

PROCEEDINGS OF INSTITUTE RESEARCH COMMITTEE- 2010

Introductory Session

Dated: May 17, 2010

The Institute IRC for the year 2009-10 started on 17th May 2010 under the chairmanship of Dr K.A. Singh, Director, IGFRI, Jhansi. At the outset Sh. K.C.Pandey, Secretary IRC welcomed the Chairman and all other members of the IRC.

Western Regional Research Station, Avikanagar

Dated: May 17, 2010

Dr. R.K. Jain presented the ATR on RAC, IRC and PME recommendations. The house accepted the ATR on IRC and PME. The house accepted the action taken on RAC recommendations after inclusions of suggestions by the members. Dr. Jain also presented thrust areas, highlights of the on going research projects, viz. RSA-4 on collection, evaluation, RSA-6 on development of agronomic practices, RSA-8 on aonla based horti-pastoral, RSA-8 on neem based silvipastoral and RSA-9 Prosopis based silvipastoral system. He also described the seed production, extension and developmental activities by the station. The following recommendations were made:

- The ATR on RAC recommendations be submitted again after including suggestions of the house.
- The on going project RSA-6 'Development of agronomic package of practices for dual purpose bajra variety (AVKB-19) under rainfed conditions' it was decided that the project be continued for one more year as 2009 was a drought year.
- The station should conduct atleast 20 FLD in Kharif on bajra and Guar.

New Proposals:

Dr. RP Nagar presented the project 'Evaluation of promising strains of promising neem starins under traditional agro-forestry system in semi-arid conditions' (Dr's RP Nagar, RK Jain, SL Meena). House approved the project in principle. Following suggestions were made:

- The project should be discussed in GSM Division.
- Include one perennial and two annual crops should be included in treatments.

After discussion in the GSM Division and including other suggestions made in the house, Dr. R.P. Nagar resubmitted the proposal, which was approved by the house.

Southern Regional Research Station, Dharwad

Dated: May 17, 2010

Dr Nagaratna Biradar, OIC, RRS, Dharwad presented the mandate, trust areas, action taken on previous RAC and IRC, ongoing research projects, seed production, Forage Technology Demonstrations conducted, development and extension activities of the station. The previous RAC suggested taking up 'on farm' research trials with animal component using different forage species. This was discussed and the house felt that with the existing facilities and manpower it would be difficult to carry out the same. These were discussed in the house and the house appreciated the progress. After discussion following recommendations were made on on-going projects:

- In Lucerne breeding project, equipments like, florescent microscope, net house etc and other facilities are to be developed.
- In the project on Climate change on fodder and livestock systems in different ecological zones in Karnataka the research aspect should be carried out as survey for one more year.
- In Guinea grass project 'Evaluation of ligno-cellulosic constituents in panicum maximum jacq. Germplasm' (PI: Dr.K.Sridhar) , data on plant height, days to flowering, no. of tillers, leaf : stem ratio etc are to be recorded in future and cutting schedule may be at 20 and 40 days interval instead of 15, 30 and 45 days.
- Regarding data recording of Farming System Research block, it was suggested to plan the experiments, include input and out put data and record various observations including soil, weather, crops, horticulture crops etc.
- Regarding the project 'Seed yield potentiality of Lucerne cultivars' it was suggested to sow the crop every year to maintain the purity.
- In Brachiaria project Dr. Mukesh Chaudhary should be included in place of Rajeev Agarwal.
- Emphasis should be given on Lucerne seed production- the insect pollinators role in enhancing seed production should be reviewed by Dr. Kulkarni and presented in IRC.
- The research articles should be enhanced in referred journals.
- All regional stations should provide script for the film on IGFRI by June 10th.

New Project Proposals:

1. Dr Vinod Kumar presented the project 'Optimizing seed production and seed standardization protocols in range grasses and legumes' (*Dr. Vinod Kumar*). The house with following suggestions approved the project.
 - Inclusion of more spp. of *Brachiaria*.
 - Continue the work of Dr Bhat and Natarajan on Seed Standardization,. The chairman also opined that, a sub project may be initiated on the role of honey bee in Lucerne seed production in collaboration with Dr N S Kulkarni, Sr Scientist (Entomology).

2. Dr N Kulkarni's presented a new project on micro flora and fauna in Farming system research, Chairman suggested to have a designed experiment and the help of microbiologist of the UAS, Dharwad is to be taken. The project was approved in principle.

Hilly Regional Research Station, Palampur

Dated: May 18, 2010

Dr. S.Radotra presented the ATR on recommendations of RAC and IRC, achievements of various on going projects and extension activities of the regional station. These were discussed in the house. It was felt that the presentation was not satisfactory and it needs to be presented again.

Division of Seed Technology

Dated: May 18, 2010

Dr. D. R. Malaviya presented the thrust areas and ATR on IRC & PME. The house discussed the ATR on last IRC meeting and observed that the action taken were appropriate. He also presented the salient research achievements of various on-going research projects.

New Project Proposals:

1. Dr. Vikas Kumar presented the project 'An analysis of impact of forage technology on socio-economic development of farmers' (*Dr's Vikas Kumar and Maharaj Singh*). He presented Introduction, objectives, hypothesis, research methodologies, activity schedule and benefits of the project. The project was discussed in the house and approved with following suggestions:
 - The role of private players in forage seed marketing
 - The forage seed purchasing chain should be studied.
2. Dr. Vikas Kumar presented the project 'Management of farm resources for efficient forage seed production' (*Dr's Vikas Kumar, D Bahukhandi and Satyapriya*). The project was discussed in the house and approved with following suggestions:
 - The project should be focused on economics of seed production in farm and in participatory mode.
 - To exclude objective 'To analyze the existing resources and production pattern'.
 - Hypothesis should be only ' Forage seed production is a competitive and profitable enterprise'.
 - Studies to be made on two Kharif and two rabi crops, besides one perennial (Guinea grass) at Jhansi and *Stylosanthes seabrana* at RRS, Dharwad.
 - Small dairy farmers should be included in the study.
 - Name of one agronomist (Dr. Mukesh Chaudhary) and an extension scientist (Dr. Maharaj Singh) should be included.

Dated: May 28, 2010

In the beginning chairman discussed about general issues like power crises, fund limitations and publication of books etc. He stressed that when the power is supplied through Institute's generator, scientist should not use AC's in order to reduce load. Some of the scientist are writing books after conducting seminar/summer Institute based on the lectures provided by other scientists and providing copy right to publisher. Dr. S.K. Das, Chairman ITMU to take corrective action on this aspect. He also informed the house about resource crunch. While chairman was explaining about fund limitation (Plan & Non-Plan) during the IRC and expressed no procurement of coolers and computers in near future and advised Heads of Divisions to share these facilities in the division. All of a sudden Dr. A.K. Singh, Sr. Scientist (Plant Breeding) stood up and started shouting. Chairman advised to please sit down but Dr. Singh left the meeting uttering some unparliamentary language. The house took it as highly undesirable action on Dr. Singh part.

Dr. S.M. Mishra, Principal Scientist of Seed technology Division presented the report of concluded project 'Effect of rate and time of Potassium application on berseem seed production. It was suggested by the house for further studies on effect of KNO_3 application at flowering stage and basal dose of potassium on berseem seed production and their economics should be worked out.

Division of Crop Production

Mr. R.N. Dwivedi, Head, C.P. Division presented the thrust areas, ATR on RAC, IRC and PME.

Following recommendations were made on ATR on IRC:

- On the compilation of weather data of different stations it was informed that statistical analysis is remaining. It was advised that report should also include data of Manipur, Jammu or Srinagar and Raipur and should be submitted by 30th September, 2010.
- Review of work on climate change has not been submitted. It should be submitted as early as possible.
- Under FSR project soil conservation aspects should be taken.

Following recommendations were made on RAC observations:

- The updated implementable crop production technologies should be prepared by a team consisting of Dr's A.K. Rai, A.K. Dixit, and Mukesh Chaudhary based on the results of RPF III submitted.

Dr. Dwivedi also presented research highlights, publications and resource generation of the division. It was felt that the publication of the division and chairman advised that the publication in referred journals must be given added emphasis.

Dr. JB Sigh presented concluded project CP 2.3.9 'Weather based prediction modeling for sorghum leaf blight, sooty stripe and Lucerne aphids'. He presented salient findings and recommondation for future research.

Division of FM & PHT

Dated: May 29, 2010

Dr. P.K. Pathak presented the ATR on the last IRC, PME recommendations and salient research achievements of various on-going research projects. The following recommendations emerged from the discussion.

- In project AE 1.3 'Study of mechanization status and energy inventory of forage production in the cropping system of northern India' and collaborative project with CIAE on seed drill for berseem, Dr. Mukesh Chaudhary, Scientist (Agronomy) shall be associated in place of Dr. A.K. Dixit.
- The project AE 1.3 is extended for year 2010-11.
- In project AE 2.4.2 on nutritional quality assessment of crop residues, the nutritional quality of baled grass stored on platform should be analyzed for another year. The storage study of feed resources may also be conducted at regional stations.

New Project Proposal:

Er. B Narsimlu presented the project 'Evaluation of water resources for efficient utilization in enhancing productivity of forage crops on a watershed basis' (*Dr's B Narsimlu, CS Sahay and AK Dixit*). After discussion in the house following suggestions emerged:

- The title should be suitably modified after excluding 'watershed' and the study area should include IGFRI farm, FSRP villages, RRS, Dharwad, Avikanagar and Srinagar.
- Two scientists of Agro meteorology, Mr. Pradeep Bihari and Dr. Suchit Rai be associated in the project.

Division of Grassland and Silvopasture Management

Dr. A. K. Roy, Head, GSM division presented the thrust area, ATR on RAC, IRC, PME and research achievements for the year 2009-10 of the division.

Following recommendations were made:

- Allelopathic study may be undertaken in new hortipastoral experiment as per need.
- Sh. Dibyendu Deb, Scientist (Agril. Stat.) was advised to formulate a project on modeling of hortipastoral and silvipasture experiments. He is also advised to develop a project on database management system of PMER records.
- Dr. Ramesh Singh, Sr. Scientist (SWC Engg) of NRCAF will continue in aonla project (GSM 4.12.1) and in new project proposals of silvi and horti pasture Dr. B. Narsimlu, Sr. Scientist (SWC Engg.) may be associated as per need.
- In IRC, 2009 it was recommended that a study in tribal villages located near the fringe areas of Shivpuri Dist. (MP) may be conducted by Dr.

N.S. Ekka; however, since in outreach programme under NAIP- Dhar fodder resource development studies are going on in tribal area, therefore idea of this project may be dropped and Dr. Ekka should concentrate on Chhatisgarh project. He may formulate and present a new project.

- Project on mulberry should be modified as per divisional meeting with Director.
- A new project on temporal availability of top feed during lean period by lopping management should be formulated as discussed during divisional meeting.
- Project on Ex-situ conservation of grasses, legumes, shrubs and trees in rainfed conditions (in lieu of Dr. M.M. Roy) will be reformulated incorporating the lopping treatment and Dr. A.K. Roy will be PI and Dr. A.K. Shukla and Dr. Archana Singh will be associated in the project.
- The house also suggested to create lopping management data in shrubs and trees.
- In the new project proposal of Dr. H.V. Singh on micro flora and fauna, Sh. K.C. Pandey may be associated till joining of new scientist of Entomology.
- Dr. Archana Singh will present two new projects on 'Digitization of Herbarium' and 'Pasture legume evaluation'.
- In tamarind and guava hortipasture experiments water requirements may be worked out and need based life saving irrigation on critical stages may be provided.

Division of Plant Animal Relationship

Dated: May 31, 2010

Dr. N. Das, Head, PAR Division presented the mandate, thrust areas, ATR on both the last RAC & IRC and PME recommendations, list of on-going projects, concluding projects and new proposals, salient findings, resource generation and publications etc, which were approved by the house.

During the course of discussion following recommendations were made-

- While discussing the RAC recommendations on studies on decreasing the cost on feeds, fodder and concentrates were emphasized to reduce the production cost of milk, It was pointed out that to reduce the cost of milk production, besides sole feeding of green forages, possibilities of conserving monsoon forages/ rabi fodders are to be explored.
- On RAC recommendation regarding QPM studies with different grades of ration to be taken up in feeding trials, it was decided that feeding trials/nutritional evaluation among the different varieties of maize including QPM will be made under maize improvement programme by Dr. Anil Kumar, as an Associate in the programme.
- While discussing IRC meeting's recommendations, the house approved the closing of project on 'Performance of mixed (sheep and goat) herd under grazing in semi-arid climate' where works could not be started due to non availability experimental natural grazing land.

- While discussing on going projects of the division, in PAR 1: Nutritional mapping of crop residues and its implication for strategic livestock feeding, it was suggested that developed prediction model on availability of crop residues at country level should be validated with ISRI, New Delhi. The Chairman also pointed out that Dr AK Misra and Dr Deb (from GSM Division) will visit IASRI, New Delhi for this purposes.
- In PAR 5.1: Evaluation of *Stylosanthes seabrana* and *S. hamata* meal as a supplementary feed for ruminants, the house suggested that feeding of stylo meal should be made in milch animals for two consecutive years giving indicative economics on reducing cost of milk production. Stylo fodder/ land will be made available for this purpose.
- In PAR 7: Pesticide residue transfer in milk through feed and forages, it was suggested that popular articles should be written on this aspect for wider circulation of generated information among the stakeholders including farmers.

New Project Proposals:

1. Based on the concluded Chaya project, Dr. Anil Kumar presented a new project on 'Utilization of chaya (*Cnidocolus aconitifolius*) for efficient livestock production' (Anil Kumar, KK Singh, MM Das, SB Maity and AK Misra). The house approved the project for three years with suggestions to give calculated amount of feeds to meet the nutrient requirements of experimental animals.
2. Dr. SK Mahanta proposed a new project 'Performance of mixed herd of sheep and goat under grazing in different silvopasture systems' (SK Mahanta, SN Ram, SK Das, Archana Singh and N Das). The project was discussed in the house at length and the house approved it for five years with recommendations that supplementary feeding strategies should be adopted based on available biomass for better performances of animals.

Division of Social Science

Dated: June 1, 2010

Dr. AK Ray, HD presented the mandate, ATR on last IRC and PME. The house discussed the ATR on last RAC meeting and following recommendations were made:

- In the project SS 2.01 (Transfer of Technology and Their Evaluation) PI should record the major incidence of pest and diseases and should collect composite soil sample. The name of Dr. A.K. Ray, Dr. Manju Suman, and Sri Mahavir Singh be deleted from project SS 2.01 and Dr. Satyapriya should be associated in the project .
- The association of Dr. Satyapriya in project SS 2.03 (Performance of improved varieties of Rabi fodder at farmers fields in different regions) is approved by the house.
- The PI (Dr. A.K. Ray) presented the RPF 3 of Peri urban project (SS 1.02 Forage and livestock production and marketing in Peri–Urban Areas of India- Sub project

1.02.1: Fodder Marketing in Peri–Urban Areas of India: A Critical Analysis). It was recommended by the IRC that project progress will be reviewed after RPF 3 submission and based on this, new project may be initiated. The PI should submit all the basic data.

- The RPF 3 of SS 3.01 “Livelihood conditions and livestock production system of resource poor farmers” should be submitted by the end of October 2010.
- The recommendations for implementation should be made based on the survey of the project under the project SS 1.01 Gender issues in livestock production with emphasis on fodder production and management.
- The house approved the new project “Development and standardization of a scale to measure socio economic status of farmers practicing livestock based farming”. The project team comprises Drs Satyapriya (PI), Maharaj Singh, Purushottam Sharma, Vikas Kumar, and Mr. Ashok Kumar.
- Dr. Mallayya presented the RPF III of Sub project 1: SS 1.1: “Study on fodder production technology under farmers resources use matrix”.

Division of Crop Improvement

Dated: June 1, 2010

Dr. G. P. Shukla, Head presented the ATR on IRC, PME and RAC, mandate, thrust area, staff position, publications, and list of projects of the Division.

Dated: June 2, 2010

Dr. M.G. Gupta requested for inclusion of Dr. M.K. Shrivastava in the project Cl. 6.7 on ‘Molecular markers for apomixes in *Cenchrus ciliaris*’ which was not agreed.

Dr. A.K. Singh explained about the observation of PME on the project Cl. 2.4 on sorghum breeding. The PME members, member secretary and chairman explained to the house about the sparse plant population in Dr. Singh’s experiment.

GSM Division

New Project Proposals:

1. Dr. A.K. Shukla presented the project ‘Evaluation of substrate dynamics for integrated nutrient management in bael based hortipastoral system’ (Dr’s. AK Shukla, HV Singh, AK Rai and Sunil Kumar). The project’s objectives, practical utility, review and technical programme were discussed in the house and the project was approved.
2. Dr. H.V. Singh presented objectives, practical utility, review and technical programme of the project ‘Studies on microflora and microfauna (organisms involved in nutrient dynamics) of *Bauhinia* and *aonla* based silvi/horti pasture system’ (Dr. HV Singh and KC Pandey).

These were discussed in the house and the project was approved with following recommendations.

- Duration of the project will be for 6 years and the 1st phase will be for four years.
 - A microbiologist will be associated in the project after joining in the Institute.
 - It was also felt that work done on microflora and fauna may be reviewed and presented by Dr. H.V. Singh and Dr. N. Hasan. Dr. H.V. Singh should also conduct studies on rhizosphere of grasses at TD Block at 3rd and 5th year.
3. Dr. Archana Singh presented the project 'Strengthening and digitization of herbarium of forage species' (*Dr's Archana Singh, AK Roy and Debyendu Deb*). After discussion in the house the project was approved with a suggestion that as far as possible photographs of fresh samples of available species should be included.
4. Dr. Archana Singh presented the project 'Evaluation and conservation of range legumes of semi-arid regions for quality forage' (*Dr. Archana Singh*). The house agreed on the project after thorough discussion with following suggestions.
- Conservation word should be deleted from the title.
 - Observation on competitive ability with grasses may be recorded.
5. Dr. AK Roy presented the project 'Silvipastoral system for round the year top feed and fodder availability' (Coordinator- Dr. KA Singh, PI- Dr's AK Roy, Sunil Kumar and HV Singh). The project's objective, practical utility, review and technical programme were presented. These were discussed in the house and the project was approved with following suggestions.
- It was felt the study should also include the economic aspects and Dr. Vikas Kumar will provide basic input data sheet for the study.
 - After completion of 5 years, association of animal nutrition scientist may be considered.

Crop Production Division

New Project Proposal:

1. Dr. JB Singh presented the project 'Forewarning models for major pests of cowpea and berseem' (*Dr's JB Singh, KC Pandey, Pradeep Saxena and Pradeep Bihari*) objective, practical utility, review and technical programme. After discussion in the house the project was approved

Social Science Division

New Project Proposal:

1. Dr. Satyapriya presented the project 'Development and standardization of a scale to measure socio economic status of farmers practicing livestock based farming' (*Dr's Satyapriya, Maharaj Singh, Vikas Kumar and Ashok Kumar*). The house approved the project in principal and felt that for item generation and scale development the PI is required to

have consultation with persons engaged in extension research at SAU, MANAGE and IARI.

Crop Production Division

Dated: June 8, 2010

New Project Proposals:

1. Dr. RK Agarwal presented the project 'Market led fodder production technologies for profit maximization in peri-urban agglomeration' (*Dr's RK Agarwal, Mukesh Chaudhary, SK Das, MM Das and Satya Priya*). The house approved the proposal with following suggestions.
 - Include economic viability of higher application of 'N' to the crops in the study.
 - After three years the project will be taken on farmer's field in only one location of NCR region/other nearby location.
2. Dr. AK Dixit presented the project 'Development of agro-techniques for cultivation of Chaya (*Cnidasculus aconitifolius*)' (*Dr's AK Dixit, AK Rai and Anil Kumar*). After discussion the house approved the project with following suggestions.
 - The irrigation requirement of Chaya should also be worked out.
3. Dr. AK Dixit presented the project 'Fodder based contingent crop planning modules for rainfed semi-arid region' (*Dr's AK Dixit, SK Rai and Mukesh Choudhary*). The project was discussed in the house and it was approved as proposed.
4. Dr. Mukesh Chaudhary presented the project 'Standardization of Agro-techniques for newly released varieties of fodder crops' (*Dr's Mukesh Chaudhary, RN Dwivedi*). The project was discussed in the house and approved with following suggestions.
 - In oat crop, irrigation schedules should be based on IW/CPE ratio.
 - An experiment on newly released varieties of bajra should be incorporated in the technical programme of project.
 - Economics should be worked out.
 - Whenever, a new scientist of Agronomy/ Soil Science discipline joins in the Institute he may join the project.
5. Dr. AK Rai presented the project 'Effect of long term organic and conventional nutrient management on soil fertility and sustainability of cropping system' (*Dr's Arvind K Rai, AK Dixit, Manoj Kumar Srivastava, SK Das and SK Rai*). The project was discussed in the house and it was approved as proposed.
6. Dr. SK Rai presented the project 'Studies of dynamic crop growth simulation model for fodder cowpea using CERES- Grain cowpea model for agronomic management and the impact of climate change on its productivity in India' (*Dr's SK Rai, DVK Nageswara Rao and Mukesh Choudhary*). The project was discussed in the house and as Co-PI inclusion of Dr. D. Deb, Scientist (GSM) was suggested. The project was approved.

Distribution of crops for breeders of institute

Sorghum- Dr. Joshi, Maize- Dr. Sahid Ahmad and Dr. D.R. Malaviya, Cowpea- Dr. Geetanjali Sahay and Dr. R.V. Kumar, Lucerne- Dr. Sridhar, Dr. D.R. Malaviya, Dr. Mridul and Dr. A.K. Roy, Oats- Dr. Sahid Ahmad and Dr. A.K. Roy, Bracharia, Guinea and Pennisetums- Dr. Sridhar and Dr. D.R. Malaviya, Bajra- Dr. A.K. Singh, Stylo and range legumes- new scientist, PGR- Dr. U.P. Singh and Dr. P.Saxena till new breeder/Geneticist joining.

Crop Improvement Division

Dated: June 25, 2010

New Project Proposals:

1. Dr. Gitanjali Sahay presented the project 'Collection, evaluation and conservation of genetic resources of forage legumes' (*Dr's Gitanjali Sahay, UP Singh, P Saxena, NK Shah and N Hasan*) Sahay. After discussion in the house, the project was approved with following recommendations.
 - Exploration be made species wise after identification of major gaps.
 - Evaluation should be species specific/new collections.
 - As soon as new scientist joins he will be the PI and Dr. Sahay will be CO- PI.
2. Dr. AK Roy presented the project 'Enrichment, evaluation, conservation and documentation of genetic resources of forage grasses' (*Dr's AK Roy, S Ahmad, NK Shah and RB Bhaskar*). The project was discussed and the PI was advised to contact Botanical Survey of India before conducting exploration specially for NE region. The project was approved.
3. Dr. DC Joshi presented the project 'Genetic improvement of sorghum (*S. bicolor*) for dual purpose' (*Dr's DC Joshi, RV Kumar, RB Bhaskar and Sultan Singh*). The project was discussed in the house and it was felt that priority should be on the higher biomass under dry /abnormal conditions and dual purpose. The project was approved.
4. Dr. S. Ahmad presented the project 'Development of dual purpose maize' (*Dr's S Ahmad, DR Malaviya, MK Shrivastava, P Saxena, NK Shah and MI Azmi*). After discussion in the house the project was approved with following recommendations.
 - Introduce exotic material.
 - Higher biomass should be the priority.
 - QPM maize should be evaluated at fodder stage and material be handed over to Dr. AK Mishra for feeding trial.
 - As soon as new scientist joins he will be the PI and Dr. Ahmad will be CO- PI.
5. Dr. S Ahmad presented the project 'Development of high yielding dual and multi-cut oats' (*Dr's S Ahmad, AK Roy and S Majumdar*). After discussion in the house the project was approved.

6. Dr. DR Malaviya presented the project 'Genetic improvement of berseem for root rot resistance, late maturity and biomass' (*Dr's DR Malaviya, M Chakarborty and AK Roy*). It was decided that after one year Dr. Chakarborty will take over as PI of the project and Dr. Malaviya will be Co-PI. The project was approved.
7. Dr. DR Malaviya presented the project 'Basic studies on apomixis and generating cytogenetic stocks in *Pennisetum* and *Panicum* agamic complex (*Dr's DR Malaviya, M Chakarborty and AK Roy*). The project was discussed and approved by the house with following recommondations.
 - Dr. Mridul Chakraborti to be the leader of the project.
 - As soon as scientist with biotechnology background joins he will be associate in the project.
8. Dr. N.K. Shah presented the project 'Integrated pest management in an intensive forage production system' (*Dr's NK Shah, RB Bhaskar and MI Azmi*). The project was discussed in the house and Dr. Shah was advised to use newly released varieties of crops in the experiment.
9. Dr. MK Shrivastava presented the project 'Biochemical and molecular approach for characterization of drought tolerant forage sorghum' (*Dr's MK Shrivastava and DC Joshi*). The project was discussed in the house and it was decided that chairman in consultation with relevant expert would finalize the projet. The chairman consulted Dr. Amresh Chandra and approved the project.

Externally funded projects

Dated: June 26, 2010

Following Externally Funded Projects were presented. The objectives, brief technical programme and achievements were discussed in the house.

1. Development of interspecific crosses between *T. alexandrinum* and *T. vesiculosum*/*T. lappaceum*. (*Dr's D.R. Malaviya, AK Roy and P Kaushal*)
2. Development of lines tolerant to salinity and identification of associated molecular markers in Oats. (*Dr's AK Roy, DR Malaviya, P Kaushal and A Chandra*) by Dr. D.R. Malaviya.
3. Use of molecular marker in improvement of Stylo with special reference to drought and quality. (*Dr's A Chandra, Suresh Kumar, RK Bhatt and SK Mahanta*) by Dr. D.R. Malaviya.
4. Development of better quality and disease resistant lines (root rot and stem rot) in Berseem through interspecific hybridization using embryo rescue technique. (*Dr's DR Malaviya, AK Roy, P Kaushal and RB Bhaskar*) by Dr. D.R. Malaviya.

5. Development of lines tolerant to salinity and identification of associated molecular markers in oats (*Dr's AK Roy, D.R. Malaviya, P Kaushal and A. Chandra*) by Dr. A.K. Roy.
6. Development of SSR markers in berseem and exploitation of marker resources of *M. truncatula* for germplasm and characterization of berseem and for developing high density linkage map of red clover (*Dr's A. Chandra AK Roy and Suresh Kumar*) by Dr. AK Roy.
7. Electromagnetic energies for biostimulation and post harvest conservation of seeds and grain (Dr. A. Chandra)
8. Evaluation, conservation, documentation and estimation of resource potential of *Dichanthium, Bothriochloa, Sehima, Heteropogon* and *Panicum* germplasm. (*Dr's AK Roy, DR Malaviya, P Kaushal, A Chandra and SK Mahanta*) by Dr AK Roy.
9. Goat husbandry based integrated approach for livelihood security in disadvantaged districts of Bundelkhand region. (*Dr's AK Roy, Sunil Kumar, SN Ram and PN Dwivedi*) by Dr. AK Roy.
10. Integrated farming system for sustainable rural livelihood in undulating and rainfed areas of Jhabua and Dhar districts of Madhya Pradesh under NAIP. (*Dr's AK Roy, AK Shukla and P Sharma*) by Dr. AK Roy.
11. Identification of QTLs for the genetic improvement of stover quality, resistance to foliar diseases and tolerance to pre-flowering drought in dual purpose Sorghum. (*Dr's GP Shukla and Sultan Singh*) by Dr. GP Shukla.
12. Generation and evaluation of Bt transgenic lucerne (*Medicago sativa* L.) for weevil resistance. (*Dr's Suresh Kumar, A Chandra and KC Pandey*) by Dr. Suresh Kumar.
13. Development of on-farm urea treatment technology for nutritional upgradation of wheat straw during threshing and its evaluation in livestock (*Dr's MM Das, KK Singh, AK Misra, Anil Kumar, PK Pathak, Sadhana Pandey and N Das*) by Dr. MM Das.
14. Performance recording and improvement of Bhadawari buffaloes (*Dr's BP Kushwaha, SB Maiti and Sultan Singh*) by Dr. BP Kushwaha.
15. Development of appropriate methane emission factors for different feeds/ forages and feeding regimens to reduce uncertainties in methane estimation (*Dr's Sultan Singh, SK Nag, AK Misra and BP Kushwaha*) by Dr. B.P. Kushwaha.
16. AICRP- Improvement of feed resources and nutrient utilization in raising animal production (*Dr's SK Mahanta and Anil Kumar*) by Dr. Anil Kumar.

16. Vegetation carbon pool assessment technique (WCMPNW) (*Dr. RK Bhatt*) by Dr. J.P. Singh.
17. Vegetation carbon pool assessment technique (WCUPSW) (*Dr. JP Singh*) by Dr. J.P. Singh.
18. Remote sensing and GIS/GPS based monitoring and evaluation of tree plantation in Jhansi. (*Dr. JP Singh*) by Dr. J.P. Singh.
19. Development of crop weather yield model for different agroclimatic regions of Bundelkhand (*Dr. SK Rai*) by Dr. S.K. Rai.

