUA&T, Faizabad).
- **INM for BxN hybrid for Tamil Nadu:** Application of FYM @25 t/ha as basal or 12.5 t/ha every year along with application of 100:50:40 NPK/ha as basal + 50 % N (50 kg N/ha) after each cut is recommended as suitable INM practice for attaining maximum GFY (371 t/ha/yr), DMY (87.1 t/ha/yr), crude protein yield (13.47 t/ha/yr), net income (Rs.352206 / ha. /yr) and BCR (2.72) in Bajra Napier hybrid grass. (TNAU, Coimbatore).
- **Package of practice for BxN hybrid in Maharashtra:** In medium deep soils of Western Maharashtra, following technology is recommended to obtain higher green forage yield and monetary returns from B x N hybrid variety Phule Gunwant. Apply 10 t FYM and set treatment with 250 g each *Azotobactor* & PSB/1000 rooted slips ha⁻¹yr⁻¹ before planting followed by application of 75:37.5:30 kg N:P₂O₅: K₂O ha⁻¹ at planting and 30: 37.5: 30 kg N:P₂O₅:K₂O ha⁻¹ at six month of planting. At each cut, application of 30 kg N ha⁻¹ should be done. Thus, the total required quantity of nutrients will be 10 t FYM + 225:75:60 kg N:P₂O₅:K₂O ha⁻¹yr⁻¹. The technology is capable to yield 185.39 t GFY, 47.15 t DMY and 3.66 t CPY ha⁻¹. it also recorded net monetary return of Rs. 1,20,385 ha⁻¹ with B:C ratio (2.93). (MPKV Rahuri).

INAUGURAL SESSION

The National Group Meeting of the All India Coordinated Research Project on Forage Crops and Utilization was inaugurated on 26th February, 2019 at Indira Gandhi Krishi Vishwavidyalaya, Raipur (Chhattisgarh).

The Inaugural session was chaired by Prof. S. K. Patil, Hon'ble Vice Chancellor, IGKV, Raipur. Dignitaries on dais included Smt. Anita Yogendra Sharma and Dr. Vinay Jaiswal (Hon'ble MLAs of Chhattisgarh); Dr. R. K. Singh, Assistant Director General (CC &FFC), ICAR; Dr. Khem Chand, Director, ICAR-IGFRI, Jhansi, Dr. A. K. Roy Project Coordinator, Dr. A. L. Rathore, Director Extension, IGKV, Raipur.

Dr. S. K. Patil, Vice Chancellor, IGKV, Raipur welcomed the delegates and presented achievements of University for the farming community especially in the forage crops. He highlighted the need of forage resources and improved technologies for enhancing the livelihood options and increasing the farmer's income in Chhattisgarh.

Dr. A. K. Roy, Project Coordinator, AICRP on Forage Crops and Utilization presented the brief introduction of the AICRP, Salient achievements during last 5 years period and summary of activities and results of the trials carried out in Kharif-2018.

Dr. R. K. Singh, ADG (CC & FFC), ICAR highlighted the achievements of NARS scientists in increasing the overall agricultural output in last few decades. He stressed upon need of disseminating new technologies to the actual users for increasing livestock outputs both in terms of quality as well as quantity. He highlighted need of more collaboration between various agencies for awareness of different stakeholders.

Dr. Khem Chand, Director, ICAR-IGFRI, Jhansi highlighted the technologies developed and successfully demonstrated by IGFRI in various parts of the country to rejuvenate the grassland and pasture lands to bridge the demand and supply gap of forage availability.

Dr. Vinay Jaiswal (MLA, Manendragarh, Chhattisgarh) and Smt. Anita Yogendra Sharma (MLA, Dharsiwan, Chhattisgarh) highlighted the importance of forages and animal husbandry especially with reference to Chhattisgarh. They informed in detail about various steps taken by state government for livestock and grassland development in the state. They informed about the state government policies to develop cow shelters and grassland in each village panchayat which is being implemented. They emphasized on the use of technologies developed by research organizations to produce more forages for these livestock. The need of conservation of surplus fodder for lean period was also highlighted.

Various publications were released which included the Annual Report of AICRP on Forage Crops and Utilization, and extension bulletins in regional languages by different AICRP centers. Certificates of appreciation were awarded to BCKV, Kalyani and IGKV, Raipur AICRP centers for their outstanding contribution. Dr. A. L. Rathore, Director Extension, IGKV, Raipur presented the vote of thanks.

TECHNICAL SESSION - I

INTERACTIVE SESSION WITH STAKEHOLDERS

Chairman	:	Dr. R. K. Singh, ADG (CC &FFC), ICAR
Convener	:	Dr. A. K. Roy, PC AICRP (FC&U)
Rapporteur	:	Dr. Mayuri Sahu

At the outset, the chairman welcomed the different stakeholders like farmers, entrepreneurs, forage seed growers, livestock keepers and animal husbandry group. About 100 stakeholders besides the delegates and University officials participated in the interactive session. The followings were the feedbacks given by the different stakeholders:

- Farmers appreciated the concerted efforts of AICRP (FC&U) scientists of IGKV, Raipur and informed the house that with their help and guidance, the forage production has increased considerably and such efforts should be kept going to further sustain the forage production in this region.
- Lack of awareness, low sale price along with the poor marketing facilities of milk were the major problems highlighted by most of the dairy farmers. It was suggested that cooperative systems should be increased in Chhattisgarh.
- Good quality seed/planting material of improved varieties of forage crops particularly Cowpea, oat, Berseem and Bajra x Napier hybrid should be made available to farmers at reasonable price.
- In most agro climatic regions, there is an utmost need to provide/develop the quick growing and vigorous fodder varieties having characters like drought tolerance.
- Extension services should be strengthened and showcasing of new technologies and new fodder crop varieties should be taken up on a large scale so that large number of farmers may be benefitted.
- Scientists should suggest/develop some technologies to overcome the scarcity of fodder during lean period in the months of April to June-July.
- More training camps should be organized in different villages to make the farmers familiar with the improved package of practices of Forage crops.
- Fodder conservation in the form of hay and silage should be popularized by Universities and other government/ NGO institutions for availability of fodder during lean period. Fodder banks should be set up at selected locations.

At the end, Project coordinator, AICRP (FCU) praised the farmers for giving very useful feedback and assured the stakeholders to work for addressing the issues raised by them. The chairman, in his concluding remarks suggested that trainings on fodder preservation and conservation technologies should be conducted in different villages to generate the awareness amongst the farmers.

The session ended with vote of thanks to the Chairman.

TECHNICAL SESSION - II

BREEDER SEED PRODUCTION

Chairman	:	Dr. R. K. Singh (ADG CC & FFC, ICAR)
Rapporteurs	:	Dr. R. K. Agarwal & Dr. Kalyan Jana

Dr. A. K. Roy, PC presented the breeder seed production data of production year kharif 2018 (Indent year Kharif 2019).

In *Kharif-2018*, the indent for Breeder Seed Production (Indent year Kharif 2019) was received from DAC&FW, Government of India for 8 varieties of four forage crops viz., fodder Maize, fodder Pearl millet, fodder rice bean and fodder Cowpea. The total indent for breeder seed production was 87.94q.

The indent was allocated to seven SAUs/ICAR/NGO institutes. Among the quantity allocated for different forage crops, the maximum was for Maize (74.14 q) followed by Cowpea (12.05q), Pearl millet (1.50q) and minimum was for fodder rice bean (0.25q).

The final Breeder Seed Production Report received from different centers as well as availability of previous year breeder seed revealed that the overall breeder seed production was higher in forage pearl millet; forage maize and forage rice bean whereas it failed to meet the target in forage cowpea.

Crop wise scenario indicates that, as compared to allocation in Maize, the final production was 118.36 q surplus. In Pearl millet production was 1.50q surplus. In cowpea, production in UPC 8705 was met; however it was 1.50q deficit in EC 4216 and 1.25q deficit in Bundel Lobia-2. Thus in cowpea total deficit was 2.75q. However in cowpea, IGFRJ Jhansi and PAU Ludhiana has surplus of 0.6q and 0.71q breeder seed respectively of notified and good varieties. The overall breeder seed production (82.55q) and previous year availability (12.50q) was 206.05 q as against indent of 87.94q.

Many centers have also produced breeder seed of the varieties are also available totaling 6.25q.

It was informed that Breeder seed indent for kharif 2020 (production year 2019) is still not available on web site and not yet finalized as per discussion with DAC officials. The allocation to centers will be made through correspondence as soon as breeder seed indent becomes available.

Chairman expressed unhappiness over the less seed production in cowpea and told the centers to take utmost care of meeting the national target as it is a commitment of ICAR.

It was also pointed out that non-lifting of seeds should be immediately reported to concerned authorities including ADG seed ICAR for proper timely corrective measures.

The session ended with Vote of Thanks to the Chair.

TECHNICAL SESSION – III

DISCIPLINE WISE REPORT

Chairman	:	Dr. R. K. Singh (ADG CC & FFC, ICAR)
Co-Chairman	:	Dr. Khem Chand, Director, IGFRI, Jhansi
Rapporteurs	:	Dr. D. K. Banyal and Dr. Usha C. Thomas

Crop Improvement

Dr. Subhash Chand, Scientist (Plant Breeding) presented the results of Forage crops breeding and quality evaluation trials conducted during *Kharif* 2018-19. Total 10 trials at 38 locations on annual and perennial crops were conducted. The summary of the trials is as follows.

- In **IVT maize**, twelve entries i.e. TNFM-131-9, PFM-9, PFM-10, ADV6781, AH-8070, AH-8071R, SCH- 201, HPFM-9, TSFM-16-10, CMVLBC-2, IMHBG-18KF-1 and IMHBG-18KF-2 were proposed for promotion to AVT-1.
- In **AVT-1 of Maize**, No entry performed better than check hence none was proposed for promotion to AVTM-2.
- AVT-2 (Forage Maize), AVT-2 (Pearl millet) and AVT-2 (Pearl millet, seed), One proposal each for varietal identification was submitted.
- In **IVT Pearl millet**, four entries (ADV-160061, TSFM-17-7, K-25 and JKFBH- 1521) were proposed for promotion to AVT-1 for SZ.
- In **IVT Cowpea**, three entries RFC-2, HFC-16-1 and HFC-16-3 for SZ, CZ and NEZ) were proposed for AVT-1
- In **AVT-1 cowpea**, one entry (MFC-16-4) was proposed for promotion to AVT-2.
- In **IVT RB (Ricebean)**, two entries (JOR-18-1 and KRB-11) were proposed for promotion to AVT-1.
- In VT *Cenchrus ciliaris*, VT *Cenchrus setigerus* and VT Bajra x Napier, One, two and four varietal identification proposals were submitted, respectively.
- In VT *Setaria*, VT *Pennisetum* hybrids and VT *Desmanthus*: One proposal each for varietal identification was submitted.

Crop Production

Dr. R. K. Agrawal, Principal Scientist and PI (Agronomy) presented the detailed report of 15 experiments conducted at 20 locations on different crops and cropping systems including climate resilience, herbicide evaluation, varietal evaluation and AVT trails etc. The results of various experiments were presented and following two recommendations were given.

- Fodder bajra germplasm NDFB-939 is recommended for higher fodder production under sodic soil of U.P. It has potential to produce up to 430 q green fodder, 130 q dry matter and 11.0 q crude protein yields per hectare. The technology produced 6.0 q green fodder per day and recorded higher net return (Rs. 42000) per hectare and B: C ratio (02.95).
- Application of FYM @ 25 t/ha as basal or 12.5 t/ha every year along with application of 100:50:40 NPK/ha as basal + 50 % N (50 kg N/ha) after each cut was found as suitable INM practice for attaining maximum green fodder yield (371 t/ha/yr), dry matter yield (87.1 t/ha/yr), crude protein yield (13.47 t/ha/yr), net income (Rs.352206/ha /yr) and BCR (2.72) in Bajra Napier hybrid grass.

Chairman suggested that in herbicide trials, residue analysis must be done before recommendation.

Crop Protection

Dr. N. R. Bhardwaj, Scientist and PI (Crop protection) presented the salient achievements of crop protection trials conducted during Kharif 2018-19. He presented the results of 6 trials conducted at 6 locations. The detailed scenario of diseases and insect pests of forage crops was presented. The resistant entries of maize, pearl millet, sorghum, cowpea and other perennial crops for different diseases and insect pests at different locations were also highlighted. Three trials *i.e.*, PPT-21, PPT-22 and PPT-23 have completed their three years evaluation and best treatment of each trial will be evaluated for one more year at large plots for validation before recommendation.

In the end, Chairman directed that the recommendations emerged out of AICRP must go to state/ universities through ICAR.

The session ended with Vote of Thanks to the Chair.

TECHNICAL SESSION-IV (A) (CONCURRENT)
FORMULATION OF TECHNICAL PROGRAMME
FORAGE CROP IMPROVEMENT

Chairman	:	Dr. R .K. Singh, ADG (FFC), ICAR
Convener	:	Dr. A. K. Roy, PC(FCU)
Rapporteurs	:	Drs. P. Mahadevu and Rahul Kapoor
Finalization of trials	:	Dr. Subash Chand

At the outset, the Chairman welcomed the delegates. Dr. Subhash Chand, Scientist presented the highlights of **15** breeding trials conducted during *Kharif* 2018 on **10** different forage crops for finalization of the technical programme for *Kharif* 2018. Entries found promising for forage traits in their evaluations can be nominated exclusively in the AICRP-FCU trials. After detailed discussion, following breeding trials were formulated.

Annual trials

Maize:

- **IVT fodder maize** trial was constituted with entries contributed by different centers and will be conducted at 24 locations. More entries will be communicated in a few days by IIMR, Ludhiana and AICRP Maize centers. Locations Jorhat stands dropped and Pusa is added as a new testing location.
- **AVTM-1:** Twelve entries viz., TNFM-131-9, PFM-9, PFM-10, HPFM-9, ADV-6781, TSFM-16-10, AH-8070, CMVLBC-2, IMHGB-18KF-1, IMHGB-18KF-2, AH-8071R, SCH-201 were promoted from IVTM-1 to AVTM-1. This trial will be evaluated at 18 locations in 4 zones (HZ, NWZ, NEZ, SZ).

Pearl millet

- New trial in IVTPM was constituted with 8 entries will be conducted at 19 locations in all the 5 zones. Avikanagar centre is added as new location. The RBB 1 may be added instead of RBC 2 as national check.
- **AVTPM-1:** Four entries viz; ADV-160061, TSFB-17-7, K-25 and JKFBH-1521 were promoted from IVTPM to AVTPM-1. The trial will be conducted at four locations of South zone only.

Cowpea

- **IVTC:** A new trial in Cowpea was formulated with 6 entries along with the checks to be conducted at 28 locations with Pusa as new testing location.
- **AVTC-1:** Three entries viz; RFC-2, HFC-16-3 and MFC-16-1 were promoted from IVTC to AVTC-1 and will be tested at 19 locations.
- **AVTC-2:** One entry viz; MFC 16-4 was promoted to AVTC-2 from AVTC-1 and will be tested in HZ only with three checks in five replications.

Rice bean

- **IVT Rice bean:** A new trial in Rice bean was formulated with 5 entries along with the checks and will be conducted at 10 locations with Raipur and Vellayani as new testing locations.
- **AVT-1 Rice bean:** Two entries viz; KRB-11 and JOR-18-1 were promoted from IVT Rice bean. This trial will be conducted at 10 locations across the country.
- **IVT Dinanath Grass (2019):** New trial in Dinanath Grass (IVT DG-2019) was formulated with 7 entries with appropriate checks and locations. Hyderabad and Coimbatore were proposed to be dropped as testing locations.

Perennial trials

- **VT *Cenchrus ciliaris* -2019:** New trial in *Cenchrus ciliaris* (VT CC-2019) was formulated with 6 new entries with appropriate checks and locations. Raipur was proposed to be added as a new testing location.
- **VT *Cenchrus setigerus* -2019:** New trial in *Cenchrus setigerus* (VT CS-2019) was formulated with 4 new entries with appropriate checks and locations.
- **VT Bajra Napier Hybrid -2019:** New trial in Bajra Napier Hybrid (VT BN-2019) was formulated with 14 new entries along with three national checks. NB 21 was replaced with BNH 10 as national check. This trial will be conducted at 20 locations across all the five zones.

General remarks

- It was suggested to identify the ideal parameters for silage making in maize and then start developing maize hybrids suited for silage making with higher dry matter content.
- The Chairman suggested for strengthening the Stylo research work and directed to execute one national breeding programme by including the centres viz; IGFRI, TNAU, Mandya and Rahuri. These centers should take the lead in collections, hybridization and distribution of the promising genotypes for evaluation to other centers.
- Exploration programme at national level needs to be taken up for collection and identification of promising Napier grass (*Pennisetum purpureum*) germplasm specifically from diversity rich regions viz; Assam, Nagaland and Western Ghats. Four centres viz; IGFRI, TNAU, Jorhat and Mandya will take part in this exploration. Furthermore, the suggestions were made by PC (FCU) to explore the international germplasm database of *purpureum* at USDA, ILRI and ICRISAT for acquiring the diverse and potential germplasm. Dr Pankaj Kaushal suggested focusing on *P. purpureum* as a new fodder crop along with BN hybrid.
- In VT BN hybrid trials, Oxalate and Brix content should be measured at selected locations.
- Efforts should be made to develop short duration varieties in Rice bean.
- The chairman directed that All the IGFRI, scientists should actively participate in formulation and execution of appropriate technical programmes as national and regional mandate for improving the production and productivity of important forage crops in the country.

The session ended with vote of thanks to the Chairman.

**TECHNICAL SESSION-IV (B) (CONCURRENT)
FORMULATION OF TECHNICAL PROGRAMME
FORAGE CROP PRODUCTION**

Chairman	:	Dr. K.L. Nandeha, Head, Crop Production Division, IGKV, Raipur
Co-Chairman	:	M.C. Bhambri. Chief scientist, IFS
Convener	:	Dr. R.K. Agrawal, PI Agronomy
Rapporteurs	:	Dr. S.K. Jha & Dr. R. Joseph Koering

Session began with introductory remarks of chairman. Dr. R.K. Agrawal, Principal Investigator (Agronomy) discussed about ongoing trials. Four trials were concluded and ongoing trial will be continued as per technical programme. In addition to ongoing trials, five new trials and one AVT trial were formulated during this session.

A. Concluding trials

- K-15-AST-5L:** Studies on carbon sequestration in subabul (*Leucaena leucocephala*) based silvi-pastoral cropping system under rain fed agriculture (Location: Hyderabad).
- K-16-AST-4:** Economization of fertilizer dose for Bajra Napier Hybrid Grass CO (BN) - 5 through INM for enhancing yield and quality. (Location: TNAU, Coimbatore).
- K-15-AST-6 L:** Nutrient management in genotype of B x Napier hybrid (Location: Rahuri).
- K-15-AST-8-7L:** Screening of genotypes of fodder pearl millet under sodic soil (Location: Faizabad).

B. New Trials

- K-18-AST-1:** Studies on organic source of nutrient on green forage yield and quality of fodder maize under irrigated situation. {Locations (4): Mandya, TNAU Coimbatore, KAU, Vellayani and Karaikal}
- K-18-AST-2:** Studies on organic source of nutrient on green forage yield and quality of fodder maize under irrigated situation. {Locations (5): AAU, Jorhat. CAU, Imphal, BCKV, Kalyani, RPCAU, Pusa and BAU, Ranchi}
- K-18-AST-3:** Bio-fortification of annual cereal fodder crops for enhancing zinc and iron content. {Locations (5): SK RAU Bikaner, PAU Ludhiana, AAU, Anand, HAU Hisar, NDUAT Faizabad and Rajasthan Agricultural Research Institute, Durgapura, Jaipur}
- K-18-AST-4:** Bio-fortification of annual cereal fodder crops for enhancing zinc and iron content. {Locations (2): PJTSAU Hyderabad and IGRI RRS Dharwad}
- K-18-AST-5:** Exploring the possibility of silage of paddy straw and sugarcane tops with different additives. {Location: Ludhiana}
- K-18-AST-6:** AVT2 -Advanced Varietal Trial in Forage Cowpea (Agron) {Location: Palampur, Srinagar}

The eleven ongoing trials mentioned in table will continue as per approved technical programme.

It was suggested to include Ranchi centre in the trial K-18-AST-2: Evaluation of fodder value of maize varieties as influenced by nitrogen levels and de-topping before physiological maturity”.

Recommendations

- Fodder bajra germplasm NDFB-939 is recommended for higher fodder production of fodder bajra under sodic soil of U.P. It has potential to produce upto 430q green fodder, 130q dry matter and 11.0q crude protein yields per hectare. The technology produced 6.0 q green fodder per day and recorded higher net return (Rs. 42000) per hectare and B: C ratio (02.95). (NDUA&T, Faizabad)
- In Tamil Nadu, application of FYM @25 t/ha as basal or 12.5 t/ha every year along with application of 100:50:40 NPK/ha as basal + 50 % N (50 kg N/ha) after each cut is recommended as suitable INM practice for attaining maximum GFY (371 t/ha/yr), DMY (87.1 t/ha/yr), crude protein yield (13.47 t/ha/yr), net income (Rs.352206 / ha. /yr) and BCR (2.72) in Bajra Napier hybrid grass. (TNAU, Coimbatore).
- Package of practice for BxN hybrid in Maharashtra:** In medium deep soils of Western Maharashtra, following technology is recommended to obtain higher green forage yield and monetary returns from B x N hybrid variety Phule Gunwant. Apply 10 t FYM and set treatment with 250 g each *Azotobactor* & PSB/1000 rooted slips ha⁻¹yr⁻¹ before planting followed by application of 75:37.5:30 kg N:P₂O₅: K₂O ha⁻¹ at planting and 30: 37.5: 30 kg N:P₂O₅:K₂O ha⁻¹ at six month of planting. At each cut, application of 30 kg N ha⁻¹ should be done. Thus, the total required quantity of nutrients will be 10 t FYM + 225:75:60 kg N:P₂O₅:K₂O ha⁻¹yr⁻¹. The technology is capable to yield 185.39 t GFY, 47.15 t DMY and 3.66 t CPY ha⁻¹. it also recorded net monetary return of Rs. 1,20,385 ha⁻¹ with B:C ratio (2.93). (MPKV Rahuri).

Session was ended with vote of thanks to the chair

**TECHNICAL SESSION-IV(C) (CONCURRENT)
FORMULATION OF TECHNICAL PROGRAMME
FORAGE CROP PROTECTION**

Chairman	:	Dr. V. K. Dubey, Head, Department of Entomology, IGKV, Raipur
Co-Chairman	:	Dr. Khare, Professor (Plant Pathology), IGKV, Raipur
Rapporteurs	:	Dr. Ashlesha and Dr. A.B. Tambe
Finalization of trials	:	Dr. N. R. Bhardwaj

Crop Protection Scientists of the Forage group discussed in detail the results of the last *Kharif* season along with the ongoing technical programme. Scientists appraised the Chairman and Co-Chairman regarding the results of last *Kharif* season along with the technical programme of *Kharif* 2019. The Chairman and Co-Chairman appreciated the work done and gave valuable suggestions for proposed new trials to be conducted during *Kharif* 2019. Based on the discussion and suggestions made by the Chairman and Co-Chairman, the following recommendations emerged.

1. The trials PPT-1 and PPT-2 will continue as they are of continuous nature.
2. PPT-25 will also continue in the *Kharif* 2019.
3. Three trials *viz.*, PPT-21 (Integrated Management of Banded leaf and sheath blight of forage Maize (Modified)), PPT-22 (Integrated Management of foliar diseases of forage Sorghum) and PPT-23 (Management of downy mildew of pearl millet using bioagents) were conducted continuously for three years and best treatments of the mentioned trials will be validated on large area as new trials *viz.*, PPT-29, PPT-30 and PPT-31 respectively.
4. Three new trials have been formulated for forthcoming *Kharif* season as given below:

PPT-26: Evaluation of Integrated disease management components against leaf blast of forage pearl millet (Locations - Ludhiana, Bhubaneswar, Jhansi and Palampur)

PPT-27: Management of invasive insect-pest fall armyworm (*Spodoptera frugiperda* L.) on forage maize. (Locations – Rahuri, Dharwad and Jhansi)

PPT-28: Assessment of avoidable crop losses due to diseases and insect-pests in forage Cowpea (Locations - Ludhiana, Palampur, Rahuri, Bhubaneswar and Jhansi)

The meeting ended with vote of thanks to the Chair & Co-Chair.

TECHNICAL SESSION V

REVIEW OF CENTER WISE ACTIVITIES

Chairman	:	Dr. Khem Chand, Director, IGFR, Jhansi
Rapporteurs	:	Dr. A. K. Mehta and Prof. A. H. Sonone

The session started with the introductory remarks by the Chairman. Twenty one centers from five zones presented their reports.

Hill Zone

- Palampur center presented the breeding activities in Setaria grass, Maize and B x N hybrids. It was advised that use of jeevamrit should be promoted in organic farming system.

North-West Zone

- Ludhiana center presented the research work done during kharif-2018. They highlighted new initiative in B x N hybrids by doubling of chromosome number for development of seed producing genotype.
- Hisar center presented the breeding activities on cowpea and pearl millet. The chairman advised the center to analyze green fodder and oil seed cake samples from the area where the milk quality is deteriorated due to excessive use of insecticides and weedicides.
- Pantnagar presented the breeding programme in cowpea and B x N hybrid. The Project Coordinator advised to submit the pedigree and station trial data in respect of B x N genotype Pant Selection-1 for inclusion in newly formulated trial.
- The report of Bikaner center was presented by Dr. Shekhawat on rangeland grasses and bajra.

North- East Zone

- Faizabad center presented breeding activities on pearl millet. The Project Coordinator advised to submit proposals for notification of varieties identified at State level.
- Ranchi center presented the breeding activities of Dinanath grass and rice bean. The Chairman suggested that perennial crops should be popularized on farmer's fields through FTD/TSP.
- Kalyani center has good collection of rice bean and presented results of mutation breeding activities. The Project Coordinator suggested introducing *Stylosanthes* in their region.
- Bhubaneswar center presented the report of kharif-2018. The chairman advised to supply rooted slips of B x N hybrid to the National Zoological Park, Bhubaneswar. The Project Coordinator directed to initiate TSP activities in the state.
- The report of breeding activities on rice bean, cowpea, TSP and FTD was presented by Jorhat center.
- Imphal center highlighted the efforts of the center to popularize forage crops in their state.
- The RAU, Pusa presented research activity and status of fodder plantation of the center.

Central Zone

- Anand center presented the results on maize, pearl millet and sorghum breeding activities.
- The Jabalpur center presented the research work on sorghum, mutation breeding activities on rice bean.
- Rahuri center highlighted breeding work of B x N hybrids and Multi cut sorghum, status of breeder seed production and TSP activity.
- BAIF center presented the report of research work on B x N hybrids, pearl millet and maize, FTD and TSP activity.
- Raipur center presented PGR status, breeding work on cow pea and mutation breeding work in rice bean.

South Zone

- Hyderabad center presented research activities on cowpea, bajra and hybrid Napier.
- Mandya center highlighted breeding work on cowpea, B x N hybrids and disease resistance in maize.
- Coimbatore center presented research work on cowpea, hybrid Napier and *Desmanthus*. The work of the center was appreciated.
- Vellayani center presented results of breeding activities on B x N hybrids and mutation breeding work on Guinea grass.

General suggestions

- The Project Coordinator suggested to all the Centre In-charges to send the details of state level breeder seed production.
- All centers were advised to send germplasm status report.

The session ended with thanks to the Chairman.

TECHNICAL SESSION VI FTD & TSP FORMULATION

Chairman	:	Dr. A. K. Roy
Finalisation of programme	:	Dr. R. K. Agrawal
Rapporteur	:	Dr. S. D. Sivakumar

At the outset, the chairman welcomed all the participants. He discussed with scientists of AICRP (FC &U) Coordinating and Cooperating centres for allotting FTD for *Kharif* 2019. A total of 707 FTD's were proposed to be allotted to AICRP centers and co-operating center during *Kharif* 2019 for the crops viz., B x N hybrid, Fodder Sorghum (including multicut and perennial), Rice bean, Fodder Maize, Fodder Bajra, *Setaria*, Guinea grass, Fodder Cowpea and *Desmanthus*. Out of 707 FTD's, 340 were allocated to B x N Hybrid, 72 to Fodder Maize, 80 to Fodder Sorghum, 85 to Fodder Bajra, 10 to Congo-signal grass, 20 to *Setaria*, 5 to Guinea grass, 55 to Fodder Cowpea, 35 to Rice bean and 5 to *Desmanthus*.

Regarding FTDs, it was emphasized that

- The FTDs should be more advisory based rather than input based.
- FTDs should be conducted in the new villages every year so that the technologies can be spread in large areas
- There is budget constraint and centers should use the resources of their respective institutions for carrying out the activities.

Table: FTDs allotted to different centers:

FTD Allocation for Kharif 2018										
Centre	BxN hybrid	Rice bean	Maize	Bajra	Cowpea	Sorghum	Desmanthus	Guinea grass	Setaria	Total
Jorhat	10								10	20
Bhubaneswar	5									05
Kalyani	10	10	10							30
Ranchi	15		15							30
Faizabad				5						05
Jabalpur	20	5	10							35
Anand	5			5						10
BAIF	10			10	5					25
Bikaner				15	10					25
Ludhiana	200									200
Hyderabad	10		10	15	5	5				45
Mandya	10			20	20	50				100
Palampur	20								20	40
Imphal		10	10							20
Raipur		10				10				20
Vellayani	20									20
Pantnagar			15		5	15				35
Rajouri			2							02
Coimbatore	5				5		5	5		20
Hisar				15	5					20
Total	340	35	72	85	55	80	5	5	30	707

TSP programme

- Various centers put forth demand for TSP activities and fund.
- It was advised that allotted amount should be spend strictly as per the guidelines and in the notified TSP districts by Tribal Welfare Ministry.
- Centers can take help of KVK's and NGO's for effective execution of TSP programme
- Centers can use the budget for technology demonstration on fodder production and conservation, livestock development and distribution of small tools to tribal rural people.

All the centers need to provide following information regarding FTDs and TSPs

- The list of beneficiaries and their details including mobile number.
- Area covered under the programme and the relevant data on yields.
- Efforts should be made to collect data on vertical and horizontal transfer of technologies.

TECHNICAL SESSION VII & VIII
PGR/BREEDING/PRODUCTION/PROTECTION ISSUES &
SCIENTIFIC, ADMINISTRATIVE AND FINANCIAL ISSUES

Chairman	:	Dr. Khem Chand, Director, ICAR-IGFRI, Jhansi
Convener	:	Dr. A. K. Roy, PC, AICRP on Forage Crops & Utilization
Rapporteurs	:	Drs. Santosh Jha & P. S. Takawale

The session started with the introductory remarks by the Chairman. In this session following presentations were made.

1. "Prospects and scope of fodder in Southern Chhattisgarh" by Dr. Adikant Pradhan, Chief Scientist, AICRP on Dry land Agriculture, Jagdalpur. He presented the status of Livestock population, land use pattern, rainfall and issues related with fodder production in Bastar District. He also mentioned focus areas on fodder production, approaches to increase fodder production including establishment of fodder bank in collaboration with Raipur center. He requested the PC, AICRP-FC&U, Jhansi to supply seed of suitable perennial grasses to be planted in National Park.
2. "Fodder breeder seed indent and lifting by NDDDB" by Dr. Digvijay Singh, DGM, NDDDB, Anand. He highlighted the work on fodder seed production by dairy cooperatives. He informed about the fifteen seed processing units established by NDDDB across the country with capacity of 5400 MT per annum. He also presented the information on indent and lifting status of breeder seed of forage crops from NDDDB since 2004. He also gave information of NCDFT's e-market and electronic portal facility for seed market.
3. "Introductory note on regional fodder stations (RFS)" by Mr. B. Singh, Director, RFS, Hyderabad. He presented the list of eight regional fodder stations located across the country along with area available for seed production. These stations are engaged in foundation seed production, demonstration of new varieties/technologies and training of farmers in forage crops.

During discussion following suggestions were given.

- Include leguminous fodder trees in the fodder development programme in National Park of Bastar District.
- The Project coordinator assured the Chief Scientist, AICRP on Dry land Agriculture, Jagdalpur to supply seed of promising perennial grasses.
- The Project coordinator suggested the incharges of RFS to visit CVRC web site and identify new varieties suitable of their region.
- The Project coordinator informed all breeders to demonstrate their new varieties on DADF, RFS farms and NDDDB.
- The Project coordinator advised the breeders to use NCDFT's e market electronic portal facility for fodder seed sale of new varieties.
- The Project coordinator suggested to include information regarding forage seed availability on web site of AICRP on FC & U.

The session ended with vote of thanks to the Chairman.

Proceedings of Varietal Identification Committee Meeting

The meeting of Varietal Identification Committee of AICRP on Forage Crops and Utilization was held under the chairmanship of Dr. R. K. Singh, Assistant Director General, (CC & FFC), ICAR on 26th February, 2019 at IGKV, Raipur.

The following 15 proposals were put up before the committee. The committee deliberated in detail and decisions taken are given as under.

Setaria Grass (*Setaria anceps*) entry S-25: The proposal was submitted by CSKHPKV, Palampur for identification for Hill zone of the country as Him Palam Setaria grass-2. The committee observed its superiority over the check varieties and also free of disease and pests. The committee identified the entry for cool sub-tropical and sub-temperate grasslands/pasture lands under rainfed conditions of Himachal Pradesh and Uttarakhand.

Cenchrus setigerus entry TNCS 265: The proposal was submitted by TNAU, Coimbatore for identification for All India cultivation as CO-2. The committee observed that the entry has showed considerable superiority in South zone for green and dry fodder yield. It also showed better quality and dry matter digestibility over the check. The entry was also resistant to leaf blight and insect-pest. The entry did not show appreciable superiority in other zones. The committee identified the entry for pasture land under rainfed condition as perennial grass for the states of Tamil Nadu, Karnataka, Telangana and Andhra Pradesh.

Cenchrus setigerus entry IGFRI-96-706: The proposal was submitted by ICAR-IGFRI, Jhansi for identification for North-West zone of the country as Bundel Dhaman -1. The committee observed that the entry has showed considerable superiority in the proposed zone for green and dry fodder yield, crude protein yield, crude protein content and dry matter digestibility over the check. The entry was also resistant to leaf blight and insect-pest. The committee identified the entry for pasture land under rainfed condition as perennial grass in arid zones particularly for the state of Rajasthan.

Cenchrus ciliaris entry IG-67-365: The proposal was submitted by ICAR-IGFRI, Jhansi for identification in central zone of the country as Bundel Anjan -4. The committee observed that the entry has showed considerable superiority in the proposed zone for green and dry fodder yield, crude protein content over the check. The entry was also resistant to leaf blight and insect-pest. The committee identified the entry for pasture land under rainfed condition as perennial grass in arid and semi-arid zones particularly for the states of Gujarat, Maharashtra, Madhya Pradesh and Uttar Pradesh.

Pennisetum hybrid (*P. glaucum* x *P. squamulatum*) entry VTPH-3: The proposal was submitted by ICAR-IGFRI, Jhansi for identification in tropical and sub-tropical areas of the country as BBS hybrid-1. The committee discussed the proposal and found that it is a new plant type and showed good yield and quality under rainfed condition and can be grown as perennial grass. The committee identified the entry for cultivation under rainfed condition in the states of Punjab, Haryana, Gujarat, Maharashtra, Himachal Pradesh and Assam.

Forage Maize entry TSFM-15-5: The proposal was submitted by PJTSAU, Hyderabad for identification in South zone of the country. The committee noted superiority of the entry in terms of green, dry fodder yield, seed yield over the check. The variety is also responsive to fertilizers *vis a vis* national checks. The variety has shown resistant to moderately resistant reaction to leaf blight, resistant to stem borer, moderately resistant to banded leaf and sheath blight. The committee identified the entry for cultivation for the states of Telangana, Andhra Pradesh, Tamil Nadu, Pudducherry and Karnataka in rainfed kharif season.

Fodder Bajra (pearl millet) entry TSFB-15-4: The proposal was submitted by PJTSAU, Hyderabad for identification for South zone of the country. The committee observed that the entry is superior for green and dry fodder yield, crude protein yield as well as crude protein content over the checks. It was also at par for dry matter digestibility with the check. The entry showed resistant to moderately resistant reaction against *Pyricularia* leaf spot and blight. The committee identified the entry for cultivation for the states of Telangana, Andhra Pradesh, Tamil Nadu and Karnataka in kharif season under rainfed condition.

Fodder Bajra (pearl millet) entry TSFB-15-8: The proposal was submitted by PJTSAU, Hyderabad for identification for south Zone of the country. The committee observed that the entry is superior for green and dry fodder yield, crude protein yield as well as crude protein content over the checks. It was also at par for dry matter digestibility with the check. The entry showed resistant to moderately resistant reaction against *Pyricularia* leaf spot and blight. It showed appreciable superiority for seed yield. The committee identified the entry for cultivation in the states of Telangana, Andhra Pradesh, Tamil Nadu and Karnataka in rainfed kharif season.

Hedge Lucerne (*Desmanthus virgatus*) entry TND 1308: The proposal was submitted by TNAU, Coimbatore for identification for All India cultivation as CO-2. The committee observed that the entry is superior for green and dry fodder yield, crude protein yield as well as crude protein content over the checks. The entry showed resistant reaction against leaf blight and no attack of insect pests were recorded. There is no release variety in this crop at national level and only one state release variety in Tamil Nadu is available. The committee identified the entry for cultivation for all India in *Desmanthus* growing states particularly Punjab, Rajasthan, Maharashtra, Gujarat, Uttar Pradesh, Telangana, Karnataka, Kerala, Tamil Nadu and West Bengal as perennial legume.

Hedge Lucerne (*Desmanthus virgatus*) entry TSLH-1: The proposal was submitted by PJTSAU, Hyderabad for identification for Central zone of the country. The committee observed that the entry is superior for green and dry fodder yield, crude protein yield as well as crude protein content over the checks. The entry showed resistant reaction against leaf blight and no attack of insect pests were recorded. There is no release variety in this crop at national level and only one state release variety in Tamil Nadu is available. The committee identified the entry for cultivation for central zone in *Desmanthus* growing states particularly Maharashtra, Gujarat and Uttar Pradesh, as perennial legume.

Bajra Napier Hybrid entry PBN-351: The proposal was submitted by PAU, Ludhiana for identification at national level for Hill, North-West, Central and South zones of the country. The committee observed that the entry is superior for green and dry fodder yield, crude protein yield over the checks in central zone. The entry showed resistant reaction against leaf blight and leaf spot. No major attack of insect pests was recorded. The committee identified the entry for cultivation in Maharashtra, Gujarat, Uttar Pradesh, Madhya Pradesh and Chhattisgarh states as perennial crop under irrigated and multicut condition.

Bajra Napier Hybrid entry TNCN 1280: The proposal was submitted by TNAU, Coimbatore for identification for North-West and Central zones of the country as CO-6. The committee observed that the entry is superior for green and dry fodder yield, crude protein yield over the checks. The entry showed resistant reaction against leaf blight and leaf spot. No major attack of insect pests was recorded. The entry was at par with best check for crude protein content and dry matter digestibility. The committee identified the entry for cultivation in Punjab, Haryana, Rajasthan, Maharashtra, Gujarat, Uttar Pradesh, Madhya Pradesh and Chhattisgarh states as perennial crop under irrigated and multicut condition.

Bajra Napier Hybrid entry BNH-14: The proposal was submitted by BAIF, Uralikanchan for identification for North-West and South zones of the country as 'BAIF Napier Hybrid-14'. The committee observed that the entry is superior for green and dry fodder yield, crude protein yield over the checks. The entry showed moderately resistant reaction against leaf blight and resistant reaction against leaf spot. No major attack of insect pests was recorded. The entry was at par with best check for crude protein content and dry matter digestibility. The committee identified the entry for cultivation in Punjab, Haryana, Rajasthan, Tamil Nadu, Karnataka, Kerala, Andhra Pradesh and Telangana states as perennial crop under irrigated and multicut condition.

Bajra Napier Hybrid entry BNH-11: The proposal was submitted by BAIF, Uralikanchan for identification for all India cultivation as 'BAIF Napier Hybrid-11'. The committee observed that the entry is superior for green and dry fodder yield, crude protein yield over the checks in North-West, central and south India. The entry showed moderately resistant reaction against leaf blight and resistant reaction against leaf spot. No major attack of insect pests was recorded. The entry was at par with best check for crude protein content and dry matter digestibility. The committee identified the entry for cultivation in Punjab, Haryana, Rajasthan, Tamil Nadu, Karnataka, Kerala, Andhra Pradesh, Telangana, Maharashtra, Gujarat, Uttar Pradesh, Madhya Pradesh and Chhattisgarh states as perennial crop under irrigated and multicut condition.

Fodder Rice bean entry JRBJ-07-4: The proposal was submitted by JNKVV, Jabalpur for identification for Central zone of the country in rice bean growing area. The committee observed that the variety did not show appreciable superiority over the best check. The committee did not recommend it for identification.

**AICRP on Forage Crops and Utilization
Technical Programme Crop Improvement
Kharif 2019**

1. IVTM: Forage Maize (New)

Entries	:	16 + 2 (NC) + 1 hybrid check [CO(HM)8] = 19
Entries	:	KDFM-4 (SKUAST-K Srinagar); IMHBG -19KF-1, IMHBG-19KF-2 (RMRSPC, ICAR-IIMR, Begusarai); DFH-2 (GBPUA&T Pantnagar); GK 3122 (Ganga Kaveri Seeds Pvt. Ltd); AFH7 (ICAR-IARI, New Delhi); AH-8183, ADC-1 (IARI RS Dharwad); PMH 11, PFM 12 (PAU Ludhiana); VMH 25 (ICAR-VPKAS Almora); MFM-23 (ZARS, Mandya); SCH-202, SCH-203 (Rasi Seed Pvt Ltd, Bangalore); NMH-1277, NMH-4040 (Nuziveedu Ltd Hyderabad)
Checks	:	African Tall, J-1006, IIMR hybrid COHM-8
Design	:	RBD with 3 replications
Plot size	:	4 m x 1.8 m accommodating 4 m long 6 rows at 30 cm
Seed rate	:	50 Kg/ha (36g/Plot)
Fertilizers	:	80:40 kg/ha (N:P) 40:40 kg/ha (N:P) basal+ 40 N after 30 days
Seed	:	3.0 Kg/entry and 3.0 Kg/ NC
Locations (24)	:	HZ -Palampur, Srinagar; Rajouri, Almora ; NWZ -Ludhiana, Hisar, Udaipur, Pantnagar, Jalore NEZ -Faizabad, Bhubaneswar, Ranchi, Pusa, Imphal; CZ -Anand, Raipur, Jabalpur, Rahuri, Uralikanchan, Jhansi; SZ -Hyderabad, Coimbatore, Mandya, Karaikal, Vellyani

2. AVTM-1: Forage Maize (HZ, NWZ, NEZ and SZ)

Entries	:	12+2 (NC) + 1 hybrid check [CO(HM)8]
Entries	:	TNFM131-9 (TNAU, Coimbatore); TSFM-16-10 (PJ TSAU, Hyderabad); HPFM-9 (CSK HPKV, Palampur); PFM-9, PFM-10 (PAU, Ludhiana); ADV6781 (Advanta Seeds Ltd); CMVLBC-2 (VPKAS, Almora); IMHBG-18KF-1, IMHBG-18KF-2 (RMRSPC, ICAR-IIMR, Begusarai); AH8070, AH8071R (IARI RS Dharwad); SCH-201 (Rasi Seed Pvt Ltd, Bangalore)
Checks	:	African Tall, J-1006 & IIMR hybrid COHM-8
Design	:	RBD with 3 replications
Plot size	:	4 m x 3 m accommodating 4 m long 10 rows at 30 cm
Seed rate	:	50 Kg/ha (60g/Plot)
Fertilizers	:	80:40 kg/ha (N:P) 40:40 kg/ha (N:P) basal+ 40 N after 30 days
Seed	:	4 Kg/entry and 4 Kg/NC
Locations (18)	:	HZ -Palampur, Srinagar, Rajouri, Almora; NWZ -Ludhiana, Hisar, Udaipur, Pantnagar, Jalore; NEZ -Faizabad, Bhubaneswar, Ranchi, Imphal, Pusa; SZ -Hyderabad, Coimbatore, Mandya, Karaikal

3. IVTPM: Forage Pearl millet (New)

Entries	:	10+ 2 (NC) + 1 (ZC)
Entries	:	JPM-18-7 (JNKVV, Jabalpur); RBB-11 (SKRAU, Bikaner); FBL-5 (PAU, Ludhiana); 16ADV0055 (Advanta ltd); DFMH-30, Dev-1 (Crystal Corp Ltd); BAIF Bajra -7 (BAIF, Uralikanchan);; TSFB-18-18 (PJ TSAU, Hyderabad)
Checks	:	RBB-1 (Rajasthan check) , Giant Bajra (NC), BAIF Bajra 1 (CZ), AFB-3 (NWZ), APFB-9-1 (NEZ), Moti Bajra (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	:	12 Kg/ha (9 g/Plot)
Fertilizers	:	40:20 kg/ha (N:P) basal
Seed	:	1 Kg/entry; 1 Kg/NC and 0.25 Kg/ZC
Locations (19)	:	NWZ -Ludhiana, Hisar, Bikaner, Jalore, Avikanagar; NEZ -Faizabad, Pusa, Bhubaneswar, Ranchi; CZ -Anand, Raipur, Jabalpur, Rahuri, Uralikanchan, Jhansi; SZ -Coimbatore, Hyderabad, Mandya, Raichur

4. AVTPM-1: Forage Pearl millet (SZ)

Entries	:	4+ 1 (NC) + 1 (ZC)
Entries	:	ADV-160061 (Advanta Seeds Ltd); TSFB-17-7 (PJTSAU, Hyderabad), K-25 (Kanchan Ganga Seeds); JKFBH-1521 (JK Agri Ltd)
Checks	:	Giant Bajra (NC), Moti Bajra (SZ)
Design	:	RBD with 4 replications
Plot size	:	4 m x 3 m accommodating 4 m long 10 rows at 30 cm
Seed rate	:	12 Kg/ha (15g/Plot)
Fertilizers	:	40:20 kg/ha (N:P) basal
Seed	:	0.5 Kg/entry; 0.5 Kg/NC and 0.50 Kg/ZC
Locations (4)	:	SZ -Coimbatore, Hyderabad, Mandya, Raichur

5. IVTC: Forage Cowpea (New)

Entries	:	6+ 2 (NC) + 1 (ZC)
Entries	:	VFC-1 (KAU, Vellayani); MFC-16-6 , MFC-09-16 (ZARS, Mandya), C-508 (IGFRI RRS Dharwad); TSFC-18-16 (PJTSAU, Hyderabad), RFC-111 (IGKV, Raipur)
Checks	:	National checks: Bundel Lobia-1, UPC-5286, Zonal checks: Bundel Lobia-2 (NWZ), UPC-622 (HZ), UPC-628 (NEZ), UPC-9202 (CZ) & MFC-09-1 (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 (26 g/plot)
Fertilizers	:	20:40 kg/ha (N:P) basal
Seed	:	3.0 Kg/entry; 3.0 Kg/NC and 0.75 Kg/ZC
Locations (28)	:	HZ -Palampur, Srinagar, Rajouri ; NWZ -Ludhiana, Hisar, Pantnagar, Bikaner, Udaipur, Jalore; NEZ -Faizabad, Bhubaneswar, Ranchi, Jorhat, Kalyani, Imphal, Pusa; CZ -Anand, Rahuri, Jhansi, Urulikanchan, Raipur, Meerut; SZ -Coimbatore, Vellayani, Mandya, Hyderabad, Dharwad & Raichur

6. AVTC-1: Cowpea (CZ, NEZ & SZ)

Entries	:	3 + 2 (NC) + 1 (ZC)
Entries	:	RFC-2 (RCC-48) (IGKV, Raipur); HFC-16-3 (HAU, Hisar), MFC-16-1 (ZARS Mandya);
Checks	:	National checks: Bundel Lobia-1, UPC-5286; Zonal checks: UPC-628 (NEZ), UPC-9202 (CZ) & MFC-8-14 (SZ)
Design	:	RBD with 4 replications
Plot size	:	4 m x 3 m accommodating 4 m long 10 rows at 30 cm
Seed rate	:	35.0 kg/ha (42 g/plot)
Fertilizers	:	20:40 kg/ha (N:P) basal
Seed	:	4.0 Kg for entry, NC and 1.5 kg for ZC
Locations (19)	:	CZ - Anand, Rahuri, Uralikanchan, Jhansi, Meerut, Raipur; NEZ - Faizabad, Bhubaneswar, Ranchi, Jorhat, Kalyani, Imphal, Pusa; SZ -Coimbatore, Vellayani, Mandya, Hyderabad, Dharwad & Raichur

7. AVTC-2: Cowpea (HZ)

Entries	:	1 + 2 (NC) + 1 (ZC)
Entries	:	MFC-16-4 (ZARS Mandya)
Checks	:	National checks: Bundel Lobia-1, UPC-5286; Zonal checks: UPC 622 (HZ)
Design	:	RBD with 5 replications
Plot size	:	4 m x 3 m accommodating 4 m long 10 rows at 30 cm
Seed rate	:	35.0 kg/ha (42 g/plot)
Fertilizers	:	20:40 kg/ha (N:P) basal
Seed	:	1.0 Kg for entry, NC and ZC
Locations (4)	:	HZ - Palampur, Srinagar, Rajouri and Almora

7A – AVT-2 Cowpea – Agronomy

Entries No.	:	1 + 2 (NC) + 1 (ZC)
Entries Name	:	MFC-16-4 (ZARS Mandya)
Checks	:	National checks: Bundel Lobia-1, UPC-5286; Zonal check: UPC 622 (HZ)
P Levels	:	Three (30, 60 & 90 kg/ha)
Design	:	RBD with 3 replications
Plot size	:	4 m x 3 m accommodating 4 m long 10 rows at 30 cm
Seed rate	:	40 kg/ha (45g/plot)
Fertilizers	:	20:40 kg/ha (N:K) basal
Seed requirement	:	405g/ entry /Centre
Locations (2)	:	HZ- Palampur, Srinagar
Total plots	:	4x3x3= 36
Seed requirement	:	Total 900 g /entry (for 2 centres)

8. AVTC-2: Cowpea (Seed)(HZ)

Entries	:	1 + 2 (NC) + 1 (ZC)
Entries	:	MFC-16-4 (ZARS Mandya)
Checks	:	National checks: Bundel Lobia-1, UPC-5286; Zonal checks: UPC 622 (HZ)
Design	:	RBD with 5 replications
Plot size	:	4 m x 3 m accommodating 4 m long 10 rows at 30 cm
Seed rate	:	35.0 kg/ha (42 g/plot)
Fertilizers	:	20:40 kg/ha (N:P) basal
Seed	:	0.6 Kg for entry, NC, ZC
Locations (2)	:	HZ- Palampur, Srinagar

9. IVT Rice bean (New)

Entries	:	5 + 2 (NC)
Entries	:	KRB-110 (BCKV, Kalyani); JRBJ-10-2, JRBJ-10-3 (JNKVV, Jabalpur); JOR-19-1, JOR-19-2 (AAU, Jorhat)
Checks	:	Bidhan-2, Bidhan-3
Design	:	4 m x 3 m accommodating 4 m long 10 rows at 30 cm
Plot size	:	RBD with 3 replications
Seed rate	:	35.0 kg/ha (42 g/plot)
Fertilizers	:	20:40 kg/ha (N:P) basal
Seed	:	1.8 Kg/entry and NC
Locations (10)	:	Kalyani, Ranchi, Bhubaneswar, Jorhat, Pusa, Vellayani, Jabalpur, Raipur, Imphal & Palghar (Dapoli)

10. AVT-I Rice bean

Entries	:	2+ 2 (NC)
Entries	:	JOR-18-1 (AAU, Jorhat); KRB-11 (BCKCV, Kalyani)
Checks	:	K-1 (Bidhan-1), Bidhan-2
Design	:	4 m x 3 m accommodating 4 m long 10 rows at 30 cm
Plot size	:	RBD with 5 replications
Seed rate	:	35.0 kg/ha (42 g/plot)
Fertilizers	:	20:40 kg/ha (N:P) basal
Seed	:	2.5 Kg/entry and NC
Locations (10)	:	Kalyani, Ranchi, Bhubaneswar, Jorhat, Pusa, Vellayani, Jabalpur, Raipur, Imphal & Palghar (Dapoli)

11. IVT Dinanath Grass (New)

Entries	:	7 + 2 (NC)
Entries	:	BAU DN-103-18-2, BAU DN-109-18, BAU DN-110-18-2 (BAU, Ranchi); JHDNG-19-1, JHDNG-19-2, JHDNG-19-3, JHDNG-19-4 (IGFRI, Jhansi)
Checks	:	Bundel Dinanath-1, Bundel Dinanath-2
Design	:	4 m x 1.8 m accommodating 4 m long 6 rows at 30 cm
Plot size	:	RBD with 3 replications
Seed rate	:	4 kg/ ha (3 g/plot)
Fertilizers	:	20:40 kg/ha (N:P) basal
Seed	:	0.25 kg / entry and NC
Locations (9)	:	Kalyani, Ranchi, Bhubaneswar, Jorhat, Pusa, Jabalpur, Imphal, Jhansi, Mandya

12. VT *Cenchrus ciliaris*-2019(New)

Entries	:	6+ 3 (NC)
Entries	:	RCCB-05, RCCB-06 (SKRAU, Bikaner); RCC-2016-8 (MPKV, Rahuri); IG-96-414, IG-67-1263 (IGFRI RRS Avikanagar); CAZRI-327 (CAZRI, Jodhpur)
Checks	:	IGFRI 3108, CAZRI 75, IGFRI-67-365
Design	:	4 m x 3 m accommodating 4 m long 10 rows at 30 cm
Plot size	:	RBD with 3 replications
Seed rate	:	5 kg/ha (6g/plot)
Fertilizers	:	20:40 kg/ha (N:P) basal
Seed	:	0.4 kg/entry + check
Locations (15)	:	NWZ- Ludhiana, Hisar, Bikaner, Jodhpur, Avikanagar; CZ- Anand, Rahuri, Uralikanchan, Jhansi, Jabalpur, Raipur; SZ- Coimbatore, Mandya, Hyderabad, Dharwad

13. IVT *Cenchrus setigerus* (New)

Entries	:	4 + 3 (NC)
Entries	:	RCSB-08, RCSB-09 (SKRAU, Bikaner); IG-97-433, IG-97-447 (IGFRI RRS Avikanagar)
Checks	:	CAZRI-76 + TNCs-265, IG-96-706
Design	:	RBD with 3 replications
Plot size	:	4 m x 3 m
Seed rate	:	6 kg/ ha (8 g per plot)
Fertilizers	:	20:40 kg/ha (N:P) basal
Seed	:	0.5 kg / entry & check
Locations (14)	:	NWZ- Hisar, Bikaner, Jodhpur, Avikanagar; CZ- Anand, Rahuri, Uralikanchan, Jhansi, Jabalpur, Raipur; SZ- Coimbatore, Mandya, Hyderabad, Dharwad

14. VT BxN Bajra Napier Hybrid (New)

Entries	:	13+ 2 (NC)
Entries	:	VBN-1 (KAU, Vellyani); PBN-402, PBN-407, PBN-408 (PAU, Ludhiana); RBN-214-48, RBN-2016-95 (MPKV, Rahuri); TNCN-1534, TNCN-1536 (TNAU, Coimbatore); BNH-26 (BAIF, Uralikanchan); TSBN-15-8, TSBN-15-15 (PJ TSAU, Hyderabad) ; IGFRI BN 2013-7, IGFRI BN 2013-8 (ICAR-IGFRI, Jhansi)
Checks	:	BNH-10, CO(BN)-5
Design	:	RBD with 3 replications
Plot size	:	4 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	:	1000 rooted slips/entry
Locations (20)	:	HZ- Palampur, Almora; NWZ- Ludhiana, Hisar, Bikaner; NEZ- Bhubaneswar, Ranchi, Jorhat; CZ- Anand, Rahuri, Uralikanchan, Jhansi, Raipur, Jabalpur, Palghar (Dapoli); SZ- Coimbatore, Mandya, Hyderabad, Vellayani & Dharwad

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)
9. Leaf/ Stem ratio
10. 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 in single cut trials.
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.

(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-2019

1. Seed supply from contributors to PC Unit, Jhansi: Before April 30, 2019
2. Trials seed dispatch from PC Unit Jhansi: Before May 25, 2019
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, 2019; however, data on seed and quality are to be submitted before December 20, 2019.
6. Reporting of Breeder seed (BSP-IV): January 10, 2020.

Seed Requirement of the Check Varieties and entries for Kharif 2019 Trials

Seed should be dispatched by speed post / TCI Express to reach Jhansi before 30th April, 2018. Seeds must be untreated. Any colour, chemical etc. must not be used for seeds. Please do not send rooted slips of BN hybrid. Date for this will be communicated later.

SN	Crop	Variety	Quantity (in kg)	Institution
1.	Maize	African Tall	Total 7.0 kg [IVT - 3.0 + AVT1 - 4.0]	MPKV, Rahuri
		J-1006	Total 7.0 kg [IVT - 3.0 + AVT1 - 4.0]	PAU, Ludhiana
		IIMR CoHM-8	Total 4.0 kg [IVT - 3.0 + AVT1 - 1.0]	IIMR, Ludhiana
2.	Pearl Millet	RBB-1	Total 1.0kg [IVT - 1]	SKRAU, Bikaner
		Giant Bajra	Total 1.50kg [IVT- 1 + AVT1- 0.50]	MPKV, Rahuri
		BAIF Bajra-1	Total 0.25 kg [IVT- 0.25]	BAIF, Uralikanchan
		AFB-3	Total 0.25 kg [IVT -0.25]	AAU, Anand
		APFB-9-1	Total 0.25 kg [IVT -0.25]	PJTSAU, Hyderabad
		Moti Bajra	Total 0.75 kg [IVT -0.25 + AVT1-1- 0.50]	PJTSAU, Hyderabad
		3.	Cowpea	Bundel Lobia-1
UPC-5286	Total 9.50 kg [IVT -3.0 + AVT1 – 4.0 + AVT2- 1.0 kg + seed- 0.6 + 0.9 kg for agronomy]			GBPUAT, Pantnagar
Bundel Lobia-2	Total 0.75 kg [IVT -0.75]			IGFRI, Jhansi
UPC-622	Total 5.50 kg [IVT -3.0 + AVT2- 1.0 kg + seed- 0.6 + 0.9 kg for agronomy]			GBPUAT, Pantnagar
UPC-628	Total 2.25 kg [IVT -0.75+ AVT- 1.50]			GBPUAT, Pantnagar
UPC-9202	Total 2.25 kg [IVT -0.75+ AVT- 1.50]			GBPUAT, Pantnagar
MFC-09-1	Total 0.75 kg [IVT -0.75]			ZARS Mandya
MFC-08-14	Total 1.50 kg [AVT- 1.50]			
4.	Rice Bean	Bidhan-1	Total 2.50 kg [AVT1 - 2.5]	BCKV, Kalyani
		Bidhan-2	Total 4.30 kg [IVT -1.80 + AVT1 – 2.50]	BCKV, Kalyani
		Bidhan-3	Total 1.80 kg [IVT -1.80]	BCKV, Kalyani
5.	Dinanath	Bundel Dinanath-1	Total 0.25 kg [IVT -0.25]	IGFRI, Jhansi
		Bundel Dinanath -2	Total 0.25 kg [IVT -0.25]	IGFRI, Jhansi
6.	<i>Cenchrus ciliaris</i>	IGFRI-3108	Total 0.40 kg [VT -0.40]	IGFRI, Jhansi
		CAZRI- 75	Total 0.40 kg [VT -0.40]	CAZRI, Jodhpur
		IGFRI-67-365	Total 0.40 kg [VT -0.40]	IGFRI, Jhansi
7.	<i>Cenchrus setigerus</i>	CAZRI-76	Total 0.50 kg [VT -0.50]	CAZRI, Jodhpur
		TNCS-265	Total 0.50 kg [VT -0.50]	TNAU, Coimbatore
		IG-96-706	Total 0.50 kg [VT -0.50]	IGFRI, RRS Avikanagar
8.	BN Hybrid	BNH-10	1200 root slips	BAIF, Uralikanchan
		CO (BN) 5	1200 root slips	TNAU, Coimbatore

Seed requirement for entries

1.	Fodder Maize	IVT	3.0 kg/ entry
		AVT-1	4.0 kg/entry
2.	Fodder Pearl millet	IVT	1.0 kg/ entry
		AVT-1	0.50 kg/ entry
3.	Fodder Cowpea	IVT	3.0 kg /entry
		AVT-1	4.0 kg /entry
		AVT-2 + AVT-2 (seed) + AVT-2 (agronomy)	2.5 kg/entry
4.	Fodder Ricebean	IVT	1.80 kg/ entry
		AVT-1	2.50kg/ entry
5.	Dinanath Grass	IVT	0.25 kg/ entry
6.	<i>Cenchrus ciliaris</i>	VT	0.40kg/ entry
7.	<i>Cenchrus setigerus</i>	VT	0.50kg/ entry
8.	BN Hybrid	VT	1200 rooted slips/ entry

AICRP on Forage Crops and Utilization
Technical Programme-Forage Crop Production
Kharif 2019

On-going trials

SN	Kharif Trial Name	Centre	Title	Concluding Year
1.	K-17-AST-1	Mandya, Coimbatore and Vellayani	Studies on performance top feeds under varied Planting geometry with and without intercrop	Kharif-2021
2.	K-17-AST-3	CZ-Jabalpur, Raipur, Urulikanchan, Rahuri, NEZ-Ranchi, Faizabad	Effect of new generation herbicides on weeds and forage yield of forage Maize	Kharif-2019
3.	CS-15-AST-4	Pantnagar, Ranchi, Kalyani, Jabalpur	Development of climate resilient production technologies on productivity and economic of food-fodder based cropping systems	Kharif-2019
4.	K-17-AST-4L	Jorhat	Effect of Rice bean+ Teosinte intercropping system and INM on succeeding kharif Rice	Kharif-2019
5.	K-15-AST-5L	Hyderabad	Studies on carbon sequestration in subabul (<i>Leucaena leucocephala</i>) based silvi-pastoral cropping system under rain fed agriculture	Kharif-20
6.	K-15 AST-8-7 L	Faizabad	Screening of genotypes of fodder bajra and oat under sodic soil	Rabi 18-19
7.	K-15-AST-10 C	Mandya and Vellayani	Intensive forage production through Agase based (<i>Sesbania grandiflora</i>) cropping system under protective irrigation	Kharif-2019
8.	K-16-AST-2	Anand, Jabalpur, Kalyani, Bhubaneswar	Effect of different techniques of seed priming on productivity of forage maize	Kharif-2018
9.	K-18-AST-1	IGFRI-SRRS, Dharwad	Studies on intercropping of Lucerne in guinea grass and Bajra napier hybrid under irrigated conditions	Kharif-2020
10.	K-18-AST-2	Dharwad, Mandya, Rahuri, Raipur, Uralikanchan, Imphal, Kalyani, Hisar	Evaluation of fodder value of maize varieties as influenced by nitrogen levels and detoping before physiological maturity	Kharif-2019
11.	R-18-AST-6	IGFRI, SRRS, Dharwad	Influence of cutting stages and chemical spray on pod maturity of fodder cowpea	Kharif 2019

B. New Trials

K-18-AST-1: Studies on organic source of nutrient on green forage yield and quality of Cowpea-Fodder maize under irrigated situation.

Locations (4): Mandya, TNAU Coimbatore, KAU, Vellayani, Karaikal	Data reporting: Kharif
Year of Start: Kharif 2019	Concluding Year: Kharif 2022

Objectives

1. Study the effect of organic nutrient sources on green forage yield and quality.
2. Study the physico-chemical and biological properties of soil.
3. To compare the economics of organic with inorganic sources.

Experimental details

Crop	:	Cowpea- Fodder maize (winter)	Design	:	RBD
Variety	:	BL-2, African tall	Fertilizers	:	As per treatments
Plot size	:	4 m x 5 m	Replication	:	3
Spacing	:	30 X 10 cm	Year of start	:	Kharif-2019
Treatments	:	12	Duration	:	4 years

Treatment details

T ₁	100% RDN through inorganic fertilizers
T ₂	100% RDN through FYM
T ₃	75% RDN through FYM+ 25% RDN through vermicompost
T ₄	75% N through FYM+ 25% RDN through Bio-compost
T ₅	50% RDN through FYM+ 50% RDN through vermicompost
T ₆	50% RDN through FYM+ 50% RDN through Bio-compost
T ₇	75% of T ₂ (both sources)
T ₈	75% of T ₃ (both sources)
T ₉	75% of T ₄ (both sources)
T ₁₀	75% of T ₅ (both sources)
T ₁₁	75% of T ₆ (both sources)
T ₁₂	50% N through FYM+ 25% RDN through vermicompost + 25% RDN through Poultry manure.

Note

- Organic manure to be applied based on N equivalent
- Before applying organic manure N content to be analyzed.
- Nutrient requirement- Maize 90:60:40 kg NPK/ha, Cowpea 20:60 kg NP/ha
- Calculate both requirement; apply organic nutrients equivalent to 55 kg N at Kharif and equivalent to 55 kg N at Rabi sowing allowing sufficient tie for decomposition
- Apply nutrient through inorganic source as pre doses given per crop
- 50% of system total requirement in equal dose in each season in treatment T12

Observations to be recorded:

A. Growth and yield parameters:

• Plant height (cm)	• Leaf stem ratio	• Ash, carbohydrates and fibre content
• GFY(q/ha)	• DMY (q/ha)	• CPY(q/ha)

B. Soil properties

OC (%), EC, NPK, Micronutrients & Microbial biomass @ initial and after harvest of the crop.

C. Economics

• Gross returns (Rs/ha)	• Net returns (Rs/ha)	• B:C ratio
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K-18-AST-2: Studies on organic source of nutrient on green forage yield and quality of Rice bean-oat under irrigated situation.

Locations (5): AAU, Jorhat. CAU, Imphal, BCKV, Kalyani; BAU, Ranchi, RPCAU, Pusa	Data reporting: Kharif
Year of Start: Kharif 2019	Concluding Year: Kharif 2022

Objectives

1. Study the effect of organic nutrient sources on green forage yield and quality.
2. Study the physico-chemical and biological properties of soil.
3. To compare the economics of organic with inorganic sources.

Experimental details:

Crop	: Rice bean - Oat	Design	: RBD
Variety	: Bidhan Rice bean 2 & JHO-822	Fertilizers	: As per treatments
Plot size	: 4 m x 5 m	replication	: 3
Spacing	: 30 X 10 cm	Year of start	: Kharif-2019
Treatments	: 12	Duration	: 4 years

Treatment details:

T ₁	100% RDN through inorganic fertilizers
T ₂	100% RDN through FYM
T ₃	75% RDN through FYM+ 25% RDN through vermicompost
T ₄	75% N through FYM+ 25% RDN through Bio-compost
T ₅	50% RDN through FYM+ 50% RDN through vermicompost
T ₆	50% RDN through FYM+ 50% RDN through Bio-compost
T ₇	75% of T ₂ (both sources)
T ₈	75% of T ₃ (both sources)
T ₉	75% of T ₄ (both sources)
T ₁₀	75% of T ₅ (both sources)
T ₁₁	75% of T ₆ (both sources)
T ₁₂	50% N through FYM+ 25% RDN through vermicompost + 25% RDN through Poultry manure as top dress at 30 DAS.

Note

- Organic manure to be applied based on N equivalent
- Before applying organic manure N content to be analyzed.
- Nutrient requirement- Oat 90:60:40 kg NPK/ha, Rice bean 20:60 kg NP/ha
- Calculate both requirement; apply organic nutrients equivalent to 55 kg N at Kharif and equivalent to 55 kg N at Rabi sowing allowing sufficient tie for decomposition
- Apply nutrient through inorganic source as pre doses given per crop
- 50% of system total requirement in equal dose in each season in treatment T12

Observations to be recorded

A. Growth and yield parameters:

• Plant height (cm)	• Leaf stem ratio	• Ash, carbohydrates and fibre content
• GFY(q/ha)	• DMY (q/ha)	• CPY(q/ha)

B. Soil properties

OC (%), EC, NPK, Micronutrients & Microbial biomass @ initial and after harvest of the crop.

C. Economics

• Gross returns (Rs/ha)	• Net returns (Rs/ha)	• B:C ratio
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K-18-AST-3: Bio-fortification of annual cereal fodder crops for enhancing zinc and iron content

Locations (6): SK RAU Bikaner; PAU Ludhiana; AAU, Anand; HAU Hisar; NDUAT Faizabad and RARI, Durgapura, Jaipur)	Data reporting: Kharif
Year of Start: Kharif 2019	Concluding Year: Kharif 2020

Technical programme

Fodders Crops

1. Kharif Maize (var. African tall)
2. Sorghum (var. SSV 74)

Zinc and Iron levels

1. 0 kg ZnSO₄ /ha
2. 10 kg ZnSO₄/ha –as basal + 1% ZnSO₄ foliar spray at 45 DAS
3. 10 kg FeSO₄/ha –as basal + 1% FeSO₄ foliar spray at 45 DAS
4. 10 kg ZnSO₄ +10 kg FeSO₄/ha –as basal + 1% ZnSO₄ 1 % FeSO₄ as foliar spray at 45 DAS
5. 20 kg ZnSO₄/ha –as basal + 1% ZnSO₄ foliar spray at 45 DAS
6. 20 kg FeSO₄/ha –as basal + 1% FeSO₄ foliar spray at 45 DAS
7. 20 kg ZnSO₄ +20 kg FeSO₄/ha –as basal + 1% ZnSO₄ 1% FeSO₄ as foliar spray at 45 DAS

Experimental details

Fertilizers	: 90:40:40 kg NPK /ha	Design	: RBD
Main plots	: Fodder crops	Sub plots	: Zn & Fe levels
Spacing	: 30 X 10 cm	Replication	: 3
Plot size	: 4 m x 3.6 m	Treatments combinations	: 2 x 7= 14
Duration	: 2 years	Year of start	: Kharif-2019

Observations to be recorded

- Zn and Fe content in soil before and after harvest of fodder crops
- Zn and Fe content in plant stem of fodder crops at harvest
- Plant height, biomass/plant and green fodder yield (q/ha)
- Number of days for harvesting (50% flowering)
- CP and CF in plant at harvest
- Net returns and B:C ratio

K-18-AST-4: Bio-fortification of annual cereal fodder crops for enhancing zinc and iron content

Locations (2): PJTSAU Hyderabad and IGFRRI RRS Dharwad	Data reporting: Rabi
Year of Start: Rabi 2019	Concluding Year: Rabi 2020

Technical programme

Fodders Crops

1. Rabi Maize (var. African tall)
2. Rabi Sorghum (var. SSV 74)

Zinc and Iron levels

1. 0 kg ZnSO₄ /ha
2. 10 kg ZnSO₄/ha –as basal + 1% ZnSO₄ foliar spray at 45 DAS
3. 10 kg FeSO₄/ha –as basal + 1% FeSO₄ foliar spray at 45 DAS
4. 10 kg ZnSO₄ +10 kg FeSO₄/ha –as basal + 1% ZnSO₄ 1 % FeSO₄ as foliar spray at 45 DAS
5. 20 kg ZnSO₄/ha –as basal + 1% ZnSO₄ foliar spray at 45 DAS
6. 20 kg FeSO₄/ha –as basal + 1% FeSO₄ foliar spray at 45 DAS
7. 20 kg ZnSO₄ +20 kg FeSO₄/ha –as basal + 1 % ZnSO₄ 1% FeSO₄ as foliar spray at 45 DAS

Experimental details

Fertilizers	: 90:40:40 kg NPK /ha	Design	: RBD
Main plots	: Fodder crops	Sub plots	: Zn & Fe levels
Spacing	: 30 X 10 cm	Replication	: 3
Plot size	: 4 m x 3.6 m	Treatments combinations	: 2 x 7= 14
Duration	: 2 years	Year of start	: Kharif-2019

Observations to be recorded

- Zn and Fe content in soil before and after harvest of fodder crops
- Zn and Fe content in plant stem of fodder crops at harvest
- Plant height, biomass/plant and green fodder yield (q/ha)
- Number of days for harvesting (50% flowering)
- CP and CF in plant at harvest
- Net returns and B:C ratio

K-18-AST-5: Exploring the possibility of silage of paddy straw and sugarcane tops with different additives

Location: Ludhiana	Data reporting: Kharif
Year of start: 2019	Concluding year: 2020

Objective:

- To study the silage quality of sugarcane tops + paddy straw with different additives.
- To study the fermentation characteristics of silage of sugarcane tops + paddy straw with different additives.

Experimental Details:

Design- RBD

Replications-03

Treatment Detail:

- T₁= 100% sugar cane tops + no additives
- T₂= 100% sugar cane tops + 1% molasses
- T₃= 100% sugar cane tops + 2% molasses
- T₄= 100% sugar cane tops + 2% urea
- T₅= 100% sugar cane tops + 1% molasses+1% urea
- T₆= 75% sugar cane tops +25% paddy straw + no additives
- T₇= 75% sugar cane tops +25% paddy straw + 1% molasses
- T₈= 75% sugar cane tops +25% paddy straw +2% molasses
- T₉= 75% sugar cane tops +25% paddy straw + 2% urea
- T₁₀= 75% sugar cane tops +25% paddy straw + 1% molasses+1% urea
- T₁₁= 50% sugar cane tops +50% paddy straw + no additives
- T₁₂= 50% sugar cane tops +50% paddy straw + 1% molasses
- T₁₃= 50% sugar cane tops +50% paddy straw +2% molasses
- T₁₄= 50% sugar cane tops +50% paddy straw + 2% urea
- T₁₅= 50% sugar cane tops +50% paddy straw + 1% molasses+1% urea

Observations to be recorded:

1. Moisture level	2. Aroma of silage	3. Color of silage
4. pH	5. Ammonical -N	6. Volatile fatty acids
7. Crude protein	8. ADF	9. NDF
10. <i>In vitro</i> dry matter digestibility	11. Ash	

K-18-AST-6: Advanced Varietal Trial in Forage Cowpea (Agronomy)

Locations: HZ- Palampur, Srinagar	Data Reporting : Kharif
Year of Start: Kharif 2019	Concluding Year: Kharif 2019

Entries No.	:	1 + 2 (NC) + 1 (ZC)
Entries Name	:	MFC-16-4 (ZARS Mandya)
Checks	:	National checks: Bundel Lobia-1, UPC-5286; Zonal checks: UPC 622 (HZ)
P Levels	:	Three (30, 60 & 90 kg/ha)
Design	:	RBD with 3 replications
Plot size	:	4 m x 3 m accommodating 4 m long 10 rows at 30 cm
Seed rate	:	40 kg/ha (45g/plot)
Fertilizers	:	20:40 kg/ha (N:K) basal
Seed requirement	:	405g/ entry /Centre
Locations (2)	:	
Total plots	:	4x3x3= 36
Seed requirement/entry/all Centre	:	Total 810g /entry (for 2 centres)

**AICRP on Forage Crops and Utilization
Technical Programme-Forage Crop Protection
Kharif 2019**

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

Locations: Bhubaneswar, Jhansi, Palampur, Dharwad, Rahuri and Ludhiana

PPT-2: Evaluation of Kharif breeding materials for their resistance to diseases and insect pests

Locations: Bhubaneswar, Palampur, Rahuri, Dharwad, Jhansi and Ludhiana

PPT-25: Non chemical management of *Helminthosporium* leaf blight in fodder maize

Location: Ludhiana **Design:** RBD **Replication:** 3 **Plot size:** 3x3 m²

Treatments

- T1: Two foliar spray of *Pseudomonas fluorescens* @ 10g/L at 10 days interval
- T2: Two foliar spray of *Bacillus subtilis* @ 10g/L at 10 days interval
- T3: Two foliar spray of *Melia azedarach* @ 3.0% at 10 days interval
- T4: Two foliar spray of *Murraya koenigii* @ 3.0% at 10 days interval
- T5: Two foliar spray of chitosan @ 0.05% at 10 days interval
- T6: Two foliar spray of mancozeb @ 0.25% at 10 days interval
- T7: Control

Observations:

1. *Helminthosporium* leaf blight severity.
2. GFY (q/ha)

PPT-26: Evaluation of Integrated disease management components against leaf blast of forage pearl millet

Locations: Ludhiana, Jhansi, Bhubaneswar and Palampur

Design: RBD **Replication:** 3 **Plot size:** 3x2 m² **Variety:** Giant Bajra

Treatments

- T1: Seed treatment with carbendazim @ 2.0g/kg seed
- T2: Seed treatment with tebuconazole + trifloxystrobin @ 1 g/kg seed
- T3: Seed treatment with chitosan @ 0.05%
- T4: Seed treatment with neem seed extract @ 5%
- T5: Seed treatment with tricyclazole @ 0.6 g/kg seed
- T6: T1+ foliar spray of carbendazim @ 0.5 g/L
- T7: T2+ foliar spray of tebuconazole + trifloxystrobin @ 0.4g/L
- T8: T3+ foliar spray of chitosan @ 0.05%
- T9: T4+ foliar spray of neem seed extract @ 5%
- T10: T5+ foliar spray of tricyclazole @ 0.3 g/L
- T11: Control

Observations:

- Seedling emergence percentage/treatment.
- Leaf blast severity in each treatment at seven days interval starting from disease onset (minimum 5 readings).
- AUDPC and rate of infection in different treatments.
- Fodder yield and seed yield in different treatments.

Note: In treatments T6 to T10, maximum of two foliar sprays will be given with first foliar spray just at disease initiation and second spray should be given need based (preferably at 15 days after first one).

PPT-27: Management of invasive insect-pest fall army worm, *Spodoptera frugiperda* L. on Forage Maize

Locations: Rahuri, Dharwad and Jhansi

Design: RBD

Replication: 3

Plot size: 4x3 m²

Variety: African Tall

Treatments:

T1: Foliar spray of Emamectin benzoate 5 WG @ 0.5g/L

T2: Foliar spray of Chlorpyrifos 20 EC @ 2 mL /L

T3: Foliar spray of *Metarhizium anisopliae* @ 5g /L

T4: Foliar spray of *Metarhizium anisopliae* @ 7.5g /L

T5: Foliar spray of *Beauveria bassiana* @ 5g /L

T6: Foliar spray of *Beauveria bassiana* @ 7.5g /L

T7: Foliar spray of *Nomuraea releyi* @ 5g /L

T8: Foliar spray of *Nomuraea releyi* @ 7.5g /L

T9: Foliar spray of Azadiractin 10000 ppm @ 2mL /L

T10: Control

Observations:

- Number of infested plants per plot at weekly interval. Per cent damage will be recorded on five randomly selected plants at an interval of seven days during the crop period.
- Number of infested plants before spray and 3, 7 & 10 days after spray.
- Green Fodder yield
- Dry matter yield
- Seed Yield
- Population of predators and natural enemies of fall armyworm.

Note: Bio-agents will be supplied by Rahuri centre.

PPT-28: Assessment of avoidable crop losses due to diseases and insect-pests in forage Cowpea

Locations: Ludhiana, Palampur, Rahuri, Bhubaneswar and Jhansi

Design: Paired plot design

Replication: 7

Plot size: 5 x 5 m²

Variety: Bundel Lobia-1

Treatments: 2 **T1:** Protected **T2:** Unprotected

Observations

- Severity/incidence of different diseases (Root-rot, Anthracnose, Yellow mosaic virus, leaf blight) and insect-pests (defoliators and aphids) as per standard disease/pests specific rating scale in both protected and unprotected plots starting from date of appearance till crop maturity at weekly interval and their correlation with weather factors.
- Green fodder yield and seed yield in protected as well as unprotected plots.

Note: All the package of practices will be same in protected and unprotected plots except following disease/insect-pests management practices in protected plots:

For management of root rot and foliar diseases (anthracnose and leaf blight) of forage cowpea:

- Seed treatment with tebuconazole 2DS @ 1g/kg seed + NSKP (50 g/kg seed) followed by two foliar sprays of 0.1 per cent propiconazole at 15 day interval.

For management of defoliators in forage cowpea:

- Foliar application of *B. bassiana* @ 5g/L (1×10^7 cfu/ml)

For management of sucking pests and yellow mosaic virus incidence:

- Two sprays of imidacloprid 17.8 SL @ 0.3 ml/lit at 15 days interval followed by two sprays of *Verticillium lecani* @ 5 g/L at 10 days interval.
- Effort must be made for need based application of disease/pest management practices in protected plots.
- Seed treatment with tebuconazole 2DS @ 1g/kg seed + NSKP (50 g/kg seed) is must. Application of management practices in standing crop should be done right at the start of disease/pests attack initiation in protected plots.
- **Bio-agents will be supplied by Rahuri centre.**

PPT-29: Validation of best treatments of trial entitled “Integrated Management of Banded leaf and sheath blight of forage Maize (Modified)”

Locations: Palampur and Bhubaneswar

Design: Paired plot design

Replication: 7

Plot size: 10 x 10 m²

Treatments: 3

- **T1:** Seed treatment with carbendazim @ 2g/kg seed + two foliar sprays with (Tryflosystrobin+Tebuconazole) @ 1g/l at 10 days interval
- **T2:** Seed treatment with *T. viride* @ 5g/kg seed + two foliar sprays with (tryflosystrobin +tebuconazole) @ 1g/l at 10 days interval
- **T3:** Untreated Control

Observations:

1. Banded leaf and sheath blight Incidence (%).
2. GFY (q/ha).
3. Seed yield.
4. Economics.

PPT-30: Validation of best treatments of trial entitled “Integrated Management of foliar diseases of forage Sorghum”

Locations: Palampur and Ludhiana

Design: Paired plot design **Replication:** 7

Plot size: 10 x 10 m² **Treatments:** 3

At Palampur:

T1: Seed treatment with carbendazim @ 2 g/kg seed + two foliar sprays with propiconazole @ 1g/l

T2: Seed treatment with *T. viride* @ 5g/kg + two foliar sprays with propiconazole @ 1g/l

T3: Untreated Control

At Ludhiana:

T1: Seed treatment with carbendazim @ 2 g/kg seed + one spray each with neem bio-pesticide (Achook) @ 3% and propiconazole @ 1g/l

T2: Seed treatment with *T. viride* @ 5g/kg + one spray each with neem bio -pesticide (Achook) @ 3% and propiconazole @ 1g/l

T3: Untreated Control

Observations:

1. Severity of Anthracnose (*Colletotrichum graminicola*), Zonate leaf spot (*Gloeocercospora sorghi*) and Grey leaf spot (*Cercospora sorghi*).
2. GFY (q/ha).
3. Seed Yield.
4. Economics.

PPT-31: Validation of best treatments of trial entitled “Management of downy mildew of pearl millet using bioagents”

Location: Ludhiana

Design: Paired plot design **Replication:** 7 **Plot size:** 10 x 10 m²

Treatments: 3

Treatments:

T1: Seed treatment with *Bacillus subtilis* @ 5g/kg seed + two foliar spray of *Bacillus subtilis* @ 5g/l at 10 days interval

T2: Seed treatment with *Pseudomonas fluorescens* @ 5g/kg seed + two foliar spray of *Pseudomonas fluorescens* @ 10g/l at 10 days interval

T3: Untreated Control

Observations:

1. Downy mildew (*Sclerophthora graminicola*) incidence.
2. GFY (q/ha).
3. Seed Yield.
4. Economics.

ALL INDIA COORDINATED RESEARCH PROJECT ON FORAGE CROPS & UTILIZATION
(Indian Council of Agricultural Research)
NATIONAL GROUP MEET: Kharif 2019

Date: 26-27 February, 2019

Venue: IGKV, Raipur

TENTATIVE PROGRAMME**26th February, 2019**

08:00-10:00	REGISTRATION
10:00-11:45	INAUGURATION
Welcome Address	Dr. S. K. Patil, Vice Chancellor, IGKV, Raipur
Project Coordinator's Report	Dr. A. K. Roy, Project Coordinator
Address by Guest of Honour	Dr. R. K. Singh, ADG (CC & FFC), ICAR
Address by Guest of Honour	Anita Yogendra Sharma MLA, Dharsiwa
Address by Guest of Honour	Dr. Vinay Jaiswal MLA, <i>Manendragarh</i>
Release of publications	
Felicitation and awards	
Vote of Thanks	Dr. A. L. Rathore, Director Extension, IGKV, Raipur
11:45-12:00	High Tea
12:00-12:45 TECHNICAL SESSION-I: INTERACTIVE SESSION WITH STAKEHOLDERS	
Chairman	Dr. R. K. Singh, ADG (CC & FFC), ICAR
The session will showcase advances made by certain centers at farmer's field. Different stakeholders like Animal husbandry group, livestock keepers, dairy personnel, fodder growers, forage seed growers will present their expectations and problems in the interaction meeting.	
Rapporteurs	Dr. Mayuri Sahoo, Scientist, IGKV, Raipur
12:45-13:30 TECHNICAL SESSION-II: BREEDER SEED PRODUCTION	
Chairman	Dr. R. K. Singh, ADG (CC & FFC), ICAR
BSP Report & Allocation	Dr. A. K. Roy, PC
Rapporteurs	Dr. R. K. Agrawal, Dr. Kalyan Jana
13:30-14:00	LUNCH
14:00-15:00 TECHNICAL SESSION-III: DISCIPLINEWISE REPORT	
Chairman	Dr. R. K. Singh, ADG (CC & FFC), ICAR
Co-chairman	Dr. Khem Chand, Director, IGFRI, Jhansi
Forage crop Improvement	Dr. Subhash Chand
Forage crop Production	Dr. R. K. Agrawal
Forage crop Protection	Dr. N.R. Bhardwaj
Rapporteurs	Dr. D. K. Banyal & Dr. Usha Thomas
15:00-16:30 TECHNICAL SESSION-IV (concurrent sessions) FORMULATION OF TECHNICAL PROGRAMME	
TECHNICAL SESSION-IV (Concurrent)-FORAGE CROP IMPROVEMENT	
Chairman	Dr. R. K. Singh, ADG (CC & FFC), ICAR
Convener	Dr. A. K. Roy, PC -AICRP FC&U
Rapporteurs	Dr. P. Mahadevu & Dr. Rahul Kapoor
Finalization of varietal trials	Dr. Subhash Chand

TECHNICAL SESSION-IV (Concurrent)–FORAGE CROP PRODUCTION	
Chairman	Dr. K. L. Nandeha, Head, Crop Production Division, IGKV, Raipur
Co-Chairman	Dr. R. K. Agarwal
Rapporteurs	Dr. S. K. Jha & Dr. Joseph Koering
Finalization of trials	Dr. R. K. Agarwal

TECHNICAL SESSION-IV (Concurrent)–FORAGE CROP PROTECTION	
Chairman	Dr. V. K. Dubey, Head, Entomology Division, IGKV, Raipur
Co-Chairman	Dr. A. S. Kotasthane, Head Pathology Division, IGKV, Raipur
Rapporteurs	Dr. Ashlesha & Dr. A. B. Tambe
Finalization of trials	Dr. N. R. Bhardwaj
16:30-16:45	Tea

16:45-18:00	TECHNICAL SESSION V: REVIEW OF CENTRE-WISE ACTIVITIES
Chairman	Dr. R. K. Singh, ADG (CC & FFC), ICAR
Co-Chairman	Dr. Khem Chand, Director, ICAR-IGFRI, Jhansi
Convener	Dr. A. K. Roy, Project Coordinator (FCU)
Rapporteurs	Dr. A.K. Mehta & Dr Joseph Koering
Hill Zone	CSK HPKV Palampur ; SKUAST (K) Srinagar; VPKAS Almora
North West Zone	PAU Ludhiana, CCS HAU Hisar, GBPUAT Pantnagar, SKRAU, Bikaner, IGFRI-RRS Avikanagar, CAZRI Jodhpur, SKRAU-RRS Jalore, MPUAT Udaipur, IIW&BR (dual purpose barley) Karnal
North East Zone	NDUAT, Faizabad ; BAU Ranchi ; BCKV Kalyani; OUAT Bhubaneswar ; AAU Jorhat ; CAU Imphal ; RAU Pusa
Central Zone	AAU Anand ; JNKVV Jabalpur ; IGFRI Jhansi ; MPKV Rahuri ; BAIF Urulikanchan ; IGKV Raipur ; CSAUAT Kanpur ; Dhari/Dapoli
South Zone	PJTSAU Hyderabad ; UAS (B) ZRC Mandya ; TNAU Coimbatore ; KAU Vellayani ; IGFRI-RRS; Dharwad

Chairman	Dr. R. K. Singh, ADG (CC & FFC), ICAR
18:00 - 19:00	VARIETAL IDENTIFICATION COMMITTEE MEETING

27th February, 2019

9:00-11:00	TECHNICAL SESSION V: REVIEW OF CENTRE-WISE ACTIVITIES – contd.
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11:00-11:30	TECHNICAL SESSION-VI: FTD & TSP FORMULATION
Chairman	Dr. R. K. Singh, ADG (CC & FFC), ICAR
Convener	Dr. A. K. Roy, Project Coordinator
Rapporteurs	Dr. R. K. Agrawal & Dr. S.D. Sivakumar
10:30-10:45	Tea

11:30-12:30	TECHNICAL SESSION VII:PGR/breeding/production/protection issues
Chairman	Dr. Khem Chand, Director, ICAR-IGFRI, Jhansi
Convener	Dr. A. K. Roy, PC
Rapporteurs	Dr. Santosh Jha&Dr P Takawale
2-3 lectures on various aspects; Future programme/thrust areas/identification	

12:30-13:30	TECHNICAL SESSION-VIII: Scientific, Administrative and financial issues
Chairman	Dr. Khem Chand, Director ICAR-IGFRI, Jhansi
Convener	Dr. A. K. Roy, Project Coordinator (FCU)
Rapporteur	Dr. A. Sonone
13:30-14:30	Lunch

15:00-17:00	TECHNICAL SESSION-IX: PLENARY SESSION	
Chairman	Dr. S. K. Patil, Vice Chancellor, IGKV, Raipur	
Co-Chairman	Director Research/ Director Extension	
Convener	Dr. A. K. Roy, Project Coordinator (FCU)	
Rapporteurs	Dr. R. K. Agrawal & Dr. S. K. Jha	
Presentation of the recommendations by respective Rapporteurs		
Technical session – I Interactive session with stakeholders	Dr. Mayuri Sahoo	
Technical session – II Breeder Seed Production	Dr. Kalyan Jana	
Technical session – III Discipline-wise presentation	Dr. D. K. Banyal	
Technical session - IV Forage Crop Improvement	Dr. P. Mahadevu	
Technical session - IV Forage Crop Production	Dr. S. K. Jha	
Technical session – IV Forage Crop Protection	Dr. Ashlesha	
Technical session – V Centre wise activities	Dr. A.K. Mehta	
Technical session – VI FTD & TSP formulation	Dr. S.D. Sivakumar	
Technical session-VII PGR/breeding/production/protection issues	Dr. P. Takawale	
Technical session – VIII – Scientific/ administration/ financial issues	Dr. A. Sonone	
Varietal Identification Committee Meeting Report	Dr. A. K. Roy	
Chairman's Remarks	Dr. S. K. Patil	
Vote of Thanks	Dr. S. K. Jha & Dr. A. K Roy	

ALL INDIA COORDINATED RESEARCH PROJECT ON FORAGE CROPS AND UTILIZATION

(INDIAN COUNCIL OF AGRICULTURAL RESEARCH)

NATIONAL GROUP MEET- Kharif - 2019

LIST OF PARTICIPANTS

Date: 26-27February,2019		Venue: IGKV, Raipur, Chhattisgarh	
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5	Mr. Subhash Chand, Scientist (Plant Breeding)		
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56	Dr. Deepak Kumar, In charge, RARS, Rajouri SKUAST, Jammu
BSKKY, Dapoli	
57	Dr. A. S. Dhane, Jr. Entomologist, BSKKY, Dapoli
Private companies/ NGO	
58.	Dr. Vishnu Ameta, Breeder, Crystal Crop Protection
59.	Dr. Bheeman Pariha, Breeder, J K Seed Ltd.
60.	Dr. Aditya Sahu, Sr. Breeder, Advanta Seed Ltd
61.	Dr. Rajesh Vere, Research Head Store Agro tech
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71.	Dr.K.L.Nandeha HOD Agronomy
72.	Dr A.K. Sarawgi HOD plant breeding
Scientist from IGKV, Raipur	
73.	Dr. Deepak Sharma
74.	Dr. G.P.Banjara
75.	Dr. G.L.Sharma
76.	Dr. Gajendrs Chandrakar
77.	Dr. B. C. Jain
78.	Dr. G. D. Sahu
79.	Dr. Vinay Samadiya
80.	Dr. Y. K. Dewangan

81.	Dr. Ambika Tandon
82.	Dr. Dharmendra Khokhar
83.	Dr. Sonali Deole
84.	Dr. Manju Tiwari
85.	Dr. Sweta Ramole
86.	Dr. Deepti Jha
87.	Dr. Jyoti Bhatt
88.	Smt. Sonali Rajput
89.	Shri Varunendra Yadav
90.	Dr. Nitish Tiwari
91.	Dr. Rama Mohan Savu
92.	Dr. Prashant Pandey
93.	Dr. Sunil Kumar
94.	Dr. S.P. Tiwari
95.	Dr. Harsh Vardhan Puranik
96.	Dr. Sunil Nag
97.	Dr. Deepak Gauraha
98.	Dr. Navneet Rana
99.	Dr. Amit Dixit
100.	Dr. H.K.Singh
101.	Dr. Hemant Panigrahi
102.	Dr. Abhinav Sao
103.	Dr. Sanjay Dwivedi
104.	Dr. Gaurav Sharma
105.	Dr. Arun Kumra Tripathi
106.	Dr. RavindraSoni
107.	Dr. Vivek Tripathi
108.	Dr. Sanjay Joshi
109.	Dr. Mangla Parikh
110.	Dr. Subha Banerjee
111.	Dr. G. Ramole
112.	Dr. R.K. Thakur
113.	Dr. Deepak Chandrakar
114.	Dr. Praveen Sharma
115.	Dr. Mayuri Sahu
116.	Dr. Vinay Bachkaui
117.	Dr. H.L.Sonboir
118.	Dr. Shrikant Chitale
119.	Dr. Rajesh Agrawal
120.	Dr. A.K.Verma
121.	Dr. S.K. Jha
Non technical staff from IGKV, Raipur	
122.	Shri Pramod Patle
123.	Shri Basant Sahu
124.	Shri Dileep Verma
125.	Shri Sanjay Nayyar
Students from IGKV, Raipur	
126.	Alka Singh
127.	Jayesh Seshe
128.	Chanchal Porte
129.	Uma Singh
130.	Meenu Mohan

Farmers	Village		Farmers	Village	
131.	LokhrajBarla	Dhaneli kanhar	132.	Mahabai	Rani dongri
133.	BalsinghBarla	Dhaneli kanhar	134.	Malti	Rani dongri
135.	KhemlalNayak	Dhaneli kanhar	136.	Rabita	Rani dongri
137.	AtmaramShivana	Dhaneli kanhar	138.	Rambha	Rani dongri
139.	TamradhbajRabte	Dhaneli kanhar	140.	Usha	Rani dongri
141.	GhanuramLedhiya	Dhaneli kanhar	142.	Basko	Rani dongri
143.	BhujbalTarama	Dhanelikanhar	144.	Dehoti	Rani dongri
145.	DayaluramLatiya	Dhaneli kanhar	146.	Bhabani	Rani dongri
147.	Ratni	Araud	148.	Maheshwari	Ranidongri
149.	Galti	Araud	150.	Chaitram	Rani dongri
151.	Satananda	Araud	152.	Somu	Rani dongri
153.	Radev	Araud	154.	Sheetal	Rani dongri
155.	Jagdish	Araud	156.	Dhamsingh	Rani dongri
157.	Rekeshwar	Araud	158.	Asnam	Rani dongri
159.	Kaliram	Araud	160.	Deepak	Rani dongri
161.	Susheela	Araud	162.	Dhamraj	Rani dongri
163.	Chaitibai	Araud	164.	Praful	Rani dongri
165.	Mansaram	Araud	166.	Suresh	Rani dongri
167.	Gajraj	Araud	168.	Roman	Malpuri
169.	Dipesh	Araud	170.	Shiv	Malpuri
171.	Gaiduram	Araud	172.	Ashok	Malpuri
173.	Anilraj	Araud	174.	Jitendra	Malpuri
175.	Batara	Araud	176.	Chandrekha	Malpuri
177.	Jitendra	Araud	178.	Chuman	Malpuri
179.	Kanshiram	Araud	180.	Dhannu	Malpuri
181.	Ainkalu	Araud	182.	Devkumar	Malpuri
183.	Kumaribai	Araud	184.	Monika	Malpuri
185.	Vedbai	Araud	186.	Beshesar	Malpuri
187.	Chaitibai	Araud	188.	AlagSingh	Malpuri
189.	Parmila	Araud	190.	Radhey	Malpuri
191.	Suresh	Araud	192.	Ankalu	Malpuri
193.	Kanshiram	Araud	194.	Ramadhin	Malpuri
195.	Yamuna	Araud	196.	Nirmala	Malpuri
197.	Mamta	Araud	198.	Mintoo	Malpuri
199.	Sharda	Araud	200.	NeeraBai	Malpuri
201.	Rebati	Araud	202.	Komin	Malpuri
203.	Susheela	Araud	204.	Shanti	Malpuri
205.	Priyanka	Araud	206.	Gulab	Malpuri
207.	Bhamji	Araud	208.	Kanhaya	Malpuri
209.	Geeta	Araud	210.	Roopnarayan	Malpuri
211.	Parvati	Araud	212.	PhoolSingh	Malpuri
213.	Pramila	Araud	214.	Alagsingh	Malpuri
215.	Sonika	Araud	216.	Kirtoram	Markatola
217.	Madhuri	Araud	218.	KripaRam	Markatola
219.	Surekha	Rani dongri	220.	RadheyShyam	Markatola
221.	Stavdeen	Rani dongri	222.	Nankishan	Markatola
223.	Tulshi	Ranidongri	224.	Ballu Ram	Markatola
225.	Jamuna	Rani dongri	226.	Mahesh	Markatola
227.	Kachara	Rani dongri	228.	Hem Singh	Markatola
229.	Radha	Rani dongri	230.	Arvind Kumar	Markatola
231.	Dhaneshwari	Rani dongri	232.	RajnuRam	Markatola
233.	Pratibha	Rani dongri	234.	KeshRam	Markatola

235.	Godabari	Rani dongri	236.	GendSingh	Markatola
237.	Kaushlaya	Rani dongri	238.	Sujoni Ram	Markatola
239.	Bashan	Rani dongri	240.	Bhagu Ram	Markatola
241.	Sandhya	Rani dongri	242.	DhaneswarPrashad	Markatola
243.	Mukesh	Rani dongri	244.	Iswar	Markatola
245.	Hemu Ram	Markatola	246.	Pahlaad	Malpuri
247.	Puran Singh	Markatola	248.	Tarun	Malpuri
249.	ParshRam	Markatola	250.	Ashee	Malpuri
251.	Bohar Singh	Markatola	252.	Yuvraaj	Malpuri
253.	Lakhan Ram	Markatola	254.	Shivdayal	Malpuri
255.	Kashi Ram	Markatola	256.	Sanjay	Malpuri
257.	Parshu Ram	Markatola	258.	Gautam	Malpuri
259.	Sumega	Markatola	260.	Gobinda	Malpuri
261.	Radha Devi	Markatola	262.	Delesh	Malpuri
263.	Jyoti	Markatola	264.	Homendra	Malpuri
265.	Jamun	Markatola	266.	Deepak Sahu	Malpuri
267.	VaratNeen	Markatola	268.	Manish	Malpuri
269.	Saraswati	Markatola	270.	Heetu	Malpuri
271.	BhubanLal	Markatola	272.	Tulshi	Malpuri
273.	Manharan	Markatola	274.	Rohit	Malpuri
275.	Gaytri Chandra	Markatola	276.	GeetaBai	Malpuri
277.	Kung Bai	Markatola	278.	GendaBai	Malpuri
279.	Kishan Ram	Markatola	280.	Kedar Singh	Malpuri
281.	Kageya	Markatola	282.	Shatrughan	Malpuri
283.	Dhaneshwari	Markatola	284.	Narayan	Malpuri
285.	Chandrika	Markatola	286.	Girdhari	Malpuri
287.	BhanKuar	Markatola	288.	Adhnu Ram	Malpuri
289.	Karan	Markatola	290.	Chatur Ram	Malpuri
291.	Bediya	Markatola	292.	Munshi Ram	Malpuri
293.	Rekhu Ram	Markatola	294.	Kebal	Malpuri
295.	Shekhar	Markatola	296.	Iswari	Malpuri
297.	Ramswarup	Markatola	298.	Omprakash	Malpuri
299.	Jyoti Prakash	Markatola	300.	Narayan	Malpuri
301.	Shukab Singh	Markatola	302.	Suresh	Malpuri
303.	Neel Singh	Markatola	304.	Amit	Malpuri
305.	Mulchandra	Rajnandgaon	306.	Deepak	Malpuri
307.	Ganesh	Suragi	308.	Munga	Malpuri
309.	Nagesh	Kumhari	310.	Radhika	Malpuri

Glimpses of Media Coverage

Annexure F



National Group Meeting of AICRP on Forage Crops & Utilization

26-27th February 2019, Raipur

The National Group Meeting of the All India Coordinated Research Project on Forage Crops and Utilization was inaugurated on 26th February, 2019 at Indira Gandhi Krishi Vishwavidyalaya, Raipur (Chhattisgarh).

Dr. S. K. Pesti, Vice Chancellor, IGKV, Raipur welcomed the delegates and presented achievements of University for the farming community especially in the forage crops. He highlighted the need of forage resources and improved technologies for enhancing the livelihood options and increasing the farmer's income in Chhattisgarh.

Dr. Vinay Jaiswal (MLA, Mahendragarh, Chhattisgarh) and Smt. Anita Yogendra Sharma (MLA, Dhariswan, Chhattisgarh) highlighted the importance of forages and animal husbandry especially with reference to Chhattisgarh. They briefed about the state government policies to develop cow shelters and grassland in each village panchayat which is being implemented. They emphasized on the use of technologies developed by research organizations to produce more forages for these livestock. The need of conservation of surplus fodder for lean period was also highlighted.

Dr. R. K. Singh, ADO (CC & PPC), ICAR, highlighted the achievements of NARS scientists in increasing the overall agricultural output in last few decades. He stressed upon need of disseminating new technologies to the actual users for increasing livestock outputs both in terms of quality as well as quantity. He highlighted need of more collaboration between various agencies for awareness of different stakeholders.

Dr. Khem Chand, Director, ICAR-IGPRL, Jhansi highlighted the technologies developed and successfully demonstrated by IGPRL in various parts of the country to rejuvenate the grassland and pasture lands to bridge the demand and supply gap of forage availability.

Dr. A. K. Roy, Project Coordinator, AICRP on Forage Crops and Utilization presented the brief introduction of the AICRP, salient achievements during last 5 years period and summary of activities and results of the trials carried out in Kharif 2018.

Various publications were released which included the Annual Report of AICRP on Forage Crops and Utilization, and extension bulletins in regional languages by different AICRP centers. Certificates of appreciation were awarded to ICROV, Kalyani and IGKV, Raipur AICRP centers for their outstanding contribution.

Fourteen varieties in 9 forage crops including cultivated forage crops, range grasses and legumes were identified for release in different zones of the country.

(Source: All India Coordinated Research Project on Forage Crops and Utilization)

ICAR at a Glance

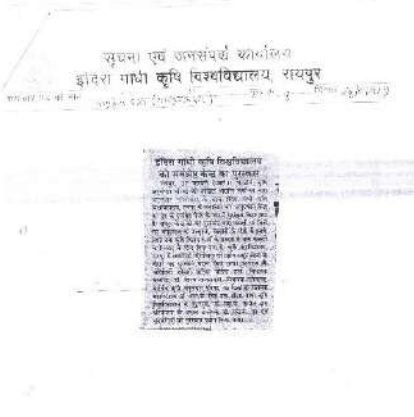
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- Institutes
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- Krishi Vigyan Kendras
- Technologies & Products for Commercialization
- ICAR Awards
- AICRPs & Network Projects
- Consortium for e-Resources in Agriculture
- ICAR Awards 2018

Divisions and Units

- Crop Science
- Horticultural Science
- Natural Resource Management
- Agricultural Engineering
- Animal Science
- Fisheries Science
- Agricultural Education
- Agricultural Extension
- Knowledge Management
- IP&TM and PHE
- Human Resource Management Unit
- National Agricultural Science Fund (NASF)
- Administration
- Finance

Research Institutes

- Deemed Universities
- Institutes



कृषि एवं पशु
अवधारणार्थक एवं अतिरिक्त आवरणों प्रस्ताव।
राजधानी सुवासी की

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