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



**Proceedings of the National Group Meeting- Kharif
held at
OUAT, Bhubaneswar
during
May 7-9, 2011**

**Project Coordinating Unit
All India Coordinated Research Project on Forage Crops
IGFRI, Jhansi- 284 003 (U.P.)**

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AICRP ON FORAGE CROPS
Tech. Pub. Number – 2 /2011

Proceedings of the National Group Meeting: Kharif 2011
(Held at OUAT, Bhubaneswar, during 7-9 May, 2011)

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June 2011

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PREFACE

The National Group Meet, *Kharif 2011* of All India Coordinated Research Project on Forage Crops was organized with the objective to review the accomplishments of Technical Programme executed at different Centres during *Kharif 2010*, in-house research activities and conductance of FTDs, and also to formulate Technical Programme for *Kharif 2011* as well as to suggest future programmes in the thrust areas. The meeting was jointly organized by Indian Council of Agricultural Research and OUAT, Bhubaneswar, during May 7-9, 2011.

The meeting was attended by the scientists mainly engaged in forage research working under coordinating and collaborating Centres located at different SAUs, ICAR Institutes and NGOs. Representatives from NDDB, NSC, SFCl, private seed companies also participated in the programme and being important stake holders contributed in development of the programmes and linkages strengthening future course of action keeping in view the changing agricultural scenario. Besides this the local participation included faculty from OUAT, Bhubaneswar, officials from Department of Animal Husbandry, representatives from media and farmers of the region.

This compilation contains brief report of National Group Meet, *Kharif 2011* covering highlights on forage production and protection technology generated, proceedings of different technical sessions and technical programme for the coming *Kharif* season. The deliberations and discussions on the various aspects of forage improvement have added aspects of future research for addressing of national and regional problems pertaining to forages. The finalized technical programme on forage crop improvement, forage crop production and forage crop protection for *Kharif 2011* have been given in annexure(s).

The successful conductance of programme is attributed to joint efforts made by the participating scientists, authorities of OUAT, Bhubaneswar and the Council, the core staff of Project Coordinating Unit, Principal Investigators and other staff. The team of All India Coordinated Research Project on Forage Crops sincerely acknowledges their technical and organizational assistance and cooperation for successful organization of this meeting.

S A Faruqui
Project Coordinator



INAUGURAL SESSION

The inaugural session of the National Group Meet, *Kharif* 2011 of AICRP on Forage Crops was organized at OUAT, Bhubaneswar (Orissa) during 7-9 May 2011. The meeting was inaugurated by Dr. D. P. Ray, Hon'ble Vice-Chancellor, OUAT, Bhubaneswar, who chaired the function. The other dignitaries on the dais included Dr. M. M. Panda, Director Research, OUAT, Bhubaneswar and Dr. J. M. Gulati, Head, Department of Agronomy, OUAT, Bhubaneswar. Dr. M. M. Panda, Director of Research, OUAT, Bhubaneswar extended welcome to the chief guest, dignitaries, participating scientists, team of NGM organizers, OUAT staff, representatives of press and media, NGO's and farmers of the region.

Dr. S. A. Faruqui, Project Coordinator (Forage Crops) presented the Coordinator's Report for *Kharif* 2011. He highlighted the progress of research activities and the targets achieved as per the Technical Programme under the project. During *Kharif* 2010, the research activities were conducted at 39 Centres located in Five Zones i.e., Hill, North-West, North-East, Central and South Zone, on aspect of forage crop improvement, forage crop production and plant protection. In *Kharif* 2010, nineteen breeding trials of six annuals and six perennials forage species comprising 83 entries along with their respective checks were conducted at 39 Centres located in five zones. The forage species evaluated were maize, pearl-millet, cowpea, rice-bean, soybean and Dinanath grass in annuals and guinea grass, *Cenchrus ciliaris*, Bajra Napier hybrid, *Setaria ancep*, *Lasiurus sindicus* and *Cenchrus setigerus* in perennials. Thirteen forage crop production trials at 22 locations were under taken to generate forage production technologies and improved forage varieties. Forage crop protection trials included pest occurrence, evaluation of varietal resistance in improved breeding trials and pest management were conducted at Anand, Hisar, Hyderabad, Jhansi, Ludhiana, Palampur and Rahuri. For monitoring the disease, insect-pests and nematodes four cultivated forage crops Sorghum, pearl-millet, maize and cowpea were screened for the occurrence and abundance of disease and pest in relation to weather parameters.

Dr. D. P. Ray, Chief Guest of the function strongly advocated the incorporation of sustainable intensive fodder production in problem soils like saline, sodic, acidic, degraded and water logged, forage production in integrated farming system based on watershed approach, integrated nutrient management, integrated pest management etc.

Dr. J. M. Gulati, Head of Department, Agronomy suggested that in agronomy-soil trials nutrient balance after cropping sequence should be included in addition to other parameters of fodder production.

The inaugural function ended with vote of thanks by Dr. J. M. Gulati, Head, Department of Agronomy (OUAT, Bhubaneswar) to the dignitaries and participants for their valuable presence inaugural session. He also extended gratitude to the faculty members and staff of OUAT, Bhubaneswar for their support in organization of National Group Meet of AICRP on Forage Crops.

Highlights: Technology Generated

A. Forage Production Technology

- A long term experimental findings in North west zone revealed that at Pantnagar application of 50% recommended N through inorganic + 50% N through FYM +100% PK through inorganic fertiliser in paddy-berseem - maize + cowpea resulted in higher green fodder equivalent yields of 2478 q/ha and net return of Rs. 55,216 /ha/year. At Hisar, 50% of recommended N through inorganic fertilizer + 50% N through FYM+100% PK through inorganic fertiliser in sorghum – berseem realized highest green fodder equivalent yield (1125 q/ha) and net return (Rs. 31,068 /ha/year). Application of 50 % of recommended N through inorganic fertilizer+ FYM 25 % N + bio-fertilizer +100% PK through inorganic fertiliser in sorghum (fodder) + Moth (grain) – Barley (grain) + Lucerne (fodder) at Bikaner produced higher green fodder equivalent yield of 877.56 q/ha with net return of Rs. 58,092 /ha/year.
- In central zone at Rahuri, application of 25% of recommended N through FYM + 50% N & 100% PK through inorganic fertilisers + Biofertilizer to Sorghum+ Cowpea (fodder)- Lucerne cropping sequence resulted in significantly higher green fodder equivalent yield of 1879.85 q/ha with net return of Rs. 68,437/ha /year.

B. Forage Protection Technology:

- The plant protection trial “Management of cowpea sucking pest and yellow mosaic virus in seed crop” has been completed after three years of testing at six locations. Spraying of Imidacloprid 17.8 SL @ 0.3 ml/l at 15 days interval (best among all the treatments) yielded Rs. 11300/- per ha benefit over control. Whereas spraying of *Verticillium leccani* @ 5 g/l at 10 days interval (best non chemical treatment) gave the benefit of Rs. 7280/- per ha over control.

TECHNICAL SESSION – I

REVIEW OF RESEARCH ACTIVITIES

Chairman	:	Dr. S. A. Faruqui, PC, AICRP-FC
Co-Chairmen	:	Dr. R. V. Kumar, PI, Plant Breeding & Dr. S. R. Kantwa, PI, Agronomy
Reporteurs	:	Dr. J. K. Bisht & Dr. C. K. Kundu

The Session started with introductory remarks by the Chairman. It has been advised that the respective centre should come out with the salient achievements. Project Coordinator discussed about the Forage Technology Demonstration (FTD) conducted by different coordinated centers. Finalization of FTDs has been done in consultation with all the centers and accordingly the demonstrations were allotted. It was decided that all the centers will take up the FTDs for newly released varieties which were identified for the region. Data should be recorded properly for these FTDs. The Project Coordinator stressed that every centre has to inform about the status and characterization of germplasm available with them. After this, center wise presentation started. The Centre-wise important point are as below:

- Palampur centre has a good collection of *Setaria* grass. Out of which two (S-20 & S-21) were found frost tolerant and 9 were having low oxalate content.
- Srinagar center had collected maize germplasm from different locations.
- Bikaner centre is having good number of *Lasiurus indicus* germplasm and they are doing good work for fodder production under desert conditions
- House suggested Pantnagar for the characterization of forage cowpea germplasm available with them.
- In eastern region, Faizabad centre highlighted the characters of promising Bajra variety. The centre has released NDFB-2.
- Good number of rice bean and maize germplasm are being maintained at Kalyani centre.
- Ranchi centre has worked on development of forage maize and got 20 new forage entries from NBPGR.
- The work on transfer of forage production technology by Jorhat center was appreciated.
- Jabalpur center has identified distinguishing characters of different soybean germplasm.

- It was advised to Anand center that there should be separate programmes under states scheme and AICRPFC.
- For Rahuri, it was suggested that they should give more emphasis on maize and pearl millet rather than Sudan grass.
- Urulikanchan centre has participated in special breeding programme for maize and pearl millet and their transfer of technology programme was appreciated.
- Hyderabad center was advised to concentrate more on the in house breeding programme and should provide the data in proper format.
- Coimbatore centre has a good programme on Bajra Napier hybrid.

Some of the important recommendations emerged out after thread bear discussion:

- All the germplasm available with different centers need to be characterized and IC numbers should be obtained from NBPGR. Centres showed concern for protection of germplasm while under characterization because of damage by birds and other animals and requested for some provision of providing protective nets etc.
- Every center will make a compilation regarding the entries submitted by them to IVTs during last five years and their status there after. The report is to be submitted to PC unit.
- To strengthen the forage improvement programme research teams were formulated :
 - i.* Poly cross nursery programme on lucerne was suggested to continue. A team lead by Anand centre was formulated with other team members from Pune, Coimbatore, Rahuri and Mandya centre.
 - ii.* For Bajra Napier hybrid programme, team will be led by Coimbatore center Pune, Vellayani, Hyderabad, Bikaner, Mandya and Jorhat are the other members. Bikaner and Hyderabad center will help in providing the good germplasm of Bajra and Jorhat for Napier.
 - iii.* For maize, the team leader will Pune and other members are from Rahuri and, Anand
 - iv.* For rice bean, Kalyani will lead and members will be Bhubaneswar, Jorhat, Jabalpur and Vellayani.

The session was concluded with the thanks to Chair.

TECHNICAL SESSION - II (Concurrent)

FORMULATION OF THE TECHNICAL PROGRAMME FORAGE CROP IMPROVEMENT

Convener: Dr. R. V. Kumar, Principal Scientist and PI (Plant Breeding)
Reporteurs: Prof. D. K. De and Dr. D. I. Sumabai

The session started with introductory remarks by Dr. R. V. Kumar, Principal Scientist and Principal Investigator (Plant Breeding). At the outset, Dr. Kumar highlighted the results of 19 breeding trials comprising of 83 entries tested at 39 locations during Kharif-2010. Altogether there were six annuals namely, Maize, Pearl millet, Cowpea, Rice bean, Dinanath grass and Soybean and six perennials namely, Guinea grass, *Cenchrus ciliaris*, *Cenchrus setigerus*, *Lasiurus indicus*, Bajra Napier hybrid, and *Setaria ancep*. However, two trials in annuals i.e., one on Forage Pearl millet and other on forage rice bean have completed their final year of evaluation. One trial in perennial viz., Guinea grass has also completed its fourth and final year of evaluation.

- In Pearl Millet IVT, three entries namely NDFB-904, RBB-1, and PAC-981 were promoted to the AVTPM-1 for further evaluation. The entry PAC-981 in spite of being hybrid in nature was considered for promotion due to its superiority over national check varieties RBC-2 and Giant Bajra as there is no hybrid check variety in forage pearl millet.
- In forage cow pea two entries namely MFC-09-1 and RR-3 were promoted to AVTC-1. The entry RR-3 was promoted to AVT-1 in last Kharif-2010 NGM, but due to lack of sufficient seed material this entry was not included.
- In case of cowpea AVTC-1, two entries namely MFC-08-14 and IL-1177 were promoted to AVTC-2 for testing in North East and South Zone only based on its performance in these two zones. As per discussion in house, it was decided that the entries which were tested in less number of locations in AVTC-1, should be evaluated in all the locations of respective zones in AVTC-2. Simultaneously, AVTC-2 (Seed) trial has been formulated.
- In rice bean IVT, three entries namely BFRB-15, JRB-13 and JRBJ-05-4 have been promoted to AVT-1.
- In case of soybean AVT-1, two entries namely JS07-24-13 and JS07-24-8 were promoted to AVT-2 on the basis of superiority. However, due to lack of sufficient quantity of seed, the agronomy and seed trial could not be formulated this year.

- All the perennial trials viz., VT Sewan-2010, VTGG-2009, VTGG-2008, VTCC-2008, VT B X N hybrid-2008, VT *C. setigerus*-2010 and VT Setaria-2008 will be continued for evaluation in Kharif-2011.
- Three new trials, one each in Fodder Pearl Millet, Cowpea and Rice-bean have been formulated.

The meeting ended with vote of thanks to the Chair.

**TECHNICAL SESSION II (CONCURRENT)
FORMULATION OF TECHNICAL PROGRAMME
FORAGE CROP PRODUCTION**

Convener : Dr. Naveen Kumar and Dr. S.R. Kantwa
Reporteurs : Dr. N.S. Yadava and Dr. K.K. Sharma

Session began with introductory remarks of Dr. Naveen Kumar. Delegates welcome Dr. S. R. Kantwa newly joined Sr. Scientist (Agronomy) at PC unit in the Project. Dr. Naveen Kumar emphasized that while reporting the data, replicated data must be sent along with mean tables and ensure timely dispatch also. 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. On-going technical programme was discussed in detail. A trial on integrated nutrient management in forage based crop sequence has been concluded this year in NW zone. Eight ongoing trials will be continued. In addition these trials, one coordinated trial on quality aspect entitled "Effect of growing environment and nitrogen levels on production and quality of BN hybrid", two location specific trials (1. Effect of levels of nitrogen on productivity of perennial grasses with and without tree shade; 2. Optimization of nitrogen for maize in different forage based cropping system) and one AVT based (cowpea) trials have also been formulated. An exploratory trial on effect of cutting and nitrogen management on production and quality of hybrid Napier will be conducted at Urulikanchan and Dapoli centres.

Following recommendations were emerged out:

- A long term experimental findings in North west zone revealed that at Pantnagar application of 50% recommended N through inorganic + 50% N through FYM +100% PK through inorganic fertiliser in paddy- berseem - maize + cowpea resulted in higher green fodder equivalent yields of 2478 q/ha and net return of Rs. 55,216 /ha/year. At Hisar, 50% of recommended N through inorganic fertilizer + 50% N through FYM+100% PK through inorganic fertiliser in sorghum – berseem realised highest green fodder equivalent yield (1125 q/ha) and net return (Rs. 31,068 /ha/year). Application of 50 % of recommended N through inorganic fertilizer+ FYM 25 % N + bio-fertilizer +100% PK through inorganic fertiliser in sorghum (fodder) + Moth (grain) – Barley (grain) +

Lucerne (fodder) at Bikaner produced higher green fodder equivalent yield of 877.56 q/ha with net return of Rs. 58,092 /ha/year.

- In central zone at Rahuri, application of 25% of recommended N through FYM + 50% N & 100% PK through inorganic fertilisers + Biofertilizer to Sorghum+ Cowpea (fodder)- Lucerne cropping sequence resulted in significantly higher green fodder equivalent yield of 1879.85 q/ha with net return of Rs. 68,437/ha /year.

Meeting ended with vote of thanks to the Chair.

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

Convener : Dr. S. A. Faruqui, PC (FC), Jhansi.
Repporteurs : Drs. D.K. Banyal and A.B. Tambe

Crop Protection Scientists of the Forage group discussed in detail the result of the last *kharif* season along with the on going technical programme. Scientists of the group 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. Based on the discussions and advices of the Chairman the following recommendations emerged.

- The trials PPT-1, 2, 7, 9 and 10 will continue in *kharif* 2011. The varietal evaluation against diseases and pests should be done in sick plots, wherever available.
- The PPT-8 entitled "Management of cowpea sucking pest and yellow mosaic virus in seed crop" has been completed for three years and best treatments viz., chemical treatment (spraying of imidacloprid 17.8 SL @ 0.3 ml/li at 15 days interval) and non-chemical treatment (spraying of *Verticillium lecanii* @ 5g/lit at 10 days interval) will be validated as PPT-12 for one year on large plots.
- A new experiment PPT-13, entitled "Effect of foliar diseases and insect-pests on quality parameters of forage cowpea" was proposed in collaboration with Biochemists and to be conducted at Anand, Rahuri, Hyderabad, Palampur and Ludhiana. This programme would be a collaborative programme for Plant Protection and Biochemistry scientists.

The session ended with vote of thanks to the Chair

TECHNICAL SESSION III PRESENTATION OF DISCIPLINE WISE REPORT

Chairman : Dr. J. M. L. Gulati, Professor & Head,
Department of Agronomy, OUAT, Bhubaneswar
Co-Chairman : Dr. S. A. Faruqi, Project Coordinator, AICRP on FC
Repporteurs : Dr. K. Velayudham and Dr. M. Shanti

The session started with presentation of crop improvement report for *kharif* 2010 by Dr. R. V. Kumar, PI (Plant Breeding).

Forage Crop Improvement: The house was informed that altogether 19 trials with 83 entries were tested through out the country involving both annuals and perennials with a success rate of 90% during *Kharif* 2010.

In IVTPM, entries NDFB—904, RBB-1 and PAC-981 were found deserving to be promoted to AVT-1 level. In AVTPM-2 the trial was completed its testing period. Entries with better performance were JHPM-08-1, AFB-3 and AFB-4 and they emerged superior over checks. In IVTcowpea, the entry MFC-09-1 was found to be promising and could be promoted to AVT-1. Entries IL-1177 from Jhansi and entry MFC-08-14 from Mandya emerged superior to national checks in AVT-1 in cowpea and could be promoted to AVTC-2. Among Soybean entries JS-07-24-13 and JS-07-24-8 were selected for AVT-2. Promising entries in IVT and AVT Rice bean were mentioned.

All existing seven perennial trials will be continued for *Kharif* 2011. In VTGG-07(4th yr) only one entry JHGG-07-2 was found to be superior to the three national checks.

In IVT maize and Dinanath grass none of the entries were found superior to the national checks. The PI (Plant breeding) opined that some good promising cultures have to be developed in these crops.

Crop Production:

Dr. Naveen Kumar, Senior Agronomist presented the work done during *Kharif* 2010. A total of 13 experiments were conducted at 22 locations among which 6 trials were conducted in network mode, 5 as location specific trials and 3 as AVTs in different crops. The success rate of experimentation was 96%. The results of concluded trial 'INM in food-forage based cropping system' from North West zone (Pantnagar, Hisar and Bikaner) were presented.

The trial entitled 'Optimizing N for sorghum in different cropping systems' conducted at Ludhiana and Panthnagar centres revealed that berseem-sorghum system gave the best green fodder yields at Ludhiana.

Nitrogen applied at 125% of RDF to sorghum gave highest green fodder yields at Panthnagar. In AST-4 i.e., 'Forage production potential of multi-cut sorghum with forage legumes under varying seed rates of intercrop', the crude protein content of green fodder increased due to intercropping legumes in sorghum.

Highest green fodder yields in fodder sorghum were achieved at Ludhiana when weed control was taken up with pre-emergence application of Atrazine 0.75 kg/ha + stomp 2.5 l/ha. In trial, 'Effect of N levels on forage yield of promising entries of pearl millet under rain-fed conditions' none of the entries surpassed the national check Gaint Bajra. In AST-14, 'Effect of P levels on forage yield of promising entries of Rice bean' higher GFY was realized at 30 Kg P₂O₅/ha at Jorhat and Kalyani. At Jabalpur, significant response was observed upto 60 kg P₂O₅/ha.

Crop Protection:

Dr. D. K. Banyal, Plant Pathologist presented the results of 6 trials conducted at 8 locations. The commonly observed pest and disease complex in Kharif crops at different centres were presented. The results of trial viz., 'Evaluation of varietal trials for resistance to diseases, insect pests and nematodes in cowpea, maize and pearl millet, soybean, rice bean and maize' were presented.

Seed treatment with vitavex @ 2 g/kg + Mancozeb spray @ 0.25 % provided maximum disease control (47%) in fodder maize and also gave maximum green fodder yield at both locations Palampur and Ludhiana.

Seed treatment with Imidacloprid @5g/kg + followed by foliar spray with Imidacloprid @0.3ml/l at 15 days interval gave the best results in control of sucking pests and Yellow mosaic virus in cowpea seed crop. Similarly for management of shootfly in fodder sorghum foliar spray of imidacloprid 0.3ml/l 10 days after sowing gave the best control(>50%) at Hyderabad while at Jhansi seed treatment with thiomethoxam @ 2 g/kg seed was found to be effective.

Management of root rot disease in cowpea at Bhubaneswar could be successful with seed treatment with *Trichoderma viridae* @ 5g/kg seed + FYM @ 2 t/ha.

The Chairman suggested that the scientists should work out economics wherever high cost inputs are involved for crop production and protection.

The session concluded with the thanks to Chair.

TECHNICAL SESSION IV STRENGTHENING FORAGE RESOURCES

Chairman: Dr. J. M. L. Gulati, Head, Department of Agronomy, OUAT

Co-Chairman: Dr. S. A. Faruqui, Project Coordinator

Repporteurs: Dr.R. V. Kumar and Dr.V. K. Sood

The session started with introductory remarks by the Chairman. In this session there were two speakers. The first speaker was Dr. G. Prabhakar Babu, Manager (Marketing), Advanta India Limited and his topic was "Role of Private Sector in Forage Crops: R & D". The following points emerged out from this presentation:

- India ranks first in milk production with 3.4 % CGAR. Local breeds of cattle are decreasing and exotic breeds are increasing.
- Uttar Pradesh, Madhya Pradesh, Maharashtra, Rajasthan, West Benagal and A.P. are having maximum number of livestock populations.
- Uttar Pradesh ranks first in milk production followed by Andhra Pradesh and Rajasthan whereas in milk productivity, Punjab ranks first followed by Andhra Pradesh and Gujarat.
- Per day fodder availability as well as average milk productivity is lowest in Uttar Pradesh whereas it is highest in Punjab.
- Average lactation period of Indian cattle population is only 182-200 days against standard lactation periods of 300 days.
- In Kharif, SSG has maximum share in fodder market followed by fodder sorghum and bajra whereas in Rabi maximum share is with oats followed by berseem.
- Fifty five percent of forage market lies with Northern India whereas 31 % is with southern India.
- To fulfill the cattle requirement with high nutritional, high palatable and high yielding forage crops, Advanta India Ltd. has come out with certain products i.e., Nutrified, Sugargraze, Jumbo, Advanta BMR etc in different forage crops. There are other products also available in the market now.

The second speaker was Dr. B. K. Sahoo and his topic was "Strategies for forage production in fragile ecosystem in Eastern India. The points emerged from his presentation are:

- Eastern Indian States account for 28.06 % of cattle population, 27.32 % of goat population, 50.94 % of total pigs population and 26.41 % of poultry population.
- Main reasons behind poor milk production in Eastern Indian States are poor feed and feeding resources, low buffalo population and high population of non-descript cows (Indigenous) which are poor yielder of milk.
- Constraints in fodder production are: small land holding size of majority of farmers, use of paddy straw for feeding of majority of Indigenous cattle, improper linkage system, lack of proper seed chain, over grazing of pasture and grazing lands etc.
- Strategies for higher fodder production are: promotion of intensive/improved fodder production technologies in cultivated fodder areas, treatment of culturable wastelands and area under problem soils, coverage under Joint Forest Management (JFM)/Community Forest management (CFM), scientific utilization of traditional pastures, promotion of Azolla cultivation, fodder seed production, watershed development programme etc.

The session concluded with the thanks to Chair.

TECHNICAL SESSION V BREEDER SEED PRODUCTION

Chairman : Dr. S. A. Faruqui, Project Coordinator, (FC)
 Repporteurs : Dr. R.N. Arora & T. Shashikala

At the out set, the Chairman welcomed all the participants in this session. Dr. R.V. Kumar, PI (Plant Breeding) presented a detailed report on Breeder seed production in forage crops, during Kharif, 2010 and the indents for Kharif, 2011.

1. In Kharif- 2010, a total quantity of 106.62q indent for breeder seed production was received from DAC, GOI for 19 varieties in five major Forage Crops viz, Maize, Cowpea, Pearl Millet, Sorghum and Teosinte.
2. The over all breeder seed production was 42.7 percent higher as evident from seed production of 151.90q against the indent for 106.92q during kharif-2010.
3. The production of Cowpea variety CL-367 couldn't take place due to heavy rains. Simultaneously, seed yield of Teosinte variety TL-1 was less i.e. 6q as against indent of 10q due to crop damage by heavy rains.
4. The breeder seed indent for Kharif -2011 in five major crops namely, Maize, Cowpea, Pearl millet, Sorghum & Rice bean is 363.55q, which is three times more than the last years indent.
5. In case of Cowpea variety HFC-42 -1 is replaced with the variety Haryana Lobia-88(CS-88) since variety HFC-42-1 has become highly susceptible to CYMV, and it is out of seed chain, more over its nucleus seed is not available.
6. Dr. R.K. Yadav, Head Forage Section, CCSHAU, Hisar will act as Nodal person for the breeder seed production at Hisar centre.
7. In case of Sorghum the indented variety S-513 may also read as HJ-513, since it was notified in the name of HJ-513.
8. For the sorghum variety Gujarat Fodder Sorghum- 5, the availability of nucleus seed and notification details will be informed to the PC unit by concerned centre.
9. Variety wise indents for the crops cluster bean and Teosinte was not reflected on DAC indent. It was decided that the same if placed afterwards will be informed to concerned producing centres later.

The session ended with vote of thanks to the chair

TECHNICAL SESSION -VI PLENARY SESSION

Chairman : Dr. M. M. Panda, Director Research, OUAT
 Co-chairman: Dr. J. M. L. Gulati, Head, Department of Agronomy, OUAT
 Convener: Dr. S. A. Faruqui, Project Coordinator, Forage Crops
 Reporteurs: Dr. R. V. Kumar and Dr. S. R. Kantwa

The session started with introductory remarks of the chairman. He invited the reporteurs of different technical sessions for presentation of proceedings. The aspects and major issues related to Kharif-2010-11 programme in specific and forage research in general were discussed. The recommendation of technical session were discussed and accepted after approval of the house. Keeping in view the future challenges, some specific recommendations were also made for strengthening of forage research and development in the country.

- Centres were advised to send the replication-wise raw data of trials conducted during last five years to the PC (FC) Unit to submit at ICAR headquarter. It has to be a time bound activity in view of Councils instructions.
- For smooth conducting of FTDs, scientists from the AICRP –FC Centres suggested that funds for conducting FTDs (*Kharif and Rabi*) should be released before start of Kharif season because unless funds are received, Universities does not allow procurement of material required to conduct demonstrations.
- After discussion with scientists it was decided that for organizing the field days/ farmers training a lump- sum amount of Rs. 10,000/ may be allocated to all the AICRP-FC-Centres.
- Scientists also raised the issue of protection of precious fodder germplasm/ breeding lines from stray/ wild animals. After discussion it was decided that suitable need based proposal should be send to PC, AICRP-FC so that financial provision can be made available from flexi budget.
- During explorations for germplasm collection/visits to rural/tribal areas, farmers indigenous technological knowledge (ITKs)and also other practices associated with agriculture should also be collect for proper documentation, validation and packaging in to crop production practices.

- All the germplasm need to be characterized and information/data submitted to NBPGR for allotment of IC number.
- For the protection of the released varieties, these should be registered under PPV& FR Authority.
- The proposal of testing of one private company entry in pearl millet in AVT -1 was also discussed in view of the guidelines from the Council that it is to be decided in the Group Meeting chaired by the DDG (CS). Since DDG (CS) could not participate in the NGM, it was decided that since the entry has been tested in IVT previous season as per previous guidelines it may be tentatively included and permission from competent authority (DDG (CS) may be obtained prior to testing this variety.

Dr. B. K. Sahoo, OIC, AICRP-FC, OUAT, Orissa extended vote of thanks to the ICAR authorities, Project Coordinator and his team, participants, local team and media for successful conductance of National Group Meet at the end of Session.

Dr. S. A. Faruqui, Project Coordinator (Forage Crops) also expressed thanks on behalf of ICAR authorities, and the Coordinating Unit to Vice-Chancellor, OUAT, Orissa, Director research, Chairman and members of organizing committee and all the other staff involved in organization of this meeting for providing all facilities and support for successful conductance of the meeting.

The meeting ended with vote of thanks to the chair.

AICRP ON FORAGE CROPS

FINALIZED TECHNICAL PROGRAMME FOR KHARIF - 2011

(A) FORAGE CROP IMPROVEMENT (PLANT BREEDING)

(a) COORDINATED TRIALS

Abbreviations:

HZ= Hill Zone, NWZ= North West Zone, NEZ =North East Zone,
CZ= Central Zone, SZ= South Zone.

1. IVTPM : Initial varietal trial in Forage Pearl millet (NEW)

Entries No. : **4 + 3 checks**
 Entries Name : (2-Anand,1-Faizabad, 1-Bikaner)
 Checks : Raj Bajra Chari-2, Giant Bajra , AVKB-19
 Design : RBD with 3 replications
 Plot size : 4 m x 1.8 m accommodating 4 m long 6 rows at 30 cm
 Seed rate : 15 kg/ha (15 g /plot)
 Fertilizers : 40 : 20 kg/ha (N : P) basal
Seed requirement from contributors: 1.25 Kg /entry

Location: (20): NWZ- Ludhiana, Hisar, Bikaner, Jalore, Bawal, Udaipur NEZ- Faizabad, Pusa , Bhubaneswar, CZ- Anand, Raipur Jabalpur, Rahuri, Urulikanchan, Jhansi, Jamnagar SZ- Hyderabad, Dharwad (IGFRI- RRS), Coimbatore, Mandya

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.

2. AVTPM -1: First Advance Varietal Trial in Forage Pearl millet

Entries : **3+ 2 checks**
 Checks Raj Bajra Chari-2, Giant Bajra
Entries Promoted from IVT 2010: NDFB-904, RBB-1, PAC-981
 Design : RBD with 4 replications
 Plot size : 4 m x 3.0 m accommodating 4 m long 10rows at 30 cm.
 Seed rate : 15 kg/ha (20 g /plot)
 Fertilizers : 40 : 20 kg/ha (N : P) basal
Seed requirement from contributors: 1.750 Kg /entry

Location: (18): NWZ- Ludhiana, Hisar, Bikaner, Jalour NEZ- Faizabad, Pusa, Bhubaneswar, CZ- Anand, Jabalpur, Rahuri,

Urulikanchan, Jhansi, Jamnagar, Dhari **SZ**- Hyderabad, Dharwad (IGFRI- RRS), Coimbatore, Mandya

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.

3. IVTC– Initial varietal trial in Forage Cowpea (New)

Entries No. : **6+ 2 (NC) +1 (ZC)**
 Checks : National checks- Bundel Lobia -1, UPC- 5286
 Zonal checks : Bundel Lobia -2 (NWZ); UPC - 622 (NEZ/HZ); UPC 9202 (CZ/SZ)

Entries Name : 1-Mandya, 2-Jhansi, 1-Vellayani , 2-Pantnagar
 Design : RBD with 4 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 (N : P) : 20:40 kg/ha basal

Seed requirement from contributors : 3.00 kg /entry

Location : (25): **NWZ** - Ludhiana, Hisar, Pantnagar, Bikaner, Udaipur **NEZ**- Faizabad, Ranchi , Kalyani, Bhubaneswar, Jorhat, Pusa, Imphal, Shillong **CZ**- Anand, Jhansi , Jabalpur, Rauri, Urulikanchan, Kanpur **SZ**- Coimbatore, Vellayani, Mandya, Hyderabad , Dharwad, Pondicherry

4. AVTC-1: First Advanced varietal trial in Forage Cowpea

Entries No. : **2+ 2 (NC) +1 (ZC)**
 Checks : National checks- Bundel Lobia -1, UPC- 5286
 Zonal checks : Bundel Lobia -2 (NWZ); UPC - 622 (NEZ/HZ); UPC 9202 (CZ/SZ)

Entries Name : MFC-09-1, RR-3
 Design : RBD with 4 replications
 Plot size : 4 m x 3 m accommodating 4 m long 10 rows at 30 cm.
 Seed rate : 35.0 kg/ha (45 g /plot)
 Fertilizers (N : P) : 20:40 kg/ha basal

Seed requirement from contributors : 4.50 kg /entry

Location : (25): **HZ**- Rajouri, Almora **NWZ** - Ludhiana, Hisar, Pantnagar, Bikaner, **NEZ**- Faizabad, Ranchi Kalyani, Bhubaneswar, Jorhat, Pusa, Shillong **CZ**- Anand, Jhansi , Jabalpur, Rauri, Urulikanchan, Kanpur **SZ**- Coimbatore, Vellayani, Mandya, Hyderabad , Dharwad Pondicherry

5. AVTC- 2 : Second Advanced Varietal Trial in Forage Cowpea

Entries : **2+2(NC)+1 (ZC)**
Checks : NC- Bundel Lobia -1, UPC- 5286
Zonal checks : UPC - 622(NEZ/HZ); UPC -9202(CZ & SZ)

Entries promoted from AVT-1: 2010 : MFC-08-14, IL-1177

Design : RBD with 4 replications
 Plot size : 4 m x 3 m accommodating 4 m long 10 rows at 30 cm.
 Fertilizers (N :P) : 20 : 40 kg/ha basal
 Seed rate : 35.0 kg/ha (45 g /plot)
Seed requirement from contributors: 2.50 kg/entry

Location : (12): NEZ- Faizabad, Ranchi Kalyani, Bhubaneswar, Jorhat, Pusa
SZ- Coimbatore, Vellayani, Mandya, Hyderabad , Dharwad
 Pondicherry

Agronomy Trial : Seed requirement – 4 kg**6. AVTC- 2 (Seed): Second Advanced Varietal Trial in Forage Cowpea (Seed)**

Entries : 2+2(NC)+1 (ZC)
Checks : NC- Bundel Lobia -1, UPC- 5286
Zonal checks : Bundel Lobia -2(NWZ);UPC - 622(NEZ/HZ);UPC 9202(CZ & SZ)

Entries promoted from AVT-1: 2010 : MFC-08-14, IL-1177

Design : RBD with 4 replications
 Plot size : 4 m x 3 m accommodating 4 m long 10 rows at 30 cm.
 Fertilizers (N :P) : 20 : 40 kg/ha basal
 Seed rate : 35.0 kg/ha (45 g /plot)
Seed requirement from contributors: 2.50 Kg/entry

Location : (13): NEZ- Faizabad, Ranchi Kalyani, Bhubaneswar, Jorhat, Pusa,
 Shillong **SZ-** Coimbatore, Vellayani, Mandya, Hyderabad ,
 Dharwad Pondicherry

7. IVT (R. bean) ; Initial Varietal Trial in Ricebean (New)

Entries No. : 5 +3(NC)
Check : K-1 (Bidhan-1), Bidhan-2, RBL-6
Entries name : 1-Kalyani, 2-Jorhat, 1-Jabalpur, 1-Bhubneshwar
 Plot size : 4mx 1.8 m accommodating 4 m long 6 rows at 30 cm
 Design : RBD with 3 replications
 Seed rate : 35 kg/ha (35 g/ Plot)
 Fertilizers (N : P) : 20 : 40 kg/ha Basal
Seed Requirement from Contributors: 1.25 kg / entry

Location – (12) :Kalyani, Ranchi, Bhubaneswar, Jorhat, Pusha, Vellayani ,
 Jabalpur, Shillong, Imphal, Raipur, Dapoli, Udaipur

8. AVT-1 (R. bean) ; Second Advanced Varietal Trial in Ricebean

Entries : 03 +1NC
Entries Promoted from IVT 2010 : BFRB-15, JRB-13, JRBJ-05-4
Check : K-1 (Bidhan-1)
 Plot size : 4 x 3 m accommodating 4 m long 10 rows at 30 cm

Design : RBD with 5 replications
 Seed rate : 35 kg/ha (45 g/ Plot)
 Fertilizers (N : P) : 20 : 40 kg/ha Basal

Seed Requirement from Contributors: 2.000 kg / entry.

Location – (8) : Kalyani, Ranchi, Bhubaneswar, Jorhat, Pusa, Vellayani ,
 Jabalpur, Shillong

9. AVT - 2 (Soy)– Second Advanced Varietal Trial in Forage Soybean

Entries : 4

Entries Promoted from AVT-1: 2010 : JS07-24-13, JS07-24-8

Design : RBD with 5 replications
 Plot size : 4.0 m x 3.0 m accommodating 4 m long 6 rows at 30 cm.
 Seed rate : 80.0 kg/ha (1 00g /plot)
 Fertilizers (N : P) : 20:40 kg/ha basal

Seed requirement from contributors : 3.5 kg /entry

Location : (7): Ranchi , Pusa , Imphal, Hisar Jhansi , Jabalpur, Rahuri

10. VT Sewan-2010 (2nd Year) : Varietal Trial in Sewan Grass (*Lasiurus indicus*)

Entries No. : 7

Design : RBD with 3 replications
 Plot size : 4.0 m x 4.5 m accommodating 4 m long 6 rows at 75 cm.

(This trial will be continued in Kharif, 2011)

Location : (5): Jodhpur , Jaisalmer , Bikaner Jalore, Fatehpur Shekhawati

11. VTGG- 2009 (3rd Yr) : Varietal Trial in Guinea Grass (Perennial)

Entries : 7 (including Checks)

National check: Riversdale, PGG-616, JHGG-96-5

Locations:(10): Faizabad, Bhubaneswar, Urulikanchan, Mandya,
 Coimbatore,

Dharwad, Anand, Ranchi, Hyderabad, Vellayani

(This trial will be continued in Kharif, 2011)

12. VT GG –2008 (4th Yr) : Varietal Trial in Guinea Grass (Perennial)

Entries : 10 (including Checks)

Checks : Riversdale, PGG-616, JHGG-96-5

Locations:(8): Faizabad, Vellayani, Dharwad, Mandya, Urulikanchan,
 Ranchi, Bhubneshwar, Anand

(This trial will be continued in Kharif, 2011)

13. VTCC-2008 (4th Yr): Varietal Trial in *Cenchrus ciliaris* (Perennial)

Entries : 6 (including Checks)
National checks : CAZRI-75, IGFRI- 3108

Location : (4): Jodhpur, Jalour , Jhansi , Rahuri,

(This trial will be continued in Kharif, 2011)

14. VT B x N hybrid -2008 (4th Yr) : Varietal trial Bajra X Napier hybrid (Perennial)

Entries : 12 (including Checks)
Checks : CO-3, PNB-233 and NB-21

Location : (16): Vellayani, Rahuri, Mandya, Hydeabad, Coimbatore, Palampur, Faizabad, Dharwad, Almora, Ludhiana, Ranchi, Urulikanchan, Bhubneshwar, Anand, Jabalpur, Pantnagar)

(This trial will be continued in Kharif 2011)

15. VT Setaria-2008 (4th Yr) : Varietal Trial in *Setaria ancep* (Perennial)

Entries : 3+ 2 (NC)
Checks : S-92 , PSS-1

Location (3): Almora, Palampur, Kullu

(This trial will be continued in Kharif 2011)

16. VT *C. setigerus* – 2010 (2nd Yr): Varietal Trial in *Cenchrus setigerus* (Perennial)

Entries No. : 8 (including Check)
National Check : CAZRI-76

Location : (10): NWZ – Jalore, Pali Jodhpur Bikaner CZ- Jhansi , Rahuri, Dhari, Anand SZ- Coimbatore, , Hyderabad

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. In perennial crops seed yield is to be recorded only in final year.
7. Plant height (cm)[In case of Ricebean and Cowpea, vine length should be recorded)
8. Leaf/ Stem ratio
9. Quality attributes

- (a) Crude protein yield (q/ha)
- (b) Crude protein content (%)
- (c) ADF and NDF estimates (%)
- (d) IVDMD%

(B) IN GUINEA GRASS

Days to cutting should be recorded instead of days to 50% flowering. Cuts are to be taken at 12.5 cm height

Note:

1. Green fodder yield data are to be recorded at 50% flowering stage for all the forage crops except guinea grass.

2. All Kharif trials except seed trials are to be conducted strictly under rain-fed conditions.

3. 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.

4. 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.			

(D). For biochemical analysis of the AVT-2 materials, please supply grinded sample, properly tagged and packed, well in time, to the centres identified. These are as follows:

S. No.	Centre identified for biochemical analysis	Centres to supply AVT-2 materials for analysis
1.	Rahuri, MPKV	Rahuri, MPKV; Ranchi, BAU; Jorhat, AAU
2.	Anand, GAU	Anand, GAU; Bhubaneswar, OUAT ; Bikaner, RAU
3.	Hyderabad, APAU	Hyderabad, APAU; Mandya, UAS(B); Coimbatore, TNAU; Vellayani, KAU
4.	Palampur, HPKV	Palampur, CSK HPKV; Pantnagar, GBPUAT; Jabalpur, JNKVV
5.	Ludhiana, PAU	Ludhiana, PAU; Hisar, CCS HAU; Faizabad, NDUAT
6.	Urulikanchan, BAIF	Urulikanchan, BAIF, Kalyani, BCKV
7.	Jhansi, IGFRI (PAR Division)	Jhansi (IGFRI), Avikanagar IGFRI RRS

The Centres identified for biochemical analysis are requested to supply data (entry-wise) timely to the Project Coordinator (FC) and also to the Centre-concerned. This must be practiced strictly. In case, if any centre can do biochemical analysis at its own, it can be done, and the data must be reported timely to the Project Coordinator (FC).

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

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

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

Mean = _____
 SE(m) ± = _____
 CD at 5% = _____
 CV% = _____

Note :

Data for each character and trial must be provided in separate sheet.

- 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.
- Please also provide data cut-wise in case of multicut entries as per data sheet given separately.
- 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 –2011

1. Seed supply from contributors to PC Unit, Jhansi : Before May 25, 2011
2. Trials seed dispatch from PC Unit Jhansi : Before June 05, 2011
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 15, 2011, however, data on seed and quality are to be submitted before January 10, 2012.
6. Reporting of Breeder seed (BSP-IV) : January 10, 2012.

AICRP ON (FORAGE CROPS), IGFRI, JHANSI 284003

SEED REQUIREMENT OF THE CHECK VARIETIES FOR KHARIF - 2010 TRIALS

S. No.	CROP	VARIETY	QUANTITY REQUIRED (kg)		TOTAL (kg)
			Breeding	Agronomy	
1.	Pearl millet	Raj Bajra chari-2	4.00	-	4.00
		Giant bajra	4.00	-	4.00
		AVKB-19	1.25		
3.	Cowpea	Bundel Lobia –1	14.00	4.00	18.00
		UPC-5286	14.00	4.00 + 7.50 (PPT)	25.50 kg
		Bundel Lobia-2	2.00	-	2.00
		UPC-622	5.00	3.00	8.00
		UPC-9202	5.00	3.00	8.00
4.	Rice bean	Bidhan-1	4.00	-	4.00
		Bidhan-2	1.50	-	1.50
		RBL-6	1.50	-	1.50

SOURCE OF SEED MATERIAL TO BE SUPPLIED

1. **Dr. A.H. Sonane**
Sr. Forage Breeder &
I/C AICRP (FC)
MPKV Rahuri- 413722
Forage Crop Variety : Giant Bajra
2. **Dr. U.S. Tiwana**
OIC- Forage Section
PAU Ludhiana 141004
Forage Crop Variety : RBL-6
3. **Dr. N.S. Yadav**
Assoc. Prof. (Agronomy) &
OIC Forage Section
Rajasthan Agricultural University,
Bikaner – 334002 (Rajasthan)
Forage Crop Variety : Raj Bajra Chari-2
5. **Dr. M.G. Gupta**
Head & Nodal Officer –AICRP Works
Div. of Crop Improvement
IGFRI Jhansi – 284 003
Forage Crop Variety : Bundel Lobia-1, Bundel lobia-2
6. **Dr. Y.P. Joshi**
Sr. Agronomist & OIC
AICRP (FC)
GBPUAT, Pantnagar
Forage Crop Variety : UPC-5286, UPC-622, UPC-9202
7. **Dr. R.P. Nagar**
Sr. Scientist (Seed Technology)
IGFRI, RRS, Avikanagar
Forage Crop Variety : AVKB-19
8. **Dr. D.K. De**
Sr. Forage Breeder &
OIC- Forage Section
B.C.K. V., Kalyani – 741235
Dist. NADIA (W B)
Forage crop variety: Bidhan-1, Bidhan-2

Annexure-I.ii

**TECHNICAL PROGRAMME FOR FORAGE CROP PRODUCTION
KHARIF - 2011**

AST-1: Influence of resource conservation techniques on forage production and physico-chemical status of soil

Objectives:

- To study the effect of resource conservation techniques (RCT) on forage yield of the system
- To study the effect of RCT on physico - chemical properties of soil.
- To study the economics of the system.

Year of start : *Kharif* 2009 (Establishment)

Duration : Five years

Methodology

Phase I : (2009)

Studies on initial physico-chemical status of the soil i.e., WHC, Infiltration rate, pH, OC (%), available N,P & K and microbial population .

Formulation of zone specific resource conservation techniques through forage crops in Pilot trial mode.

Phase II : (2010-2011)

Execution of the experiments as per the technical programme in the respective zone

Recording observation on growth, yield and quality in different seasons of the system in each year

Recording observation on soil fertility status after end of the in each year.

Phase III : (2013-14)

Recording final physico-chemical soil status after completion of the study

Computation of data and analysis and preparation of the report

Observations:

Crop growth:

Plant / shoot population at harvest (per m²)

Plant height at harvest

Leaf : stem ratio

B) Yield (q/ha) :

Green fodder

Dry matter

Grain

Straw

Forage equivalent yield

C) Quality:

Crude protein content (%)

Crude protein yield (q/ha)

D) Economics:

Cost of cultivation (Rs./ha)

Gross monetary return (Rs./ha)

Net monetary return (Rs./ha)

Benefit : cost ratio

E) Soil studies:

Soil fertility status before and after completion of the sequence, i.e., pH, OC (%), EC, available NPK .

Microbial population before and after completion of experiment.

F) Soil moisture conservation studies:

Soil moisture data from 0-15 and 15-30 cm depth at initial, 15 days after germination and later on every 30 days interval.

NOTE: Specific observations will be recorded as per experimental need and data will be reported in rabi

1. Hill Zone : (Rainfed conditions)

Subtitle: Effect of vegetative barriers and improved forage species on conservation of degraded grassland

Design : Split

Replication (s) : 3

Treatments :

Main plot -Vegetative barriers

i. No vegetative barrier

ii. Napier Bajra Hybrid

iii. *Setaria***Sub plot - Species**

Local grass

*Setaria**Desmodium**Setaria + Desmodium***Location (2): Palampur and Rajouri****North-West Zone****a) Irrigated conditions**

Subtitle: Effect of different tillage practices on productivity of forage crop in the prevalent crop sequence

Design : RBD

Replication(s) : 3

Treatments

T₁-Conventional tillage – 3 cultivation – disc harrow + 2 cultivator

T₂-2 cultivation – 1 disc harrow + 1 cultivator

T₃-2 cultivation - rotavator

T₄-1 cultivation – disc harrow

T₅-1 cultivation – rotavator

T₆-Broadcast seed before T-3

T₇-Broadcast seed before T-5

T₈-No cultivation (zero tillage)

Locations (3): Ludhiana, Hisar and Pantnagar

b) Rainfed conditions

Subtitle: Conservation of rangelands by incorporating grass species in alleys of improved variety of *Khejari (Prosopis cineraria)*

Design : Split plot

Replications : 3

Treatments

A. Main plot-Alley foliage utilization

- i. 100 % foliage as fodder
- ii. 100 % foliage incorporation as litter
- iii. 50 % foliage as fodder + 50 % foliage as litter incorporation

Sub plot -Grass species

Lasiurus indicus

Cenchrus ciliaris

Cenchrus setigerus

Panicum antidotale

Specific observation:

Rate of decomposition of litter

Nutrient mobilization in rhizosphere

Location (2): Bikaner and Jalore

3. Central Zone:

Sub title: Effect of planting methods and forage crop combinations on fodder productivity through moisture conservation

Design : RBD

Replication(s) : 3

Treatments :

A. Main plot- Moisture conservation techniques

Ridge and furrow

Flat bed

B. Sub plot -Combination of grasses and legumes

Cenchrus + Desmenthus
Cenchrus + Stylosanthes
Dicanthium + Desmenthus
Dicanthium + Stylosanthes

Location (4): Rahuri, Jabalpur, Anand and Urulikanchan

4. North East Zone:

Sub title: Effect of moisture conservation practices on production of perennial grasses

Design : RBD
Replication(s) : 3

Treatments

A. Perennial grasses

Brachiaria brizantha
Guinea grass/ Napier *Bajra* Hybrid
Setaria grass

B. Moisture conservation

Control (Without mulch)
Soil mulch
Live mulch with legume (cowpea / ricebean/berseem)

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

5. South Zone:

a) Sub title: Intensive forage production through silvipasture system under rainfed ecosystem

Design : RBD
Replication(s) : Three

Treatments

T₁ – Subabool + *Cenchrus ciliaris*
T₂ –Subabool + *Stylosanthes*
T₃ –Subabool + *Desmenthus*
T₄ –Subabool + *Cenchrus ciliaris* + *Stylosanthes* (3:1)
T₅ – Subabool + *Cenchrus ciliaris* + *Desmenthus* (3:1)
T₆ – Subabool + Sorghum + Horse gram (2:1)
T₇ – Subabool + Pearl millet + horse gram (2:1)
T₈- Subabool (Sole)

Note: Spacing of subabool – 3 m x 2 m

Locations (3): Hyderabad, Coimbatore and Mandya**b) Sub title: Cassava based sustainable alley farming system for rainfed areas of the humid tropics**

Design : RBD

Replication : 3

Treatments**(A) Grasses**

BN Hybrid

Brachiaria brizantha

No grass

(B) Legumes

Fodder cowpea

No fodder legume

(C) Biofertilizer

VAM

No biofertilizer

Location: Vellayani

AST-2 (AST-3): Optimization of nitrogen for sorghum in different cropping systems

Year of start : Rabi-2009-10 (Hisar centre – Kharif 2011)

Duration : Three years

Design : Split plot

Replications : 3

Plot size : 5mx4m

Treatments : 6x4=24**(a) Cropping System (6)**

Wheat – Sorghum (F)

Wheat – Maize (F)– Sorghum (F)

Wheat – Cowpea (F) – Sorghum (F)

Berseem – Sorghum (F)

Oat – Maize (F)– Sorghum (F)

Oat – Cowpea (F)– Sorghum (F)

(b) Nitrogen Levels (4)

50% of Recommended dose

75% of Recommended dose

100% of Recommended dose

125% of Recommended dose

Note: N levels treatments will be applied to sorghum. Other crops of the sequence will be grown with recommended NPK doses and other packages. Data will be reported after the completion of the sequence in Rabi.

Observations:

A. Crop Growth

- Plant Population/m²
- Growth parameters (Plant height and leaf stem ratio)
- Green fodder, dry matter, forage equivalent and crude protein yield (q/ha)

B. Economics (Rs./ha/year)

- Cost of cultivation
- Gross monetary returns
- Net monetary returns
- Benefit : Cost ratio

C. Nutrient Studies

- Nitrogen uptake by each crop and entire system
- Nitrogen use efficiency
- Soil fertility status before and after completion of sequence

Locations (3): Ludhiana, Hisar, Pantnagar

AST-3 (AST- 4): Forage production potential of Sorghum hybrid with forage legumes under varying seed rates of intercrop

Objectives

To access the effect of seed rate of intercrops on sorghum

Replications : 3
 Design : RBD
 Year of start : *Kharif 2010*
 Duration : Two years

Treatments =9

a. Legumes (2)

Cowpea
 Ricebean/guar

b. Seed rates of legumes (4)

25% of recommended seed rate
 50% of recommended seed rate
 75% of recommended seed rate

100 % of recommended seed rate

Treatments will comprise all possible combinations of a. and b. plus sole stand of Sorghum

Observations:

- Plant height (cm)
- Plant population/ shoot number (per m²)
- Green and dry fodder yield (q/ha)
- Crude protein content (%) and yield (q/ha)
- Economics of production
- Land equivalent ratio (LER)

Note: Seed rate of each crop will be used on the basis of seed ratio in respective treatment. Data will be reported in kharif

Locations (4) : Palampur, Ludhiana, Pantnagar, Bikaner

AST-4 (AST- 5): Performance of Forage crops raised through waste water under varied nutrient levels

Objectives

To access the production and quality of various forage crops raised through waste water under varied nutrient level

To work out the economics

Year of Start	:	<i>Kharif</i> 2010
Duration	:	3 years
Design	:	Split Plot
Replications	:	Three

Treatments

Main Plot -Forage Crops – 4

- C₁ – Cumbu Napier Hybrid grass - CO(CN)4/ APBN-1
- C₂ – Guinea Grass - CO(GG)3
- C₃ – Multicut fodder sorghum - CO(FS)29 / Para grass
- C₄ – Lucerne - CO 1

Sub Plot -Nutrient Levels – 5

- S₀. Control
- S₁- 25% RDF
- S₂ – 50% RDF
- S₃ – 75% RDF
- S₄ – 100% RDF

Observations:

- Plant population / m row, Plant height at harvest, Leaf stem ratio
- Green fodder and dry matter yield (q/ha)
- Crude protein content (%) and Crude protein yield (q/ha)

- Economics (Rs/ha/yr)
- Chemical analysis of waste water, soil and fodder for heavy metals
- Soil fertility at initial and at end of the year

Note: **Data will be reported in Rabi**

Locations (2): Coimbatore and Hyderabad

AST-5 (AST-6): Effect of tillage and nutrient management on productivity of rice – oat cropping system

Objective:

- To study the effect of tillage and nutrient management in oats on the productivity of the system

Design : Split plot
 Replication : 3
 Plot size : 4m x 3m
 Year of start : *Kharif 2010* (Raipur and Jabalpur - Kharif 2011)

Treatment: 12

Main plot – Tillage practices (3)

- S₁. Zero tillage
- S₂. Minimal tillage
- S₃. Conventional tillage

B) Sub Plot - nutrient management (4)

- M₁ – 75 % Recommended Dose of NPK (RD)
- M₂ – 75 % RD + Biofertilizers (*Azotobactor* + PSB)
- M₃ – 100 % RD
- M₄ – 100 % RD + Biofertilizers (*Azotobactor* + PSB)

Note: Tillage and nutrient management will be done in oat crop and residual effect of the treatments will be studied on *Kharif* rice. Data will be reported in Rabi.

Observations:

- Initial and final status of soil fertility and microbial population
- Yield of grain and straw for rice
- Yield of green and dry matter of oat
- Weed studies
- CP% and CP yield of oat
- Economics.

Locations (6) : Bhubaneswar, Ranchi, Kalyani, Jorhat, Raipur and Jabalpur

AST 6 (NT): Effect of growing environment and nitrogen levels on production and quality of BN Hybrid

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

Design : RBD
Replications : Three
Year of start : Kharif 2011
Duration : 3 years
Treatments : 10

Growing environments:

1. Shaded
2. Unshaded

Nitrogen levels :

1. 25% of recommended
2. 50% of recommended
3. 100% of recommended
4. 125% of recommended
5. Control

Observations:

Crop growth and development

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

Quality studies

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

Soil studies

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

Economic studies

- Net returns (Rs/ha)
- B:C ratio

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

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

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

B- LOCATION SPECIFIC TRIALS

AST- 7 (NT): Optimization of nitrogen for maize in different forage based cropping systems

Year of start	:	<i>Kharif-2011</i>
Duration	:	3 years
Design	:	Split plot
Replications	:	3
Plot size	:	5m x 4m
Treatments	:	4x4=16

(a) Cropping System (4)

Maize	– Cowpea	– Oat
Maize	– Ricebean	– Oat
Maize	– Cowpea	- barley
Maize	– Rice bean	- barley

(b) Nitrogen Levels (4)

- 50% of Recommended dose
- 75% of Recommended dose
- 100% of Recommended dose
- 125% of Recommended dose

Observations:**A. Crop Growth**

- Plant Population/m²
- Growth parameters (Plant height and leaf stem ratio)
- Green fodder, dry matter, forage equivalent and crude protein yield (q/ha)

B. Economics (Rs./ha/year)

- Cost of cultivation
- Gross monetary returns
- Net monetary returns

Benefit : Cost ratio

C. Nutrient Studies

- Nitrogen uptake by each crop and entire system
- Nitrogen use efficiency
- Soil fertility status before and after completion of sequence

Note: N levels treatments will be applied to maize. Other crops of the sequence will be grown with recommended NPK doses and other packages. Data will be reported in Rabi.

Locations (1): Shillong

AST- 8: Effect of soil amendments on productivity of rice-berseem and changes in soil properties of sodic soil

Year of start	:	<i>Kharif 2009</i>		
Duration	:	Five years		
Plot size	:	4m x 3m		
Design	:	RBD	Replication	: 3

Treatments:

- T1- RDF= Recommended dose of fertilizer
- T2- RDF + FYM 10 t/ha
- T3- RDF + gypsum @ 75 % GR
- T4- RDF + gypsum @ 50 % GR
- T5- RDF + Pressmud @ 75 % GR
- T6- RDF + Pressmud @ 50 % GR
- T7- RDF + gypsum @ 75 % GR + FYM 10 t/ha
- T8- RDF + gypsum @ 50 % GR + FYM 10 t/ha
- T9- RDF + Pressmud @ 75 % GR + FYM 10 t/ha
- T10- RDF + Pressmud @ 50 % GR + FYM 10 t/ha

- Note: 1. All the soil amendment treatments will be applied to rice only. Hence, berseem crop will be grown with recommended fertilizer dose.**
- 2. Calculation of doses of soil amendments will be based on gypsum requirement.**
 - 3. Data will be reported in Rabi**

Observations

- Plant /shoot population at harvest (per m²) , Plant height at harvest, grain and straw yield and Harvest index (Rice).
- GFY, DMY, Forage equivalent yield, CP % and CPY (Berseem)
- Net monetary return (Rs/ha/yr)
- Uptake of N, P and K (kg/ha) by each crop and entire system
- Initial soil fertility status viz., pH, EC, Exch. Na, OC and available NPK
- Soil fertility status after completion of sequence i.e. pH, EC, OC, available NPK and exchangeable sodium percentage

Location: Faizabad

AST-9 (AST- 10): Banana based fodder intercropping in the homesteads of Kerala

Objectives: To evaluate the production potential, quality and economics of fodder crops in banana based production system

Year of Start	:	<i>Kharif 2010</i>
Duration	:	3 years

Design : RBD
 Replication : 3
 Plot size : 5.8 m x 5.4 m

Treatments : 12

- T₁ –Banana+ Guinea grass
- T₂ – Banana + Hybrid Napier
- T₃ – Banana + Congo signal
- T₄ – Banana + cowpea
- T₅ – Banana sole
- T₆ – Guinea grass sole
- T₇ – Hybrid Napier sole
- T₈ – Congo signal sole
- T₉ – Cowpea sole

Observations:

Banana

- Bunch yield (q/ha)

Fodder Crops

- Plant height at harvest (cm), plant population ,Leaf stem ratio
- Forage yield and forage equivalent yield(q/ha)
- Economics (Gross Returns, Net Returns and BC Ratio)
- Crude protein content (%) and Crude protein yield (q/h)
- Crude fibre content (%) and Crude fibre yield (q/ha)

D. Nutrient studies

- NPK uptake by each crop and entire system
- Nutrient use efficiency of NPK by each crop and entire system
- Soil fertility status before and after completion of the sequence i.e., pH, OC (%)
- EC, available NPK before and after completion of experiment

Note: Data will be reported in Rabi

Location: Vellayani

AST 10 (AST- 11): Chemical control of *Acrachne racemosa* weeds in sorghum fodder

Objective: To find out the suitable herbicide for the control of *Acrekny (Acrachne racemosa)* weed in sorghum

Year of Start : Kharif 2010
 Duration : Two years
 Design : RBD
 Replications : 3

Treatments:

1. Control (weedy check)
2. Atrazine 1kg/ha PE
3. Stomp 2.5 lit/ha PE
4. Treflan 2.5 lit/ha PE
5. Lasso 2.5 lit/ha PE
6. Atrazine 0.75 kg + Stomp 2.5 lit/ha PE
7. Atrazine 0.75 kg + Treflan 2.5 lit/ha PE
8. Atrazine 0.75 kg + Lasso 2.5 lit/ha PE
9. Atrazine 1.0 + Stomp 2.5 lit/ha PE
10. Atrazine 1.0 kg + Treflan 2.5 lit/ha PE
11. Atrazine 1.0 kg + Lasso 2.5 lit/ha PE

Observations:

- Plant Height at Harvest, Leaf Stem Ratio
- Green fodder and Dry matter yield
- Crude protein content and yield
- Weed population
- Weed dry weight
- Economics (Gross Returns, Net Returns and BC Ratio)

Note: Data will be reported in kharif

Location: Ludhiana

AST 11 (NT) : Effect of levels of nitrogen on productivity of perennial grasses with and without tree shade

OBJECTIVES:

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

Year of start : Kharif 2011

Duration : 3 years

Design : Split - Plot

Replication : 3

Plot size (Gross) : 5 m x 3 m

Treatments :

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

- a) Grass-(2)
 P1. Setaria (*Setaria anceps*)
 P2. Congosignal (*Brachiaria brizantha*)
 b). Fertilizer level = (F-4)
 F₁ – 25% less than recommended dose of N
 F₂ – Recommended dose of N
 F₃ – 25% higher than recommended dose of N

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

Total treatment combination 2 x 2x3 = 12

Observations :

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

Note: data will be reported in kharif

Location-Jorhat

AVT BASED TRIALS

AST- 12: Effect of nitrogen levels on forage yield of promising entries of *Setaria* grass

Year : Kharif 2010
 Design : RBD
 Duration : Two years
 Replications : Three
 Plot Size : 4m x 4m

Treatments -16

(A) Entries: 2+2 (S-20, S-21, PSS-1, S-92)

(B) N-levels: 4 (0, 40, 80 and 120 kg N/ha)

Observations:

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

Location (1): Palampur

Seed requirement – 1200 root slips of each entry

Note : Data will be reported in kharif

AST-13: Effect of phosphorus levels on forage yield of promising entries of cowpea

Year : Kharif 2011

Design : RBD
 Replications : Three
 Plot Size : 4m x 3m (RXR = 30 cm)

Treatments

- (A) Entries: 5 (2+2+1)
 2 (MFC 08-14, IL – 117)
 2 (UPC 5286, Bundel Lobia 1 - NC)
 1 (UPC 622 – ZC for NE)/(UPC 9202 – ZC for SZ)
- (B) P-levels: 3 (30, 60 and 90 kg P/ha)

Observations:

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

**Locations (8): NE – Faizabad, Ranchi, Kalyani, Bhubaneswar
 SZ – Coimbatore, Vellayani, Mandya, Dharwad**

Seed requirement per entry = 4.0 kg seed of each entry will be supplied by contributing centre to coordinating unit. Seed of zonal checks = 3.0 kg per entry

GENERAL SUGGESTIONS

- The technical programme must not be changed without prior approval of the Project Coordinator (FC). The data are to be recorded as per technical programme and reported to the Project Coordinator (FC) accordingly well in time scheduled. A hard copy with CD in MS-Word 2003 and also through E-mail must be provided to the Project Coordinator (FC). In case of location – specific trials, the text of the trial should also be supplied by the Centre concerned.
- Data must be analyzed factor-wise statistically (with two-way tables) having SEm \pm , CD at 5% and CV %. In case of interaction, two-way tables must be reported.
- Following (statistically analyzed) data with yield data must be reported for comparisons and making valid conclusions.
- Net monetary return (Rs./ha/yr) of the complete sequence (Crop sequences trial).
- Component-wise and total green fodder and dry matter yield (q/ha), net monetary return (Rs./ha/yr) and Land Equivalent Ratio (LER) (Intercropping trial)

- Component-wise and total crude protein yield (q/ha) as well as crude protein (%)
- Initial and final fertility status of the soil, i.e., after completion of trial which should essentially include pH, EC, OC (%), available N, P & K (Crop sequences and fertility trials).
- In trials on problematic soils, initial and final fertility status of the soil, i.e., after completion of trial and uptake of NPK by the crop(s) in each season is to be provided.
- In multi-cut crop(s)/variety(s), data on growth and quality parameters (i.e., plant population / m row length, L:S ratio, No. of tillers / m row length, No. of branches/plant and crude protein content (%) are to be recorded as per schedule given below :
- In Cereals and grasses, growth observations, in general, are to be recorded for first and last harvest. However, in cutting management trials or in trials with split application of N, the observations are to be taken for each cut.
- Data on dry matter estimation and crude protein analysis are to be recorded for each cut
- Centres / Locations are advised to send complete information on soil characteristics, variety (ies), agronomic recommendations, No. of cuts, etc., for the experiments in the prescribed format.
- In case of net monetary return, current market price (Rs./q) must be indicated.
 - Centres /Locations are advised to provide trials at a glance in one sheet mentioning trials allotted, trials conducted, data reported (character-wise-analyzed) and trials not conducted (with valid reasons) while supplying data to the Project Coordinator (FC). The format is attached herewith.

**AICRP ON FORAGE CROPS
AGRONOMY TRIALS AT A GLANCE**

Year: Kharif 2011 Centre/Location:

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

Annexure –I.iii

**FORAGE CROP PROTECTION COORDINATED TRIALS
PROPOSED TECHNICAL PROGRAMME FOR KHARIF 2011**

PPT 1: Monitoring of diseases, insect pests and nematodes in cowpea, maize, Pearl millet and sorghum ecosystem.

Observations to be recorded:

1. All insect pests including natural enemies
2. Pathogens and other micro flora
3. Nematode population

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

PPT 2: Evaluation of *kharif* breeding materials of cowpea, maize, pearl millet and sorghum for their resistance to diseases, insects and nematodes.

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

PPT-7: Integrated disease management in fodder maize.

Design: RBD **Plot size** 3 x 2.25 m² **Replications:** 3

Treatment details:

1. Seed treatment with Vitavax powder @ 2 g/kg seed
2. Seed treatment with *Trichoderma viride* @ 5 g/kg seed
3. Seed treatment with *Pseudomonas fluorescens* @ 5 g/kg seed
4. T1 + spray of mancozeb @ 0.25 %
5. T2 + spray of mancozeb @ 0.25 %
6. T3 + spray of mancozeb @ 0.25 %
7. T1 + spray of *P. fluorescens* @ 3 g/lit.
8. T2 + spray of *P. fluorescens* @ 3 g/lit.
9. T3 + spray of *P. fluorescens* @ 3 g/lit.
10. Control

Locations: Palampur and Ludhiana

Observations to be recorded

1. Disease severity/ incidence at weekly interval

Note: 3 sprays will be given at 10 days interval, 1st spray being at appearance of the disease.

PPT 9: Management of shoot fly in forage sorghum.

Design : RBD **Plot size:** 3 x 4 m² **Replication:**3 **Variety:**Local susceptible variety.

Treatments:

1. Seed treatment with Thiomethoxam @ 2 g/kg of seed.
2. Seed treatment with Neem Seed Kernal Powder @ 50 g/kg of seed
3. Followed by NSE foliar spray @ 5 % at 10 DAS.
4. Seed treatment with Imidacloprid @ 5 g/kg of seed
5. Foliar spray of Thiomethoxam 25 WSC @ 0.0125% at 10 days after sowing.
6. Foliar spray with NSE @ 5 % at 10 days after sowing.
7. Foliar spray with Imidacloprid @ 0.3 ml/lit at 10 days after sowing.

8. Foliar spray with Endosulfan @ 0.07% at 10 days after sowing.
9. Untreated control.

Observations to be recorded:

1. Percentage of dead hearts at 14 and 28 days after sowing.
2. Green forage yield (GFY) in q/ha.
3. Dry matter yield (DMY) in q/ha.
4. Net monetary return (NMR) Rs./ha/yr.

Locations: Hyderabad, Rahuri and Jhansi.

PPT 10: Management of root rot disease in cowpea.

Design: RBD Plot size: 4 x 3 m² Replication: 4 Variety: EC 4216.

Treatments:

1. Seed treatment with *Trichoderma viride* @ 5 g/kg seed + FYM @ 2 t/ha.
2. Seed treatment with *Pseudomonas fluorescens* @ 5 g/kg seed + FYM @ 2 t/ha
3. Seed treatment with Neem Seed Kernel Powder @ 50 g/kg of seed.
4. Seed soaking in solution of gum of Asafoetida @ 0.4 % for 4 hrs.
5. Seed treatment with Carbendazim @ 2 g/kg of seed.
6. Soil drenching with 3 % pitcher compost at the time of sowing.
7. Untreated control

Observations to be recorded:

1. Percentage germination (Invitro and in field).
2. Vigour index of seedlings (Invitro).
3. Green forage yield.
4. Dry matter yield.
5. Net monetary return (NMR).

Location: Bhubaneswar.

PPT -12: A validation of effective treatments for the management of sucking pest and yellow mosaic virus in cowpea seed crop.

Plot size: 100 m²

Locations: Bhubaneswar, Hyderabad, Rahuri, Ludhiana and Palampur

Treatments:

1. Spraying of *Verticillium leccani* @ 5 g/L at 10 days interval (Non-chemical)
2. Spraying of Imidacloprid 17.8 SL @ 0.3 ml/L at 15 days interval (Chemical)
3. Untreated control

Observations to be recorded:

1. Percentage germination
2. No. of sucking pests/leaf
3. Percentage disease incidence and severity
4. Seed yield (q/ha)

Note: Foliar sprays should start at the appearance of pest *Verticillium leccani* will be supplied by Hyderabad centre.

PPT-13: Effect of foliar diseases and insect-pests on quality parameters of forage cowpea

Locations: Anand, Hyderabad, Ludhiana, Palampur and Rahuri

Plot size: 9 x 9 m

Variety: UPC 5286

Period of study: *Kharif*, 2011

Objectives: To study the variations in quality of fodder with incidence of pest and disease in forage cowpea.

Treatments:

1. Protected: Seed treatment with imidacloprid 70 WS @ 5g/kg seed+ carbendazim @ 2g/kg seed followed by foliar sprays of imidacloprid 17.8 SL @ 0.3 ml/lit at 15 days interval for the management of insects and alternate foliar spray on mancozeb and metalaxyl + mancozeb @ 2.5 g/lit at 10 and 15 days interval for management of diseases.
2. Unprotected: No seed treatment or foliar spray

Observations to be recorded:

1. Green forage yield and dry matter content
2. CP%, ADF%, ADF-N, NDF%, IVDMD%
3. Chlorophyll content (a, b and total)
4. Hemi-cellulose content
5. Total carbohydrates
6. Total ash content
7. Calcium and potassium content
8. Total phenols
9. Occurrence and severity of pathogen and insect pests at germination, 30 DAS and at harvest (50% flowering)

Role of Plant protection Scientist:

1. Laying out experiment and imposing treatments
2. To study the occurrence pest and disease severity at intervals mentioned

Role of Biochemist:

1. Sampling at 30DAS and at harvest
2. Biochemical analysis
3. Reporting of data

Note : Seed will be supplied by Dr. J. S. Verma, GBPUAT, Pantanagar.

Annexure -II

List of Participants
ALL INDIA COORDINATED RESEARCH PROJECT ON FORAGE CROPS
 (Indian Council of Agricultural Research)
NATIONAL GROUP MEET- KHARIF-2011
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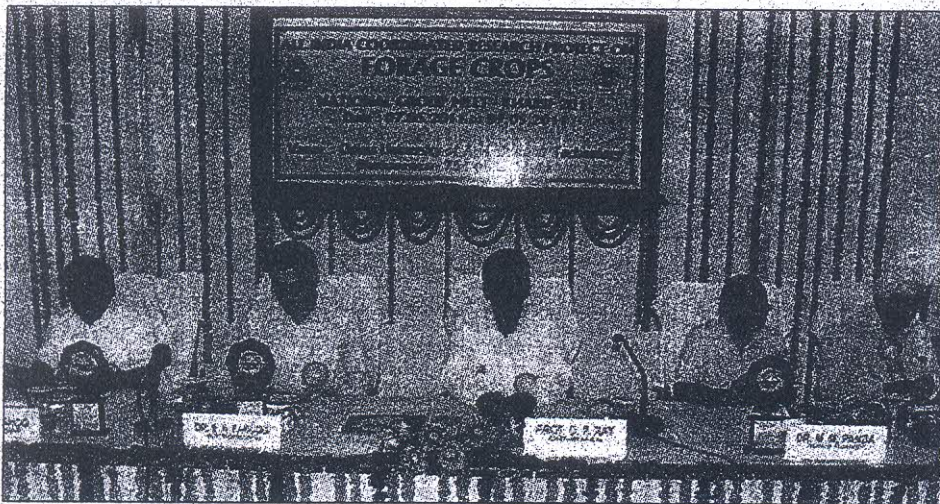
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 121 Sri Jugal Badhei, Progressive Fodder Farmer,Gambharikanta, Sambalpur
 122 Sri Bedabyasa Naik, Progressive Fodder Farmer,Dumerpalli, Jujumara,
 123 Sri Suresh Behera, Progressive Fodder Farmer,Anthuari,Khurda
 124 Sri Pratap Das,Progressive Fodder Farmer,Biridi, Jagatsinghpur
 125 Sri Sukant Das,Progressive Fodder Farmer, Korkara, Raghunathpur,
 126 Sri Krushna Ch. Sahu, Progressive Fodder Farmer,Matiapada, Simili,
 127 Sri Debendra Dash, Progressive Fodder Farmer,Sahanaipur, Niali,Cuttack.
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 129 Mr. G. Pravakar Babu,Marketing Manager,Advanta India Ltd
 130 Mr. R. Sathish Kumar,Pelican India Ltd
 131 Mr. R. Palaniswamy,Pelican India Ltd
 132 Sri N.P. Mallik,Door Darshan,DD National
 133 OTV- Reportor (News)
 134 ETV- Reportor (News)
 135 Kamyab TV (News)
 136 Krishi Darshan, National TV
 137 Nakhatra TV (News)
 138 S.T.V. (News)
 139 M.P.C. TV (News)
 140 A-Z TV (News)
 141 CNEB TV (News)
 142 The Samaj (News Paper)
 143 The Dharitri (News Paper)
 144 The Sambad (News Paper)
 145 The Pragaribadi (News Paper)
 146 The Khabar (News Paper)
 147 The Times of India (News Paper)
 148 Sri Brundaban Sahoo, OTV, Jayakrishan
 149 The Telegraph (News Paper)
 150 The Samaya (News Paper)

Glimpses of Media Coverage



ଝ ପ୍ରତିଶତ ଜମିରେ ଗୋ-ଖାଦ୍ୟ ଚାଷ, ଉତ୍ପାଦନ ବୃଦ୍ଧି ପାଇଁ ଗବେଷଣା ଆବଶ୍ୟକ



ଭୁବନେଶ୍ୱର, ଚାମାଝ (ପିଏନ୍ଏସ୍): ଏବେ ଦେଶ ତଥା ରାଜ୍ୟରେ ଚାଷ ଜମି ହ୍ରାସ ପାଉଥିବା ବେଳେ ଗୋ-ଖାଦ୍ୟ ଫସଲ ଉତ୍ପାଦନ ମଧ୍ୟ ହ୍ରାସ ପାଇଛି । ଗୋ-ଖାଦ୍ୟ ଉତ୍ପାଦନ ବୃଦ୍ଧି କିପରି ହେବ, ଏଥିପାଇଁ ଗବେଷଣା ସହ ଉନ୍ନତ ଧରଣର ଗୋ-ଖାଦ୍ୟ ଉତ୍ପାଦନର ଆବଶ୍ୟକତା, ବିଭିନ୍ନ ଗୋଖାଦ୍ୟ ଫସଲ ଉପକାରିତା ବିଷୟରେ

ଆଲୋଚନା ପାଇଁ ଆଜି ସ୍ଥାନୀୟ ଓୟୁଏଚି ପରିସରରେ ଅଖିଳ ଭାରତୀୟ ଗୋ-ଖାଦ୍ୟ ଫସଲର କୃଷି ବୈଜ୍ଞାନିକ ସମ୍ମିଳନୀ ଉଦ୍ଘାଟିତ ହୋଇଯାଇଛି । ନୂଆଦିଲ୍ଲୀସ୍ଥିତ ଭାରତୀୟ କୃଷି ଗବେଷଣା ପରିଷଦ ଓ ଓଡ଼ିଶା କୃଷି ବୈଷୟିକ ବିଶ୍ୱବିଦ୍ୟାଳୟର ଆନୁକୁଲ୍ୟରେ ଦୁଇଦିନିଆ ସମ୍ମିଳନୀ ଅନୁଷ୍ଠିତ ହୋଇଛି ।

ଏହି ଆଲୋଚନାତଳୁ ତଥା ସମ୍ମିଳନୀରେ ଭାରତର ବିଭିନ୍ନ ପ୍ରଦେଶର ପ୍ରାୟ ୩୦ ଗୋଟି କୃଷି ବିଶ୍ୱବିଦ୍ୟାଳୟର ବୈଜ୍ଞାନିକ, ଭାରତୀୟ କୃଷି ଗବେଷଣା ପରିଷଦର ଅଧିକାରୀ, ଭାରତୀୟ ଦାରା ଫସଲ ଗବେଷଣା କେନ୍ଦ୍ର, ଜାତୀୟ ବିହନ ନିଗମ ଓ ଭାରତୀୟ ରାଜ୍ୟ କୃଷି ନିଗମର

ଅଧିକାରୀ ଯୋଗ ଦେଇ ଆଲୋଚନାରେ ଅଂଶଗ୍ରହଣ କରିଥିଲେ । ଏହି ସମ୍ମିଳନୀରେ ଓୟୁଏଚି କୂଳପତି ଦେବୀ ପ୍ରସାଦ ରାୟ ଅଧ୍ୟକ୍ଷତା କରିଥିବା ବେଳେ ଗବେଷଣା ଅଧ୍ୟକ୍ଷ ମଦନମୋହନ ପଣ୍ଡା ସାତେ ଭାଷଣ ପ୍ରଦାନ କରିଥିଲେ । ଅଖିଳ ଭାରତୀୟ ଗୋ-ଖାଦ୍ୟ ଫସଲ ଗବେଷଣା ପ୍ରକଳ୍ପର ପ୍ରକଳ୍ପ ସଂଯୋଜକ ଡଃ ଏସ୍.ଏ. ଫାରୁକ୍ ଗୋ-ଖାଦ୍ୟ ଫସଲ ଗବେଷଣା ସମ୍ବନ୍ଧୀୟ ସଫଳରେ ସୂଚନା ଦେଇ ସମଗ୍ର ଭାରତରେ ହାରାହାରି ୮.୩୩ ଲକ୍ଷ ହେକ୍ଟର ଜମିରେ ଗୋ-ଖାଦ୍ୟ ଫସଲ ଚାଷ କରାଯାଉଛି । ଯାହାକି ସମଗ୍ର ଭାରତର ଚାଷ ଜମିର ଶତକଡ଼ା ୫ ଭାଗ ବୋଲି ମତ ଦେଇଥିଲେ । ଶେଷରେ ଡଃ ଜେ.ଏସ୍.ଏଲ୍. ଗୁଲାଟି ଧନ୍ୟବାଦ ଦେଇଥିଲେ । ଏହି ଅବସରରେ ୮ଟି ଜିଲ୍ଲାର ୧୦ ଜଣ ଆଗୁଆ ଚାଷୀଙ୍କୁ ସମ୍ବର୍ଦ୍ଧନା ଦିଆଯାଇଥିଲା ।

