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अखिल भारतीय समन्वयित अनुसंधान परियोजना—  
चारा फसलें एवं उपयोगिता  
(भारतीय कृषि अनुसंधान परिषद)

**ALL INDIA COORDINATED RESEARCH PROJECT  
ON FORAGE CROPS & UTILIZATION**  
(Indian Council of Agricultural Research)

कार्यवृत्त—राष्ट्रीय समूह बैठक खरीफ 2016  
एस.के.यू.ए.एस.टी—के, श्रीनगर

**Proceedings of the National Group Meeting-Kharif-2016  
SKUAST-K, Srinagar**

परियोजना समन्वयन इकाई  
अखिल भारतीय समन्वयित अनुसंधान परियोजना  
(चारा फसलें एवं उपयोगिता)  
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**(Held at SKUAST-K, Srinagar during May 16-17, 2016)**

This document is meant for official use only of the AICRP (FC&U) Centres, Coordinating Unit, ICAR Headquarters and Forage Scientists.

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## PREFACE

The National Group Meeting, *Kharif*- 2016 of All India Coordinated Research Project on Forage Crops and Utilization was organized with the objectives to review the accomplishments of technical programme executed during *Kharif* 2015 at different coordinating and cooperating centres, In-House breeding and other research activities, forage technology demonstrations (FTDs) and activities executed under Tribal Sub Plan at selected centres. The technical programme of ongoing research trials was also discussed and new trials were formulated for *Kharif* 2017 in addition to focussed discussion on future thrust areas for fodder research. The meeting was jointly organized by Indian Council of Agricultural Research and SKUAST- K, Srinagar during May, 16-17, 2016.

The meeting was attended by officials from ICAR, SKUAST-K, scientists engaged in forage research working at coordinating and collaborating centers of AICRP on Forage Crops and Utilization located at different SAUs, ICAR institutes and NGOs, other AICRPs, and public and private companies. The important stakeholders from other sections, besides livestock keepers of J&K State, also contributed in the development of programme, future linkages and collaborations to strengthen future course of action keeping in view the changing agricultural needs of the farmers. The local participants included scientists and staff members from SKUAST- K, Srinagar and electronic and print media of the region.

This compilation contains brief report of the National Group Meet, *Kharif* 2016 covering highlights on forage crop improvement, production and protection technologies generated; proceedings of different technical sessions and approved technical programme for the coming *Kharif* 2017. The national group meet members discussed and planned future strategies for improving the forage productivity, quality, nutritive value and soil health to address the regional and national forage security with sustainability for ever increasing livestock population. The finalized technical programme on forage crop improvement, forage crop production and forage crop protection for *Kharif* 2017 have been given in annexure(s).

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

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

A. K. Roy  
Project Coordinator

**ALL INDIA COORDINATED RESEARCH PROJECT  
ON FORAGE CROPS & UTILIZATION  
(INDIAN COUNCIL OF AGRICULTURE RESEARCH)**

**NATIONAL GROUP MEET: *KHARIF* 2016**

**INAUGURAL SESSION**

National Group Meet *Rabi* -2015-16 of All India Coordinated Research Project of Forage Crops & Utilization was organized by ICAR and SKUAST-K, Srinagar during 16-17 May, 2016 at SKUAST-K, Srinagar.

Prof. Nazeer Ahmed, Vice-Chancellor in his inaugural address emphasized on the fact that livestock production and agriculture has been complementary since long and are crucial for overall food security and stability as 65-70 per cent of the population is dependent on agriculture for their livelihood and contribute 14.10 % to GDP while Livestock contributes 4% to national GDP and is a source of employment and livelihood for most of the population in rural areas, particularly in J& K State. In J&K state, it is the backbone of rural economy as almost all farming households are either wholly or partially dependent on the livestock – pasture as one of their component of livelihood.

Dr. A. K. Roy, Project Coordinator, AICRP-FCU presented the brief account of AICRP project and forage-livestock scenario in J&K. He also highlighted the activities undertaken by the project during the Kharif 2015.

Speaking at the occasion, Dr. J. S. Chouhan, ADG (Seeds), ICAR, highlighted the importance of forages in the nutrition security and livelihood. He further said the acreage under forages is difficult to increase hence; efforts should be made to increase productivity and explore new niches. He also suggested revisiting the information on area and production of pasture and fodder resources of the country, in general and forests and hilly terraces in particular.

The guest of Honour, Dr. I.S. Solanki, ADG (FFC), ICAR, urged to develop nutritionally superior varieties of forage crops especially range grasses and legumes and their dissemination to farmers' field. He also reiterated the role of pre-breeding as well as participatory varietal development and seed production to match the seed requirement.

Ten publications including the Annual Report and extension bulletin in regional languages were released. The meeting also identified one variety of cowpea (TNFC-0924) proposed by TNAU, Coimbatore for NE Zone. It also recommended forage crop production and protection technologies for adoption.

More than 120 forage scientists, experts and practitioners from public (SAUs & ICAR) and private (Seed companies) institutions participated in the meeting. More than 100 local farmers were present and interacted with the scientists.

The meeting ended with vote of thanks

## Highlights: Technology Generated

### Variety identified

- **TNFC 0926 (Fodder Cowpea):** The proposal was submitted by TNAU, Coimbatore for identification in North East Zone. The committee noted its superiority in terms of dry matter yield, green fodder yield and per day productivity for both green as well as dry matter yield in comparison to national and zonal checks. The committee identified the entry for cultivation for the states of Eastern Uttar Pradesh, West Bengal, Odisha, Assam and Jharkhand under rainfed conditions. **The proposed name is Central fodder cowpea, TNFC 0926.**

### Forage Production Technologies

- At Coimbatore, the application of  $\text{FeSO}_4$  @ 50 kg+  $\text{ZnSO}_4$  @ 25 kg/ha alongwith recommended dose of NPK (recommended dose) to irrigated Bajra Napier hybrid grass is most productive (3695 q green or 735 dry matter or 8160 kg crude protein/ha). The technology also fetched highest net monetary returns and benefit cost ratio. It can be recommended for cultivation in the similar agro-ecology of Tamilnadu
- At Mandya, pearl millet cv. BAIF Bajra-1, is recommended for achieving higher green forage (237.47 q/ha) as well as grain yields (3.23q/ha). The crop should be supplemented with 150:60:40 NPK kg/ha and harvested twice, 1<sup>st</sup> cut at 40 days after sowing and 2<sup>nd</sup> cut on 40 days after 1<sup>st</sup> cut for green fodder and later left for grain purpose. The practice recorded net monetary returns (25329 Rs/ha) & B:C ratio (3.23) also. It can be recommended for cultivation in the similar agro-ecology of Karnataka.
- At Mandya, in Coconut Gardens, BN hybrid supplied with 150% RDF (270:180:120 kg NPK/ha) is recommended for realizing optimum biomass yields (1127.4 q green and 248.0 q drymatter/ha) as well as returns (net monetary returns- Rs.42987/ha and benefit cost ratio-2.03). The technology is also capable of intercepting maximum light by the canopy. It can be recommended for cultivation in the similar agro-ecology of Karnataka.

### Forage Protection Technology

- For the the management of leaf spot diseases of sorghum particularly Zonate spot, seed treatment with carbendazim@ 2 g/kg seed followed by two foliar sprays of propiconazole @ 0.1per cent is recommended.

## Recommendations of the National Group Meeting: Kharif 2016 (held at SKUAST-K, Srinagar during May 16-17, 2016)

### Recommendations

- **Variety identified : TNFC 0926 (Fodder Cowpea):** The proposal was submitted by TNAU, Coimbatore for identification in North East Zone. The committee noted its superiority in terms of dry matter yield, green fodder yield and per day productivity for both green as well as dry matter yield in comparison to national and zonal checks. The committee identified the entry for cultivation for the states of Eastern Uttar Pradesh, West Bengal, Odisha, Assam and Jharkhand under rainfed conditions. **The proposed name is Central fodder cowpea, TNFC 0926.**
- Breeders should nominate new entries after proper evaluation of material.
- Collection of germplasm after proper planning with due consultation and involvement of NBPGR was suggested. The germplasm after proper multiplication should be shared among the centres.
- After exploration, the multiplied seed sample along with passport data should be sent to NBPGR for getting IC numbers
- All centres should register the unique and novel germplasm with NBPGR, New Delhi.
- Seeds of released and notified varieties should be deposited with NBPGR, New Delhi
- It was suggested that large number of crosses should be attempted by the scientists involving diverse parents to generate new breeding material. Advance breeding lines should be evaluated for various parameters including disease and quality.
- There should be better collaboration with AICRP maize and AICRP pearl millet and the two AICRPs should contribute entries from their center having good forage value in forage and dual purpose multilocation trials.
- Proposals for varieties identified by Varietal Identification committee should be submitted to CVRC within one month.
- Efforts should be made by different institutions to increase the breeder seed demand by popularizing the varieties so that forage seed replacement rate be increased.
- Resistant and susceptible checks should be included in the evaluation trial. For selected diseases, screening should be done under epiphytotic conditions.
- Breeders should also check the reaction of the promising entries for important pest and diseases before entering them in to the IVT or AVT.
- For the management of leaf spot diseases of sorghum particularly Zonate spot, seed treatment with carbendazim @ 2 g/kg seed followed by two foliar sprays of propiconazole @ 0.1 per cent is recommended.
- Fodder conservation techniques should be popularized by the centers
- TSP programme will be taken up as proposed by AAU, Jorhat; OUAT, Bhubaneswar; BCKV, Kalyani; JNKVV, Jabalpur; BAIF, Urulikanchan; PJTSAU, Hyderabad; HPKV, Palampur; SKUAST-K, Srinagar; CAU, Imphal; IGKV, Raipur; KAU, Vellayani; GBPUAT, Pantnagar and BAU, Ranchi.
- Centers should provide the list of beneficiaries and their details covered under TSP.
- It was emphasized that there is no allocation of fund for FLD in forage crops, while DAC is funding FLDs in other major crops. Project coordinator will explore the possibility of getting funding from DAC in consultation with ICAR.

## TECHNICAL SESSION I

### INTERACTIVE SESSION WITH STAKEHOLDERS

<b>Chairman</b>	<b>:</b>	<b>Dr. I. S. Solanki, ADG, (FFC), ICAR</b>
<b>Co-Chairman</b>	<b>:</b>	<b>Dr. J. S. Chauhan, ADG (Seed), ICAR</b>
<b>Rapporteur</b>	<b>:</b>	<b>Dr. Rahul Kapoor</b>

At the outset, the chairman welcomed the different stakeholders like farmers, entrepreneurs, forage seed growers, livestock keepers and animal husbandry group. About 60 stakeholders besides the delegates of the National group Meeting participated in this interactive session. The following were the feedbacks given by the different stakeholders:

- Many farmers were of the view that with the help of concerted efforts of AICRP (FCU) scientists of SKUAST, Srinagar, the forage production has increased considerably and such efforts should be kept going to further sustain the forage production in this region.
- 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.
- Good quality seed of improved varieties of different forage crops in sufficient quantity should be made available to large number of the farmers.
- There is an utmost need to provide/develop the quick growing and vigorous fodder varieties having sufficient winter tolerance, particularly in mountainous regions,.
- Scientists should suggest/develop some technologies to overcome the scarcity of fodder during severe lean period during November to February.
- Training and extension of fodder conservation techniques is required.
- Oats being a major Rabi fodder crop in the region, emphasis should be laid to develop the oats varieties that are tall, high yielding and multicut in nature.
- Regular training camps should be organized in different villages to make the farmers familiar with the advance technologies.

#### Recommendations

- Extension service should be strengthened for popularizing the technologies.
- Fodder conservation techniques should be popularized by University and other government/ NGO institutions
- Varieties and technologies should be developed keeping in view the farmers demand.

The session ended with vote of thanks to the Chairman.



**TECHNICAL SESSION - II**  
**BREEDER SEED PRODUCTION**

<b>Chairman</b>	<b>:</b>	<b>Dr. J. S. Chauhan, ADG (Seed), ICAR</b>
<b>Co-Chairman</b>	<b>:</b>	<b>Dr. I. S. Solanki, ADG, (FFC), ICAR</b>
<b>Rapporteur</b>	<b>:</b>	<b>Dr R. K. Agrawal</b>

Dr. A. K. Roy Project coordinator presented the indent, allocation and production of Kharif 2016 indent (production year Kharif 2015). The total indent received from DAC, Government of India was 77.84 q for 7 varieties of three forage crops, which was allocated to 7 institutes, NGOs/ SAU. The total quantity indented included forage maize 75.79 q, cowpea 1.95 q and pearl millet 0.1 q.

The overall breeder seed production was higher in comparison to allocated quantity. In maize the production was 82.85 q (7.06 q surplus), in pearl millet 4.40 q (4.30q surplus), in cowpea 3.25 q (1.30 q surplus). Thus the total production was 12.66 q or 16.26 percent higher than the indented quantity. Only in one variety, Pratap Makka Chari, the production was slightly less than the indented quantity.

The breeder seed indent received for Kharif 2017 (production year kharif 2016) was also discussed. The indented quantity was allocated production centers at ICAR institutes, SAUs and NGO.

Chairman expressed satisfaction over the surplus production. He further emphasized that efforts should be made to increase the forage seed demand.

**Recommendation:**

- Efforts should be made by different institutions to increase the breeder seed demand by popularizing the varieties so that forage seed replacement rate be increased.

The meeting ended with vote of thanks to the chair.

## TECHNICAL SESSION III

### DISCIPLINE WISE REPORT

<b>Chairman</b>	:	<b>Dr. J. S. Chouhan, ADG (Seed) ICAR</b>
<b>Co-Chairman</b>	:	<b>Dr. I. S. Solanki, ADG (FFC), ICAR</b>
<b>Rapporteurs</b>	:	<b>Drs. P. Mahadevu and S. K. Jha</b>

The session started with the welcome address of Dr. J. S. Chauhan ADG (Seeds).

Dr. A. K. Roy, Project coordinator presented the results of forage breeding and quality evaluation conducted during *Kharif* 2015. A total of 19 trials involving 93 entries in four annuals and nine perennial crops were conducted at 39 locations with the success rate of 86.4 %. The summary of annual trials is as follows

- In IVTM, out of six entries, only two entries i e., **ADVI 5788 & JHM 15-1** were found superior than the best check in HZ and CZ.
- In AVTM-1, out of five entries, three entries i e **PAC -746, MFM -4** and **AFM-4** were found superior than checks in HZ, NWZ and NEZ
- In IVT Pearl millet, six entries were evaluated and found superior in NWZ, NEZ and SZ.
- AVTPM-2 trial has been completed
- In cowpea IVTC, total six entries were evaluated and three entries viz., **MFC 09-3, MFC 09-4 & MFC 09** were found superior in IVTC.
- In cowpea AVTC-2 : the trial has been completed
- In rice bean IVT, three entries viz., **JOR 15-1, JOR 15-5 & JRGB 07-1** were found superior than the checks.

The following Trials in Perennial Crops will be continued for *Kharif* 2016 along with respective checks

- VT B x N Hybrid-2013 (4<sup>th</sup> year)
- VT *Dichanthium*-2013 (4<sup>th</sup> year)
- VT *Cenchrus ciliaris*-2013 (4<sup>th</sup> year)
- VT B x N Hybrid-2015 (2<sup>nd</sup> year)
- VT *Pennisetum hybrid*-2015 (2<sup>nd</sup> year)
- VT *Cenchrus ciliaris*-2015 (2<sup>nd</sup> year)
- VT *Cenchrus setigerus* -2015 (2<sup>nd</sup> year)
- VT *Setaria* -2015 (2<sup>nd</sup> year)

Dr. R. K. Agarwal Principal Scientist and PI (Agronomy) presented the detail report on 12 crop production experiments conducted at 20 locations on different crops and cropping systems including nutrient management, planting geometry and conservation agronomy. Three production technologies were proposed for adoption.

- Among perennial grasses under low land condition, significantly higher green fodder and dry matter yield was observed with Karanga dol at Jorhat, whereas, at Bhubaneswar, Jabalpur and Kalyani, para grass produced significantly higher GFY, DMY, and net returns.
- The applications of straw mulch @ 7.5 t/ha economized the water requirement and reduced the weed menace as well as resulted in higher GFY, DMY, CP content and economics.

- Seed rate ratio of Sorghum: Pearl millet @ 50:50 or 25:75 seed rate/ratio of sorghum: pearl millet in lines, recorded higher green and dry matter and crude protein output.
- For coconut gardens, BN hybrid proved better than other grasses and recorded significant superiority in terms of GFY, DMY, net monetary returns and benefit cost ratio.
- Under sodic soil conditions pearl millet Cv. NDFB-939 proved suitable and showed superiority in plant height, leaf stem ratio, green, dry and crude protein yields as well as crude protein content than other entries. The entry also recorded maximum per day productivity.

Dr. A. B. Tambe from MPKV Rahuri presented the salient achievements of crop protection. He presented the results of six trials on five crops conducted in five locations and the summary of crop protection results are as follows

- Occurrence and incidences of the following major diseases & insect-pests viz., Wilt, Leaf spot and blights in cowpea, Blight of maize, zonate leaf spot of sorghum, *Helminthosporium* blight of Bajra & sorghum were found during *Kharif 2015 in different forage crops ecosystem viz.* Sorghum, Bajra, Maize and cowpea under field conditions.
- All the biological control agents except *Pseudomonas fluorescence* @5 g(cfu 10<sup>6</sup>)/lt proved superior over untreated check in managing defoliator. Among the biological agents tested against defoliator *Spilosoma obliqua*, three treatments viz., *Beauveria basiana* @ 5 g (cfu 10<sup>6</sup>) /lt (T<sub>1</sub>), NSE 5% (T<sub>3</sub>) and *Nomurae relyi* @ 5 g (cfu 10<sup>6</sup>)/lt (T<sub>2</sub>) were at par with each other and they were superior over *Pseudomonas fluorescence* @5 g (cfu 10<sup>6</sup>)/lt (T<sub>4</sub>). Similar trend was reflected in obtaining green forage yield and dry matter yield.
- Seed Treatment with carbendazim @ 2 g/kg seed + Two foliar sprays of propiconazole @ 0.1% provided 83.9 per cent control of zonate leaf spot (13.2 % disease severity) over check (81.8 % disease severity) with 22.5 per cent increase in green fodder yield (299q/ha) as compared to control (244q/ha).
- Number of coccinellids was not affected due to biopesticide spray in the in the experiment on Efficacy of different bio pesticides against aphids on forage cowpea. Significantly higher green fodder yield (108.3q/ha) was obtained in Neem sprayed plot as against control plot (70.83 q/ha).

### Recommendations

- Resistant and susceptible checks should be included in the evaluation trial. For selected diseases, screening should be done under epiphytotic conditions.
- Breeders should also check the reaction of the promising entries for important pest and diseases before entering them in to the IVT or AVT.
- Persistency of perennial crops should also be worked out with nutrient application

The session was ended with the vote of thanks

## TECHNICAL SESSION IV (CONCURRENT)

### FORMULATION OF TECHNICAL PROGRAMME FORAGE CROP IMPROVEMENT

<b>Chairman</b>	:	Dr. I. S. Solanki, ADG, (FFC), ICAR
<b>Co-chairman</b>	:	Dr. J. P. Yadavendra
<b>Finalization of varietal trials</b>	:	Dr. A. K. Roy, PC (AICRP on FCU)
<b>Rapporteurs</b>	:	Drs. C. Babu and Y. Jindal

At the outset, the chairman welcomed the delegates. Dr. A. K. Roy, PC presented the highlights of 19 breeding trials conducted during *Kharif* 2015 on 11 different forage crops for finalization of the technical programme for *Kharif* 2016. After thorough discussion, following breeding trials were formulated.

#### Maize

- IVT fodder maize trial constituted with 11 entries + checks at 25 locations
- AVTM-1 and AVTM-2 are merged to form combined AVTM-2: One entry JHM 15-1 was promoted to AVTM-1 from IVT. From AVTM-1 of *kharif* 2015, three entries *viz.*, MFM-4, PAC-746 and AFM-4 were promoted to AVTM-2.
- AVTM-2 (Seed): Three entries *viz.*, MFM-4, PAC-746 and AFM-4 will be tested.
- Agronomy trial of AVTM-2 with 3 entries and 2 checks will also be conducted.

#### Pearl Millet

- New trial in IVT Pearl millet constituted 10 entries + checks at 20 locations
- AVTPM-1: Six entries *viz.*, RBB-6, TSFB-14-10, RBB-7, AFB-36, TSFB 10-5 and TSFB 13-12 were promoted from IVTPM to AVTPM-1.

#### Cowpea

- New trial in IVT Cowpea constituted with 7 entries + checks at 29 locations
- AVTC-1: Six entries *viz.*, TSFC-12-15, MFC-09-3, MFC -09-13, UPC 1501, MFC-09-4 and Vellyani-1 were promoted from IVTC to AVTC-1.

#### Rice bean

- New trial in IVT Rice bean constituted with 3 entries + checks at 09 locations
- AVT-1 Rice bean: Three entries *viz.*, JOR-15-1, JOR 15-5, JRBJ -07-1 were promoted from IVT to AVT-1.

#### Desmenthus

- A new perennial trial constituted with 5 entries in Hedge Lucerne (*Desmenthus*) at 15 locations

#### New trials

- **Annual trials:** IVT Maize IVT Pearl Millet, IVT Cowpea, IVT Rice bean constituted
- **Perennial trials :** VT Desmenthus

#### Perennial trials

- Four trials namely VTBN-2013, VT *Sehima*-2013, VT *Dichanthium*-2013 and VT *Cenchrus ciliaris*-2013 to be continued for the fourth year during *kharif* 2016.
- Four trials namely VTBN-2015, *Cenchrus setigerus*-2015, VT *Setaria*-2015 and VT *Pennisetum* hybrids-2015 to be continued for the second year during *kharif* 2016.

#### Recommendations

- All the breeders should nominate new entries only after getting properly evaluated in the station trials.

- Scientists contributing entries should send the seeds immediately so as to reach Project coordinating unit at IGFRI, Jhansi before 28<sup>th</sup> May, 2016.
- Seed requirements for each entry as well as national and zonal checks were also communicated to all the centers.
- IVT trials in four crops – Fodder Maize, Fodder pearl millet, Rice bean in annuals and Desmanthus in perennial constituted.
- Four perennial trials in 4<sup>th</sup> year and four perennial trials in 2<sup>nd</sup> year will continue in coded form.
- Advance varietal trials in Fodder Maize, Fodder pearl millet, Rice bean will be constituted with entries promoted from previous trials.

The session ended with vote of thanks to the chair.

## **TECHNICAL SESSION IV (CONCURRENT)**

### **FORMULATION OF TECHNICAL PROGRAMME FORAGE CROP PRODUCTION**

<b>Chairman</b>	:	Dr. Raihana Habib Kanth, Prof & Head, Div. of Agronomy
<b>Expert</b>	:	Dr Menhi Lal, Member, Ex Head, CP Division, IGFRI, Jhansi
<b>Convener</b>	:	Dr. R.K. Agrawal, P.I (PC, unit) Jhansi
<b>Rapporteurs</b>	:	Dr. B.G. Shekara & Dr. R. Joseph Koireng

Session began with introductory remarks of Dr. Raihana Habib kanth, Professor & Head, Division of Agronomy. Convener welcomed Chairman, Expert and all delegates. Dr. R. K. Agarwal, P.I. emphasized on timely dispatch of report which should contain replicated data along with mean tables as well as inferences. In order to avoid ambiguity, season for reporting the data for each trial has been mentioned in the technical programme as per suggestion of the Project Coordinator. Dr. J. S. Chauhan, ADG (Seed) ICAR suggested besides comprehensive data on morphological traits, climatic variable, moisture content of soil in irrigation experiment need to be taken into account while concluding the experiment. Dr. I. S. Solanki, ADG (FFC) ICAR, suggested besides macro nutrients impact of micro nutrients and Neem coated urea on yield and quality of forage need to be studied.

On-going technical programme was discussed in detail. Four trials have been concluded and seventeen coordinated trials and nineteen location specific trials will be continued and one trial (Utilization of industrial effluent as source of irrigation water and its effect of productivity and profitability of forage based cropping system-Pant nagar) was dropped.

In addition to these trials, three coordinated trials, six location specific trials and one exploratory trial have also been formulated.

#### **A. Concluding trials**

- Effect of nutrient management on productivity of perennial grasses under low land condition.
- Enhancing the production potential of various forage crops in coconut garden through nutrient management.
- Effect of level of nitrogen on productivity of perennial grasses with and without tree shade.
- Performance of Bajra Napier grass as influenced by micronutrients under irrigated conditions.

## **B. New experiments**

### **a. Coordinated trials**

- Feasibility of hydroponics as an alternate fodder production technology for higher quality and quantity (Hyderabad, Mandya & Vellayani)
- Studies on effect of different technique of seed priming in forage maize for enhancing seed germination. (BAIF, Urulikanchan, AAU Anand, JNKVV Jabalpur & BCKV, Kalyani)
- Effect of P and Zn application and cutting management on yield and quality of cowpea. (Bikaner & DUVASU, Mathura)

### **b. Location specific**

- Economization of fertilizer dose for NB hybrids (Co-5) through INM for enhancing yield and quality (TNAU, Coimbatore)
- Effect of nitrogen level on productivity of perennial grasses under hilly terrace condition (Nagaland)
- Organic nutrient management in fodder sorghum –berseem cropping sequence for sustainable fodder production (CCS, HAU, Hisar)
- Effect of nitrogen level on fodder yield and quality in Mulberry based fodder production system (AAU, Jorhat)
- Resource management in rice-oat cropping system under sodic soil (NDUAT, Faizabad).
- Seed production of fodder maize as influence by Zinc and Boron under red and lateritic soils of west Bengal. (Sriniketan, W.B.)

### **AVT Based trial**

### **C. Exploratory trials**

- Evaluation of vegetative propagules and planting methods in NB hybrids (TNAU, Coimbatore)

**Following results was drawn after careful analysis of concluded trials results which can be recommended for wide scale cultivation in recommended area.**

- At Coimbatore, the application of  $\text{FeSO}_4$  @ 50 kg+  $\text{ZnSO}_4$  @ 25 kg/ha alongwith recommended dose of NPK (recommended dose) to irrigated Bajra Napier hybrid grass was found most productive (3695 q green or 735 drymatter or 8160 kg crude protein/ha. The technology also fetched highest net monetary returns and benefit cost ratio
- At Mandya, pearl millet cv. BAIF Bajra-1, is recommended for achieving higher green forage (237.47 q/ha) as well as grain yields (3.23q/ha). The crop should be supplemented with 150:60:40 NPK kg/ha and harvested twice, 1<sup>st</sup> cut at 40 days after sowing and 2<sup>nd</sup> cut on 40 days after 1<sup>st</sup> cut for green fodder and later left for grain purpose. The practice recorded net monetary returns (25329 Rs/ha) & B:C ratio (3.23) also.
- At Mandya, in Coconut Gardens, BN hybrid supplied with 150% RDF (270:180:120 kg NPK/ha) is recommended for realizing optimum biomass yields (1127.4 q green and 248.0 q drymatter/ha) as well as returns (net monetary returns- Rs.42987/ha and benefit cost ratio-2.03). The technology is also capable of intercepting maximum light by the canopy.

Meeting ended with vote of thanks to the Chair.

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

<b>Chairman</b>	:	Dr. G. M. Mir, Head, Dept. of Entomology, SKUAST-K, Srinagar
<b>Convener</b>	:	Dr. A. B. Tambe
<b>Rapporteurs</b>	:	Dr. A. B. Tambe and Ravinder Kumar

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, regarding the results of last *Kharif* season along with the technical programme. The Chairman appreciated the work done by this small group and gave valuable suggestions. He emphasized on the importance of monitoring and surveillance of diseases and insect pests in forage crops, which may create a gap in fodder production and plant protection group can play an important role in minimizing this gap.

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

1. The trials PPT-1, PPT-2, PPT-16, PPT-17 and PPT-19 will continue as such in *Kharif* 2016 as per the technical programme approved in last NGM
2. The PPT-18 was concluded and validated on large field (500m<sup>2</sup>) during kharif 2015 and management technology for the leaf spot diseases of sorghum particularly Zonate spot, Seed treatment with carbendazim@ 2 g/kg seed followed by two foliar sprays of propiconazole @ 0.1per cent is recommended for the management to leaf spot diseases of sorghum.
3. PPT15 (Management of root rot and foliar diseases of forage cowpea) has been conducted for three years and the best treatment (Seed treatment with tebuconazole 2DS @ 1g/kg seed + NSKP@ 50 g/kg seed followed by foliar spray of propiconazole @ 1ml/l at 15 days interval was found effective for the control of root rot, anthracnose, leaf blights and nematode ) will be validated for one year on large area during Kharif 2016 as new trial PPT 20.
4. All the entries of maize (IVT & AVT) will be screened for their reaction to downy mildew and turcicum leaf blight diseases at AICRP Mandya in collaboration with AICRP maize.
5. **New trials formulated**
  - **PPT20:** Validation for management of root rot and foliar diseases of forage cowpea,
  - **PPT 21:** Integrated Management of BLSB of forage Maize
  - **PPT 22 :** Integrated Management of foliar diseases of forage Sorghum
  - **PPT-23:** Management of downy mildew of pearl millet using bioagents

The session ended with vote of thanks to the chair.

**TECHNICAL SESSION V**  
**REVIEW OF CENTER WISE ACTIVITIES**

<b>Chairman</b>	:	Dr. I. S. Solanki ADG, (FFC) ICAR
<b>Co-Chairman</b>	:	Dr. A. K. Roy, Project Coordinator
<b>Rapporteurs</b>	:	Dr .T.Shashikala., Dr.Usha Thomas, Dr.Zahoor Ahmed Dar

At the outset the Chairman welcomed all the participants to the session. The centre wise presentations were done and the recommendations are as under:

- ✓ The chairman appreciated the forage breeding programme carried out by respective centres in view of limited manpower and large number of crops as well as involvement in both rabi and Kharif seasons.
- ✓ In many cases, it was suggested that large number of crosses should be attempted by the scientists involving diverse parents.
- ✓ Collection of germplasm after proper planning with due consultation and involvement of NBPGR was suggested.
- ✓ The germplasm after proper multiplication should be shared among the centres.
- ✓ Advance breeding lines should be evaluated for various parameters including disease and quality.
- ✓ Entries in coordinated trials should be contributed after proper evaluation.
- ✓ Multi location trials in Rye grass and clovers in the rabi season should be constituted. Centers in Hill region should contribute entries in these pasture crops.
- ✓ Chairman suggested to have better collaboration with AICRP maize and AICRP pearl millet and the two AICRPs should contribute entries from their center having good forage value in forage and dual purpose multilocation trials.

The session ended with a vote of thanks



## TECHNICAL SESSION VI

### FTD & TSP FORMULATION

<b>Chairman</b>	:	Dr. I. S. Solanki ADG, (FFC) ICAR
<b>Co-Chairman</b>	:	Dr. A. K. Roy, Project Coordinator
<b>Finalisation of programme</b>	:	Dr R. K. Agrawal

At the outset, the chairman welcomed all the participants. Dr R. K. Agrawal discussed with scientists of AICRP (FC &U) Coordinating and Cooperating centres for allotting FTD for *Kharif* 2016.

A total of 780 FTD's were proposed to be allotted to AICRP centres and co-operating centre during *Kharif* 2016 for the crops *viz.*, BN hybrid, sorghum, rice bean, maize, Pearl millet, Pearl millet + Cowpea, Setaria and guinea grass. Out of 780 FTD's, 255 were allocated to BN Hybrid, 31 to Rice bean, 169 to Maize, 50 to Pearl millet, 115 to Cowpea, 50 to Guinea grass, 60 to perennial grasses, 10 to Pearl millet + Cowpea and 40 to forage sorghum.

#### **Regarding FTDs, it was emphasized that**

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

#### **TSP programme**

- TSP programme was proposed by AAU, Jorhat; OUAT, Bhubaneswar; BCKV, Kalyani; JNKVV, Jabalpur; BAIF, Urulikanchan; PJTSAU, Hyderabad; HPKVV, Palampur; SKUAST-K, Srinagar; CAU, Imphal; IGKV, Raipur; KAU, Vellyani; GBPUAT, Pantanagr; BAU, Ranchi which was approved by the house. Project Coordinator assured that the TSP money will be made available to each center as per the budget provided by the council.

#### **Regarding TSP programme, it was emphasized that**

- The guidelines issued by Tribal Welfare Ministry, ICAR should be strictly followed.
- 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 in yield level.
- Every year the village and farmers should be changed.
- Efforts should be made to collect data on vertical and horizontal transfer of technologies.

#### **Recommendations**

- It was emphasized that there is no allocation of fund for FLD in forage crops, while DAC is funding FLDs in other major crops. Project coordinator will explore the possibility of getting funding from DAC in consultation with ICAR.

**FTD Allocation for Kharif 2016**

Centre	BN hybrid	Rice bean	Maize	Bajra	Cowpea	Sorghum	Bajra + Cowpea	Guinea grass	Paras grass	Congro signal grass	Setaria grass	Total
Jorhat	15		20						10	15	20	80
Bhubaneswar	20		10		10							40
Kalyani	15	15	10									40
Ranchi	20		15		20			20				75
Faizabad	5			5								10
Jabalpur	5	6	4									15
Anand	5			5								10
BAIF	5						10					15
Bikaner				15	10							25
Ludhiana	70											70
Hyderabad	25		25	25	25							100
Mandya	20		20		40	10		20				110
Rahuri	10											10
Palampur	15										15	30
Srinagar			20									20
Imphal	10	10	10									30
Raipur			10									10
Vellayani	10							10				20
Pantnagar			20		10	30						60
Karaikal	5		5									10
<b>Total</b>	<b>255</b>	<b>31</b>	<b>169</b>	<b>50</b>	<b>115</b>	<b>40</b>	<b>10</b>	<b>50</b>	<b>10</b>	<b>15</b>	<b>35</b>	<b>780</b>

## 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. I. S. Solanki, Assistant Director General, (FFC), ICAR on 16<sup>th</sup> May, 2016 at SKUAST-K, Srinagar.

Following members were present in the meeting

1.	Dr. I. S. Solanki, ADG (FFC), ICAR	Chairman
2.	Dr. J. S. Chouhan, ADG (Seeds), ICAR	Member
3.	Dr. Menhi Lal, Agronomist, Member RAC and Ex Head, CP Division, IGFRI	Member
4.	Dr. J. P. Yadavendra, Forage Breeder and Member, RAC, IGFRI	Member
5.	Dr. Shafiq A. Wani, Professor GPB, SKUAST-K, Srinagar	Member
6.	Dr. Qazi Nissar, Prof. & Head (Division of Plant Pathology), SKUAST-K, Srinagar	Member
7.	Dr. G. M. Mir, Prof. & Head, (Division of Entomology), SKUAST-K, Srinagar	Member
8.	Dr. Badrul Hasan, Professor Agronomy, SKUAST-K, Srinagar	Member
9.	Dr. A. K. Garg, DGM, NDDDB, Anand	Member
10.	Dr. A. K. Roy, Project Coordinator, AICRP on FC &U, IGFRI, Jhansi	Member Secretary

The following three proposals were put up before the committee. The committee deliberated in detail and following decisions were taken.

**TNFC 0926 (Fodder Cowpea):** The proposal was submitted by TNAU, Coimbatore for identification in North East Zone. The committee noted its superiority in terms of dry matter yield, green fodder yield and per day productivity for both green as well as dry matter yield in comparison to national and zonal checks. The committee identified the entry for cultivation for the states of Eastern Uttar Pradesh, West Bengal, Odisha, Assam and Jharkhand under rainfed conditions. **The proposed name is Central fodder cowpea, TNFC 0926.**

**DFMH-30 (Forage Pearl Millet Hybrid):** The proposal was submitted by Syngenta India Limited, Pune, for identification in South and North West Zone. The committee observed that the entry has only marginal superiority over best check, Giant Bajra in North West and South Zone for green fodder yield and in NW zone for dry fodder yield. The agronomic trial results in South Zone were also inferior to the checks. Hence the committee did not recommend its identification for cultivation.

**IHTFM (Forage Maize Hybrid):** The proposal was resubmitted by Advanta Limited, Hyderabad. The committee after observing previous two VIC meeting proceedings found no merit for reconsideration of the proposal.

## TECHNICAL SESSION VII

### PGR/BREEDING/PRODUCTION /PROTECTION ISSUES

<b>Chairman</b>	:	Dr. I. S. Solanki, ADG (FFC), ICAR
<b>Co-Chairman</b>	:	Dr. A. K. Roy, Project Coordinator
<b>Rapporteurs</b>	:	Dr. Mareen Abraham

In the session, two lectures were presented followed by discussion on various scientific issues

**Dr. Shanker Lal Jat, Scientist, Indian Institute of Maize Research, New Delhi** presented talk on 'Maize-Perspective as a dual purpose fodder crop'

- The various types of maize / corn with the fodder potential was highlighted.
- The uses of QPM with high lysine and tryptophan for feed was highlighted
- Baby corn can be a good source of fodder as after the corn harvest, the plant remains green and is a good source of nutritious fodder. It can be grown through out the year in all parts of the country except in winter.
- Sweet corn or green cob area also a good source of fodder, as plants remains green after cob harvest.
- Maize stover quality improvement via urea treatment
- Fodder maize varieties including sweet corn cultivars with green fodder yield and silage quality are available at the centre which may be utilized by AICRP on FC

**Dr. Anjali Kak, Principal Scientist, NBPGR**, gave an elaborate talk on registration of trait specific germplasm with special reference to forage crops.

- Emphasis should be laid on the registration of forage crops for increasing its utilization in breeding programme.
- Exploration for trait specific germplasm should be taken up in collaboration with NBPGR.
- Requirements for exotic germplasm should be placed with NBPGR
- Allotment of IC numbers is mandatory for all collected germplasm.

#### Recommendations

- All centres should register the unique and novel germplasm with National Germplasm Registration committee, NBPGR.
- Seeds of released and notified varieties should be deposited with NBPGR
- After exploration, the multiplied seed sample along with passport data should be sent to NBPGR for getting IC numbers
- Proposals for varieties identified by Varietal Identification committee should be submitted to CVRC within one month.

The session ended with vote of thanks to the Chair.

## SPECIAL SESSION

### SCIENTIFIC, ADMINISTRATIVE AND FINANCIAL ISSUES

<b>Chairman</b>	:	Dr. I. S. Solanki, ADG (FFC), ICAR
<b>Co-Chairman</b>	:	Dr. A. K. Roy, Project Coordinator
<b>Rapporteurs</b>	:	Dr. A. K. Mehta

The session started with welcome note by the chairman. He asked the delegates to raise any issue which they feel will help them in better discharge of duties as well as any constraints being felt by them.

Many scientists from voluntary and coordinated centers raised issues which were responded by Chairman and co-chairman

Following common and specific points emerged out of discussion

- Issue of non remittance of fund under the recurring contingency and TA to Jorhat and Imphal was raised. Project coordinator informed that due to nil budget under the General head in NEH, the remittance is not being made. However it is being compensated by remittance under PC Flexi budget.
- Issue of fund utilization under TSP grant was made. The scientists were told to strictly follow the guidelines of TSP as available on ministry web site as well as circulated by Project coordinating unit.
- MPKV Rahuri raised the issue of pooling of one scientist (agronomy) in administrative unit. PC will raise the issue with authorities at MPKV to solve this.
- Non participation of OUAT scientist in the meeting was raised. Chairman took serious view of the matter and Project coordinator was told to raise the issue with higher authorities at OUAT, Bhubaneswar.
- Issue of one coordinating center at Viswa Bharati Sriniketan, WB was raised and a letter from Vice Chancellor was handed over to PC. It was decided that no center can be opened in XII plan as EFC is already approved. In future we will look into the feasibility of center.
- Recommendation of QRT regarding closure of centre at OUAT Bhubaneswar and BAU, Ranchi was discussed. It was decided that PC will write to the authorities at two SAUs and will apprise ICAR about developments.
- Extra fund under the recurring contingency was demanded by most of the centers.
- Non remittance of non recurring fund as approved under EFC was raised by many centers. It was informed that funds will be remitted as per approved budget for 2016-17 by ICAR. At present no budget under the capital head is sanctioned for 2016-17.
- Importance of timely reporting of data and prompt response to queries by project coordinating unit was highlighted.
- Chairman informed all the scientists to approach their university authorities to fill all the vacant posts at the earliest.

The meeting ended with vote of thanks

## TECHNICAL SESSION

### PLENARY SESSION

<b>Chairman</b>	:	Dr. Nazeer Ahmed, Hon'ble Vice Chancellor, SKUAST-K
<b>Chief Guest</b>	:	Sri Sundeep Kumar Nayak, IAS, Principal Secretary Agriculture, Government of J&K
<b>Guest of Honour</b>	:	Dr. I. S. Solanki, ADG (FFC), ICAR
<b>Convener</b>		Dr. A. K. Roy, Project Coordinator
<b>Rapporteur</b>		Dr. R. K. Agrawal

After the welcome address by the chairman and brief introduction of the chief guest, the meeting started.

The proceedings and recommendations of the various technical sessions were presented by the respective rapporteurs, which were approved with suitable modifications after discussion and queries.

Guest of Honour, Dr. I. S. Solanki, Assistant Director General, Food and Fodder Crops, ICAR in his address thanked the University and the Vice Chancellor for agreeing to hold the meeting at SKUAST-K. He thanked the University staff for successfully organizing the meeting and taking all care of the participants during the meeting. He stressed upon the importance of forage crops in agricultural scenario through out the country and especially for the J&K. He requested all the stakeholders to work sincerely to meet the forage deficit in the country.

Dr. Nazeer Ahmed, Vice Chancellor exhorted upon the scientists to focus research on high yielding varieties of forage crops. He emphasized on developing varieties with better qualities like desirable amino acid/ protein balance and good digestibility and palatability. Varieties with drought resistance and cold tolerance should be developed to increase the production from marginal and problem soil. To increase the productivity, emphasis should be given on horti-pastoral system with pasture component in the existing and newly developing orchards. He thanked ICAR for holding the meeting at this University and requested further to enhance the capacity of the forage center in terms of providing additional manpower and resources.

Sri Sundeep Kumar Nayak, Principal Secretary, Agriculture Production Department, Government of J &K stressed upon the agriculture- horticulture tourism – a dream project of late chief minister. He complimented university for research attainments in the field of agriculture and animal husbandry. He appreciated efforts of ICAR and SKUAST-K, for holding this event at J&K and assured the gathering for implementation of the recommendations emerging out the technical sessions in the state.

Project Coordinator Dr. A. K. Roy thanked ICAR, SKUAST-K for giving permission and sanction to hold the meeting. He thanked Vice chancellor and his team of University staff for all the faculties, logistics for smooth conductance of the meeting. He was especially thankful to the university staff for their all round care in terms of food, accommodation, transport, logistics with smiling faces.

**TECHNICAL PROGRAMME FOR FORAGE CROP IMPROVEMENT - Kharif-2016****1. IVTM: Initial Varietal Trial in Forage Maize (New)**

Entries No.	: 10+ Checks 2
Entries Name	: Mandya (MFM-2), Anand (AFM-6), Hyderabad (2), SKUAST-K (KDFM-1); JNKVV Chhindwara (H 1003); IGKV, Ambikapur (3); Advanta (ADV 6737)
Checks	: African Tall & J-1006
Design	: RBD with 3 replications
Plot size	: 4 m x 1.8 m accommodating 4 m long 6 rows at 30 cm
Seed rate	: 75 Kg/ha (60g/Plot)
Fertilizers	: 80:40 kg/ha (N:P) 40:40 kg/ha (N:P) basal+ 40 N after 30 days
Seed requirement	: 5.0 Kg/entry and 5.0 Kg/NC
Locations (24)	: <b>HZ</b> -Palampur, Srinagar; Rajouri, <b>NWZ</b> -Ludhiana, Hisar, Udaipur, Pantnagar, Jalore <b>NEZ</b> -Faizabad, Bhubaneswar, Ranchi, Jorhat, Imphal ; <b>CZ</b> -Anand, Raipur, Jabalpur, Rahuri, Urulikanchan, Jhansi ; <b>SZ</b> -Hyderabad, Coimbatore, Mandya, Karaikal, Vellyani

**2. Combined AVTM-1 & AVTM-2: Combined first and Second Advanced Varietal Trial in Forage Maize**

Entries No.	: 4 + 2 Checks
Entries Name	: <b>JHM 15-1</b> promoted from IVT to AVT-1 <b>MFM-4, PAC-746, AFM-4</b> promoted from AVT-1 to AVT-2
Checks	: African Tall, J-1006
Design	: RBD with 4 replications
Plot size	: 4 m x 3 m accommodating 4 m long 10 rows at 30 cm
Seed rate	: 75 Kg/ha (90g/Plot)
Fertilizers	: 80:40 kg/ha (N:P) 40:40 kg/ha (N:P) basal+40 N after 30 days
Seed requirement	: 7 Kg/entry and 7 Kg/NC
Locations (18)	: <b>HZ</b> -Palampur, Srinagar, Almora <b>NWZ</b> -Ludhiana, Hisar, Udaipur, Pantnagar, Jalore <b>NEZ</b> -Faizabad, Bhubaneswar, Ranchi, Jorhat <b>CZ</b> -Anand, Raipur, Jabalpur, Rahuri, Urulikanchan, Jhansi

**3. AVTM-2 (seed) :Second Advanced Varietal Trial in Forage Maize (seed)**

Entries No.	: 3 + 2 Checks
Entries Name	: MFM-4, PAC-746, AFM-4
Checks	: African Tall, J-1006
Design	: RBD with 4 replications
Plot size	: 4 m x 3 m accommodating 4 m long 10 rows at 30 cm
Seed rate	: 75 Kg/ha (90g/Plot)
Fertilizers	: 80:40 kg/ha (N:P) 40:40 kg/ha (N:P) basal+40 N after 30 days
Seed requirement	: 3.5 Kg/entry and 3.5 Kg/NC
Locations (9)	: <b>HZ</b> -Palampur, Srinagar, <b>NWZ</b> -Ludhiana, Hisar, Udaipur, Pantnagar, <b>NEZ</b> - Bhubaneswar, Ranchi, Jorhat

**4. IVTPM: Initial Varietal Trial in Forage Pearl millet (New)**

Entries No.	: 10 + 2 Checks + 3 (ZC)
Entries Name	: Faizabad (NDFB-1502), Anand (AFB-37), Bikaner (RBB-8), Ludhiana (PHBF-4, PHBF6, PHB 3144), IARI-(2), Hyderabad (TSFB 15-4, TSFB 15-8)
Checks	: Raj Bajra Chari-2 (NC), Giant Bajra (NC), BAIF Bajra 1 (CZ) + AFB-3 (NWZ) + APFB-9-1 (NEZ),
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 requirement	: 1 Kg/entry; 1 Kg/NC and 0.30 Kg/ZC
Locations (20)	: <b>NWZ</b> -Ludhiana, Hisar, Bikaner, Jalore, Meerut <b>NEZ</b> -Faizabad, Pusa, Bhubaneswar, Ranchi <b>CZ</b> -Anand, Jamnagar, Jabalpur, Rahuri, Urulikanchan, Jhansi <b>SZ</b> -Coimbatore, Hyderabad, Mandya, Raichur, Vellayani

### 5. AVTPM-1: Advanced Varietal Trial -1 in Forage Pearl millet

Entries No.	:	5+ 2 Checks + 3 (ZC)
Entries Name	:	RBB-6, TSFB-14-10, RBB 7, TSFB 10-5, TSFB 13-12
Checks	:	Raj Bajra Chari-2 (NC), Giant Bajra (NC), BAIF Bajra 1 (CZ) + AFB-3 (NWZ) + APFB-9-1 (NEZ)
Design	:	RBD with 3 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 requirement	:	1 Kg/entry; 1 Kg/NC and 0.30 Kg/ZC
Locations (12)	:	<b>NWZ</b> -Ludhiana, Hisar, Bikaner, Jalore, Meerut <b>NEZ</b> -Faizabad, Pusa, Bhubaneswar, Ranchi <b>SZ</b> -Coimbatore, Hyderabad, Mandya, Raichur

### 6. IVTC: Initial Varietal Trial in Forage Cowpea (New)

Entries No.	:	7 + 2 (NC) + 5 (ZC)
Entries Name	:	Mandya (MFC 09-23, MFC 09-15), Hyderabad (1), Ludhiana (PFC39, PFC 40) , IGFR I RRS Dharwad (1), Pantnagar (1)
Checks	:	National checks: Bundel Lobia-1, UPC-5286, Bundel Lobia-2 (NWZ), UPC-622 (HZ), UPC-628 (NEZ), UPC-9202 (CZ) & MFC-8-14 (SZ)
Design	:	RBD with 3 replications
Plot size	:	4 m x 1.8 m accommodating 4 m long 6 rows at 30 cm
Seed rate	:	35.0 kg/ha (30 g/plot)
Fertilizers	:	20:40 kg/ha (N:P) basal
Seed requirement	:	3 Kg/entry; 3 Kg/NC and 1.0 Kg/ZC
Locations (29)	:	<b>HZ</b> -Palampur, Srinagar, Almora, Rajouri <b>NWZ</b> -Ludhiana, Hisar, Pantnagar, Bikaner, Udaipur, Jalore, Meerut <b>NEZ</b> -Faizabad, Bhubaneswar, Ranchi, Jorhat, Kalyani, Imphal <b>CZ</b> -Anand, Rahuri, Urulikanchan, Jhansi, Raipur, Mathura <b>SZ</b> -Coimbatore, Vellayani, Mandya, Hyderabad, Dharwad, & Raichur

### 7. AVTC-1: First Advanced Varietal Trial in Cowpea

Entries No.	:	6 + 2 NC + 5 ZC
Entries Name	:	TSFC-12-15, MFC-09-3, MFC -09-13, UPC 1501, MFC-09-4, Vellyani-1
Checks	:	<b>National checks:</b> Bundel Lobia-1, UPC-5286, <b>Zonal checks:</b> Bundel Lobia-2 (NWZ), UPC-622 (HZ), UPC-628 (NEZ), UPC-9202 (CZ) & MFC-8-14 (SZ)
Design	:	RBD with 3 replications
Plot size	:	4 m x 3 m accommodating 4 m long 10 rows at 30 cm
Seed rate	:	35.0 kg/ha (45 g/plot)
Fertilizers	:	20:40 kg/ha (N:P) basal
Seed requirement	:	5.0 Kg for entry, 5.0 kg for NC and 1.0 kg for ZC
Locations (29)	:	<b>HZ</b> -Palampur, Srinagar, Almora <b>NWZ</b> -Ludhiana, Hisar, Pantnagar, Bikaner, Udaipur, Jalore, Meerut <b>NEZ</b> -Faizabad, Bhubaneswar, Ranchi, Jorhat, Kalyani, Imphal <b>CZ</b> -Anand, Rahuri, Urulikanchan, Jhansi, Kanpur, Raipur <b>SZ</b> -Coimbatore, Vellayani, Mandya, Hyderabad, Dharwad, Karaikal & Raichur

### 8. IVT Rice bean: Initial Varietal Trial in Rice bean

Entries No.	:	3+ 3 Checks
Entries Name	:	Jorhat (JOR 16-1, JOR 16-2), Jabalpur (1)
Checks	:	K-1 (Bidhan-1), Bidhan-2, RBL-6
Design	:	4 m x 1.8 m accommodating 4 m long 10 rows at 30 cm
Plot size	:	RBD with 4 replications
Seed rate	:	35.0 kg/ha (30 g/plot)
Fertilizers	:	20:40 kg/ha (N:P) basal
Seed requirement	:	1.5 Kg/entry and 1.5 Kg/NC
Locations (9)	:	Kalyani, Ranchi, Bhubaneswar, Jorhat, Pusa, Vellayani, Jabalpur, Imphal, & Palghar (Dapoli)



**9. AVT-1 Rice bean: Advanced Varietal Trial -1 in Rice bean**

Entries No.	:	3 + 3 Checks
Entries Name	:	JOR-15-1, JOR 15-5, JRBJ -07-1
Checks	:	K-1 (Bidhan-1), Bidhan-2, RBL-6
Design	:	4 m x 3 m accommodating 4 m long 10 rows at 30 cm
Plot size	:	RBD with 4 replications
Seed rate	:	35.0 kg/ha (30 g/plot)
Fertilizers	:	20:40 kg/ha (N:P) basal
Seed requirement	:	1.5 Kg/entry and 1.5 Kg/NC
Locations (9)	:	Kalyani, Ranchi, Bhubaneswar, Jorhat, Pusa, Vellayani, Jabalpur, Imphal, & Palghar (Dapoli)

**10. VTBN-2013 (4th year): Varietal Trial in Bajra Napier Hybrid (Perennial)**

Entries No.	:	8 +3 checks
Entries Name	:	TNCN-1076, TNCN-1078, PBN-342, PBN-346, RBN-2004-03, RBN-2010-Y-1, RBN-2011-12 and DHN-15
Checks	:	CO-3, NB-21, PBN-233
Design	:	RBD with 3 replications
Plot size	:	4.2 m x 3 m (50 rooted slips)/60 x 50 cm
Seed rate	:	42 rooted slips/rep/entry
Fertilizers	:	150:50:40 kg N, P <sub>2</sub> O <sub>5</sub> , K <sub>2</sub> O/ha in split doses
Seed requirement	:	1000 rooted slips/entry
Locations (14)	:	<b>HZ</b> -Palampur, <b>NWZ</b> -Ludhiana, Hisar, Bikaner <b>NEZ</b> - Jorhat <b>CZ</b> -Anand, Rahuri, Urulikanchan, Jhansi, Jabalpur, Palghar (Dapoli) <b>SZ</b> -Coimbatore, Mandya, Hyderabad, Dharwad

The trial will continue in coded form at the locations already established for Kharif 2016 also.

**11. VT *Dichanthium*-2013 (4th year): Varietal Trial in *Dichanthium annulatum* (Perennial)**

Entries No.	:	7 +1 checks
Entries Name	:	JHD-13-1, JHD-13-2, JHD-13-3, Marvel-09-1, Marvel-09-4 and Marvel-06-40
Checks	:	Marvel-8
Design	:	RBD with 3 replications
Plot size	:	4 x 3 m (48 rooted slips)/50 x 50 cm
Seed rate	:	48 rooted slips/rep/entry
Fertilizers	:	90:50:40 kg N, P <sub>2</sub> O <sub>5</sub> , K <sub>2</sub> O/ha
Seed requirement	:	0.15 kg/entry
Locations (8)	:	<b>NWZ</b> -Ludhiana, Bikaner, <b>CZ</b> -Anand, Rahuri, Urulikanchan, Jhansi, Jabalpur, <b>SZ</b> -Coimbatore

The trial will continue in coded form at the locations already established for Kharif 2016 also.

**12. VT *Cenchrus ciliaris* -2013 (4th year): Varietal Trial in *Cenchrus ciliaris* (Perennial)**

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

The trial will continue in coded form at the locations already established for Kharif 2016 also.

**13. VT *Cenchrus ciliaris* -2015 (2<sup>nd</sup> year): Varietal Trial in *Cenchrus ciliaris* (Perennial)**

Entries No.	:	6 + 3 Checks
Entries Name	:	3 (IGFRI), 2 (Bikaner) & 1(CAZRI)
Checks	:	IGFRI 3108, CAZRI 75 & IGFRI 727
Design	:	RBD with 3 replications
Plot size	:	4 x 3 m (6 rows of 4.0 m at 50 cm)
Seed rate	:	5 Kg/ha (6g/plot)
Fertilizers	:	90:50:40 kg N, P <sub>2</sub> O <sub>5</sub> , K <sub>2</sub> O/ha
Seed requirement	:	0.30 Kg/entry and 0.30 Kg/NC
Locations (15)	:	<b>NWZ</b> -Ludhiana, Hisar, Bikaner, Jodhpur, Avikanagar, Jalore <b>CZ</b> -Anand, Rahuri, Urulikanchan, Jhansi, Jabalpur, <b>SZ</b> -Coimbatore, Mandya, Hyderabad & Dharwad

The trial will continue in coded form at the locations already established for Kharif 2016 also.

**14. VT *Cenchrus setigerus* -2015 (2<sup>nd</sup> year): Varietal Trial in *Cenchrus setigerus* (Perennial)**

Entries No.	:	8 + 1 check
Entries Name	:	3 (Bikaner), 1 (Coimbatore), 1(CAZRI) & 3 (IGFRI)
Checks	:	CAZRI-76
Design	:	RBD with 3 replications
Plot size	:	4 x 3 m (6 rows of 4.0 m at 50 cm)
Seed rate	:	5 Kg/ha (6g/plot)
Fertilizers	:	90:50:40 kg N, P <sub>2</sub> O <sub>5</sub> , K <sub>2</sub> O/ha
Seed requirement	:	0.30 Kg/entry and 0.30 Kg/NC
Locations (13)	:	<b>NWZ</b> -Jalore, Pali (CAZRI), Jodhpur (CAZRI), Bikaner, Avikanagar <b>CZ</b> -Jhansi, Rahuri, Dhari, Anand <b>SZ</b> -Coimbatore, Mandya, Hyderabad & Karaikal

The trial will continue in coded form at the locations already established for Kharif 2016 also.

**15. VTBN-2015 (2<sup>nd</sup> year): Varietal Trial in Bajra Napier Hybrid (Perennial)**

Entries No.	:	6 + 3 checks
Entries Name	:	4 (BAIF), 1 (Ludhiana) & 1 (TNAU)
Checks	:	CO-3, NB-21, TNFC-074
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 <sub>2</sub> O <sub>5</sub> , K <sub>2</sub> O/ha in split doses
Seed requirement	:	1000 rooted slips/entry
Locations (20)	:	<b>HZ</b> -Palampur, Almora <b>NWZ</b> -Ludhiana, Hisar, Bikaner <b>NEZ</b> -Bhubaneswar, Ranchi, Jorhat <b>CZ</b> -Anand, Rahuri, Urulikanchan, Jhansi, Raipur, Jabalpur, Palghar (Dapoli) <b>SZ</b> -Coimbatore, Mandya, Hyderabad, Vellayani & Dharwad

The trial will continue in coded form at the locations already established for Kharif 2016 also.

**16. VT *Setaria* grass -2015 (2<sup>nd</sup> year): Varietal Trial in *Setaria anceps* under cool sub- tropical and sub-temperate Himalayan Range lands (Perennial)**

Entries No.	:	3 + 3 Checks
Entries Name	:	S-4, S-6 & S-25 (Palampur)
Checks	:	PSS-1, S-18 & S-92
Design	:	RBD with 4 replications
Plot size	:	4 x 3 m
Planting	:	30 cm slip to slip and 40 cm row to row
Fertilizers	:	NPK 60:40:30 Kg/ha at the time of sowing and 30N after each cut
Root Slip requirement	:	Root slips/hill: 3600 root slips will be provided to each centre for multiplication and actual trial will be planted during <i>Kharif</i> -2016
Locations (4)	:	Palampur, Bajaura (Kullu), Almora, Mukteswar & Jorhat

The trial will continue in coded form at the locations already established for Kharif 2016 also.

**17. VT Pennisetum hybrids – 2015 (2<sup>nd</sup> year): (*P. gluacum* x *P. squamulatum*) (Perennial)**

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

The trial will continue in coded form at the locations already established for Kharif 2016 also.

**18. VT *Desmanthus* -2016 (I<sup>st</sup> Year): Varietal Trial in *Desmanthus* (Perennial)**

Entries No.	:	5 + 1 check
Entries Name	:	Coimbatore (TND 1308, TND 1309), Hyderabad (1), Rahuri (RHDV-2014-1) and BAIF (BAIF DASRATH-1)
Check	:	<i>Desmanthus</i> CO 1 (State release variety)
Design	:	RBD with 4 replications
Plot size	:	4 x 3 m (6 rows of 4.0 m at 50 cm)
Spacing	:	50 cm x solid stand (continuous sowing)
Seed rate	:	20 Kg/ha (25g/plot)
Fertilizers	:	Basal: 25 : 40 : 20 kg N, P <sub>2</sub> O <sub>5</sub> , K <sub>2</sub> O/ha
Seed requirement	:	<b>1.6 Kg/entry and 1.6 Kg/check</b>
Locations (15)	:	<b>NWZ-</b> Ludhiana, Bikaner, Udaipur, Pantnagar <b>NEZ-</b> Jorhat, Kalyani, Bhubaneswar <b>CZ-</b> Rahuri, Urulikanchan, Anand, Jhansi <b>SZ</b> Hyderabad, Coimbatore, Mandya, Vellayani.
<b>Seed treatment</b>	:	To get better germination seeds must be treated in mild hot water for 30 minutes. After hot water treatment, seeds should be soaked in fresh water for overnight. Seeds should be shade dried before sowing.
Harvest	:	First harvest at 90 days after sowing and subsequent harvests at 50 /60 days intervals.

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

(B) Yield conversion Factor:

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

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

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

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

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

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

Entry Code	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	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-2016**

1. Seed supply from contributors to PC Unit, Jhansi: Before May 30, 2016
2. Trials seed dispatch from PC Unit Jhansi: Before June 10, 2015
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 December 20, 2016; however, data on seed and quality are to be submitted before January 10, 2017.
6. Reporting of Breeder seed (BSP-IV): January 10, 2017.

**Seed Requirement of the Check Varieties for Kharif 2016 Trials**

**Seed should be dispatched immediately by speed post to reach Jhansi before 28<sup>th</sup> May, 2016.**

SN	Crop	Variety	Quantity ( in kg)	Institution
1.	Maize	African Tall	<b>Total 23.0 kg</b> 16 [IVT+AVT1 -5.0; AVT2 – 7.0; AVT2seed -3.5 +7.0 kg for agronomy ]	MPKV, Rahuri
		J-1006	<b>Total 23.0 kg</b> 16 [IVT+AVT1 -5.0; AVT2 – 7.0; AVT2seed -3.5 + 7.0 kg for agronomy ]	PAU, Ludhiana
2.	Pearl Millet	Raj Bajra Chari-2	2 [ IVT -1.0 + AVT1 – 1.0]	SKRAU, Bikaner
		Giant Bajra	2 [ IVT -1.0 + AVT1 – 1.0]	MPKV, Rahuri
		AVKB-19	2 [ IVT -1.0 + AVT1 – 1.0]	IGFRI RRS Avikanagar
		BAIF Bajra-1	0.8 [ IVT -0.4 + AVT1 – 0.4]	BAIF, Urulikanchan
		AFB-3	0.8 [ IVT -0.4 + AVT1 – 0.4]	PJTSAU, Hyderabad
		APFB-9-1	0.8 [ IVT -0.4 + AVT1 – 0.4]	PJTSAU, Hyderabad
3.	Cowpea	Bundel Lobia-1	8 [ IVT -3.0 + AVT1 – 5.0]	IGFRI, Jhansi
		UPC-5286	8 [ IVT -3.0 + AVT1 – 5.0]	GBPUAT, Pantnagar
		Bundel Lobia-2	2 [ IVT -1.0 + AVT1 – 1.0]	IGFRI, Jhansi
		UPC-622	2 [ IVT -1.0 + AVT1 – 1.0]	GBPUAT, Pantnagar
		UPC-628	2 [ IVT -1.0 + AVT1 – 1.0]	GBPUAT, Pantnagar
		UPC-9202	2 [ IVT -1.0 + AVT1 – 1.0]	GBPUAT, Pantnagar
		MFC-8-14	2 [ IVT -1.0 + AVT1 – 1.0]	UAS, ZARS Mandya
4.	Rice Bean	Bidhan-1	3 [ IVT -1.5 + AVT1 – 1.5]	BCKV, Kalyani
		Bidhan-2	3 [ IVT -1.5 + AVT1 – 1.5]	BCKV, Kalyani
		RBL-6	3 [ IVT -1.5 + AVT1 – 1.5]	PAU, Ludhiana
5.	Desmenthus	Desmenthus co-1	1.6 kg	TNAU, Coimbatore

**Seed requirement for entries**

**IVT Maize:** 5.0 kg/ entry;

**AVT Maize:** 7.0 kg/entry

**AVT maize seed:** 3.5 kg /entry for **MFM-4, PAC-746, AFM-4**

**AVT agronomy :** 7.0 kg /entry for **MFM-4, PAC-746, AFM-4**

**IVT Pearl millet:** 1 kg/ entry

**AVT Pearl millet:** 1 kg/ entry

**IVT cowpea:** 3.0 kg /entry

**AVT cowpea:** 5.0 kg /entry

**IVT – Rice bean –** 1.5 kg/ entry

**AVT – Rice bean –** 1.5 kg/ entry

**VT Desmenthus :** 1.6 kg/entry

**Seed Requirement for AVT-2 Agronomy: 7.0 KG in Maize / entry & Checks**

**Forage Crop Production (Centre wise Kharif Trial Details 2015-16)**

SN	Kharif Trial Name	centres	Title of trial
1.	PS-14-AST-1	Ludhiana, Bikaner and Raipur	Effect of straw mulch on the water requirement, weeds and productivity of BN hybrid
2.	PS-14-AST-3	Dharwad and Mandya	Response of Congo-signal grass ( <i>Brachiaria ruziziensis</i> (var. DBRS 1)) to planting geometry and N levels
3.	CS-13-AST-4	Ludhiana	Residual effect of P applied to wheat on the succeeding summer fodders in sorghum-wheat-summer fodders cropping system
4.	K-12-AST-4	Srinagar	Cropping system studies in fodder maize with legume intercropping
5.	K-12-AST-5	Srinagar	Effect of varying seed rate of forage legumes on productivity of fodder maize
6.	K-15-AST-6L	Rahuri	Nutrient Management in genotypes of BxNapier hybrid.
7.	K-15-AST-7L	Faizabad	Screening of genotypes of fodder bajra and oat under sodic soil
8.	K-15-AST-13 C	Palampur & Ludhiana	Performance of multicut Sorghum and Pearl millet mixture at variable seed rates under different methods of sowing.
9.	K-15-AST-8 C	Bikaner	Compatibility of <i>Stylosanthes scabra</i> with Sewan and Dhaman grass pastures under north-western India
10.	K-16-AST-2	Urulikanchan, Anand, Jabalpur, Kalyani Karaikal and Bhubaneswar	Effect of different techniques of seed priming on productivity of forage Maize
11.	K-16-AST-3	Bikaner, Sriniketan, W.B. and DUVASU, Mathura	Effect of Phosphorus & Zinc application and cutting management on fodder and seed yield and quality in dual cut cowpea.
12.	K-16-AST-5	Nagaland (Medziphema)	Effect of nitrogen levels and cutting management on productivity of perennial grasses under hilly terrace condition
13.	K-16-AST-7	AAU, Jorhat	Effect of Nitrogen levels on fodder yield and quality in Mulberry based fodder production system
14.	K-16-AST-9	Sriniketan, Visva-Bharati, West Bengal	Seed production potentiality of fodder maize as influenced by Zinc and Boron under red and lateritic soil of West Bengal
15.	K-16-AST-7	HZ: Palampur and Srinagar NWZ: Ludhiana and Pantnagar NEZ: Bhubaneswar and Kalyani	Effect of nitrogen levels on forage yield of promising entries of forage hybrid maize (AVTM-2)

**Forage Crop Production (Centre wise Rabi Trials Detail 2015-16)**

Sr. No.	Rabi Trial Name	centres	Title of trial
1.	PS-13-AST-2	Dharwad, Raipur and Bikaner	Performance of perennial fodder sorghum ( <i>Sorghum bicolor</i> cv. COFS 29) as influenced by planting geometry and cutting intervals under irrigated conditions
2.	PS-14-AST-2	Vellayani	Impact of Mg and B on nutrient uptake, quality and yield of bajra napier hybrid
3.	PS-14-AST-4	Palampur and Srinagar	Studies on the effect of planting geometry of tall fescue grass and seed rates of white clover in wet temperate conditions
4.	CS-13-AST-1	Urulikanchan, Anand, Rahuri, and Bikaner	Study on different models for year round green fodder production under irrigated condition
5.	CS-13-AST-2	Ranchi, Jabalpur, and Bhubaneswar	Evaluation of fodder crops under different rice fallow system
6.	CS-13-AST-3	Raipur and Jorhat	Evaluation of different varieties of grasspea ( <i>Lathyrus sativus</i> L.) as forage crop under different sowing methods in rice based cropping system
7.	CS-14-AST-1	Raipur	Studies on intensive fodder cropping systems for yield maximization

8.	CS-14-AST-2	Raipur (Data Rabi season)	Study of intensive annual fodder crop based cropping system
9.	K-14-AST-3	Ranchi and Raipur	Study of intercropping system of pigeon pea with different annual fodder crops
10.	K-15-AST-1 L	Mandya	Studies on different models for year round green fodder production under irrigated condition
11.	K-15-AST-2 L	IGFRI, RRS, Dharwad	Performance of napier bajra hybrids as influenced by nature of vegetative propagules
12.	K-15-AST-3 L	Imphal	Studies on Integrated nutrient management in Fodder Rice bean
13.	K-15-AST-5L	Hyderabad	Studies on carbon sequestration in subabul based silvi-pastoral cropping system under rain fed agriculture
14.	K-15-AST-9 C	Pantnagar, Ranchi, Kalyani, Jabalpur & IVRI, Bareilly	Development of climate resilient production technologies on productivity and economics of food - fodder based cropping systems
15.	K-15-AST-10 C	Mandya, Vellayani & Raichur	Intensive Forage Production through Agase based ( <i>Sesbania grandiflora</i> ) cropping system under Protective Irrigation
16.	K-15-AST-11 C	Hyderabad, Coimbatore, Vellayani, Ranchi, Jabalpur & Anand	Studies on carbon sequestration in perennial grass based cropping systems
17.	K-15-AST-12 C	Palampur and Srinagar	Studies on the productivity and carbon sequestration of silvipastoral systems in hills of north western Himalayas
18.	R-13-AST-1	Srinagar	Yield Potential of cereals with forage legumes under pure stand and mixtures
19.	R-14-AST-1	Palampur & Srinagar	Studies on the production potential feasibility of annual rye grass with berseem in hill zone
20.	R-14-AST-2	Imphal	Effect of cutting and nutrient management on growth, yield and quality of Oat
21.	R-14-AST-3	Vellayani	Studies on the effect of additives on silage quality of different grasses
22.	R-15-AST-1	Kalyani, Ranchi, Imphal & Bhubaneswar	Productivity of oat-lathyrus intercropping system as influenced by integrated nutrient management
23.	R-15-AST-2	Jorhat	Productivity of oat - pea intercropping system as influenced by integrated nutrient management
24.	R-15-AST-3	NDUA&T, Faizabad	Response of phosphogypsum to various cultivars of fodder oat in sodic soil.
25.	R-15-AST-4	Bikaner	Study on lucerne + oats /sarson fodder production system at variable seed rates of mixed crop under irrigated condition
26.	R-15-AST-5	Sriniketan, West Bengal	Effect of Zinc and Boron on seed production potentiality of oat under red and lateritic soil of West Bengal
27.	R-15-AST-6	Puducherry	Evaluation of sowing window suitable for forage oats cultivation in the coastal region of Puducherry
28.	R-15-AST-7	NDRI, Karnal	Standardization of seed rate of berseem with rye grass under mixed cropping system
29.	R-15-AST-8	IVRI, Mukteshwar	Study on berseem + oats /sarson fodder production system at variable seed rates of mixed crop under irrigated condition
30.	K-16-AST-1	Hyderabad, Vellayani, Mandya and Ludhiana	Feasibility of Hydroponics fodder production system - A Quantitative and Qualitative study.
31.	K-16-AST-4	TNAU, Coimbatore	Economization of fertilizer dose for Bajra Napier Hybrid Grass CO (BN) 5 through INM for enhancing yield and quality
32.	K-16-AST-6	CCS, HAU, Hissar	Organic nutrient management in sorghum-berseem cropping sequence for sustainable fodder production
33.	K-16-AST-8	NDUAT, Faizabad	Resource management in rice- oat cropping system under sodic soil.



## Details of New Experiments

### A. Coordinated trials

#### K-16-AST-1: Feasibility of Hydroponics fodder production system - A Quantitative and Qualitative study.

<b>Locations (4):</b> Hyderabad, Vellayani, Mandya and Ludhiana	<b>Data Reporting:</b> Rabi
<b>Year of Start:</b> 2016 for three years	<b>Concluding year:</b> Rabi 2019

#### Objectives:

- ✓ To evaluate the suitability of different crops for growing under Hydroponics system
- ✓ To find out ideal seed rate and cutting interval for quality biomass production
- ✓ To quantify the fodder quality in Hydroponics terms of proximate factors in various crops at different stages of harvest
- ✓ To study the economics of the system

**Experimental Details:** Design & Replications : CRD & Three

#### Treatments

Crops		Seed rate (g per square feet)		Time interval for harvest	
C <sub>1</sub>	Maize	S <sub>1</sub>	200g	D <sub>1</sub>	9 days
C <sub>2</sub>	Sorghum	S <sub>2</sub>	300g	D <sub>2</sub>	11days
C <sub>3</sub>	Cowpea	S <sub>3</sub>	400g	D <sub>3</sub>	13 days
				D <sub>4</sub>	15 days

#### Observations to be recorded

1. Seed to GFY multiplication ratio in terms of GFY according to crop wise intervals of harvest, crop wise
2. GFY at different harvest intervals
3. Yields at different seed rates and managerial/handling issues if any
4. Quality viz., Dry matter percent, crude protein, ADF, NDF, EE, ash content and **enzymes present** at different stages of harvest
5. Diseases or pest noted if any.
6. Economics of the system

#### K-16-AST-2: Effect of different techniques of seed priming on productivity of forage Maize.

<b>Locations (6):</b> Urulikanchan, Anand, Jabalpur, Kalyani Karaikal, Bhubaneswar	<b>Data Reporting:</b> Kharif
<b>Year of Start:</b> 2016 for three years	<b>Concluding year:</b> Kharif 2019

#### Objectives:

- To identify the ideal seed priming methods for enhanced germination and improved crop yield in forage maize.
- To study economics of different seed priming methods
- To study effect of different seed priming methods on soil chemical properties

#### Experimental Details:

1.	<b>Design</b>	RBD	6.	<b>Seed rate (kg/ha)</b>	75
2.	<b>Replications</b>	03	7.	<b>Spacing (cm)</b>	30
3.	<b>Plot size Gross</b>	4 x 3 m	8.	<b>No. of rows/plot</b>	10
4.	<b>Plot size Net</b>	3.4 x 2.4	9.	<b>Method of sowing</b>	Line sowing
5.	<b>Fertilizers (N:P:K kg/ha)</b>	80:40:40	10.	<b>Treatments</b>	09

Note: Recommended package of practices will be followed as per the crop

#### Treatment details:

T <sub>1</sub>	Seed priming with water for 6 hrs	T <sub>6</sub>	Seed priming with KNO <sub>3</sub> @ 0.5% for 12 hrs
T <sub>2</sub>	Seed priming with water for 12 hrs	T <sub>7</sub>	Seed priming with KH <sub>2</sub> PO <sub>4</sub> @ 0.5% for 6 hrs
T <sub>3</sub>	Seed priming with ZnSO <sub>4</sub> @ 0.5 % for 6 hrs	T <sub>8</sub>	Seed priming with KH <sub>2</sub> PO <sub>4</sub> @ 0.5% for 12 hrs
T <sub>4</sub>	Seed priming with ZnSO <sub>4</sub> @ 0.5 % for 12 hrs	T <sub>9</sub>	Control (no priming)
T <sub>5</sub>	Seed priming with KNO <sub>3</sub> @ 0.5% for 6 hrs		

**Observations to be recorded:**

<b>Growth:</b>	<b>Yield and quality</b>
Days to 50 % germination	Green fodder yield (q/ha)
Germination percentage (%) at 10 DAS	Dry matter yield (q/ha)
Plant height (cm)	Crude protein yield (q/ha)
No. of leaves per plant	Dry matter (%)
Days to 50 % flowering	Crude protein (%)
Leaf stem ratio	

**Economics:** Net monetary returns & benefit cost ratio**Soil studies:** Soil fertility status before and after crop season for pH, EC, OC, N, P & K**K-16-AST-3: Effect of Phosphorus & Zinc application and cutting management on fodder and seed yield and quality in dual cut cowpea.**

<b>Locations (2): Bikaner, Sriniketan, W.B. and DUVASU, Mathura</b>	<b>Data Reporting: Kharif</b>
<b>Year of Start: 2016 for three years</b>	<b>Concluding year: Kharif 2019</b>

**Objectives:**

- To study the effect of P & Zn and cutting management on yield and quality of green fodder and seed.
- To study economics of different cutting management, P & Zn nutrition.

**Experimental Details:**

<b>Design</b>	:	FRBD
<b>Replications</b>	:	3
<b>Plot size Gross</b>	:	4 x 3 m
<b>Fertilizers (N:P:K kg/ha)</b>	:	As per recommendation
<b>Treatments</b>	:	15

Note: Recommended package of practices will be followed as per the crop

**Treatment details:**

<b>Factor A (P &amp; Zn Levels: 3)</b>		<b>Factor B Cutting Management-5)</b>	
T <sub>1</sub>	Control (No P & Zn application)	C <sub>1</sub>	Harvesting for green fodder at 50% flowering
T <sub>2</sub>	20 Kg P + 5 Kg Zn/ha	C <sub>2</sub>	Harvesting at maturity for grain yield
T <sub>3</sub>	40 Kg P + 10 Kg Zn/ha	C <sub>3</sub>	Harvesting green pod + Fodder at grain filling stage
		C <sub>4</sub>	C1 + harvest of regrowth for green pod + Fodder
		C <sub>5</sub>	C1+harvest of regrowth for grain

\*10 Kg N/ha will be applied after cut in C4 and C5 beside uniform application recommended N dose at sowing.

**Observations to be recorded:**

<b>Growth (At each harvest)</b>	<b>Yield and quality:</b>
Plant height (cm)	Green fodder yield (q/ha)
No. of leaves per plant	Dry Fodder/ by product yield (q/ha)
No. of branches per plant	Dry matter yield (q/ha)
Days to 50 % flowering	Crude protein yield (q/ha)
Leaf stem ratio	Dry matter (%)
	Crude protein (%)
	Green pod yield (q/ha)
	Seed Yield (q/ha)

**Economics:** Net monetary returns & benefit cost ratio**Soil studies:** Soil fertility status before and after crop season for pH, EC, OC, N, P, K & Zn

## B. Location Specific Trials

### K-16-AST-4 : Economization of fertilizer dose for Bajra Napier Hybrid Grass CO (BN) 5 through INM for enhancing yield and quality

Locations: TNAU,Coimbatore	Data Reporting: Rabi
Year of Start: 2016 for three years	Concluding year: Rabi 2019

#### Objectives:

1. To identify optimum nutrient dose and time of application
2. To study the influence of nitrogen and phosphorus along with its interaction with organic sources on crop growth and yield
3. To assess the soil quality parameters
4. To work out the economics

#### EXPERIMENTAL DETAILS

Design: FRBD	Spacing : 60 cm x 50 cm
No. of Factors : 3	Variety : CO (BN) 5 hybrid grass
No. of treatments : 12	Plot Size: 5.5 m x 4.0 m
No. of replications: 3	Year of start : Kharif 2016

#### TREATMENT SCHEDULE

Factor I	Factor II	Factor III
Nitrogen (3 levels)*	Phosphorus (2 levels)	Organic sources (2 levels)
50 kg	25 kg	First year
100 kg	50 kg	Every year
150 kg		

**Note:** \* 50 % of the suggested dose of Nitrogen will be applied after each cut

#### # Organic sources

First year	15 t/ha of FYM as basal along with biofertilizers (2 kg <i>Azospirillum</i> + 2 kg <i>Phosphobacteria</i> or 4 kg <i>Azophos</i> ) and Nitrogen and Phosphorus as per treatment
Every year	7.5 t/ha of FYM along with biofertilizers (2 kg <i>Azospirillum</i> + 2 kg <i>Phosphobacteria</i> or 4 kg <i>Azophos</i> ) and Nitrogen and Phosphorus as per treatment

#### Observations to be recorded:

1. Number of tillers per tussock	8. Crude protein yield (q/ ha)
2. Plant height (cm)	9. Crude Fiber yield (q/ ha)
3. Leaf: stem ratio	10. Acid Detergent Fiber (ADF) (%)
4. Tussock persistency	11. Neutral Detergent Fiber (NDF) (%)
5. Tussock girth (perimeter)	12. Soil analysis at initial and final stage (N, P, K, pH, OC, EC and microbiological properties)
6. Green fodder yield (q/ha)	13. Economics
7. Dry matter yield (q /ha)	

### K-16-AST-5: Effect of nitrogen levels and cutting management on productivity of perennial grasses under hilly terrace condition

Locations: Nagaland (Medziphema)	Data Reporting: kharif
Year of Start: 2016 for three years	Concluding year: kharif 2019

#### Objectives:

- To know the performance of different grasses under Hilly terrace condition for higher green forage yield and quality.
- To study the influence of nitrogen levels on green forage yield and quality.
- To work out the economics
- **EXPERIMENTAL DETAILS**

Design: FRBD	Spacing : as per recommendation
No. of Factors : 2	Plot Size: 5.5 m x 4.0 m
No. of treatments : 15	Year of start : Kharif 2016
No. of replications: 3	

Factor A (Grasses: 3)		Factor B (N Levels-5)	
T1	NB Hybrid (Co-4)	N1	No Nitrogen (Control)
T2	<b>Tall fescue grass</b>	N2	60 Kg/ha N
T3	Congo Signal (DRSB-7)	N3	80 Kg/ha N
		N4	100 Kg/ha N
		N5	120 Kg/ha N

Note: 50% as basal and remaining quantity in equal splits

**Observations to be recorded:**

**Growth:**

- Plant height (cm)
- No. of tillers per tussock
- Leaf stem ratio

**Yield and quality:**

- Green fodder yield (q/ha)
- Dry matter yield (q/ha)
- Crude protein yield (q/ha)
- Dry matter (%)
- Crude protein (%)

**Economics:** Net monetary returns & benefit cost ratio

**Soil studies:** Soil fertility status before and after crop season for pH, EC, OC, N, P & K.

### **K-16-AST-6 : Organic nutrient management in sorghum-berseem cropping sequence for sustainable fodder production**

<b>Location (1):</b> CCS, HAU, Hisar	<b>Data Reporting:</b> Rabi
<b>Year of Start:</b> 2016	<b>Concluding Year:</b> Rabi 2021

**Objectives:**

- To study the effect of organic sources of nutrients on yield and quality of forage in sorghum- Berseem cropping system.
- To study the influence of organic sources of nutrients on soil fertility.
- To work out the economics

#### **EXPERIMENTAL DETAILS**

Design	RBD
Replication(s)	Three
Variety	Sorghum - HJ 541 and Berseem - HB 1
Crop sequence	sorghum (single cut) – berseem
Plot size	12x8 = 96 sq
Duration	5 years
No of Treatments	9

**Treatment details:**

T<sub>1</sub>: Recommended dose of fertilizers through inorganic source (75 kg N + 15 kg P<sub>2</sub>O<sub>5</sub>/ha:N in two splits i.e. 50 kg at sowing an 25 kg after one month, full dose of phosphorus as basal dose, Berseem : 25 kg N + 70 kg P<sub>2</sub>O<sub>5</sub>/ha both at the time of sowing

T<sub>2</sub>: 20 t FYM/ha (15 t in sorghum and 5 t/ha in berseem)

T<sub>3</sub>: 20 t FYM/ha (15 t in sorghum + 5 t in berseem) + biofertilizer

T<sub>4</sub>: 20 t FYM/ha (15 t in sorghum + 5 t in berseem) + Green manuring

T<sub>5</sub>: 20 t FYM/ha (15 t in sorghum + 5 t in berseem) + biofertilizer + Green manuring

T<sub>6</sub>: 7.5 t vermicompost/ha (5 t in sorghum + 2.5 t in berseem)

T<sub>7</sub>: 7.5 t vermicompost/ha (5 t in sorghum + 2.5 t in berseem) + biofertilizer

T<sub>8</sub>: 7.5 t vermicompost/ha (5 t in sorghum + 2.5 t in berseem) + Green manuring

T<sub>9</sub>: 7.5 t vermicompost/ha (5 t in sorghum + 2.5 t in berseem) + biofertilizer + Green manuring

**Observations to be recorded:****Growth:**

- Plant height (cm)
- No. of tillers per hill
- Leaf stem ratio
- Days to 50% Flowering

**Yield and quality:**

- Green fodder yield (q/ha)
- Dry matter yield (q/ha)
- Crude protein yield (q/ha)
- Dry matter (%)
- Crude protein (%)

**Quality studies:** Crude protein, Crude fibre and IVDMD**Economics:** Net monetary returns & benefit cost ratio**Soil studies:** physico-chemical properties of soil before sowing and after harvest, microbial population before starting and after completion of trial**K-16-AST-7 : Effect of Nitrogen levels on fodder yield and quality in Mulberry based fodder production system**

<b>Location (1):</b> AAU, Jorhat	<b>Data Reporting:</b> kharif
<b>Year of Start:</b> 2016 (establishment year)	<b>Concluding Year:</b> kharif 2020

**Objectives:**

- To study the forage production potential of various forage crops in Mulberry.
- To study the effect of Nitrogen levels on forage yield and quality of forage crops and mulberry.
- To study Economics of Mulberry based fodder production system.

**EXPERIMENTAL DETAILS**

<b>Design:</b> FRBD	<b>Spacing :</b> as per recommendation
<b>No. of Factors :</b> 2	<b>Plot Size:</b> 5X4 sq m
<b>No. of treatments :</b> 15	<b>Year of start :</b> Kharif 2016
<b>No. of replications:</b> 3	

<b>Factor A (Cropping system- 5)</b>		<b>Factor B (Levels of Nitrogen (kg/ha)-3)</b>	
C1	Mulberry (sole)	F1	N-75 kg for Setaria (sole)/ 40kg P <sub>2</sub> O <sub>5</sub> for Cowpea (sole)
C2	Cowpea (sole)	F2	N-100 kg for Setaria (sole)/ 60kg P <sub>2</sub> O <sub>5</sub> for Cowpea (sole)
C3	Setaria (sole)/	F3	N-125 kg for Setaria (sole)/ 80kg P <sub>2</sub> O <sub>5</sub> for Cowpea (sole)
C4	Mulberry + Cowpea		
C5	Mulberry + Setaria		

\*Proportionate doses of N and P<sub>2</sub>O<sub>5</sub> to be applied under mulberry system**Observations to be recorded:****Growth:**

- Plant height (cm)
- No. of tillers per hill
- Leaf stem ratio
- Days to 50% Flowering

**Yield and quality:**

- Green fodder yield (q/ha)
- Dry matter yield (q/ha)
- Crude protein yield (q/ha)
- Dry matter (%)
- Crude protein (%)

**Economics:** Net monetary returns & benefit cost ratio**Soil Properties:** OC %, pH, Exchangeable Na% available NPK (Kg/ha).

## **K-16-AST-8 : Resource management in rice- oat cropping system under sodic soil.**

Location: NDUAT, Faizabad	Data Reporting: Rabi
Year of Start: kharif 2016	Concluding Year: Rabi 2019

### **Objectives:**

- To study the effect of organic sources of nutrients on yield and quality of forage in Rice- Oat cropping system.
- To study the influence of integrated resource management on soil fertility.
- To work out the economics

### **EXPERIMENTAL DETAILS**

Design : RCBD  
Replication(s) : Three  
Crop sequence : Rice-Oat  
Plot size : 4 x 3 M  
Duration : 4 years  
No of Treatments : 8

### **Treatment details:**

T<sub>1</sub>-Control  
T<sub>2</sub>- RDF 120 Kg N:60Kg P<sub>2</sub>O<sub>5</sub>:40 KgK<sub>2</sub>O:25 Kg ZnSO<sub>4</sub>/ha  
T<sub>3</sub>- 75 % RDF +25%N substitution through bio- compost ( press mud )  
T<sub>4</sub>- 75 % RDF + 25%N substitution through green manuring (dhaincha)  
T<sub>5</sub>- 75 % RDF + 25%N substitution through crop residue  
T<sub>6</sub>- 50% RDF + 50%N substitution through bio- compost ( press mud )  
T<sub>7</sub>-50% RDF + 50%N substitution through green manuring (dhaincha)  
T<sub>8</sub>-50% RDF + 50%N substitution through crop residue

**Note: All the treatments will be applied in rice and oat crop will be grown with recommended fertilizer dose.**

### **Observations to be recorded:**

#### **Growth:**

- Plant height (cm)
- No. of tillers per hill/m row length
- Leaf stem ratio
- Days to 50% Flowering

#### **Yield and quality:**

- Green fodder yield (q/ha)
- Dry matter yield (q/ha)
- Crude protein yield (q/ha)
- Dry matter (%)
- Crude protein (%)
- Grain Yield (q/ha)
- Straw Yield (q/ha)
- Harvest Index (%)

**Economics:** Net monetary returns & benefit cost ratio

**Soil Properties:** OC %, EC, pH, Exchangeable Na% available NPK (Kg/ha)

## **K-16-AST-9: Seed production potentiality of fodder maize as influenced by Zinc and Boron under red and lateritic soil of West Bengal**

Location (1): Sriniketan, Visva-Bharati, West Bengal	Data Reporting: kharif
Year of Start: 2016	Concluding Year: kharif 2019

### **Objectives:**

- To study the seed production potentiality of fodder maize as influenced by Zn and B application.
- To study the seed quality of fodder maize as influenced by Zn and B.
- To study Economics of fodder maize seed production.

### **EXPERIMENTAL DETAILS**

<b>Design:</b> FRBD	<b>Spacing :</b> as per recommendation
<b>No. of Factors :</b> 2	<b>Plot Size:</b> 4 X3 m
<b>No. of treatments :</b> 16	<b>Year of start :</b> Kharif 2016
<b>No. of replications:</b> 3	

<b>Factor A (Levels of Zinc (Kg/ha)- 4)</b>		<b>Factor B (Levels of Boron (kg/ha)-4)</b>	
Z1	0	B1	0
Z2	2.5	B2	0.5
Z3	5.0	B3	1.0
Z4	7.5	B4	1.5

### **Observations to be recorded:**

1. Plant height(cm)
2. Plan population/meter length
3. Seed yield (t/ha)
4. Stick yield (t/ha)
5. Seed quality: Test wt., seed viability, seed germination, crude protein % and crude protein yield.
6. Stover Quality: Dry matter (%), Crude protein, Crude fibre
7. Economics: Gross return, net return, B:C ratio

## **C. AVT based trials**

### **K-16-AST-7: Effect of nitrogen levels on forage yield of promising entries of forage hybrid maize (AVTM-2)**

<b>Locations (6) HZ:</b> Palampur and Srinagar NWZ: Ludhiana and Pantnagar	<b>Data Reporting :</b> kharif
<b>NEZ:</b> Bhubaneswar and Kalyani	
<b>Year of Start:</b> 2016 (1 year)	<b>Concluding Year:</b> kharif 2017

**Objective:** To study the response of promising entries of maize to nitrogen levels

#### **Technical details:**

**Year :** Kharif 2016

**Design:** FRBD

**Replications:** Three

**Plot Size:** 4m x 3m (10 rows at RXR spacing= 30 cm)

**Seed rate:** 75 kg/ha (90g/plot)

#### **Treatments**

**Entries: 5 (3+2):** MFM-4, PAC-746, AFM-4; African Tall and J-1006 (Checks)

**N-levels: 4:** 0, 40, 80 and 120 kg N/ha (half N as basal and half N after 30 DAS and 40 kg P<sub>2</sub>O<sub>5</sub> /ha as basal to all treatments)

#### **Observations:**

- Plant population/m<sup>2</sup>, Plant length and Leaf: stem ratio
- Green fodder and dry matter yields (q/ha)
- Crude protein content and crude protein yield (q/ha)
- (Seed requirement per entry = 6.75 kg seed of each entry will be supplied by contributing centre to coordinating unit)

## D. Exploratory Trial:

### 1. Performance evaluation of vegetative propagules and planting methods for Bajra Napier Hybrid Grass- CO (BN) 5

Location: TNAU, Coimbatore	Data Reporting: kharif
Year of Start: 2016 kharif for one year	Concluding year: kharif 2017

#### Objectives:

- To evaluate the germination and establishment potential of different vegetative propagules and planting methods
- To identify the appropriate age of the crop for stem cuttings
- To study the impact of vegetative propagules and planting methods on productivity and persistency
- To work out the economics

#### Experimental Details:

No. of Factors : 3	Year of start : <i>Kharif</i> 2016
No. of treatments : 12	Spacing : 60 cm x 50 cm
No. of replications: 3	Variety : CO (BN) 5 hybrid grass
Design: FRBD	Plot Size: 5.0 x 4.0 m
Duration: Three years	

#### Treatment details:

Factor I	Factor II	Factor III
<b>Vegetative propagules</b>	<b>Age</b>	<b>Method of planting</b>
Single budded stem cutting	3 months	Vertical
Two budded stem cutting	4 months	Horizontal
	5 months	

#### Observations to be recorded:

Growth parameters	Yield parameters
Germination percentage at 10 and 20 DAP	GFY & DFY (q/ha/year)
No. of established plants at 45 and 75 DAP and after each cut	Leaf stem ratio
No. of tillers at 45 and 75 DAP and before each cut	<b>Quality:</b> Crude protein content (%) and yield (q/ha) at each cut
Plant Height at 45 and 75 DAP and before each cut	<b>Economics:</b> Net return, cost of cultivation and Benefit cost ratio



## TECHNICAL PROGRAMME OF TRIALS (REPORTING IN KHARIF)

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

Locations (3): Ludhiana, Bikaner and Raipur	Data reporting – Kharif
Year of Start: Kharif 2014	concluding report: Kharif 2017

#### Objectives:

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

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

#### Treatments

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

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

**Variety :** PBN 233 **Seed rate :** 27500 root slips/stem cutting/ha

**Spacing :** 60 cm x 60 cm **Fertilizers :** 50 t FYM + 75 kg N/ha/cut

**Design :** Split-plot **Replication(s) :** 3

#### Observations:

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

### PS-14-AST-3: Response of Congo-signal grass (*Brachiaria ruziziensis* Cv. DBRS 1) to planting geometry and N levels

Locations (2): Dharwad and Mandya	Data reporting: Kharif
Year of Start: 2014	Concluding report: Kharif :2018

#### Objectives:

- To evaluate performance of *Brachiaria ruziziensis* (var. DBRS 1) under irrigated and rainfed conditions
- To study the effect of planting geometry and nitrogen nutrition on the performance of *Brachiaria spp.*
- To study the interactive effect of growing systems, planting geometry and nitrogen nutrition on the performance of *Brachiaria spp.*

#### Technical details

**Design:** Split-split plot design **Replications:** Three **Plot size:** 3.6 m x 3.6 m

**Start:** Kharif 2014 **Duration:** Three year

#### Treatments:

**Growing systems:** 2 (Main plot)

- (i) Rainfed (G<sub>1</sub>) (ii) Irrigated (Based on available soil moisture regime) (G<sub>2</sub>)

**Planting geometry:** 2 (Sub plot)

- (i) 45 cm x 45 cm (8 rows plot) (P<sub>1</sub>) (ii) 60 cm x 60 cm (6 rows plot) (P<sub>2</sub>)

**Nitrogen nutrition:** 4 (sub-sub plot)

- Control
- 10 kg N/ha (Basal and after each cut) (N<sub>2</sub>)
- 20 kg N/ha (Basal and after each cut) (N<sub>3</sub>)
- 30 kg N/ha (Basal and after each cut) (N<sub>4</sub>)

#### Observations:

##### Plant observations:

Plant height at each cut

No. of tillers at each cut

Dry matter per /tiller at each cut

Light interception at 30 days interval

GFY and DFY/ha /cut & year

CP content (%) and yield (q/ha) at each cut

##### Soil observation:

OC (%), available N, P and K initial and at one year interval

### CS-13-AST-4: Residual effect of P applied to wheat on the succeeding summer fodders in sorghum-wheat-summer fodders cropping system

Location (1): Ludhiana	Data Reporting: Kharif
Year of Start:2013	Concluding year: Kharif 2017

#### Objectives:

- To identify suitable summer fodder crop in sorghum-wheat-summer fodder cropping systems and
- To study the residual effect of phosphorus applied to wheat on succeeding summer fodder crops

#### Technical details:

##### Treatments

**(A) Summer fodder crops (3):** Cowpea, maize and pearl millet

**(B) P - levels to summer fodder crops (5):**

0, 25, 50, 75 and 100 % of recommended fertilizers: 100 kg N + 20 kg P<sub>2</sub>O<sub>5</sub>/ha

**Year of start:** Kharif 2013

**Design :** FRBD **Replications:** 3

**Variety:** PSC 1

**Seed rate:** 37.5 kg/ha

**Row spacing:** 30 cm

#### Observations to be recorded:

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

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

Location (1): Srinagar	Data Reporting: Kharif
Year of start: Kharif 2012	Concluding Year: Kharif 2017

#### Objectives:

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

#### Technical details:

**Design:** RBD;

**Replication:** 4;

**Year of start:** Kharif 2012;

**Duration:** 3 Years

#### Treatment details:

**T1 - Sole maize (30cm spacing);**

**T2 - Sole cowpea (30cm spacing);**

**T3 - Sole soybean (30cm spacing);**

**T4 - Maize + cowpea (1:1);**

**T5 - Maize + cowpea (2:1);**

**T6 - Maize + soybean (1:1);**

**T7 - Maize + soybean (2:1);**

**T8 - Maize + cowpea mixed cropping**

**T9 - Maize + soybean mixed cropping**

#### Note:

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

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

Inter cropping: Recommended seed rate for sole crops

#### Observation to be recorded:

- Crop Growth:** Plant population at harvest/m<sup>2</sup>; Plant height at harvest and Leaf stem ratio
- Yield (q/ha):** Green fodder; dry fodder and Forage equivalent yield
- Quality Parameters:** Crude protein content (%) and Crude protein yield (q/ha)
- Nutrient studies:** Nitrogen content and uptake by each crop and Soil fertility states before and after completion of system.

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

Location (1): Srinagar	Data Reporting: Kharif
Year of Start: Kharif 2012	Concluding year: Kharif 2017

### Objective:

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

### Technical details:

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

### Treatment details:

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

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

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

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

### Observation to be recorded:

**A. Crop Growth:** Plant population at harvest/m<sup>2</sup>; Plant height at harvest and Leaf stem ratio

**B. Yield (q/ha):** Green fodder yield; dry fodder yield and Forage equivalent yield

**C. Quality Parameters:** Crude protein content (%) and Crude protein yield (q/ha)

**D. Nutrient studies:** Nitrogen uptake by each crop and soil fertility status before and after completion of experiment

**E. Economics:** Net returns, BC ratio and cost of cultivation

## K-15-AST-6L: Nutrient Management in genotypes of B x Napier hybrid.

Location (1): MPKV, Rahuri	Data Reporting: Kharif
Year of Start: 2015	Concluding year: Kharif 2018

### Objectives:

- To find out the optimum fertilizer dose for various B x Napier Hybrid genotypes.
- To study the economics of different treatments.

### Experimental Details:

**Crop:** B x Napier Hybrid

**Design:** FRBD

**Season:** Kharif-2015-16

**Variety:** As per treatment

**Replications:** 3

**Plot size:** Gross : 4.50 x 6.00 m.

Net : 2.70 x 4.80 m.

**Duration:** 05 years

**Treatments:** 8

<b>Treatment Details:</b>
<b>A) Main Factor: Variety (2)</b>
V <sub>1</sub> - RBN 2011-12
V <sub>2</sub> - Phule Jaywant
<b>B) Sub-Factor: (Fertilizer levels-4)</b>
F <sub>1</sub> - 75 % RDF (112.5: 37.5:30 Kg NPK ha <sup>-1</sup> )
F <sub>2</sub> - 100 % RDF (150:50:40 Kg NPK ha <sup>-1</sup> )
F <sub>3</sub> - 125 % RDF (187.5:62.5:50 Kg NPK ha <sup>-1</sup> )
F <sub>4</sub> - 150 % RDF (225:75:60 Kg NPK ha <sup>-1</sup> )

### Note:

- FYM - 10 t ha<sup>-1</sup> year<sup>-1</sup> before planting.
- Seed treatment with 250 g *Acetobactor* and PSB each 1000 rooted slips.
- Green forage cut will be taken at 60 days interval.

### Fertilizer application schedule per year

<b>a) F<sub>1</sub> - 75 % RDF (112.5:37.5:30 Kg NPK ha<sup>-1</sup>)</b>	<b>b) F<sub>2</sub> - 100 % RDF (150:50:40 Kg NPK ha<sup>-1</sup>)</b>
• Basal dose- (37.5:18.75:15 Kg NPK ha <sup>-1</sup> )	• Basal dose- (50:25:20 Kg NPK ha <sup>-1</sup> )
• After six month of planting (At time of 1 <sup>st</sup> earthing up) (15:18.75:15 Kg NPK ha <sup>-1</sup> )	• After six month of planting (At time of 1 <sup>st</sup> earthing up) (20:25:20 Kg NPK ha <sup>-1</sup> )
• Top dressing after each cut 15 Kg N ha <sup>-1</sup>	• Top dressing after each cut 20 Kg N ha <sup>-1</sup>
<b>c) F<sub>3</sub> - 125 % RDF (187.5:62.5:50 Kg NPK ha<sup>-1</sup>)</b>	<b>d) F<sub>4</sub> - 150 % RDF (225:75:60 Kg NPK ha<sup>-1</sup>)</b>
• Basal dose- (62.5:31.25:25 Kg NPK ha <sup>-1</sup> )	• Basal dose- (75:37.5:30 Kg NPK ha <sup>-1</sup> )
• After six month of planting (At time of 1 <sup>st</sup> earthing up) (25:31.25:25 Kg NPK ha <sup>-1</sup> )	• After six month of planting (At time of 1 <sup>st</sup> earthing up) (30:37.5:30 Kg NPK ha <sup>-1</sup> )
• Top dressing after each cut 25 Kg N ha <sup>-1</sup>	• Top dressing after each cut 30 Kg N ha <sup>-1</sup>

### Observations to be recorded:

<b>a.</b>	Number of tillers per tussock.	<b>b.</b>	Plant height (cm)
<b>c.</b>	Leaf: stem ratio	<b>d.</b>	Tussock persistency
<b>e.</b>	Tussock girth (perimeter)	<b>f.</b>	Green fodder yield (q ha <sup>-1</sup> )
<b>g.</b>	Dry matter yield (q ha <sup>-1</sup> )	<b>h.</b>	Crude protein yield (q ha <sup>-1</sup> )
<b>i.</b>	Crude Fiber (%)	<b>j.</b>	Acid Detergent Fiber (ADF) (%)
<b>k.</b>	Neutral Detergent Fiber (NDF) (%)	<b>l.</b>	In-vitro digestibility (IVDMD)
<b>m.</b>	Soil fertility status at initial stage (Composite)	<b>n.</b>	Soil fertility status at initial stage after completion of experiment (pH, OC, EC, N, P, K) (each treatment)
<b>o.</b>	Economics.		

### K-15-AST-7L: Screening of genotypes of fodder bajra and oat under sodic soil.

<b>Location (1):</b> Faizabad	<b>Data Reporting:</b> Rabi
<b>Year of Start:</b> Kharif 2015	<b>Concluding year:</b> Kharif 2017

#### Objective:

- To identify promising genotypes of bajra and oat for fodder production under sodic soil of eastern UP.

#### Experimental detail:

**Design** : RBD

**Replication:** Three

**Plot Size** : 4m x 5m

#### Treatment:

**Kharif**

Bajra genotypes: Eight

**Rabi**

Oat genotypes: Eight

#### Observations to be recorded:

- Plant height (cm) at 50% flowering, green forage yield, dry mater yield, CP%, CP yield and leaf: stem ratio for both the crops.
- Soil properties: Initial OC%, EC, pH, Exchangeable Na% and available NPK (kg/ha).

### K-15-AST-13 C: performance of multicut Sorghum and Pearl millet mixture at variable seed rates under different methods of sowing.

<b>Location (2):</b> Palampur & Ludhiana	<b>Data Reporting:</b> Kharif
<b>Year of Start:</b> Kharif 2015	<b>Concluding year:</b> Kharif 2018

#### Objective

- To find out suitable method of sowing mixture of multicut sorghum and pearl millet with optimum seed rate.

**Experimental Details:**

Design : RBD

Replications: Three

Plot size: Gross 4 x 5.5 m, Net 3.60 m x 5 m

**Treatments**

<b>A) Varieties</b>	Sorghum- PSC-4, Pearl millet- FBC-16 (different varieties for Palampur)
<b>b) *Seed rates</b>	Sorghum: pearl millet (5) 100: 0, 75:25, 50:50, 25:75, 0:100
<b>c) Sowing methods</b>	(2): Broadcast and line sowing (22.5 cm)
<b>Seed rate</b>	as per treatments
<b>Fertilizer</b>	As recommended for respective crop and in proportion of crop mixtures

\* Seed rate: Sorghum- 37.5 kg/ha and pearl millet – 20 kg/ha

**Observations to be recorded:****Growth parameters:** Plant population, plant height (cm) and leaf: stem ratio of both the crops and equivalent ratio.**Yield parameters:** Green fodder and dry matter yield of mixture and individual crops.**Quality parameters:** CP content and yield.**Soil fertility parameters:** Soil fertility status before experiment and after experiment each year.**Economics:** Net returns and BC ratio.**K-15-AST-8 C: Compatibility of *Stylosanthes hamata* with sewan and dhaman grass pastures under north-western India**

<b>Locations (3):</b> Bikaner, Bhilwara, Fatehpur-Shekhawati	<b>Data Reporting:</b> Kharif
<b>Year of Start:</b> Kharif 2015	<b>Concluding year:</b> Kharif 2018

**Objectives:**

- To study the effect of individual grass on pasture establishment and growth.
- To study the effects of *Stylosanthes scabra* and Sewan and Dhaman grass cropping systems on pasture establishment and fodder production.
- To analyse the quality of fodder and economic of treatments.

Design : RBD

Replications: 3

Treatments: 8

Plot size: 6.0 x 4.0 m.

Start of experiment: Kharif 2015

Duration: 04 years

Treatments	(grass and grass +legume mixture study)
T <sub>1</sub>	100 % seed of sewan grass ( <i>Lasiurus indicus</i> L.)
T <sub>2</sub>	100 % seed of dhaman grass ( <i>Cenchrus ciliaris</i> L.)
T <sub>3</sub>	100 % seed of <i>Stylosanthes scabra</i> legume
T <sub>4</sub>	75 % seed of sewan grass+ 25% <i>Stylosanthes</i> legume
T <sub>5</sub>	75 % seed of dhaman + 25% <i>Stylosanthes</i> legume
T <sub>6</sub>	50 % seed of sewan grass+ 50% <i>Stylosanthes</i> legume
T <sub>7</sub>	50 % seed of dhaman + 50 % <i>Stylosanthes</i> legume
T <sub>8</sub>	33 % seed of every grass (1/3 sewan ,1/3 dhaman & 1/3 <i>Stylosanthes</i> legume)

**Observations to be recorded:**

After establishment (observations would be recorded twice in a year i.e. December and May months and data will be reported during Rabi season)

Number of shoots/ clump	Dry fodder yield per year.
Shoot weight	Inter crop capability parameters
Root weight	Fodder quality parameters analyses
Shoot/ root weight ratio	Soil nutrient status (initial and final) each year

**Note: Seed rates 6 kg/ha of grass/legume as individual crop would be used, and sowing at 50 cm row spacing will be done, finally maintaining the plant stand at the geometry 50 X 50 cm**

## TECHNICAL PROGRAMME FOR RABI TRIALS (REPORTING IN RABI)

### PS-13-AST-2: Performance of perennial fodder sorghum (*sorghum bicolor* cv. COFS- 29) as influenced by planting geometry and cutting intervals under irrigated conditions)

<b>Location (3):</b> Dharwad, Raipur and Bikaner	<b>Data reporting:</b> Rabi
<b>Year of start:</b> Rabi 2013-14	<b>Concluding year:</b> Rabi 2017

**Objectives:**

- To study the effect of planting geometry on growth and yield
- To study the effect of cutting intervals on growth and yield
- To study the interactive effect of planting geometry and cutting intervals on growth and yield

**Year** : Rabi 2013-14                      **Design** : FRBD                      **Replications** : Three  
**Plot size** : 4.0 m x 3.6 m                      **Seed rate** : 10 kg/ha

**Treatments:**

**A. Planting geometry:** 30 cm inter-row spacing, 2. 45 cm inter-row spacing, 3. 60 cm inter-row spacing  
**B. Cutting interval:** 45 days, 2. 60 days, 3. 75 days, 4. 90 days

**Observations to be recorded:** All observations will be recorded at each cut

Plant height,	Number of tillers/m row length,
Leaf: stem ratio	Dry matter /m row length,
Green fodder yield/ha	DFY/ha
Crude protein (%),	Crude fibre (%),
HCN content at each harvest	

### PS-14-AST-2: Impact of Mg and B on nutrient uptake, quality and yield of bajra napier hybrid

<b>Location (1):</b> Vellayani	<b>Data reporting:</b> Rabi
<b>Year of start:</b> 2014	<b>Concluding year:</b> Rabi 2017

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

**Technical details:**

**Design:** Factorial RBD    **Number of replication:-** Three  
**Plot size:** 4 m x 4 m    **Duration of study:** 3 years

**Treatments:-**

**A. Field condition (2)**

1. Open situation
2. Coconut garden

**B. Nutrient levels (5)**

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

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

General recommendation for deficient soils in Kerala is 80 kg/ha of Mg SO<sub>4</sub> and 10 kg/ha of Borax.

**Observations**

**A. Biometric characters:** Plant height at harvest (cm), Leaf /stem ratio

**B. Yield characters:** Green fodder yield (q/ha), Dry fodder yield (q/ha)

**C. Quality characters:** Crude protein content (%), Crude fibre content (%)

**D. Nutrient studies**

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

**E. Light intensity studies**

## PS-14-AST-4: Studies on the effect of planting geometry of tall fescue grass and seed rates of white clover in wet temperate conditions

<b>Location (2):</b> Palampur and Srinagar	<b>Data reporting:</b> Rabi
<b>Year of start:</b> Rabi 2014-15 (1st year establishment)	<b>Concluding year:</b> Rabi 2019

### Objectives:

- To evaluate the productivity, quality and compatibility of tall fescue grass + white clover mixture
- To estimate soil NPK and soil organic carbon (SOC) storage under different treatments

### Technical details:

**Design:** Randomized block design      **Year of start:** Rabi 2014-15      **Duration:** Three years  
**Replications:** Three      **Plot size:** 3.60 m x 3.60 m

**Treatments** (11 including sole stand of tall fescue and white clover):

#### (A) Spacing of tall fescue grass -3\*

(a) 20 cm x 30 cm      (b) 30 cm x 30 cm      (c) 40 cm x 40 cm

#### (B) White clover seed rate (Kg/ha)-3\*\*

(a) 1.0      (b) 2.0      (c) 3.0

All possible combination of A and B plus sole stand of Tall fescue grass at 30 cm x 30 cm spacing, and white clover @ 6 kg/ha sowing by broadcast.

**Note:** (\*Tall fescue seedling will be established through transplanting; \*\* Seed of white clover will be over sown by broadcast after transplanting of tall fescue grass)

### Observations to be recorded:

- Plant height (cm); L/S ratio; Per cent proportion of each species (on dry weight basis)
- GFY, DMY, CPY (q/ha) CP Content
- Competition functions net returns (Rs/ha) and benefit cost ratio
- Soil NPK, pH, total soil organic carbon storage (Tonnes carbon/ha) before start of the experiment and after completion of the experiment in each season

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

<b>Location(4):</b> Urulikanchan, Anand, Rahuri and Bikaner	<b>Data reporting:</b> Rabi
<b>Year of start:</b> Kharif 2013	<b>Concluding year:</b> Rabi 2016

### Objectives

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

### Treatments: Crop combinations-models

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

**Design:** RBD      **Replications:** 4      **Plot size:** 6 x 5 m      **Duration:** 3 years (Starting from Kharif 2013)

### Observations to be recorded:

- Growth:** Plant height, Leaf stem ratio, Plant population per m row length
- Yield and quality:** Green fodder yield, Dry matter yield, Crude protein yield, CP (%), CF (%)
- Economics:** Net monetary returns, benefit cost ratio
- Soil studies:** Initial soil status and after completion of sequence for pH, EC, OC, N, P & K

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

The ratio of cereal to legume will be 2:1 for seasonal crops. In hybrid napier + lucerne and hybrid napier + *Desmanthus*: Two rows of hybrid napier spaced at 4.8 meter (60 cm from boarder) and in between two lines of hybrid napier 12 lines of legumes at 30 cm spacing.

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

<b>Location (3):</b> Ranchi, Jabalpur and Bhubaneswar	<b>Data reporting:</b> Rabi
<b>Year of start:</b> 3 years (Starting from Kharif 2013)	<b>Concluding year:</b> Rabi 2016

**Objectives:**

- To assess the effect of different methods of rice cultivation on fodder establishment, yield and economics.
- To study the physio-chemical properties of soil before and after cropping system.

**No. of Treatments:** 12

**Design:** Split plot

**Replications:** 3

**Plot size:** 6 x 5 m

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

**Main plot- Systems of rice establishment methods (4)**

**M1-** Conventional method

**M2-** SRI (raised bed)

**M3-** SRI (flat bed)

**M4-** Aerobic rice

**Sub Plot: Forage crops (3)**

**C1-** Oat

**C2-** Berseem

**C3-** Lathyrus

**Observations to be recorded:**

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

**Note: Package of practices: IPNM to rice crop: FYM @ 5t/ha + RD@ 80-40-40 kg M, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O/ha**

**Water management in rice:**

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

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

<b>Location (2):</b> Raipur and Jorhat	<b>Data reporting:</b> Rabi
<b>Year of start:</b> 2013	<b>Concluding year:</b> Rabi 2016

**Objective:**

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

**Treatment details:**

**Main plot: Methods (4)**

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

**Sub plot: Varieties (6)**

• Pusa-24	• Mahateora
• Prateek	• Ratan
• Nirmal	• One line of Chhattisgarh i.e. RLS which is already in IVT mode of AICRP on MuLLaRP

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

**Seed treatment:** Rhizobium and PSB

**No. of cutting:** Single (50 DAS)

**Design:** Split Plot Design

**Replication:** 3

**No. of treatment:** 24

**Date of sowing:** Before 15 Nov.

**Observations to be recorded:**

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



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

Location: Raipur	Data reporting: Rabi
Year of start: 3 years from Kharif 2014	Concluding year: Rabi 2017

### Objectives:

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

### Treatments:

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

Year: Summer/Kharif 2014

Design : RBD

Replications: Three

Plot size (Gross): 6.0 m x 5.0 m

Duration: Three years

### Observations to be recorded:

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

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

Location: Raipur	Data reporting: Rabi
Year of start: 3 years from 2014	Concluding year: Rabi 2017

### Objectives

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

### Treatment details

- Sorghum multi cut + Cowpea (2:1) - Lucerne
- Maize + Cowpea (2:1) - Lucerne
- Pearl millet multi cut + Cowpea (2:1) - Lucerne
- Maize + Rice bean (2:1) – Berseem – Sorghum multi cut + Cowpea (2:1)
- Maize + Rice bean (2:1) – Oat multi cut - Sorghum multi cut + Cowpea (2:1)
- Pearl millet multi cut + Rice bean (2:1) –Oat multi cut – Maize + Cowpea (2:1)
- Pearl millet multi cut + Rice bean (2:1) – Berseem – Maize + Cowpea (2:1)
- Pearl millet multi cut + Rice bean (2:1) – Berseem – Sorghum multi cut + Cowpea (2:1)
- Pearl millet multi cut + Rice bean (2:1) – Oat multi cut – Sorghum multi cut + Cowpea (2:1)

### Technical details:

Year of start: Kharif 2014 Design: Randomized block design Replication: Three

Plot size: Gross plot size- 6m x 5m = 30m<sup>2</sup> Duration: Three years

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

### Observations

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

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

<b>Locations (2):</b> Ranchi and Raipur	<b>Data Reporting:</b> Rabi
<b>Year of start:</b> Kharif 2014	<b>Concluding year:</b> Rabi 2017

### Objectives:

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

### Experiment details

#### Technical details:

**Year of start:** Kharif 2014

**Design:** Randomized block design

**Replication:** Three

**Plot size:** Gross plot size- 6m x 5m = 30m<sup>2</sup>

**Duration:** Three years

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

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

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

### Observations

- Green fodder yield (q/ha)
- Dry fodder production (q/ha)
- Green fodder yield per day (q/ha)
- Dry fodder production per day (q/ha)
- Nutrient use efficiency
- Soil pH, organic carbon, available nitrogen
- Crude protein content
- Crude protein yield
- Plant height (cm)
- Leaf : stem ratio

Economics: Cost of cultivation, Net return, B: C ratio

### Other related yearly observation

**K-15-AST-1 L: Studies on different models for year round green fodder production under irrigated condition**

<b>Location (1):</b> Mandya	<b>Data Reporting:</b> Rabi
<b>Year of Start:</b> Kharif 2015	<b>Concluding year:</b> Kharif 2019

**Objectives:**

- To identify the sustainable cropping system with respect to soil fertility and crop productivity.
- To study the different combinations of perennial and seasonal fodder crops for productivity.
- To study economics of different models.

**Experimental Details:**

**Duration:** Three years

**Design:** RBD

**Replications:** 4

**Plot size :** Gross : 4.80 x 5.00 m

**No. of treatments:** 6

**Year of Start:** Kharif 2015

Treatments	Kharif	Rabi	Summer
T <sub>1</sub>	Fodder Maize + Cowpea (3:1)	Fodder Oat + Lucerne (3:1)	Pearl millet + Cowpea (3:1)
T <sub>2</sub>	Fodder Sorghum + Cowpea (3:1)	Fodder Maize +Cowpea (3:1)	Pearl millet + Cowpea (3:1)
T <sub>3</sub>	B N hybrid +Cowpea (2:8)	B N hybrid +Cowpea (2:8)	B N hybrid + Cowpea (2:8)
T <sub>4</sub>	B N hybrid + Lucerne (2:8)	Year round	
T <sub>5</sub>	B N hybrid + Desmanthus (2:8)	Year round	
T <sub>6</sub>	B N hybrid + <i>Sesbania sps.</i> (2:8)	Year round	

**Note: B N hybrid will be raised in the paired row method (between pair 2.4 m & with in pair 0.6 m)**

**Observations to be recorded:**

- Plant height (cm) at the time of harvest
- Green forage yield (q/ha)
- Dry matter yield (q/ha)
- Crude protein content (%) and yield (q/ha)
- Economics of the system (net returns, B:C ratio)
- Soil N, P, K, OC, PH and EC before sowing and after completion of the sequence

**K-15-AST-2 L: Performance of napier bajra hybrids as influenced by nature of vegetative propagules**

<b>Location (1):</b> IGFRI, RRS, Dharwad	<b>Data Reporting:</b> Rabi
<b>Year of Start:</b> 2015	<b>Concluding year:</b> Rabi 2018

**Objectives:**

- To study the establishment pattern in napier bajra hybrids through different vegetative propagules.
- To study the influence of vegetative propagules on fodder productivity.
- To work out the economics of vegetative propagules in napier bajra hybrids.

**Experimental Details:**

**Design:** Split-Plot design

**Sub plots:** Vegetative propagules

**Main plots:** Hybrids

**Plot size:** 4 m x 3.6 m

**Replications:** Three

**Spacing:** 60 cm x 60 cm

**Treatments**

**I. Hybrids: 3**

- DHN 6 (Sampoorna)
- Co (BN)- 5
- IGFRI 7

## II. Planting material: 4

1. Rooted slip 1 eyed
2. Rooted slip 2 eyed
3. Stem cutting 1 eyed
4. Stem cutting 2 eyed

### Observations to be recorded:

#### Growth

- No. of established plants at 30, 45, 60, 75 DAT
- No. of tillers at 60, 75, 90 DAT
- Height of tillers at 60, 75, 90 DAT
- Dry matter/hill (g) at 60, 75, 90 DAT
- Days to flowering
- No. of cuts (at 50% flowering) / annum

#### Yield

- GFY & DFY (t/ha/annum)
- Volume (cubic meter) & weight (kg) of planting material/ha

#### Quality

- Crude protein content (%) and yield (t/ha) at each cut

## **K-15-AST-3 L: Studies on Integrated nutrient management in Fodder Rice bean**

Location (1): Imphal	Data Reporting: Rabi
Year of Start: 2015	Concluding year: Kharif 2018

### Objectives:

- To assess effect of chemical fertilizer and poultry manure on productivity of fodder rice bean and soil health.
- To work out the economics.

### Experimental Details:

Design : RBD

Plot Size : 4X3

Seed rate : 35 kg/ha

Replications: 3

Spacing : 30 cm (R-R)

Duration: 03 years

Treatments			
T <sub>1</sub>	100% RDF	T <sub>2</sub>	75% RDF for phosphorus + 1 tonne Poultry manure
T <sub>3</sub>	75% RDF for phosphorus + 2 tonne Poultry manure	T <sub>4</sub>	50% RDF for phosphorus + 1 tonne Poultry manure
T <sub>5</sub>	50% RDF for phosphorus + 2 tonne Poultry manure	T <sub>6</sub>	25% RDF for phosphorus + 1 tonne Poultry manure
T <sub>7</sub>	25% RDF for phosphorus + 2 tonne Poultry manure		

### Observation to be recorded:

I. Growth and yield parameters	II. Quality	III. Economics	IV. Soil health
Plant height	Crude protein content (%)	Net return	Available NPK content in being and of each year
Leaf Stem ratio	Crude protein yield (kg/ha)	Cost of cultivation	
Green forage yield (q/ha)		BC ratio	
Dry matter yield (q/ha)			

## R-14-AST-2-: Effect of cutting and nutrient management on growth, yield and quality of oat

Location (1): Imphal	Data Reporting: Rabi
Year of Start: Rabi 2014-15	Concluding year: Rabi 2017

### Objectives:

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

### Experimental details

Design: FRBD	Replication: 3
Duration: Three year	Year of start: Rabi 2014-15
Plot Size: 4x3 m <sup>2</sup>	Variety: JHO-822

### Treatment details:

(A) Cutting Management: 3	(B) Nutrient Levels: 04
(i) C1: No cutting (Seed)	(i) N <sub>1</sub> : RDF (N, P <sub>2</sub> O <sub>5</sub> & K <sub>2</sub> O @ 80: 40:40)
(ii) C2: Single cut (60 DAS) + Seed	(ii) N <sub>2</sub> : 75% NPK of RDF + 5 t FYM/ha
(iii) C3: Three cut (60, 90 & 120 DAS)	(iii) N <sub>3</sub> : 50% NPK of RDF + 7.5t FYM/ha
	(iv) N <sub>4</sub> : 25% NPK of RDF + 10t FYM/ha

\* N will be given in four splits doses (40% as basal, 20% at 30 DAS, 20% at 60 DAS and 20% at 90 DAS).

### Observation to be recorded:

- Plant height (cm)
- Leaf stem ratio
- GFY & DMY (q/ha)
- Grain or seed and straw yield (q/ha)
- Crude protein content (%)
- Crude protein yield (q/ha)
- Gross and net return (Rs./ha)
- Benefit cost ratio.
- Soil fertility status before and after cropping season.

## K-15-AST-5L: Studies on carbon sequestration in subabul based silvi-pastoral cropping system under rain fed agriculture

Location (1): Hyderabad	Data Reporting: Kharif
Year of Start:2015	Concluding year: Kharif 2020

### Objectives

- To study the organic matter input to soil through subabul based perennial fodder cropping system
- To study organic matter partitioning added through the ROTH-C

### Experimental details

Design : RBD

Replications: 3

Treatments: 8

Duration: 05 years

Treatments	In subabul plantation
T <sub>1</sub>	Subabul (Sole crop)
T <sub>2</sub>	Subabul + APBN-1 as intercrop
T <sub>3</sub>	Subabul + APBN-1 + <i>Desmanthus</i> in 3:1 ratio
T <sub>4</sub>	Subabul + APBN-1 + <i>Desmanthus</i> (3:1) in stylo ground cover
T <sub>5</sub>	Subabul + <i>Cenchrus ciliaris</i>
T <sub>6</sub>	Subabul + <i>Cenchrus ciliaris</i> + <i>Desmanthus</i> intercrop (3:1 ratio) in Stylo ground cover
T <sub>7</sub>	Subabul + <i>Cenchrus ciliaris</i> + <i>Desmanthus</i> intercrop (3:1 ratio)
T <sub>8</sub>	Subabul + <i>Desmanthus</i> as intercrop

**Observation to be recorded:**

- a. Growth parameters of Subabul and companion crop.
- b. GFY and DFY at flowering and at seed maturity
- c. CP%, CF% at flowering and at harvest crops.
- d. Monthly OM input surface soil 0-30 cm
- e. Root biomass and carbon assessment from all component species.

**Inputs for model**

- 1. Clay % in soil
- 2. Plant residue input viz.,
  - a. Root biomass measured immediately after harvesting crop (Franzluebbers et al, 1999)
  - b. Rhizodeposition of C from root exudates and root turn over (Shamoot et al, 1968)
  - c. Leaf litter
- 3. Monthly mean temperature, rainfall, evaporation

**Note: Studies will be continued & observations will be recorded in existing Subabul based Cropping system**

**K-15-AST-9 C: Development of climate resilient production technologies on productivity and economics of food - fodder based cropping systems**

<b>Locations:</b> (4) Pantnagar, Ranchi, Kalyani, Jabalpur & IVRI, Bareilly	<b>Data Reporting:</b> Rabi
<b>Year of Start:</b> 2015	<b>Concluding year:</b> Rabi2020

**Objectives**

- To study the effect of climate change on productivity and profitability of food– fodder based cropping systems.
- To find out the suitable climate resilient production technology for higher profitability of grain – fodder based cropping systems.

**Experimental detail:**

<b>Duration of the experiment</b> : 03 years	<b>Replication</b> : 04
<b>Design</b> : Split Plot Design	<b>Plot Size</b> : 3m x 5 m

<b>Main plot: (Climate Resilient technology): 04</b>
1. Zero tillage- (All the crops)
2. Minimum tillage single pass of cultivator + sowing with seed drill.
3. Conventional tillage
4. Zero tillage- minimum tillage- Zero tillage.
<b>Sub plot (Cropping systems): 04</b>
1. Rice (upland) – Berseem - Maize + Cowpea
2. Maize (Baby corn) – Berseem – Sorghum (Fodder)
3. Maize (Baby corn) – Wheat – Rice bean (Fodder)
4. Sorghum (Fodder) – Berseem – Maize (Baby Corn)

**Observation to be recorded:**

- a. Growth attributes of all crops of the system
- b. Green forage yield
- c. Dry Forage yield
- d. Economic yield,
- e. Quality parameters (CP content and yield, NDF and ADF)
- f. Residual soil fertility status of the systems at beginning and end of each crop cycle.
- g. Forage equivalent yield of the systems,
- h. Economics of the systems.

**K-15-AST-10 C: Intensive Forage Production through Agase based (*Sesbania grandiflora*) cropping system under Protective Irrigation**

<b>Locations (3):</b> Mandya, Vellayani & Raichur	<b>Data Reporting:</b> Kharif
<b>Year of Start:</b> 2015	<b>Concluding year:</b> Kharif 2019

**Objectives:**

- To study the effect of cropping system on fodder yield, quality & soil fertility.
- To work out the economics.

**Experimental Details:**

<b>No. of treatments :</b> 7	<b>Year of start:</b> Kharif 2015
<b>No. of replications:</b> 3	<b>Spacing:</b> 2.0m x 1.0 m (Agase Sole)
<b>Design:</b> RCBD	<b>Plot Size:</b> 6.0 x 5.0 m

**Treatment Details:**

T <sub>1</sub> - Agase + Congo Signal grass (2:2)	T <sub>2</sub> - Agase + Rhodes grass (2:2)
T <sub>3</sub> - Agase + Guinea grass (2:2)	T <sub>4</sub> - Agase + Napier Bajra hybrid (2:1)
T <sub>5</sub> - Agase + <i>Setaria anceps</i> (2:2)	T <sub>6</sub> - Agase + Perennial fodder Sorghum (2:5)
T <sub>7</sub> - Agase(Sole)	

**Note: Agase will be raised in the paired row method (between pair 2m & within pair 1 m)**

**Observations to be recorded:**

- Plant height (cm) at the time of harvest
- Green forage yield (q/ha)
- Dry matter yield (q/ha)
- Crude protein content (%) and yield (q/ha)
- Economics of the system (net returns, B:C ratio)
- Soil N, P, K, OC, P<sup>H</sup> and EC before sowing and after completion of the sequence

**R-13-AST-1: Yield Potential of cereals with forage legumes under pure stand and mixtures**

Locations: Srinagar

**R-15-AST-1: Productivity of oat - lathyrus intercropping system as influenced by integrated nutrient management.**

<b>Locations (4):</b> Kalyani, Ranchi, Imphal, Bhubaneswar	<b>Data Reporting:</b> Rabi
<b>Year of Start:</b> Rabi 2015	<b>Concluding year:</b> Rabi 2018

**Objectives**

- To assess the productivity of food-forage intercropping system on rice fallows
- To study the profitability of food-forage intercropping system influenced by INM

**TECHNICAL DETAILS**

**Treatment details**

**A. Intercropping system (Rabi season) (Main plot)**

T<sub>1</sub> = Sole oat    T<sub>2</sub> = Lathyrus    T<sub>3</sub> = Oat + Lathyrus (3:2)    T<sub>4</sub> = Oat + Lathyrus (3:3)

**B. Integrated Nutrient Management (sub plot)**

F<sub>1</sub> = RDF (inorganic)

F<sub>2</sub> = 50% N of RDF + 50% N through FYM

F<sub>3</sub> = 50 % N of RDF + 50% N through Vermicompost

**Year of start:** Rabi 2015-16

**Design** : Split Plot Design (SPD)

**No of replications:** 3

**Total treatments** : 12

**Seeds will be treated with Rhizobium and PSB culture in all the treatments.**

### Observations to be recorded

#### Soil physico- chemical properties before sowing and after harvest of crop

#### Growth and yield attributes and yield of oat

- (i) Plant height and plant population (ii) Green forage and dry matter yield

#### Growth and yield attributes and yield of legume

- (i) Plant height and plant population (ii) Stover yield, Green Forage and Dry Matter Yield

#### Productivity of cropping system:-

Land Equivalent Ratio (LER) Green Forage Equivalent Yield Harvest Index

**Quality Parameters:** Crude protein content and crude protein yield

**Economic analysis:** Gross return, Net return and B: C ratio

### R-15-AST-2: Productivity of oat - pea intercropping system as influenced by integrated nutrient management.

<b>Location:</b> Jorhat	<b>Data Reporting:</b> Rabi
<b>Year of Start:</b> Rabi 2015	<b>Concluding year:</b> Rabi 2018

#### Objectives

- To assess the productivity of food-forage intercropping system on rice fallows
- To study the profitability of food-forage intercropping system influenced by INM

#### TECHNICAL DETAILS

##### A. Intercropping system (Rabi season) (Main plot)

T<sub>1</sub> = Sole oat T<sub>2</sub> = Sole pea T<sub>3</sub> = Oat + pea (3:2) T<sub>4</sub> = Oat + pea (3:3)

##### B. Integrated Nutrient Management (sub plot)

F<sub>1</sub>= RDF (inorganic) F<sub>2</sub>= 50% N of RDF+50%N through FYM F<sub>3</sub>= 50% N of RDF+50%N through Vermicompost

**Year of start:** Rabi 2015-16 **Design:** Split Plot Design (SPD)

**No of replications:** 3 **Total treatment:** 12

Seeds will be treated with Rhizobium and PSB culture in all the treatments.

### Observations to be recorded

#### Soil physico- chemical properties before sowing and after harvest of crop

#### Growth and yield attributes and yield of oat

1. Plant height and plant population 2. Green forage and dry matter yield

#### Growth and yield attributes and yield of pea

1. Plant height and plant population 2. Stover yield, Green Forage and Dry Matter Yield

#### Productivity of cropping system:-

1. Land Equivalent Ratio (LER) 2. Green Forage Equivalent Yield 3. Harvest Index

**Quality Parameters:** Crude protein content and crude protein yield

**Economic analysis:** Gross return, Net return and B: C ratio

### R-15-AST-3: Response of phosphogypsum to various cultivars of fodder oat in sodic soil.

<b>Location:</b> NDUAT, Faizabad	<b>Data reporting:</b> Rabi
<b>Year of Start:</b> Rabi 2015	<b>Concluding year:</b> Rabi 2017

#### Objectives

- To workout impact of different levels of phosphogypsum on growth and yield parameters of fodder oat.
- To study the effect of phosphogypsum on soil properties.
- To workout the economics of each treatment.



## TECHNICAL DETAILS

Treatments: 12

Oat cultivars: 3 (NDO-1, NDO-2 & NDO-711)

Levels of phosphogypsum (sulphur): 4

1- Control, 2- 125 kg/ha (20kg S /ha) 3- 250 kg/ha (40kg S /ha) 4- 375kg/ha (60kg S /ha)

Design: RBD

Replications: Three

Plot size: 4x3m

### Observations to be recorded

- Days to 50%flowering, Plant height, Plant population m<sup>-2</sup>.
- Leaf stem ratio, Green forage yield, Dry matter yield, DM%,
- Crude protein yield, CP%, per day Productivity (q/ha/day)
- Soil physico-chemical properties before and after harvest of crop.

## R-15-AST-4: Study on lucerne + oats /sarson fodder production system at variable seed rates of mixed crop under irrigated condition

Location: Bikaner	Data reporting: Rabi
Year of Start: Rabi 2015	Concluding year: Rabi 2018

### Objectives

- To find out optimum seed rate of oats/ sarson mixed cropping for long term stable green fodder.
- To work out the economics of different treatments.

## TECHNICAL DETAILS

Treatment as per treatments

- 100 % Seed rate lucerne (20kg/ha) = T1
- 100 % Seed rate oats (100 kg/ha)
- T1+10 kg/ha oats
- T1+20 kg/ha oats
- T1+30 kg/ha oats
- T1+40 kg/ha oats
- T1+0.625 kg/ha Sarson
- T1+1.250 kg/ha Sarson
- T1+1.880 kg/ha Sarson
- T1+2.50kg/ha Sarson

Design : RBD

Replications : Three

Plot size : 5.0m x 3.5 m, Net 4.0 m x 2.5 m

Varieties : Oats- Kent/UPO-212, Lucerne- T-9/Anand Lucerne-2,

Fertilizer:

- 20 kg N, 40kg P<sub>2</sub>O<sub>5</sub>, 20 kg K<sub>2</sub>O, 12.5 kg ZnSO<sub>4</sub> as basal, and
- 20 kg N in two equal splits at 30 DAS and after first cut for GF
- Foliar sprays of 0.5% ZnSO<sub>4</sub> 10 days after first cut and 10 days thereafter.

Cutting management: first cut at 50-55DAS and next cut 35-40 days' intervals.

## R-15-AST-5: Effect of Zinc and Boron on seed production potentiality of oat under red and lateritic soil of West Bengal

Location: Visva-Bharati, Sriniketan, West Bengal	Data reporting: Rabi
Year of Start: Rabi 2015	Concluding year: Rabi 2018

### Objectives

- To study the seed production potentiality of oats as influenced by Zn and B application
- To study the seed quality of oats as influenced by Zn and B
- To study economics of oats seed production as influenced by Zn and B application

## TECHNICAL DETAILS

Treatments			
T1- Control (No Zn and No B)	T5- Borax@5 kg/ha	T9- ZnSO <sub>4</sub> @ 15 kg/ha+ Borax @10 kg/ha	T13- ZnSO <sub>4</sub> @ 20 kg/ha + Borax @ 15 kg/ha
T2- ZnSO <sub>4</sub> @ 15 kg/ha	T6- Borax@10 kg/ha	T10- ZnSO <sub>4</sub> @ 15 kg/ha + Borax @15 kg/ha	T14- ZnSO <sub>4</sub> @ 25 kg/ha + Borax @ 5 kg/ha
T3- ZnSO <sub>4</sub> @ 20 kg/ha	T7- Borax@15 kg/ha	T11- ZnSO <sub>4</sub> @ 20 kg/ha+ Borax @5 kg/ha	T15- ZnSO <sub>4</sub> @ 25 kg/ha + Borax @ 10 kg/ha
T4- ZnSO <sub>4</sub> @ 25 kg/ha	T8- ZnSO <sub>4</sub> @ 15 kg/ha + Borax@5 kg/ha	T12- ZnSO <sub>4</sub> @20 kg/ha + Borax @ 10 kg/ha	T16- ZnSO <sub>4</sub> @ 25 kg/ha + Borax @ 15 kg/ha

Oats variety: JHO-822

Year: Rabi 2015-16

Design: RBD

Replications: Three

Plot size: 4.0 m x 3.0 m

Duration: Three years

### Observations to be recorded

Plant height (cm)

Plant population/m length

Leaf: stem ratio

Seed yield (t/ha)

Straw yield (t/ha)

Seed quality: Test wt., seed viability, L:S ratio, seed germination, crude protein % and crude protein yield.

Economics: Gross return, net return, B:C ratio

## R-15-AST-6: Evaluation of sowing window suitable for forage oats cultivation in the coastal region of Puducherry

Location: Puducherry	Data reporting: Rabi
Year of Start: Rabi 2015	Concluding year: Rabi 2018

### Objectives

- To explore the feasibility of introducing a new forage crop during *Rabi* season in the coastal region of Puducherry
- To find out the sowing window suitable for forage oats cultivation during *Rabi* season in the coastal region of Puducherry

## TECHNICAL DETAILS

### Treatment Combinations (8)

- Sowing of Kent on October Second Fortnight
- Sowing of Kent on November First Fortnight
- Sowing of Kent on November Second Fortnight
- Sowing of Kent on December First Fortnight
- Sowing of JHO- 2000-4 on October Second Fortnight
- Sowing of JHO- 2000-4 on November First Fortnight
- Sowing of JHO- 2000-4 on November Second Fortnight
- Sowing of JHO- 2000-4 on December First Fortnight

Design: RBD

Replications: 3

### Biometric Observations

- Plant height (cm)
- Leaf stem ratio
- Days to harvesting
- Dry fodder yield (q/ha)
- Green fodder yield (q/ha)
- Per day productivity (q/ha/day)

## R-15-AST-7: Standardization of seed rate of berseem with rye grass under mixed cropping system

Location: NDRI, Karnal	Data reporting: Rabi
Year of Start: Rabi 2015	Concluding year: Rabi 2017

### Objectives

- To study the effect of different seed rate on growth and yield of berseem and ryegrass
- To estimate the quality of berseem and rye grass fodder
- To work out the economics of berseem and rye grass as mixed crops

## TECHNICAL DETAILS

### Treatments

1. Sole Berseem (seed rate @25 kg/ha)
2. Sole Ryegrass (seed rate @8kg/ha)
3. Mixed crops with 50 % seed rate (B+RG)
4. With 100%+25% (B+RG)
5. With 75%+25% (B+RG)
6. With 50%+25% (B+RG)
7. With 100%+25% (RG+B)
8. With 75%+25% (RG+B)
9. With 50%+25% (RG+B)

Replications: 3

Design: RBD

Gross plot Size: 5.0m x 3.5m

### Observations to be recorded

1. Plant height (cm)
2. Leaf: Stem ratio
3. Green fodder yield (q/ha)
4. Dry matter yield (q/ha)
5. Crude protein (q/ha)
6. Economics of both crops

## R-15-AST-8: Study on berseem + oats /sarson fodder production system at variable seed rates of mixed crop under irrigated condition

Locations: Mukteshwar (IVRI)	Data Reporting: Rabi
Year of Start: Rabi 2015	Concluding year: Rabi 2018

### Objective

- To find out optimum seed rate of oats/ sarson mixed cropping for long term stable green fodder.
- To work out the economics of different treatments.

### TECHNICAL DETAILS

#### Treatment

1. Berseem
2. Oats & Sarson

- 100 % Seed rate Berseem (20kg/ha) = T1
- 100 % Seed rate oats (100 kg/ha)
- T1+10 kg/ha oats
- T1+20 kg/ha oats
- T1+30 kg/ha oats
- T1+40 kg/ha oats
- T1+0.625 kg/ha Sarson
- T1+1.250 kg/ha Sarson
- T1+1.880 kg/ha Sarson
- T1+2.50kg/ha Sarson

Design: RBD

Replications: Three

Plot size: 5.0m x 3.5 m, Net 4.0 m x 2.5 m

Varieties: Oats- Kent/UPO-212, Berseem-BB-3/ Wardan

#### Fertilizer:

- 20 kg N, 40kg P<sub>2</sub>O<sub>5</sub>, 20 kg K<sub>2</sub>O, 12.5 kg ZnSO<sub>4</sub> as basal, and
- 20 kg N in two equal splits at 30DAS and after first cut for GF
- Foliar sprays of 0.5% ZnSO<sub>4</sub> 10 days after first cut and 10 days thereafter.

**Cutting management:** first cut at 50-55DAS and next cut 35-40 days intervals.

### Observations to be recorded

- Yield parameters- green fodder and dry matter yield
- Quality studies- CP content and CP yield.
- Economics- Net returns and BC ratio.

## **K-15-AST-11 C: Studies on carbon sequestration in perennial grass based cropping systems**

<b>Locations:</b> Hyderabad, Coimbatore, Vellayani, Ranchi, Jabalpur & Anand	<b>Data Reporting:</b> Rabi
<b>Year of Start:</b> 2015	<b>Concluding year:</b> Rabi 2019

### **Objectives:**

- To study the effect of cropping system on carbon sequestration
- To study the effect of cropping system on Fodder yield, quality, Soil fertility & economics

### **Experimental Details:**

**Design :** RBD

**Replications:** 3

**Period :** Three years

### **Treatments**

T <sub>1</sub>	BN hybrid at recommended spacing
*T <sub>2</sub>	Guinea grass at recommended spacing
T <sub>3</sub>	BN hybrid in paired rows (60/120 cm) + Fodder cowpea (Kharif) - Lucerne (Rabi)
T <sub>4</sub>	BN hybrid in paired rows (60/120 cm) + <i>Desmanthus</i> (Perennial)
T <sub>5</sub>	BN hybrid in paired rows (60/120 cm) + <i>Sesbania grandiflora</i>
*T <sub>6</sub>	Guinea grass in paired rows (60/120 cm) + Fodder cowpea (Kharif) - Lucerne (Rabi)
T <sub>7</sub>	Guinea grass in paired rows (60/120 cm) + <i>Desmanthus</i> (Perennial)
T <sub>8</sub>	Guinea grass in paired rows (60/120 cm) + <i>Sesbania grandiflora</i>

\*T<sub>2</sub> and T<sub>6</sub> cowpea included instead of lucerne at Kerala (Vellayani)

### **Observations to be recorded**

#### **Soil**

- Pre sowing analysis – EC, pH, OC, NPK
- Post harvest analysis – EC, pH, OC, NPK

#### **Growth and yield parameters**

- Plant height, No. of tillers/ m<sup>2</sup>, Leaf length, Leaf breadth, Leaf stem ratio
- Green fodder yield, Dry matter yield
- Root weight, Root volume (After the end of three years)

#### **Quality parameters**

- Crude protein, Crude protein yield, Crude fibre

#### **Economics**

- Net return, B:C ratio

## **K-15-AST-12 C: Studies on the productivity and carbon sequestration of silvipastoral systems in hills of north western Himalayas**

<b>Locations (3):</b> Palampur and Srinagar	<b>Data Reporting:</b> Rabi
<b>Year of Start:</b> Establishment Year	<b>Concluding year:</b> Rabi 2019

### **Objectives:**

- To study the system productivity and organic matter input to soil through silvipastoral system

### **Experimental Details:**

• **Design:** Spilt plot

**Replications:** 3

**Period:** Three years

### **Treatments:**

#### **Main plot treatments: Trees species**

- Salix (3 m x 3m)
- Morus (3m x 3m)

**Sub plot Treatments: Range species**

- Setaria grass (var. S-18) (30cm x 30 cm)
- Fescue grass (var. Hima-14) (30 cm x 30 cm)
- White clover (var. Palampur Composite) (Broadcast)
- Fescue grass + White clover (Fescue grass at 30 cm x 30 cm spacing and with broadcasting of white clover)
- Local system (Natural grasses cover)

**Replications: Three**

**Note: Salix and Morus will be planted at 3 m x 3m spacing, White clover seed rate in sole stand 6 kg/ha and in mixed stand 3 kg/ha**

**Observations:****Soil:**

- Pre sowing analysis – EC, pH, OC, NPK
- Post harvest analysis – EC, pH, OC, NPK
- Monthly OM content in 0-30 cm soil surface

**Growth and yield parameters**

- Fresh and dry weight (g/m<sup>2</sup>)
- Green and dry fodder yield (q/ha)
- Root weight (after the end of five years)
- Root volume (after the end of five years)

**Quality parameters**

- Crude protein and crude fibre contents (%)
- Crude protein and crude fibre yield (q/ha)

**Economics**

- Net return
- B:C ratio

**R-14-AST-1-: Studies on the production potential feasibility of annual rye grass with berseem in hill zone**

<b>Locations (2): Palampur and Srinagar</b>	<b>Data Reporting: Rabi</b>
<b>Year of Start: Rabi 2014</b>	<b>Concluding year: Rabi 2017</b>

**Objectives:**

- To explore the possibilities of rye grass cultivation with or without berseem in the hill region.
- To evaluate the effect of different seeding ratio of rye grass with berseem on productivity and quality of forage
- To estimate the effect on soil NPK and soil organic carbon (SOC) storage under different treatments.

**Technical details:****Design:** Randomized block design**Replications:** Three**Year of start:** Rabi 2014-15**Plot size:** 3.0 m x 3.0 m**Duration:** Three years**Treatment (13)****(a) Rye grass genotypes \* (3)**

(i) Punjab Rye grass-1      (ii) Kashmir collection      (iii) Seed from 'ATMA' (HP)

**(b) Seed rate of ratio of rye grass: Berseem**

(i) 100:0      (ii) 75:25      (iii) 50:50      (iv) 25:75

All possible combination of A and B plus sole stand of berseem sown by broadcast.

(Crops will be sown by broadcast)

**Observations:**

- Plant height (cm); L:S ratio; Per cent proportion of each species (on dry weight basis)
- GFY, DMV and CPY (q/ha) and CP content (%)
- Competition functions (Sole berseem and Punjab Rye grass will be considered as standard check for computation of competition functions)
- Net returns (Rs/ha) and benefit cost ratio
- Soil NPK , pH, Total soil organic carbon storage (Tonnes carbon /ha) before start of the experiment and after completion of the experiment in each season

## R-14-AST-3: Studies on the effect of additives on silage quality of different grasses

Location (1): Vellayani	Data Reporting: Rabi
Year of Start: Rabi 2014	Concluding year: Rabi 2016

### Objective

- To select ingredients with a view to get nutritive and palatable silage

### Technical details

Design: CRD      Replication: Three      Year of start: 2014-15      Duration: One year

### Treatments:-

(a) Fodder crops-2 - 1. Hybrid Napier      2. Guinea grass

### (b) Silage Additives-5

1. Urea 1%.      2. Urea 2%      3. Urea 1% + Jaggery 1%  
4. Tapioca flour 1%.      5. Jaggery 2%.

### Observations to be recorded:

- Fresh silage/pit, dry matter content (%)
- Palatability, pH, silage colour,
- Nutrient analysis.**- Total digestible nitrogen content, Digestible crude protein, fibre, micronutrients
- Economics

**Note: The experiment will be carried out in pits of 0.83m<sup>3</sup> size. The pits will be insulated from climatic factors and the trial will to be carried out in two seasons in a year.**

**FORAGE CROP PROTECTION  
TECHNICAL PROGRAMME FOR *KHARIF* 2016**

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

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

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

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

**PPT 16: Efficacy of different biopesticides against aphids on forage sorghum**

**Location:** Rahuri and Ludhiana

**Design: RBD                  Variety: Ruchira                  Plot size: 3X 4 m<sup>2</sup>**

**Treatments:**

- T1- Foliar application of *Verticillium lecani* @ 10<sup>8</sup> CFU/g (5 g/lit)
- T2- Foliar application of *V. lecani* @ 10<sup>8</sup> CFU/g (7.5 g/lit)
- T3- Foliar application of *Beuveria bassiana* @ 10<sup>8</sup> CFU/g (5 g/lit)
- T4- Foliar application of *B. bassiana* @ 10<sup>8</sup> CFU/g (7.5 g/lit)
- T5- Foliar application of *Metarhizium anisopliae* @ 10<sup>8</sup> CFU/g (5 g/lit)
- T6- Foliar application of *M. anisopliae* @ 10<sup>8</sup> CFU/g (7.5 g/lit)
- T7- NSE 5%
- T8- Azadirachtin 1% (Commercial neem product)
- T9- Untreated control

**Observations:**

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

**PPT 17: Biological management of defoliators on cowpea.**

**Locations:** Jhansi, Dharwar and Rahuri

**Replication: 4    Design: RBD                  Plot size: 3 x 4 cm<sup>2</sup>**

**Treatments:**

- T1: *Beauveria basiana* @ 5 g(cfu 10<sup>6</sup>)/lt
- T2: *Nomurae relyi*@ 5 g(cfu 10<sup>6</sup>)/lt
- T3: NSE 5%
- T4: *Pseudomonas fluorescence* @5 g(cfu 10<sup>6</sup>)/lt
- T5: Untreated control

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

**Observations:**

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

## **PPT 19: Efficacy of different biopesticides against aphids on forage cowpea**

**Location:** Hyderabad and Karaikal (Puducherry)

**Design:** RBD

**Variety:** local

**Plot size:** 3x 4 m<sup>2</sup>

### **Treatments:**

- T1- Foliar application of *Verticillium lecani* @ 10<sup>8</sup> CFU/g (5 g/lit)
- T2- Foliar application of *V. lecani* @ 10<sup>8</sup> CFU/g (7.5 g/lit)
- T3- Foliar application of *Beuveria bassiana* @ 10<sup>8</sup> CFU/g (5 g/lit)
- T4- Foliar application of *B. bassiana* @ 10<sup>8</sup> CFU/g (7.5 g/lit)
- T5- Foliar application of *Metarhizium anisopliae* @ 10<sup>8</sup> CFU/g (5 g/lit)
- T6- Foliar application of *M. anisopliae* @ 10<sup>8</sup> CFU/g (7.5 g/lit)
- T7- NSE 5%
- T8- Azadirachtin 1% (Commercial neem product)
- T9- Untreated control

### **Observations:**

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

## **PPT 20: Validation for management of root rot and foliar diseases of forage cowpea**

**Locations:** Palampur and Ludhiana,

### **Treatments:**

- T<sub>1</sub>=Seed treatment with tebuconazole 2DS @ 1g/kg seed + NSKP(50 g/kg seed) followed by foliar spray of propiconazole @ 1ml/l at 15 days interval
- T<sub>2</sub>=No treatment

### **Sowing dates**

- 1<sup>st</sup> Date of sowing i.e. 15 days before Normal Days of Sowing
- 2<sup>nd</sup> Date of sowing i.e. Normal Days of Sowing
- 3<sup>rd</sup> Date of sowing i.e. 15 days after Normal Days of Sowing

### **Target Diseases:**

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

### **Observations:**

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



### PPT 21: Integrated Management of BLSB of forage Maize

Locations: Palampur

Design: RBD                      Replication: 3                      Plot size: 3 x 2 m<sup>2</sup>

#### Treatments:

- T<sub>1</sub> = Seed treatment with *T. viride* @ 5g/kg
- T<sub>2</sub> = Seed treatment with carbendazim @ 2 g/kg seed
- T<sub>3</sub> = T<sub>1</sub> + Two spray of carbendazim @ 1g/l
- T<sub>4</sub> = T<sub>1</sub> + Two foliar sprays with *P. fluorescens* @ 5g (CFU 10<sup>7</sup>) /l
- T<sub>5</sub> = T<sub>2</sub> + Two spray of carbendazim @ 1g/l
- T<sub>6</sub> = T<sub>2</sub> + Two foliar sprays with *P. fluorescens* @ 5g (CFU 10<sup>7</sup>) /l
- T<sub>7</sub> = T<sub>3</sub> + One spray each of carbendazim @ 1g/l and *P. fluorescens* @ 5g (CFU 10<sup>7</sup>) /l
- T<sub>8</sub> = T<sub>3</sub> + One spray each of carbendazim @ 1g/l and *P. fluorescens* @ 5g (CFU 10<sup>7</sup>) /l
- T<sub>9</sub> = Control

**Target Diseases:** 1. Banded leaf and sheath blight (BLSB)

### PPT 22: Integrated Management of foliar diseases of forage Sorghum

Locations: Palampur and Ludhiana

Design: RBD                      Replication: 3                      Plot size: 2 x 2 m<sup>2</sup>

#### Treatments:

- T<sub>1</sub> = Seed treatment with *T. viride* @ 5g/kg
- T<sub>2</sub> = Seed treatment with carbendazim @ 2 g/kg seed
- T<sub>3</sub> = Two foliar sprays with neem bio-pesticide (Achook) @ 3%
- T<sub>4</sub> = Two foliar sprays with propiconazole @ 1g/l
- T<sub>5</sub> = T<sub>1</sub> + Two foliar sprays with neem bio-pesticide (Achook) @ 3%
- T<sub>6</sub> = T<sub>1</sub> + Two foliar sprays with propiconazole @ 1g/l
- T<sub>7</sub> = T<sub>2</sub> + Two foliar sprays with neem bio-pesticide (Achook) @ 3%
- T<sub>8</sub> = T<sub>2</sub> + Two foliar sprays with propiconazole @ 1g/l
- T<sub>9</sub> = T<sub>1</sub> + One spray each of neem bio-pesticide (Achook) @ 3% and propiconazole @ 1g/l
- T<sub>10</sub> = T<sub>2</sub> + One spray each of neem bio-pesticide (Achook) @ 3% and propiconazole @ 1g/l
- T<sub>11</sub> = Control

#### Target Diseases:

1. Anthracnose (*Collectotrichum graminicola*)
2. Zonate leaf spot (*Gloeopercospora sorghi*)
3. Grey leaf spot (*Cercospora sorghi*)

### PPT 23: Management of downy mildew of pearl millet using bioagents

Locations: Ludhiana

Design: RBD                      Replication: 3                      Plot size: 2x2 m<sup>2</sup>

#### Treatments:

- T<sub>1</sub> = Seed treatment with *Trichoderma viride* @ 5 g/kg seed
- T<sub>2</sub> = Seed treatment with *Pseudomonas fluorescens* @ 5g/kg seed
- T<sub>3</sub> = Seed treatment with *Bacillus subtilis* @ 5g/kg seed
- T<sub>4</sub> = Seed treatment with Metalaxyl @ 2g/kg seed
- T<sub>5</sub> = T<sub>1</sub> + two foliar spray of *Trichoderma viride* @ 5g/l
- T<sub>6</sub> = T<sub>2</sub> + two foliar spray of *Pseudomonas fluorescens* @ 5g/l
- T<sub>7</sub> = T<sub>3</sub> + two foliar spray of *Bacillus subtilis* @ 5g/l
- T<sub>8</sub> = Two foliar spray of Ridomil MZ @ 2.5g/l
- T<sub>9</sub> = Control

**Target diseases:** Downy mildew (*Sclerothora graminicola*)

## **Guidelines for recording of Pests and diseases**

- Please don't change technical program without intimation and approval of PI & PC.
- Sample size should not be less than 20 leaves or tillers/plants for small plots (10m<sup>2</sup>)
- For large plot size (more than 10 m<sup>2</sup>) sample should be 50 leaves or tillers/plants or more
- For virus, wilt and rots whole plant to be considered as one unit
- During recording of data crop growth stage should be noted
- Data should be recorded periodically (10 days interval)
- All Insect and Pests (mention in Table below) should be reported. If any Insect or Pest/disease not appeared at the center, please do not leave blank, clearly mention "Not Appeared"
- At the end of crop season information should be reported

*For plant diseases:*

Plant disease index (PDI)

Area under disease progress curve (AUDPC)

Disease Reaction

*For Insect Pests:*

Average Counts /leaf or tillers or plant or meter row and their reaction

- On the basis of PDI
- I. If disease intensity (PDI) is up to 5% entry should be promoted
  - II. If disease intensity (PDI) is in between 6-25 % , entry may be promoted considering other traits and circumstances
  - III. If disease intensity (PDI) is more than 25 % the entry should be rejected

### **(a) Data should be taken on following pests and diseases**

<b>SN</b>	<b>Crop</b>	<b>Insect pests &amp; Diseases</b>
1	Berseem	Root rot complex ( <i>Rhizoctonia solani</i> , <i>Fusarium semitactum</i> and <i>Tylenchorhynchus vulgaris</i> ), Stem rot ( <i>Sclerotinia trifoliorum</i> ), Pod borer ( <i>Helicoverpa armigera</i> )
2	Lucerne	Downy mildew ( <i>Peronospora trifoliorum</i> ), Rust ( <i>Uromyces striatus</i> ), Common leaf spot ( <i>Pseudopeziza medicagenis</i> ), Lucerne weevil ( <i>Hypera postica</i> ), Pea aphids ( <i>Acyrtosiphon pisum</i> ), Spotted alfalfa aphid ( <i>Therioaphis trifolii</i> f. <i>maculata</i> )
3	Oats	Crown rust ( <i>Puccinia coronata</i> ), Stem rust ( <i>Puccinia graminis</i> f. sp. <i>avenae</i> ), Powdery mildew ( <i>Erysiphe</i> (= <i>Blumeria</i> ) <i>graminis</i> f. sp. <i>avenae</i> ), Leaf spot or blotch ( <i>Helminthosporium</i> spp.), Bird cherry aphid ( <i>Rhapalosiphum maidis</i> )

**(b) How to record data in case of Diseases (A general scale for evaluating diseases).**

Index value	Desirability	Judgment	For stress expanded code	Severity or incidence
<b>Blank</b>	No data or missing point	--	--	--
0	--	--	<b>HR</b>	Immune Reactions
1	Trait expression is satisfactory, from the Plant Breeder's point of view and the parent of variety can be used as a donor	Equal to best resistant	<b>R</b>	Less than 1%
<b>2 Good</b>				
3			<b>MR</b>	1-5%
4	Trait expression is not as good as it should be but may be acceptable under some circumstances	Between resistant & susceptible	<b>MS</b>	6-25%
<b>5 Fair</b>				
6				
7	Trait expression is unsatisfactory in terms of commercial acceptability or genetic improvement program	Equal to most susceptible	<b>S</b>	26-50%
<b>8 Poor</b>				
9			<b>HS</b>	51-100%

HR = Highly Resistant, R = Resistant, MR = Moderately Resistant, MS = Moderately Susceptible, S = Susceptible, HS = Highly Susceptible

**(c) ET Level for Insect Pest Data**

Insect	ETL
Pea Aphid	20 Aphids/tiller
Cowpea aphid	15 aphid/twig
Spotted aphid	30 aphid/leaf
Spodoptera	2 larvae/running meter
Army worm	2 larvae/running meter
Lucerne weevil	2-3 grubs/plant
Bird cherry Aphids	50 Aphids/tillers

R = Below ET level; MR= equal to ET level; S= More than ET level

**ALL INDIA COORDINATED RESEARCH PROJECT ON FORAGE CROPS & UTILIZATION**  
**(Indian Council of Agricultural Research)**  
**NATIONAL GROUP MEET: Kharif 2016**

Date: May 16-17, 2016

Venue: SKUAST-K, Srinagar

## PROGRAMME

May 16, 2016

08:00-10:00	<b>REGISTRATION</b>
10:00-11:00	<b>INAUGURATION</b>
<b>Welcome</b>	Dr. M. Y. Ghani, Associate. Director Research, SKUAST-K, Srinagar
<b>Chairman</b>	Dr. Nazeer Ahmed, Vice Chancellor, SKUAST-K, Srinagar
<b>Guests of Honour</b>	Dr. I. S. Solanki, Assistant Director General (FFC), ICAR Dr. J. S. Chauhan, Assistant Director General (Seeds), ICAR
<b>Project Coordinator's Report</b>	Dr. A. K. Roy, Project Coordinator
<b>Remarks</b>	Dr. I. S. Solanki, ADG (FFC), ICAR Dr. J. S. Chauhan, ADG (Seeds), ICAR
<b>Chairman's Address</b>	Dr. Nazeer Ahmed, VC, SKUAST-K, Srinagar
<b>Vote of Thanks</b>	Dr Gul Zafar, Organizing Secretary
11:00-11:15	<b>High Tea</b>

<b>11:15-12:45 TECHNICAL SESSION-I: INTERACTIVE SESSION WITH STAKEHOLDERS</b>	
<b>Chairman</b>	Dr. I. S. Solanki, ADG (FFC), ICAR
The session will showcase advances made by certain centers at farmer's field and ready to share technologies by SAU/ ICAR.. 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.	
<b>Rapporteurs</b>	Dr. Rahul Kapoor

<b>12:45-13:30 TECHNICAL SESSION-II: BREEDER SEED PRODUCTION</b>	
<b>Chairman</b>	Dr. J. S. Chauhan, ADG (Seed), ICAR
<b>Co-Chairman</b>	Dr. I. S. Solanki, ADG (FFC), ICAR
<b>BSP Report &amp; Allocation</b>	Dr. A. K. Roy, PC
<b>Rapporteurs</b>	Dr. R. K. Agrawal
13:30-14:00	<b>LUNCH</b>

<b>14:00-15:00 TECHNICAL SESSION-III: DISCIPLINEWISE REPORT</b>	
<b>Chairman</b>	Dr. J. S. Chauhan, ADG (Seed), ICAR
<b>Co-Chairman</b>	Dr. I. S. Solanki, ADG (FFC), ICAR
<b>Forage crop Improvement</b>	Dr. A. K. Roy
<b>Forage crop Production</b>	Dr. R. K. Agrawal
<b>Forage crop Protection</b>	Dr. A. B. Tambe
<b>Rapporteurs</b>	Dr. P. Mahadevu & Dr. S. K. Jha

<b>15:00-16:30 TECHNICAL SESSION-IV (concurrent sessions)</b>	
<b>FORMULATION OF TECHNICAL PROGRAMME</b>	
<b>TECHNICAL SESSION-IV (Concurrent)-FORAGE CROP IMPROVEMENT</b>	
<b>Chairman</b>	Dr. I. S. Solanki, ADG (FFC), ICAR
<b>Co-Chairman</b>	Dr. J. P. Yadavendra
<b>Rapporteurs</b>	Dr. C. Babu & Dr. Y. Jindal
<b>Finalization of varietal trials</b>	Dr. A. K. Roy, PC

<b>TECHNICAL SESSION-IV (Concurrent)–FORAGE CROP PRODUCTION</b>	
<b>Chairman</b>	Dr. Raihana Habib Kanth, Head, Crop Production Division, SKUAST-K, Srinagar
<b>Expert</b>	Dr. Menhi Lal
<b>Rapporteurs</b>	Dr. B. G. Sekhara & Dr. Joseph Koering
<b>Convener/ Finalization of trials</b>	Dr. R. K. Agarwal
<b>TECHNICAL SESSION-IV (Concurrent)–FORAGE CROP PROTECTION</b>	
<b>Chairman</b>	Dr. G. M. Mir, Head, Dept. of Entomology, , SKUAST-K, Srinagar
<b>convener</b>	Dr. A. B.. Tambe
<b>Rapporteurs</b>	Dr. A. B. Tambe and Ravinder Kumar
<b>16:30-16:45</b>	<b>Tea</b>

<b>16:45-19:00</b>	<b>TECHNICAL SESSION V: REVIEW OF CENTRE-WISE ACTIVITIES</b>
<b>Chairman</b>	Dr. I. S. Solanki, ADG (FFC), ICAR
<b>Co-Chairman</b>	Dr. A. K. Roy, Project Coordinator (FCU)
<b>Rapporteurs</b>	Dr .T. Shashikala., Dr.Usha Thomas, Dr. Zahoor Ahmed Dar
<b>Hill Zone</b>	CSK HPKV Palampur ; SKUAT (K) Srinagar; VPKAS Almora
<b>North West Zone</b>	PAU Ludhiana, CCS HAU Hisar, GBPUAT Pantnagar, SKRAU, Bikaner, IGFRI-RRS Avikanagar, CAZRI Jodhpur, SKRAU-RRS Jalore, MPUAT Udaipur, DWR (dual purpose barley) Karnal
<b>North East Zone</b>	NDUAT, Faizabad ; BAU Ranchi ; BCKV Kalyani; OUAT Bhubaneswar ; AAU Jorhat ; CAU Imphal ; RAU Pusa
<b>Central Zone</b>	AAU Anand ; JNKVV Jabalpur ; IGFRI Jhansi ; MPKV Rahuri ; BAIF Urulikanchan ; IGKV Raipur ; CSAUAT Kanpur ; Dhari/Dapoli
<b>South Zone</b>	PJTSAU Hyderabad ; UAS (B) ZARC, Mandya ; TNAU Coimbatore ; KAU, Vellayani ; IGFRI-RRS, Dharwad

<b>19:00 - 20:00</b>	<b>VARIETAL IDENTIFICATION COMMITTEE MEETING</b>
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May 17, 2016

<b>9:00-11:00</b>	<b>TECHNICAL SESSION V: REVIEW OF CENTRE-WISE ACTIVITIES- contd</b>
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<b>11:00-11:30</b>	<b>TECHNICAL SESSION-VI: FTD &amp; TSP FORMULATION</b>
<b>Chairman</b>	Dr. I. S. Solanki, ADG (FFC), ICAR
<b>Convener</b>	Dr. A. K. Roy, Project Coordinator
<b>Rapporteurs</b>	Dr. R. K. Agrawal

<b>11:30-12:30</b>	<b>TECHNICAL SESSION VII:PGR/breeding/production/protection issues</b>
<b>Chairman</b>	Dr. I. S. Solanki, ADG (FFC), ICAR
<b>Convener</b>	Dr. A. K. Roy, PC
<b>Rapporteurs</b>	Dr. Mareen Abraham
2-3 lectures on various aspects and interaction; Future programme/thrust areas/identification	

<b>12:30-13:30</b>	<b>SPECIAL SESSION: Scientific, Administrative and financial issues</b>
<b>Chairman</b>	Dr. I. S. Solanki, ADG (FFC), ICAR
<b>Convener</b>	Dr. A. K. Roy, Project Coordinator (FCU)
<b>Rapporteur</b>	Dr. A. K. Mehta

<b>13:30-14:30</b>	<b>Lunch</b>
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<b>14:30-17:30</b>	<b>TECHNICAL SESSION-VIII: PLENARY SESSION</b>
<b>Chairman</b>	Dr. Nazeer Ahmed, Hon'ble Vice Chancellor, SKUAST-K
<b>Chief Guest</b>	Sri Sundeep Kumar Nayak, IAS, Principal Secretary Agriculture, Government of J&K
<b>Guest of Honour</b>	Dr. I. S. Solanki, ADG (FFC), ICAR
<b>Convener</b>	Dr. A. K. Roy, PC
<b>Rapporteurs</b>	Drs. R. K. Agrawal

<b>Presentation of the recommendations by respective rapporteurs</b>	
Technical session – I Interactive session with stakeholders	Dr. Rahul Kapoor
Technical session – II Breeder Seed Production	Dr. R. K. Agrawal
Technical session – III Discipline-wise presentation	Dr. P. Mahadevu
Technical session - IV Forage Crop Improvement	Dr. C. Babu
Technical session - IV Forage Crop Production	Dr. B. G. Sekhara
Technical session – IV Forage Crop Protection	Dr. A. B. Tambe
Technical session – V Centre wise activities	Dr. T. Shashikala
Technical session – VI FTD & TSP formulation	Dr. R. K. Agrawal
Technical session-VII PGR/breeding/production/protection issues	Dr. Mareen Abraham
Varietal Identification Committee Meeting Report	Dr. A. K. Roy
Guest of honour remarks	Dr. I.S. Solanki
Chairman's Remarks	Dr. Nazeer Ahmed
Chief Guest Remark	Sri Sundeep Nayak
Vote of Thanks	Dr. A. K Roy

**List of Participants**

SN	Name	Designation
<b>SKUAST-K and other officers of J &amp; K</b>		
1.	Dr. Nazir Ahmad	Vice Chancellor, SKUAST-K, Srinagar
2.	Dr. Gul Zaffar	Assoc. Director Research, SKUAST-K, Srinagar
3.	Dr. F.A.Zaki	Dean Horticulture, SKUAST-K, Srinagar
4.	Dr. M.Y.Zargar	Dean Agriculture, SKUAST-K, Srinagar
5.	Dr. Sarfaraz A. Wani	Dean, FVSC & AH, SKUAST-K, Srinagar
6.	Dr. M.Y.Ghani	Assoc. Director Research, SKUAST-K, Srinagar
7.	Dr. K.N.Singh	Assoc. Director Extension, SKUAST-K, Srinagar
8.	Mr. Sandeep Kumar Nayak	Principal Secretary, Commissioner, APD, Srinagar, Govt of Jammu & Kashmir
9.	Dr.N.S. Khuroo	Jr. Scientist (PB), SKUAST-K, Srinagar
10.	Dr. Ansarul Haq	Jr. Scientist (Agronomy), SKUAST-K, Srinagar
11.	Dr. Vinod Gupta	In charge RARS, Rajouri,
12.	Dr. M.I.Mukhdoomi	Sr. Scientist (PB), DARS-Budgam, SKUAST-K, Srinagar SKUAST-K, Srinagar
13.	Dr. Z.A.Dar	Sr. Scientist (PB), AICRP-Maize DARS-Budgam, SKUAST-K, Srinagar
14.	Dr. Ajaz Ahmad Lone	Jr. Scientist (PB), AICRP-Maize DARS-Budgam, SKUAST-K, Srinagar
15.	Dr. B.A.Alie	Sr Scientist (Agronomy), AICRP-Maize DARS-Budgam, SKUAST-K, Srinagar
16.	Dr. S.A.Dar	Sr. Scientist (PB), AICRP- MuLLARP DARS-Budgam, SKUAST-K, Srinagar
17.	Dr.F.A.Bahar	Jr. Scientist (Agronomy), AICRP- MuLLARP DARS-Budgam, SKUAST-K, Srinagar
18.	Dr.Nasir A Dar	Sr. Scientist (Agronomy), DARS-Budgam , SKUAST-K, Srinagar
19.	Dr. S.A.Hakeem	Jr. Scientist (Entomology), DARS-Budgam, SKUAST-K, Srinagar
20.	Dr. Seerat-un Nisa	Jr. Scientist (Soil Sciences), DARS-Budgam, SKUAST-K, Srinagar
21.	Dr. A Sidique	Students Welfare Officer, SKUAST-K, Srinagar
22.	Dr. S.A. Wani	Prof. Division of Biotechnology, SKUAST-K, Srinagar
23.	Dr. Badrul Hassan	Prof. Division of Agronomy, SKUAST-K, Srinagar
24.	Dr. M.A. Bhat	Prof. & Head, Division of Plant Breeding, Faculty of Agriculture –Wadura,
25.	Dr. Raihaina Habib	Prof. & Head, Division of Agronomy, Faculty of Agriculture -Wadura , SKUAST-K
26.	Dr. G. M. Mir	Prof. & Head, Division of Entomology, SKUAST-K, Srinagar
27.	Dr. F. A. Banday	Prof. & Head, Division of Fruit Sciences, SKUAST-K, Srinagar
28.	Dr. Shakil Ahmad	Prof. & Head, Division of Agri-Stat., SKUAST-K, Srinagar
29.	Dr. M. H. Wani	Professor i/c, Rajiv Gandhi Chair, SKUAST-K, Srinagar
30.	Dr. Fahimullah khan	Prof. & Head, Division of Floriculture, SKUAST-K, Srinagar
31.	Dr. Javed Ahmad Wani	Prof. & Head, Division of Soil Sciences, SKUAST-K, Srinagar
32.	Dr. Shabir Ahmad Mir	Prof. & Head, Division of Division of Agri. Economics & Marketing, SKUAST-K,
33.	Er. Jagvir Dixit	Head, Division of Agri. Engg., SKUAST-K, Srinagar
34.	Dr. Ghulam Hassan Dar	Prof. & Head, Division of Environmental. Sciences, SKUAST-K, Srinagar
35.	Dr. Sheikh Bilal Ahmad	Prof. I/C Centre for Quality Residue Analysis, SKUAST-K, Srinagar
36.	Dr. Nayeema Jabeen	Head, Division of vegetable sciences, SKUAST-K, Srinagar
37.	Dr. Manzoor Ahmad	Prof. & Head, Temperate Sericulture Research Institute, Mirgund, SKUAST-K
38.	Dr. P S Hussain	Programme Coordinator, KVK, Budgam
39.	Dr. Tabasum Ara	Programme Coordinator, KVK, Srinagar
40.	Dr. S A Simnani	Programme Coordinator, KVK, Ganderbal
41.	Dr. K A Dar	Subject Matter Specialist, KVK, Ganderbal
42.	Dr.Gowhar Gull Shiekh	Asstt.Professor (Animal Nutrition), FVSC & AH, Shuhama
43.	Dr.Khurshid Ahmad Sofi	Subject Matter Specialist, KVK, Bandipora
44.	Dr. Rakesh Vaishnavi	Sc. Scientist (PB), SKUAST-Kashmir
45.	Dr. Bilal A. Lone	Jr. Scientist (Agronomy), MLRI-Manasba, SKUAST-K, Srinagar I
46.	Dr. Gowhar Ali	Jr. Scientist (PB), Faculty of Agriculture –Wadura, SKUAST-K, Srinagar
47.	Dr. Amal sexana	Sc. Scientist (Agronomy), SKUAST-K, Srinagar
48.	Dr. Fayaz Mohidin	Jr. Scientist (P. Pathology), SKUAST-K, Srinagar
49.	Dr. Zahoor Ahmed Bhat	Jr. Scientist (P. Payhology), SKUAST-K, Srinagar
50.	Dr. Irfan Bisati	Jr. Scientist (Pomology & Fruit Sciences), SKUAST-K, Srinagar

51.	Dr. Ishfaq Abidi	Assistant Director Research, SKUAST-K, Srinagar
52.	Dr. G. A. Parray	ADR, Mountain Research Centre for Field Crops, Khudwani,
53.	Dr. Manzoor A Ganie	Jr. Scientist (Agronomy), Mountain Research Centre for Field Crops, Khudwani ,
54.	Dr Sameera Qayoom	Sc. Scientist (Agronomy), SKUAST-K, Srinagar
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56.	Dr. Parmeet Singh	Jr. Scientist (Agronomy), Faculty of Agriculture -Wadura
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58.	Mr. M.Ilyas Bhat	Technical Assistant AICRP on Seeds, SKUAST-K, Srinagar
59.	Mr.Showkat A Khan	Jr. Technical Assistant, DARS-Budgam, SKUAST-K, Srinagar
60.	Mr.Farhat Abass	Steno./Clerck, DARS-Budgam, SKUAST-K, Srinagar
61.	Miss Shafaq Jabeen	Accountant, DARS-Budgam, SKUAST-K, Srinagar
62.	Ab. Majid Reshi	FCLA (PB), Faculty of Agriculture –Wadura, SKUAST-K, Srinagar
<b>ICAR and inter related Institutes</b>		
63.	Dr. J. S. Chouhan	ADG (Seeds), ICAR
64.	Dr. I. S. Solanki	ADG (FFC), ICAR
65.	Dr. Menhi Lal	Ex Head, & RAC Member, IGfRI, Jhansi
66.	Dr. J. P. Yadavendra	Ex Prof. & RAC Member, IGfRI, Jhansi
67.	Dr. Omvir Singh	Project Coordinator, AICRP on Pearl Millet, Jodhpur
68.	Dr. Anjali Kak Koul	Principal Scientist, ICAR-NBPGR, Pusa Campus, New Delhi
69.	Dr. Sultan	Officer In charge, NBPGR Regional station – Srinagar
70.	Dr. Putan Singh	Principal Scientist (Animal Nutrition), IVRI-Izatnagar- Bareilly
71.	Dr. J. K. Bisht	Head, Crop Production, ICAR-VPKAS, Almora (Uttarakhand)
72.	Dr. S. L. Jat	Scientist (Agronomy), IIMR New Delhi
73.	Mr.Javid M Dad	DST Young Scientist, Central Institute of Temperate Horticulture, Srinagar
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74.	Dr. A. K. Roy	Project Coordinator, AICRP Forage Crops and Utilization
75.	Dr R K Agarwal	Principal Scientist & PI Agronomy, AICRP Forage Crops and Utilization
76.	Dr V.K. Yadav	Head, ST Division, IGfRI , Jhansi
77.	Dr B G Shivkumar	Scientist (Agronomy), IGfRI , Jhansi
78.	Dr. S.R. Kantwa	Sr. Scientist, IGfRI , Jhansi
79.	Dr. D.C Joshi	Scientist, IGfRI , Jhansi
80.	Dr. D.K.Verma	Principal scientist & OIC, IGRFI Regional station-Srinagar
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83.	Mr. Nazim Ahmad	Scientist, IGRFI Regional station-Srinagar
<b>AICRP Coordinating centres</b>		
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85.	Dr D S Pogat	Scientist, CCS HAU Hisar
86.	Dr RS Sheoran	Scientist, CCS HAU Hisar
87.	Prof. A. H. Sonone	Forage Breeder & OIC MPKV, Rahuri, (Maharashtra)
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89.	Dr. S. V. Damame	Scientist-I (Biochemistry), MPKV, Rahuri, (Maharashtra)
90.	Shri. M.G. Gavit	Sr. Research Asstt., MPKV, Rahuri, (Maharashtra)
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99.	Dr. P.M. Patel	Research Scientist (Agronomy), AAU, Anand (Gujarat)
100.	Dr. D.H. Desai	Research Scientist (Bio. chem.), AAU, Anand (Gujarat)
101.	Dr.Ramesh Singh Yadav	Forage agronomist, NDUAT, Kumarganj, Faizabad (Uttar Pradesh)
102.	Dr. S. S Shekhawat	Professor (PBG) & OIC, RAU, Bikaner (Rajasthan)



103.	Dr. Sagarmal Kumawat	Prof. Agronomy, RAU, Bikaner (Rajasthan)
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111.	Dr. Ravinder Kumar	Asstt. Entomologist, PAU, Ludhiana (Punjab)
112.	Dr. Sukhpreet Singh	Asstt. Agronomist, PAU, Ludhiana (Punjab)
113.	Dr. Meenakshi Goyal	Asstt. Biochemist, PAU, Ludhiana (Punjab)
114.	Drs. Naveen Kumar	Principal Scientist & OIC, CSK HPKV, Palampur (H.P.)
115.	V. K. Sood	Sr. Scientist (PBG), CSK HPKV, Palampur (H.P.)
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120.	Dr. P Mahadevu	Sr. Scientist (GPB), UAS, Bangalore (Campus Mandya), Karnataka
121.	Dr M R Krishanappa	Professor, UAS, Hebbal, Bangalore
122.	Dr. T. Shashikala	Principal Scientist (PB) & Head, PJTSAU, Hyderabad (Telangana)
123.	Dr. M. Shanti	Senior Scientist, PJTSAU, Hyderabad (Telangana)
124.	Dr. R. Susheela	Senior Scientist, PJTSAU, Hyderabad (Telangana)
125.	Dr. K. Loka Reddy	Ex- Head, Forage Centre, PJTSAU, Hyderabad (Telangana)
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127.	Dr. (Mrs) Seuji Bora Neog	Principal Scientist (PBG), AAU, Jorhat (Assam)
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129.	Dr. (Mrs). V. Vasuki	Asst. Professor (Agronomy), Coimbatore (Tamil Nadu)
130.	Mrs Ashisan Tuti	Jr. Scientist (PB) & OIC, BAU, Kanke, Ranchi (Jharkhand)
131.	Dr. Birender Kumar	Agronomist, BAU, Kanke, Ranchi (Jharkhand)
<b>Collaborating centres</b>		
132.	Dr.. S Mala	Assoc. Prof. (Agronomy), Pandit Jawaharlal Nehru College of Agril. & Research Institute, Karaikal (Puducherry)
133.	Dr T Gohain	Assoc. Prof. (Agronomy), Nagaland University, Medziphema, Nagaland
134.	Dr. A. K. Barik	Professor (Agronomy), Viswa Bharati University, Sriniketan, W. B.
135.	Dr Brijesh Upadhyay	DUVASU, Mathura 281 122 (Uttar Pradesh)
136.	Dr. U. S. Kudtarkar	Jr. Agrostologist, Grass Breeding Station-Palghar, Maharashtra
<b>Cooperatives/ State Departments/ progressive farmers</b>		
137.	Dr. A. K. Garg	DGM (Animal Nutrition), NDDB, Anand
138-147	Ten Progressive Farmers	Different areas of District Ganderbal (J&K)
148-157	Ten Progressive Farmers	Different areas of District Budgam (J&K)
158-166	Ten Progressive Farmers	Different areas of District Srinagar (J&K)
167	Mr. Cris Zande (Netherland)	Entrepreneur, Cheese Maker, Upper Hills of Phalagam (J&K)
<b>Private Companies</b>		
168	Dr. Vishnu Ameta	Syngenta Limited
169	Mr GN Gharde	Syngenta Limited
170	Dr Narayan Kolekar	Breeder (R&D), Advanta India Limited, Secunderabad (Andhra Pradesh)
171	Dr. Aditya Sharma	Sr. Breeder-Forage millet, Advanta India Limited, Secunderabad (Andhra Pradesh)

## 2-day National Group Meet at SKUAST-K

**Srinagar, May 16:** The two-day National Group Meet of All India Co-ordinated Research Project on Forage Crops and Utilization begins today here at SKUAST-K.

The event is organized by SKUAST-K in collaboration with ICAR at Nund Reshi Convention Centre of the University here.

The meeting was inaugurated by Prof Nazeer Ahmed, Vice-Chancellor who was the Chief Guest on the occasion. Dr J S Chauhan and Dr JS Solanki, ADGs of ICAR were the Guests of Honour.

A spokesperson said the audience included around 120 delegates

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from different SAUs and Centres, Officers/HoDs/Scientists of University, Heads of Line Departments, Progressive farmers and other stakeholders.

A total of ten publications including the Annual Report (Kharif 2015) of AICRP-FC and a book on Oats were released on the occasion," he added.

"Dr M Y Ghani, Associate Director Research presented welcome address. Dr A.K.Roy, Project Coordinator, AICRP-FC presented the review of the project work. Dr Gul Zafar presented the vote of thanks. Scientists are expected to deliberate upon various issues related to fodder development/ production and technology generation in 2 days National Group Meeting," he said.

Vice-Chancellor speaking on the occasion informed that livestock production and agriculture are complementary to each other and both are crucial for overall food security and 65-70 per cent of the population is dependent on agriculture for their livelihood and contribute 14.10 % to GDP while Livestock contributes 4% to national GDP and is a source of employment and livelihood for most of the population in rural areas.

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## National Group Meet on Forage Crops concludes at SKUAST-K

Rising Kashmir News

**Srinagar:** Principal Secretary Agriculture Production Department Sundeep Kumar Nayak pitched for promotion of Agriculture-Tourism, the dream project of the state Chief Minister.

He advised the scientists while devoting their efforts for meeting the feed and fodder requirements of the livestock advised to focus on promotion of Agri-Tourism sector in the State which has a huge potential. Nayak was speaking while speaking during Two Days National Group Meet of All India Co-ordinated Research Project Forage Crops & Utilization organized by SKUAST-K in collaboration with ICAR held today on 17th of May, 2016 at Shalimar Campus.

He was Chief Guest of the Valedictory function. He further complimented the University for research attainments in the field of rice and animal husbandry sector and was happy to see the university scientists' efforts in these directions. He also appreciated the Vice-Chancellor and the Indian Council of Agricultural



Research for hosting this event at the University and assured the path for implementation of the recommendations in the state which have emerged from the different technical sessions for benefit of the farmers.

Vice-Chancellor SKUAST-Kashmir Prof. Nazeer Ahmad while speaking exhorted upon the scientists to focus their research on high yielding varieties of forage crops containing amino acids / proteins besides genetic enhancements in forages and animal feed.

He also advised scientists to double their efforts for developing drought resistant and cold tolerant varieties to augment the requirement and added that scientists need to study

the forage crops grown in other parts of the world having high success rate for adoption in the similar agro climatic conditions of the country to augment the requirements of the country's huge population of animals.

Advocating for further augmenting deficiencies, he asserted that Horticulture-Pastoral Systems is also a viable solution to meet the additional feed and fodder requirements of the livestock. He thanked the scientists for making to come to Srinagar from different parts of the country for participation in the two days event.

At the same time appealed them all to be the ambassadors of peace in their respective universities and States for inducing friends and col-

leagues to visit Kashmir valley.

Vice-Chancellor also requested the ICAR for enhancing the capacity of the Forage Centre of the university in terms of providing additional manpower in the field of Plant Protection and Entomology to have the desired results and thanked the ICAR for holding the event in the University and expected that deliberation held during the two days event will be useful for adoption at the national level and also at the state level as well. He also complimented the scientists and the officials of the university in successfully handling the event.

Earlier Chairmen of the technical sessions presented their findings and recommendations for adoption at the national level with reference to the State of Jammu & Kashmir. During the event eight technical sessions were held where scientists presented their attainment.

Dr. P.C. Roy, Project Coordinator of the AICRP of Forage Crops presented the brief account of activities undertaken during the two days event.

## Commercial Taxes Deptt asks traders to file returns

**SRINAGAR:** The Commercial Taxes Department, J&R Government, has no feed that such dealers whose annual gross turnover is Rs. 20 lakh and above shall have to file their periodical returns along with due payments electronically in the first quarter of financial year 2016-2017.

"All dealers and other stakeholders registered under VAT/GST/ CST and whose annual gross turnover is Rs. 20 lakh and above to file their periodical returns and due payments in electronic mode only," Additional Commissioner (Administration), Commercial Taxes Department, Kashmir, said.

The Additional Commissioner said the Commercial Taxes Department, Jammu and Kashmir, has rolled out the facility of filing e-returns and e-payments few years back.

With this facility the dealer can file his/her periodical returns and payments to Commercial Taxes department electronically through internet on department's website. The registered dealers are already availing the facility successfully.

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- Animal Science
- Fisheries Science
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**National Group Meeting of All India Coordinated Research Project (Forage Crops & Utilization) Organized**

16-17 May, 2016, Srinagar

National Group Meeting Kharif 2016 of All India Coordinated Research Project (Forage Crops & Utilization) was organized at SKUAST-K, Srinagar (May 16-17, 2016).

Prof. Nazeer Ahmed, Vice-Chancellor in his inaugural address emphasized on the fact that livestock production and agriculture has been complementary since long and are crucial for overall food security and stability. In J&K state, it is the backbone of rural economy as almost all farming households are either wholly or partially dependent on the livestock – pasture as one of their component of livelihood.

Dr. A. K. Roy, Project Coordinator, AICRP-FCU presented the brief account of AICRP project and forage-livestock scenario in J&K. He also highlighted the activities undertaken by the project during the Kharif 2015.

Speaking at the occasion, Dr. J. S. Chouhan, ADG (Seeds), ICAR, highlighted the importance of forages in the nutrition security and livelihood. He further said the acreage under forages is difficult to increase hence; efforts should be made to increase productivity and explore new niches. He also suggested revisiting the information on area and production of pasture and fodder resources of the country, in general and hilly terraces in particular.

The guest of Honour, Dr. I.S. Solanki, ADG (FFC), ICAR, urged to develop nutritionally superior varieties of forage crops especially range grasses and legumes (TNFC-0924) proposed by TNAU, Coimbatore for NE Zone. It also recommended forage crop production and protection technologies for adoption.

Ten publications including the Annual Report and extension bulletin in regional languages were released. The meeting also identified one variety of cowpea (TNFC-0924) proposed by TNAU, Coimbatore for NE Zone. It also recommended forage crop production and protection technologies for adoption.

The meeting consisted of ten technical sessions in which, the results based on last year's technical programme were presented and discussed. Technical programmes for 2016-17 were formulated in discipline wise concurrent sessions and finalised in the plenary session.

More than 120 forage scientists, experts and practitioners from public (SAUs & ICAR) and private (Seed companies) institutions participated in the meeting. More than 100 local farmers were present and interacted with the scientists.



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