



Agricultural Human Resource Development

Education Division of the Indian Council of Agricultural Research has the mandate to plan, coordinate and guide the higher agricultural education in the country. The programmes of the Education Division include: development grant to universities, accreditation of different programmes in the universities, conduct of All-India Competitive Examinations for admissions in Under Graduate and Post Graduate Programmes in SAUs, ICAR DUs, CAU, and CUs with agricultural faculty, award of scholarships and fellowships and internship assistance for veterinary students. The programmes also include ICAR National Professor Scheme, National Fellow Scheme, Emeritus Scientists Scheme, Admission of Foreign Students, Centres of Advanced Studies, Niche Area of Excellence, Scheme for Experiential learning Model Farms and Pilot Plants, Best Teacher Awards and University Level Textbook Writing Scheme. The achievements under these programmes during 2006–2007 are as follows.

CAPACITY DEVELOPMENT

Deemed Universities

Central Institute of Fisheries Education, Mumbai:

Altogether 71 students were admitted in different M.F.Sc and Doctoral programmes during the year 2006–07.

The Niche Area of Excellence project on ‘Utilization of inland saline and sodic soil for aquaculture’ was started with Rs 82 lakhs. Under this, renovation of 10 (0.1 ha) ponds at CIFE’s Rohtak Centre for the flow-through system; the design for the wet lab and procurement of equipments and programmes on stocking the ponds with *Chanos chanos* and *Mugil cephalus* seed have been finalized.

Two training programmes on “Recent Advances in Biochemical and Molecular Techniques and their Applications in Aquaculture and “Genetic Improvement of Fish—A Biotechnological Approach” were conducted under Centre of Advanced Studies.

Dr A. K. Pal, Principal Scientist, received the “Bharat Ratna Dr Subramaniam Award for Outstanding Teachers” for the year 2006. The institute organized the fourth Deans’ Committee Meeting to revise the undergraduate teaching programmes in fisheries colleges. Also, the institute arranged a series of meetings with the experts in various specializations to upgrade the M.F.Sc. and Ph.D. syllabi.

National Dairy Research Institute, Karnal: Academic

Session 2006–07 started from 1st August 2006, and the students admitted to the various courses were: 27 in B.Tech. (Dairy Technology) 81 in Master’s in Dairying and 60 in Ph.D.

Foreign students from Bhutan, Nepal, Ethiopia and Iran were also admitted in various courses. Mr. Arul Murugan M., Ph.D. scholar in Animal Biochemistry was selected for the award of “Commonwealth Split-site Doctoral Scholarship-2006” at the Royal College, University of London for a period of one year.

A set of 6 genes (Caspase, RASPA, GATABP, FSHR, LHR and NALP) were identified and their expression during oocyte maturation process in buffalo is being worked out under the Niche Area of Excellence Project on ‘Buffalo Production and Reproduction Genomics’. The genes have been successfully amplified in buffalo oocyte. Work has been initiated to reveal polymorphism in the casein milk protein at DNA and protein sequence level in buffalo.

State Agricultural Universities

Acharya N.G. Ranga Agricultural University, Hyderabad:

During the academic year 2006–2007, a total of 672 students in various undergraduate, 162 in postgraduate and six in to the doctoral programmes were admitted.

New postgraduate programmes of M. Tech. were started in three disciplines of Agricultural Engineering, viz. Soil and Water Engineering, Agricultural Process and Food Engineering and Farm Machinery and Power and Ph.D. in Agronomy at Agricultural College, Bapatla; one-year Diploma in Food Analysis and Quality Control at College of Home Science, Hyderabad were started from the academic year 2006–07.

The unstinted efforts of the scientists of ANGRAU resulted in development and release of a set of 26 new improved varieties/hybrids of crops, thus bringing the total number of varieties/hybrids released by ANGRAU, so far, to 328.

To increase research for development of efficient water

- Vice-Chancellor of ANGRAU Dr S. Raghu Vardhan Reddy, inaugurated the Educational Technology Cell at Rajendra Nagar, on 30th June 2006. It is the first of its kind in the country to establish an exclusive Educational Technology Cell.



- The ANGRAU entered into MOUs with many international organizations and universities like Wageningen Agricultural University and Research Centre (WUR), International Land Reclamation Institute (ILRI) in Netherlands, United States Development Agency (USDA), Tuskegee University, Alabama and Cornell University in USA, Food and Agriculture Organization (FAO), Rome, for exchange of Academic Staff, exchange of students, collaboration for research and other academic activities.

management technologies, the University has established a Water Technology Centre at Rajendra Nagar campus and entered in to Memorandum of Understanding with the University of Florida, USA and the University of Wageningen, the Netherlands in this regard. The University also entered into Memorandum of Understanding with World Wide Fund for Nature (WWF), Hyderabad, to undertake System of Rice Intensification (SRI) Project.

Two projects, viz. (i) Mega Seed Project with an outlay of Rs 6.5 crore to improve Seed Replacement Rate of field and horticultural crops and (ii) Distinctness, Uniform and Stable project with an outlay of Rs 93.25 lakh, with the objective of preparation of plant variety protection under DUS testing were sanctioned.

The main training programmes organized by the College of Home Science, were 21-days Training Programme on 'Food Enterprises—Opportunities and Challenges'. Winter School on Computer Aided Residential and Commercial Interior Designing from 17 January 2006 to 6 February 2006; and six-day certificate course on 'Basics of Field Functioning'.

Assam Agricultural University, Jorhat: The Assam Agricultural University comprises four faculties, viz. Agriculture, Veterinary, Home Science and Fishery. Altogether 425 students were admitted in different faculties of the University during 2006 under UG, Masters' and Ph.D programme.

Although no new courses were added in any programme in different faculties of the University during the year, but recasting of the UG courses in Agriculture, Fisheries Science and Home Science faculty were already made as per recommendations of the 4th Deans' committee.

The scheme of experiential learning—setting up of facilities for hands on training on: (i) Production of ornamental, medicinal and aromatic plants and nurseries management (ii) Post Harvest Technology and processing for value addition to the university have been started.

The Rural Agricultural Work Experience (RAW), an internship programme is running regularly since 1993 and during the year, 61 students benefited from the programme. Besides. Rural Home Work Experience (RHWE) and the Rural Fishery Work Experience

(RFWE), similar other two internship programmes of the faculty of Home Science and Faculty of Fishery Science respectively were also carried out.

The faculty of Home Science carried out the programme during February to April 2006 in Mudoijan village of Jorhat District. Rural women and local youths were the target group beneficiaries who greatly benefited from the training imparted by the students primarily in various aspects of germane designing/dress designing unit, clothing practices and care of fabrics and food and nutrition.

Horticultural exhibition and competition was organized at Jorhat on February 15, 2006 by the Department of Horticulture, to demonstrate good quality horticultural crops. Similar horticulture exhibition cum competitions were also organized on February 2nd, 2006 by the University at different locations in the state.

Bidhan Chandra Krishi Viswavidyalaya, Mohanpur: The University admitted 143 students in undergraduate (UG), 187 in postgraduate (PG) courses during the year. All the UG students also successfully completed their RAW.

The undergraduate classrooms have been modernized with OHP, multimedia LCD projectors with the support provided by the ICAR.

Construction of new Girls Hostel was started out of ICAR grant. Under KVK-Nadia, construction of administrative building, trainees hostel and various farm structures have been completed.

Education Technology Cell and Students' Counseling and Placement Cell have successfully been established.

The Examination Cell has been provided with all the facilities required by the cell. The NISAGNET cell has also been set up.

The University was awarded with Niche Area of Excellence in 'Arsenic Management Options including Organic Agricultural Systems in West Bengal'. The World Health Organization, on the other hand, has assigned the task of monitoring the pesticides residues in sugar samples to the Pesticides Residue Laboratory of the Viswavidyalaya. The Viswavidyalaya has also established the 'Regional Analytical Quality Control Laboratory of Medicinal and Aromatic Plants'.

Extension and Training activities in the Farmers' Training Centre are going on regular basis.

The plant physiology aspects being examined mainly include the (i) basis of arsenic uptake, (ii) remobilization pattern of arsenic within the plant biomass, and (iii) pattern of diurnal fluctuation of arsenic uptake.

The studies relating to soil microbiology explored the potential

- International seminar on weed control and several national seminars and workshops on Export of Horticultural Crops, IPM, Water Management, Cultivation of Medicinal and Aromatics Plants were organized at BCKV.



soil micro-organisms, which are responsible to transmute the toxic form of arsenic to less toxic forms (of arsenic) and those, which are responsible for methylation of arsenic to less harmful as species.

The objective of the genetic studies is to find out varietal differences in arsenic uptake pattern by different genotypes of paddy and to identify molecular markers to tag gene(s) responsible for arsenic uptake. From such evaluation significant difference in regard to arsenic uptake by different genotypes has been noted.

Chaudhary Charan Singh Haryana Agricultural University, Hisar: The University brought about significant developments in its approach to teaching by modifying its course curriculum, establishing a sound infrastructure and upgrading the skills of its faculty. The university admitted 354 students for undergraduate courses, and 350 students for postgraduate courses.

A Memorandum of Understanding (MOU) was signed in April 2006 between the University of Maryland, USA and this University to promote and accelerate the programme of research, training and extension. Dr Terry Young, a renowned scientist from Michigan State University, USA visited the university for framing the policy and regulations for Intellectual Property Rights (IPR) Management at the university.

A grant of Rs 125 lakhs was received from the ICAR for setting up of four Model Plants equipped with modern facilities and equipments for practical study of students. The facility will also help in generating employment on a large scale.

During the session under report, HAU got Rs 14.5 crores prestigious project on guar gum from the Ministry of Rural Development and the Ministry of Commerce, Government of India. This project is on Quality Seed Production of guar for distribution to farmers.

The generous grant from ICAR has helped the University to consolidate its position.

Chandra Shekhar Azad University of Agriculture and Technology, Kanpur: The University admissions to all the courses were completed in July 2006. Admissions to new PG programmes in Microbiology and Biotechnology were also done. Practical manuals for 12 courses of the B.Sc. Ag. Hons. and 27 courses of Home Science have been prepared. Fifth batch training programme of agri-clinic and agri-business scheme started in the Directorate of Extension for unemployed agricultural graduates for establishing their own business.

Two new Colleges were sanctioned by the Government of Uttar Pradesh at Kanpur Campus, viz. College of Horticulture and College of Forestry with a financial allocation of Rs 328.54 and 217.66 lakhs, respectively. Two more Colleges at Etawah Campus, viz. College of Dairy Technology and College of Fisheries Science with a financial allocation of Rs 1,307.36 and 409.96 lakhs, respectively were also started. An Advance Centre on “Agri-industrial Enterprise

and Agricultural Management” was sanctioned by the Government. The University has introduced automation in its library by providing facilities as online use public access catalogue, Bar Coded Member ID Card and internet facilities.

The 45th All India Wheat and Barley Workshop Meet–2006 (ICAR) was held from 18–21 August 2006. A three days training programme for IAS probationers was organized on “Agrarian Structure and Rural Development”.

Tenth Convention of Indian Society of Agricultural Biochemists and International Conference on post harvest technology and value addition in cereals, pulses and oilseeds was held on 27–30 November, 2006.

Dr Y S Parmar University of Horticulture and Forestry, Solan: Human Resource Development both in Horticulture and Forestry sector is the major objective of the University. Two new departments, one that of Forest Plant Protection and the other of Business Management were created in September 2006. The admissions made under different programmes in College of Horticulture and College of Forestry are 98 in B.Sc., 76 in M.Sc. and 34 for MBA programme.

The Niche Area of Excellence project on Research Strategies For Sustainable Apple Production was sanctioned. The University has started Experiential Learning Programme for which the funds to the tune of Rs 60 lakhs were made available by the education division of ICAR.

In the development of infrastructure facilities, the major ones have been starting of work on Girls Hostel for which Rs 75 lakhs are being spent and the building will be completed in January 2007. An International Hostel is also coming up at a cost of Rs 84 lakhs. Work on construction of College of Forestry is also being awarded at an estimated cost of Rs 1.6 crores. Jawahar Lal Nehru Communication Centre was inaugurated on October 6, 2006 by the Chief Minister of Himachal Pradesh.

Hon'ble Chief Minister of Himachal Pradesh dedicating the Jawahar Lal Nehru Communication Centre to the farmers





Under postgraduate research on apple, new clonal rootstocks for cultivars Oregon Spur and Red Chief were identified. “Myrocal” a clonal rootstock for plum and apricot was identified. In tomato, new indeterminate hybrids were developed having firmness and long shelf life. Low-pressure treatment of ginger rhizomes resulted in complete control of rhizome rot. Thirty-one novel kinds of Chrysanthemum could be established. Agroforestry models for plantation of trees and medicinal plants were developed. Successful domestication and development of agro techniques for cultivation of a number of aromatic and medicinal plants were standardized.

Junagarh Agricultural University, Junagarh: The Junagarh Agricultural University has adopted the revised post graduate syllabus as per the recommendations of Third Dean’s Committee on Agriculture as well as Fisheries from the year 2006. Post Graduate Degree Programme in Fisheries has also been started from 2006.

Construction of two new Girls hostel was started, one at College of Fisheries, Veraval and other at College of Agricultural Engineering, Junagarh from ICAR support.

Under the scheme for Experiential Learning - setting up of facilities for hands on training from ICAR, three programmes, viz. (i) Mushroom, bio-agents and vermicompost production and processing, (ii) Seafood processing centre for value added products and byproducts, and (iii) Production and management of alternative/renewable source of energy were started with the total cost of Rs 110 lakhs.

Rural Agricultural Work Experience (RAWE) Programme for the students of seventh semester of Agriculture faculty was organized and the students were exposed to various learning situations during different phases of the programme.

400 Scientists/Officers of the University actively participated in the Krishi Mahotshav-2006 programme, which was organized by Government of Gujarat and guided the farmers for adoption of new agricultural technologies.

Kerala Agricultural University, Thrissur: Students admitted in various programmes of the university were 402 in undergraduate courses, 123 for postgraduate and 23 for Ph.D degree.

The university started two new programmes, a MBA programme on Agri-business Management at college of Co-operation, Banking and Management, and a Post Graduate programme on Veterinary Biochemistry at the College of Veterinary and Animal Sciences, during the year.

Dr C Lekha Rani, Assistant Professor was honored with the ICAR Jawaharlal Nehru Award for the year 2004 for outstanding PG agricultural research for her Ph.D. Dr C Subramanian Best teacher ICAR Award for Outstanding Teachers 2004–05 was given to Dr M R Sasindranath, Associate Professor, College of Veterinary and Animal Sciences, Mannuthy.

Maharana Pratap University of Agriculture and Technology, Udaipur: During the academic year, 426 undergraduate, 88 postgraduate and 42 Ph.D. admissions were made through Joint Entrance Test (JET). Pre-Engineering Test (PET).

- Campus Interviews and placement of graduates and Post Graduate students in reputed firms, institutions and NGOs were organized by the Maharana Pratap University of Agriculture and Technology. There was 100% placement of the passed outs in Dairy Technology and Food Technology and 90% in Engineering and Technology. There was spectacular increase in the placement of students of Agriculture and Home Science.

A new educational UG programme in Electronics and Communication Engineering was initiated. The AICTE has approved the UG teaching programmes in Dairy and Food Science Technology. Professional packages leading to job-oriented education in Home Science as recommended by the Fourth Dean’s Committee of the ICAR have been initiated from the academic session commencing from 2006–07.

A model of hi-tech horticulture unit was established at the university with a financial support of Rs 282 lakhs from the ICAR. The forced ventilated green house with cooling system is the first in Rajasthan and three naturally ventilated green houses have been installed. Small replicable models of the hi-tech horticulture units were also established in two KVKs.

Model Plastic Lined Water Pond

MPUAT has been in the forefront for demonstration of important technologies whose impact can be felt at the state and national level. One of its major success has been in the area of water harvesting. Rajsamand KVK is the finest example where plastic lined farm pond has been developed on scientific lines. Based on the success, such plastic lined ponds are being constructed at 100 KVKs in the country. This year the entire farm would be under drip irrigation and plantation. The water harvesting at Rajsamand KVK represents a success story, which has no parallel.

A herbal park has been established to conserve valuable biodiversity. Experiential learning unit, specially in fruits and vegetables processing and speciality food for imparting six months hands on training to final year B. Tech students in the College of Dairy and Food Science Technology was established using ICAR grant of Rs 120 lakhs.

The university strengthened its seed production and processing capabilities through financial support of Rs 4.86 crores from ICAR.



AGRICULTURAL HUMAN RESOURCE DEVELOPMENT

Dr Ritu Singhvi, Associate Professor, College of Home Science was awarded Bharat Ratna Dr C Subramanian best teacher award by the ICAR. Dr F L Sharma, Assistant Professor, Rajasthan College of Agriculture, Dr A K Sharma, Associate Professor, College of Technology and Agricultural Engineering and Dr Vandana Kaushik, Associate Professor, College of Home Science were bestowed with best teacher award at the university level.

Marathwada Agricultural University, Parbhani: The University admitted 1614 under-graduate and 212 post-graduate students in 2006–07. A total of 1,572 Bachelors, 68 Masters and 61 Doctoral candidates obtained their degrees in the 15th Convocation held on 10th February 2006.

- The Agricultural Technology Information Centre at the Marathwada Agricultural University, a single window delivery dissemination and support system for various innovative techniques provides technical advice; diagnostic services and input supply, viz. Seeds of different crops, Planting materials, Agricultural implements, Agricultural Literature, etc. to the farmers. It operates through Telephone Help-Line, Kisan Call Centre and Internet connectivity.

Under RAWI programme the students were placed in different villages under the jurisdiction of the university.

Training programmes, viz. Fruit processing; Post harvest management of fresh fruits and vegetables and their export; Application of extrusion cooking for designer foods and educational methodology and instructional technology by NAARM, Hyderabad were organized.

Professor (Mrs) D Murlu, Associate Dean and Principal, College of Home Science, MAU, Parbhani got Excellence Education Award 2006.

The University released sweet tamarind variety Ajantha, suitable for table purpose and value addition. The spineless variety of safflower PBNS 40 was released at national level. Two production technologies in sorghum, four in cotton, one in pearl millet and guava were recommended by this university. During the current year university targeted 9,818 quintals seed production during *kharif* and 5,363 quintals in *rabi* season of different crops.

The Rural Bio-resource Complex was established at Karmad village of Aurangabad district to mitigate the social problems of rural masses. Department of Biotechnology, Ministry of Agriculture, Government of India, New Delhi provided financial support of Rs 489.96 lakhs to run this project for five years.

Navsari Agricultural University, Navsari: The new courses on Environmental Science, Biotechnology and Protected Cultivation were initiated in the undergraduate curriculum. The



Biotechnology laboratory at Navsari

Postgraduate curriculum was revised and implemented as per the recommendations of Deans Committee.

The Central Library was strengthened by acquiring Libsys Software package for handling the in-house activities of the Library. The Library has also developed LAN using TCP/IP technology and



Processing of tomato at the Post-harvest technology lab

connected with University Internet through fibre optic line.

As a part of the Centre of Excellence on Post-harvest Technology, Mango fruit processing plant with a capacity of 5 tonnes and a Tomato Processing Unit were established. A commercial production unit for bio-agents was established in the Department of Entomology. Advanced Centre for Research in Biotechnology with State of the Art facilities has been commissioned in the ASPEE College of Horticulture and Forestry.

Short-term training programmes of 3 months were conducted on tissue culture techniques and hi-tech Horticulture. Gardeners training certificate programme was conducted in the ASPEE College of Horticulture and Forestry.

Punjab Agricultural University, Ludhiana: Students were



admitted in various undergraduate and masters' programmes on the basis of merit in entrance tests of eligible candidates while in doctorate programmes on the basis of merit in qualifying degrees.

Diploma in Fisheries was the new course started. The annual convocation of the University was held on October 31, 2006 to confer degrees to 333 PG students including 70 Ph.D, 263 M.Sc/M.Tech and MBA students.

A new girls hostel, a new international hostel, renovation and modernization of classrooms, laboratories, conference hall and library were taken up for upgrading infrastructure facilities. An electronic book bank was also established in the College of Agriculture to provide electronic connectivity to acquire technical information through e-journals and e-books.

The Indian Council of Agricultural Research sanctioned a Niche Area of Excellence on Soil and Water Management. Four farmers' training camps were organized for sustaining soil and crop productivity. A five days training programme on "Efficient Management of Soil and Water for Sustainable Agriculture", and a one-day workshop on "Water and Nutrient Management in Rice" were organized. Amelioration of manganese deficiency in wheat: Demonstrations were carried out at cultivators' fields in districts Ludhiana, Faridkot, Jalandhar and Kapurthala.

The Experiential Learning programme was introduced in the Colleges of Agriculture and Home Science. A sum of Rs 1 crore has been received from ICAR to start this programme.

Tamil Nadu Agricultural University, Coimbatore: A total of 728 students were admitted for 10 undergraduate degree

- The TNAU launched 17 days Agro-industrial Tie Up programme in which students underwent *in-plant* training in marketing for which a workshop was organized. Various issues involved in implementation of the AITP were discussed in the workshop.

programmes of TNAU. The new course B. Tech (Bio-informatics) has been introduced in TNAU during 2006–2007. Under the School of Post Graduate Studies, 29 masters and 23 doctoral programmes started by admitting 321 and 95 students respectively. Also, TNAU has launched two post-graduate diploma courses, one in Organic Farming and the other in Capital and Commodity Markets, this academic year.

The Rural Agricultural Work Experience (RAWE) programme for the final year undergraduate students was conducted for 60 days.

Educational technology trainings were given to teaching staff

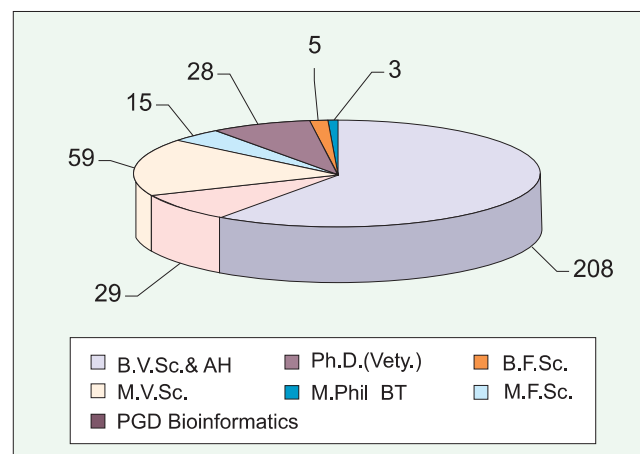
- The launching of open and Distance learning programmes of the TNAU, Coimbatore for 2006 was held at the Directorate of Extension Education.

for creating awareness on modern methods of teaching in association with NAARM, Hyderabad and Bharathidasan University, Trichy, Tamil Nadu.

Tamil Nadu Veterinary and Animal Sciences University, Chennai: The overall intake of students during the year 2005–2006 was 455. The programme wise intake was 226 in B.V.Sc. and

- Bilateral collaborative programme has been established between TANUVAS and Michigan State University, USA through a Teaming Agreement for a period of five years in the areas of staff and student exchange, teaching and research activities.

AH, 35 in B.F.Sc., 95 in M.V.Sc., 44 in Ph.D., Veterinary, 21 seats in M.F.Sc., and 8 in Ph.D. (Fisheries). The intake for PG diploma in Bio-informatics was 20 and M. Phil in Biotechnology is 6.



A new undergraduate degree programme, viz. Bachelor of Technology (B. Tech.) (Food processing) with admission strength of 20 students was introduced. Also, one year Post Graduate diploma in Companion Animal Practice with the strength of six students and one year Postgraduate diploma in Veterinary

- Some of the technologies developed by the Scientists in Veterinary and Fisheries are: Custom hatching unit at cheaper cost, hybrid Namakkal Quail I possessing higher growth rate, value added milk products, PPR diagnostic kit, PPR vaccine for sheep and goat, new vaccines for New castle disease and Fowl cholera in poultry, vero cell rabies vaccine for animals and TANUVAS-RUSITEC (Rumen simulation machine) in Veterinary Science and in Fisheries Science Raceway technique in shrimp aquaculture, poly herbal product for the production of disease resistant tiger shrimp, production of live fish food white worm, fish processing technology and lobster fattening technology.



The Chancellor of the University, Hon'ble Shri Surjit Singh Barnala conferring the degrees at the convocation of the university.

Laboratory Diagnosis with the strength of six students were introduced for B.V.Sc. graduate students.

Dr Dhinakar Raj G., Associate Professor, Department of Animal Biotechnology, MVC, Chennai received Dr Maruthamuthu Mariyayee Best Teacher Award of TANUVAS for his innovative methods in teaching. Mrs Sohini Dey, Ph.D. student in Animal Biotechnology received Jawaharlal Nehru Award for her Ph.D. thesis titled "Development of Recombinant Leptospiral Antigen for the Diagnosis of Leptospirosis".

The Indian Council of Agricultural Research sanctioned a Niche Area of Excellence project on molecular diagnostics for emerging avian viral diseases and their immunopathogenesis for Rs 200 lakhs, which is functioning at the Department of Animal Biotechnology.

MANPOWER DEVELOPMENT

All-India Competitive Examinations for Admissions to Agriculture and allied Science Subjects

For admissions to 15% seats in Under Graduate Programmes in Agriculture and allied science subjects, the 11th All India Competitive Examination was conducted on May 07, 2006. This was conducted for 11 subjects of undergraduate programmes including award of National Talent Scholarships (NTS) for 45 Universities (40 SAUs, CAU, BHU, Viswa Bharati and Nagaland University) and all seats at NDRI Karnal. In this examination, 16,500 candidates appeared and 1,271 were finally admitted through counseling held during July 2006. All the candidates who joined any university falling outside their state of domicile were awarded National Talent Scholarship (NTS) of Rs 1,000 per month.

For admissions to 25 percent seats in Postgraduate programmes at 40 State Agricultural Universities, five Central Universities (CAU, BHU, Viswa Bharti, AMU and Nagaland University), and 100% seats

at IARI, NDRI, CIFE, and IVRI including the award of Junior Research Fellowships, competitive examinations were held on June 21, 2006. A total of 466 Junior Research Fellowships (JRF) were awarded to meritorious students. Based on the number of graduates getting JRF awards, the following Universities were rated the best five. (i) University of Agricultural Sciences, Dharwad (37 JRF), (ii) University of Agricultural Sciences, Bangalore (33 JRF), (iii) Kerala Agricultural University (30 JRF), (iv) CSAUT Kanpur (27 JRF), and TNVASU Chennai (25 JRF).

Admission of Foreign Students

During the year 2006–2007, 290 students from 25 countries were given admissions. To meet quality residential needs of foreign students support has been provided to eleven Agricultural Universities for construction of international students hostels. The students come from different countries namely: Nepal, Afghanistan, Bhutan, Kenya, Ethiopia, Sri Lanka, Namibia, Syria, Finland, Thailand, Mauritius, Bangladesh, Yemen, Uganda, Turkey, Spain, Iran, Libya, Vietnam, Malaysia, Iraq, Indonesia, Oman, Egypt and Sudan.

Summer/Winter Schools and Short Courses

To provide continuing education and training in highly specialized subjects to teaching faculty, 87 Summer and Winter Schools and Short Courses of 10 to 21 day duration were supported by ICAR. In all 2,200 scientists engaged in teaching, research and

Scholarships and other Financial Assistance Schemes

Merit-cum-Means Scholarship (MCM): This Scholarship is granted to the students belonging to economically weaker sections of the society to undertake UG studies in agriculture and allied science subjects in SAUs, ICAR DUs, CAU and CUs with agricultural faculty. Maximum 7% students from one University are awarded the Scholarship at the rate of Rs 170 per month.

Internship Assistance: This assistance is being provided to all the final year students of B.V.Sc and A.H. programme during their Internship @ Rs 400 per month besides Rs 400 for undertaking to-and-fro journey to the place of internship for a period of six months.

Junior Research Fellowship (JRF): This prestigious fellowship is awarded to meritorious students (judged on merit rank secured by them in the ICAR's All India Competitive Examination for Admissions to PG Programmes and Award of JRF conducted every year during May–June). There are total 475 Fellowships in 19 subject groups (90 subjects). The amount is Rs 5,760 per month for non-veterinary and Rs 8,000 per month for veterinary students to pursue PG degree programme. Besides, a contingency grant of Rs 6,000 per year is payable to all the awardees.



extension education in diverse disciplines of agriculture and allied sciences benefited from these programmes.

Centres of Advanced Studies

The 31 Centres of Advanced Studies (CAS), sponsored and supported by the Council, offer facilities for continuing capacity building of faculty engaged in teaching. This year all the Centres initiated analysis of the trainings conducted by them. 58 training programmes covering various disciplines of agriculture and allied sciences benefited 1,035 faculty members/scientists of SAUs and ICAR Institutes.

PROFESSIONAL EXCELLENCE RECOGNITION

ICAR National Professor Scheme

The scheme is for conducting basic research in the disciplines of agriculture and allied sciences. There are ten positions of ICAR National Professors. Of these, five have been in position during the year 2006–2007. The major objectives of the Scheme have been: (i) To carry out lead researches in new directions on basic aspects of agricultural sciences, veterinary, and fisheries, (ii) to provide national leadership in R&D on frontier areas of agricultural sciences, (iii) development of human resources through research guidance, and teaching, (iv) creation of lead facilities—state of the art laboratories, and (5) contribute in the process of planning, monitoring and control of R&D. In pursuance with the recommendations of Dr Jain's Committee and approval of the Governing Body of ICAR Society, the following have joined as ICAR National Professors during the year 2006–2007 for a period of five years.

Dr Ramesh Chandra (NCAP New Delhi). Project title: Analysing impact of agriculture policy, technology, institutions and trade on agriculture growth, farm income, sustainability and urban poverty. Date of start: 10/04/2006.

Dr V K Gupta (IASRI New Delhi). Project Title: Designs for single factor and multi-factor experiments and their applications in agricultural systems research. Date of start: 05/04/2006.

Dr Bijay Singh (PAU Ludhiana). Project title: Plant need-based nitrogen management in rice and wheat. Date of start: 12/05/2006.

Dr T C Thakur (GBPUA&T Pantnagar). Project title: Technologies development for subsoil structure modification, deep placement of fertilizers (P&K) and micronutrients, and controlled field traffic for different cropping systems of Indo-Gangetic Plains. Date of start: 11/05/2006.

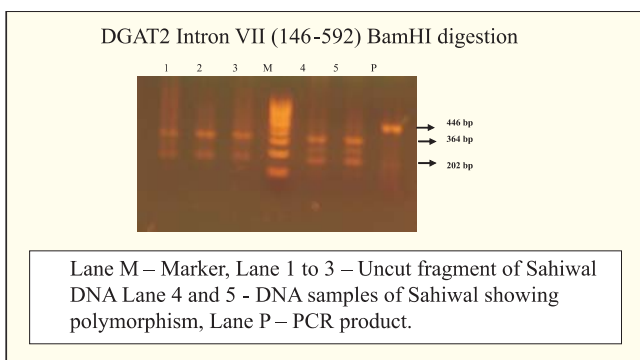
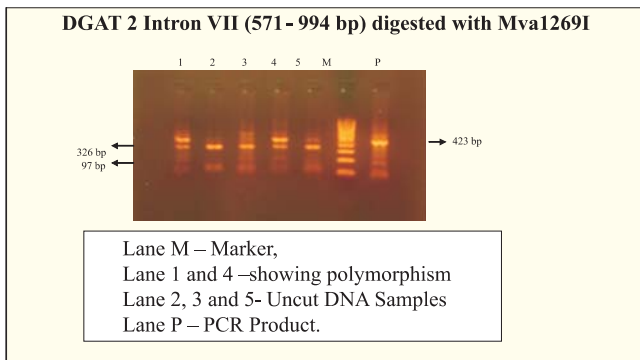
Dr I. Karunasagar (KVAFSU Bidar; Station: Mangalore). Project title: Patho-genomics of two important fish associated pathogens—*Salmonella Weltevreden* and *Vibrio harveyi*. Date of start: 15/05/2006.

In order to fill up the vacant positions, the process has been in progress.

ICAR National Fellow Scheme

A total of 25 positions of National Fellows exist in ICAR under the "Scheme for Creation of Professorial Chairs". Of these, 22 have been in position during the year 2006–2007. The progress reports of the projects undertaken by the ICAR's National Fellows have been given below.

- Dr A V N Paul, at IARI New Delhi under the research project entitled "Chemical Ecology, Strain Development and Novel Methods of Species/Strain Determination for Enhancement of Efficiency of *Trichogramma* spp." studied the synomonal effect of cotton crop ecosystem on the foraging capacity of *Trichogramma brasiliensis*, *T. chilonis* and *T. bactrae* in 11 cotton varieties. In late vegetative phase irrespective of the *Trichogramma* species, the cotton variety Pusa 8-6-68-29 showed highest response. In flowering phase, irrespective of the three *Trichogrammatids*, the cotton variety Pusa 6263 showed maximum response. Among three *Trichogrammatids*, *T. chilonis* showed highest response in the cotton ecosystem both in late vegetative and flowering phase.
- Dr Ravinder Kaur, at IARI, New Delhi worked on the project "Developing Regional Plans For Managing Poor Quality Irrigation Waters for Soil/Water Conservation and Agricultural Sustainability of National Capital Region". The natural resources of NCT, Delhi were characterized. It was observed that application of saline/alkali irrigation waters in paddy-based crop rotations of Najafgarh, Kanjhawala and Alipur blocks were responsible for development of salt affected soils. Excepting chromium concentrations in Alipur and Shahdara blocks, concentrations of most other heavy metal in irrigation waters of NCT, Delhi were well within permissible limits. It was further observed that there is acute zinc (Zn) deficiency (<0.6 ppm) in paddy growing soils of north Kanjhawala, Alipur and some parts of Najafgarh and Shahdara blocks.
- Dr B R Yadav at NDRI, Karnal has studied on "Identification of Quantitative Trait Loci in the Genome of Indigenous Breeds of Cattle and Buffaloes and their propagation through Marker Assisted Selection". He carried out research work in cattle and buffaloes on genotyping β -casein, β -lactoglobulin, α S2 casein, DGAT1 and DGAT2 gene polymorphism. Possible association has been seen in genetic variants and milk protein polymorphism. The ARMS-PCR analysis in Sahiwal cattle showed two allelic variants A and B. AA genotype was observed in high frequencies (0.964) whereas AB genotype had the frequency of 0.0364 in the



population. The genotype BB could not be found in any of the Sahiwal animals in the population. However, in Murrah buffaloes only BB genotype was found. The β -lactoglobulin is a major whey protein. PCR-RFLP analysis revealed two allelic variants A and B in Sahiwal. The variant A differs from B by a single amino acid substitution of Valine (Val) for Alanine (Ala) at position 118. The digestion of 262 bp amplified fragment with *Hae*III (GG/CC) yielded two types of restriction pattern due to underlying change in codon 10 and respective genotypes were identified accordingly.

- Dr D.K. Sharma at the Assam Agricultural University, Guwahati has been working on the project entitled “Development of ELISA based immunodiagnosics for classical swine fever”. A double sandwich ELISA test was standardized for detection of CSF viral antigen in tissues of pigs slaughtered for human consumption and died of suspected cases of CSF. 20.17% of the samples from slaughtered pigs were found to be positive for CSF viral antigen. Seven ELISA positive tissue samples selected were tested for CSF viral RNA by RT PCR. using primers specific to E 2 region of the virus and amplicons of 271 bp could be generated from 4 of the samples. Nine ELISA positive samples, which reacted with BVDV monoclonal antibodies were characterized by RT PCR. From two of the samples the DNA was cloned and sequenced. The sequence study also confirm that the samples contain CSF virus and not BVDV.

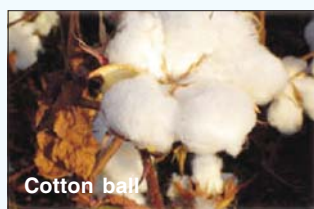
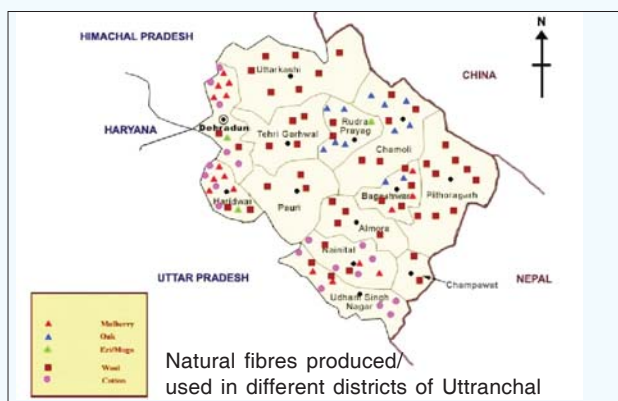
- Dr I M Santha at IARI, New Delhi has been approved the project entitled “Exploitation of Metabolic diversity for isolation of genes involved in lipid biosynthesis”. Triacyl glycerol (TAG) is synthesized by the Kennedy pathway and DGAT is the terminal enzyme and is the only one committed to TAG synthesis. RNA isolated from developing seeds of *Brassica juncea* was subjected to RT_PCR using designed DGAT specific primers and the PCR product of 1.5 kb was cloned and analysed. Two different types of cDNA clones were identified among the recombinants analysed.
- Dr K Alagusundaram at TNAU, Kumulur has been working on the project “Identifying Technologies for Using Modified Atmosphere Gases to Extend Shelf Life of Selected Tropical Fruits and Vegetables for Export Markets”. A high-tech modified atmosphere packaging research laboratory has been established. To determine the gas permeability through polythene based packs, a permeability apparatus was designed and fabricated. An evaporative cooler was designed and is being fabricated for on-farm cooling of fruits and vegetables. This cooler will be essential to retard the ageing process of fruits and vegetables immediately after harvest. Further studies are in progress.
- Dr Kausalya Ramachandran at CRIDA, Hyderabad worked on the project “Assessment of Sustainability of Treated/Development Watersheds in Rainfed Agro-eco-sub-regions of Peninsular India using GIS and Remote Sensing”. The evaluation work is being undertaken in a modular fashion pertaining to five aspects of the study—Use of Geomatics technologies, viz. GIS, GPS and Remote Sensing for mapping, temporal study, land cover change studies (LCCS), change in normalized differential vegetative index (NDVI) etc. A Sustainability Matrix was generated to compare the various aspects of sustainability, viz. productivity, viability, security, protection and acceptability in the selected micro-watersheds.
- Dr (Mrs) Renu Khanna-Chopra at IARI has been working on the project entitled Senescence: Mechanism in crops in relation to abiotic stresses, sink strength and their interaction. She has characterized the thermostability of the SOD isozymes from *Chenopodium murale in vitro*. The leaf protein extracts, thylakoidal and stromal fractions were subjected to elevated temperatures ranging from 50°C to boiling and analyzed for activity and isoform pattern of SOD. Out of six SOD isoforms, SOD V showed stability even after boiling the extract for 10 min. Under high temperature treatment (> 60°C) there was an appearance of a new SOD band with higher electrophoretic mobility. An unusual, constitutive thermostable chloroplastic Cu/Zn SOD from *C.*



murale is reported, which may contribute towards its heat tolerance.

- Dr D C Uprety at IARI, New Delhi has been working on the project “Effect of rising atmospheric CO₂ on the photosynthesis and productivity of crop plants”. The interaction of elevated CO₂ and temperature changes experienced by the *Brassica* plant was studied using leaves at different canopy positions in FACE (Free air CO₂ enrichment technology) in two cultivars namely *B. campestris* cv. Pusa gold (V1) and *B. juncea* cv. RH 30. Elevated CO₂ significantly increased the rate of photosynthesis in the leaves irrespective of their position, stress treatment and variety. The CO₂ induced increase in photosynthesis was significantly greater in top leaves followed by middle and lower leaves irrespective of variety and treatment. The interaction studies indicated that the effect of elevated CO₂ on photosynthesis was influenced maximum by temperature changes compared to other environmental factors.

- Dr Alka Goel at GBPUA&T, Pantnagar carried out work on the project “Evolution of Textiles Articles through Processing of Wool with Silk Waste Cotton to Create Entrepreneurial Skills in Rural Women”. Major textile work in Uttaranchal is carried out with wool fibres (rearing, processing and product formation) (Bhotia tribe) were preparing *dun*, *asan*, *chutka*, *namda*, and *thulma* etc. Combination of naturalistic, geometrical, stylized and abstract designs were used on their textile articles. All the fibres were processed by using different methods to improve their performance and aesthetic appearance and also to find out the best suitable and less expensive method of processing. Physical and chemical properties of all the selected fibres, viz. cotton, merinowool, tussar silk and mulberry silk were evaluated to judge their quality and also to decide their suitability for particular end use.
- Dr B M Prasanna at IARI, New Delhi carried out research on Molecular Characterization of Indian Maize Landraces and Allele Mining for Agronomically Important Traits. A set of



Use of wool with silk waste cotton by rural women



96 maize landraces, were analyzed using 100 microsatellite/SSR markers covering the maize genome. The study led to identification of 50 informative SSR markers suitable for fluorescent-labelled fingerprinting assays and population genetic analysis. Phenotypic evaluation of 126 landraces, including 73 from NEH region and 52 landraces from other agro-ecological regions in India, at two locations (New Delhi and Hyderabad) led to identification of 31 highly promising landraces for various agronomically important traits.

- Dr Rashmi Aggarwal at IARI has been working on the project “Improvement of strain of *Chaetomium globosum*, a potential antagonist of fungal plant pathogens for enhanced bioefficacy and developing molecular markers for its identification”. Fifteen isolates of *Chaetomium globosum* and one isolate each of *C. reflexum* and *C. perlucidum* have been established for molecular studies. Strain improvement through hybridization yielded eight hybrid cultures, out of which hybrid 6 and hybrid 8 showed superiority in terms of antagonism and antifungal metabolite production over parent cultures. The antifungal metabolites have been purified and one of the purified compounds showed 100% inhibition in growth of *Bipolaris sorokiniana* and *Fusarium* spp. at 100 ppm under *in vitro*. *C. globosum* also showed potentiality in detoxifying the toxin produced by the plant pathogen, *Bipolaris sorokiniana*. *C. globosum* produced xylanase and β 1, 3-glucanase which play role in antagonism.

EMERITUS SCIENTISTS

Dr T Maharana at the Orissa University of Agriculture and Technology, Bhubaneswar worked on standardisation of propagule production in *Dioscorea* of Orissa through various methods including tissue culture, *D. alata* performed the best out of the three species of *Dioscorea* tried with 20 cm size sets from tail end (13.87 tonnes/ha) and grown with okara as staking material with a spacing of 30 cm × 30 cm (12 tonnes/ha) and application of 90 : 90 : 90 kg NPK per hectare (15.66 tonnes/ha) under high density planting. *De novo* budding study in *D. alata* showed that keeping tubers in black polythene in vertical position yields the highest multiplication rate of 12.5. Vine cuttings of all the three *Dioscorea* responded well to rooting. *D. alata* can be propagated through out the year whereas *D. hispida* from June to October and *D. oppositifolia* from June to December. Rooting was best under yellow light during winter. Microtubers can be produced in all the three species but *D. oppositifolia* responded best to microtuber production while heaviest microtubers were produced in *D. hispida*. Rooted cuttings of *D. alata* produced 18.5 tonnes/ha tubers with the application of vermicompost at the time of planting. High

density planting of rooted cuttings of *D. alata* in a spacing of 30 cm × 30 cm produced 30 tonnes/ha. Use of 200 g whole tubers as planting material produced in previous year from the cut pieces under high density planting gave the highest yield of 61 tonnes/ha. All the three *Dioscorea* responded well to *in vitro* culture. Use of 0.1% HgCl₂ for 6 minutes followed by NaOCl 1% for 5 min was best sterilant. Shoot proliferation was best with BAP 92.5 mg/litre) and NAA (0.5 mg/litre). Root formation was best under MS medium supplemented with NAA (2 mg or 2.5 mg/litre) with BAP 0.5 mg/litre.

Dr M.S. Shaktawat at the Maharana Pratap University of Agriculture and Technology, MPUAT Udaipur conducted experiments on farmers' field during *kharif*-2004 and 2005 and *rabi*, 2004–05 and 2005–06. Results indicated application of phosphorus @ 60 kg P₂O₅/ha through PROM (Phosphate Rich Organic Manure) in maize and wheat to be highly beneficial as it gave the highest yield attributes of maize and wheat, grain yield of maize and wheat (31.74 and 39.84 q/ha), stover/straw yield of maize and wheat (54.96 and 55.74 q/ha), net returns of maize and wheat (Rs 18,088 and 29,152/ha) and benefit : cost ratio of maize and wheat (1.90 and 2.65). PROM being organic in nature gave additional benefit to crop in the form of moisture conservation and prevented phosphorus fixation and PROM P is available to more than one crop in succession. The phosphorus supplied through PROM cost only Rs 12/kg whereas phosphorus supplied through DAP cost Rs 18/kg at subsidized rate of fertilizer (DAP). Thus, use of PROM is beneficial to soil and crop under sustainable crop production. It is cheaper to farmers and environment friendly.

Professor S N Sharma worked on late-sown wheat crop (after rice) to evolve most economic, suitable and sustainable weed management practice under a study on weed management under conservation tillage in rice-wheat cropping system. *Phalaris minor* Retz., *Rumex denticulata* L., and *Cyperus rotundus* L. were the most common grassy, broad-leaved and sedge weeds respectively. In late-sown wheat, increasing seed rate up to 150% of normal practice helped check weed growth. Maximum crop yield was obtained with 125 kg seed/ha. Mechanical weeding (twice) resulted in highest crop yield.

Dr R P S Tomer undertook a study on seed testing procedures and seed quality tests for medicinal and aromatic plants. The weight of submitted and working sample for physical purity analysis in case of Satawar (*Asparagus racemosus*) was worked out to be 1,000 g and 100 g, respectively. Amongst the substrata (BP, TP, S) were tested for seed germination, BP (between paper) substrata was the best after applying the dormancy breaking treatment (PEG, imbibition for 72 h in water and hot water (80°C, 5 min) at 30°C to study seed viability, longitudinal cut and dipping seed in 1% Tetrazolium salt solution were found better to



differentiate between viable and non viable seed. The accelerated ageing seed vigour test was standardized (at 40°C, 72 h). In three seed lots of satawar, 0.23% saponin content was worked out. Hard seededness decreased with increase in storage periods resulting in higher germination.

Dr G S Sethi experimented on improvement of tolerance to abiotic stresses in wheat through doubled haploidy breeding at Palampur. Doubled haploid (DH) breeding was undertaken in winter × spring wheat crosses to develop elite DH lines with tolerance to biotic (rusts and powdery mildew) and abiotic stresses (drought and cold). In order to combine the desirable traits of winter wheat (drought and cold tolerance) with the desirable spring wheat traits such as adaptability and amber grain colour, winter × spring wheat hybridization followed by wheat × maize system for the production of doubled haploids was exercised. The doubled haploid lines so obtained exhibit a wide range of variability for these traits. The DH lines, DH 31A and DH 33R were found to be fairly resistant to powdery mildew under natural epiphytotic conditions over the locations. The promising DH lines resulting from the project combining the desirable traits from winter wheat and rye can be directly used as cultivars.

Dr G D Sharma in a study on assessment and mapping of genetic diversity in natural populations of *Jatropha* spp. in Central and Western India, undertook surveys of four states, i.e. Gujarat, Maharashtra, Chhattisgarh and Jharkhand for study of genetic diversity for plant height, branches, stem girth, seed size and seed weight. Maximum seed yield (1.66 kg/plant) was recorded at Raipur followed by Deesa and Ahmad Nagar (1.64 kg/plant) while

the seed yield was lowest at Akola (1.56 kg/plant). Maximum plant height was recorded at Anand Nagar (2.79 m) followed by Sangli (2.76 m) and Raipur (2.74 m) whereas minimum plant height was observed at Deesa (2.48 m) and Akola (2.55 m).

Dr (Mrs) B A Talvelkar: Haematological profile during gestation and lactation and their influence on milk production and reproductive efficiency was studied in buffaloes (*Bubalus bubalis*) in Maharashtra. The results did not indicate physiological anaemia during gestation in buffaloes. When both the groups were compared, in Early Lactation group, there was a drop in erythrocyte number and haemoglobin in early lactation group. The results of the present study indicated significantly ($P < 0.05$) higher platelet count on 0 day when compared with 4 week, 3 week and 1 week. Total leucocytes were higher in 1 week when compared with 0 day and reduced in 1week postpartum.

Dr P.C. Ravi has been working on the project Institutional Arrangements for Agricultural Marketing in Karnataka—a policy perspective. The present system of handling commodities in the state and other post harvest practices, especially, in the case of perishables such as pre-cooling, storage, packing and transportation were observed to be primitive leading to colossal loss of valuable produces besides affecting the quality. Disintermediation and reducing costs by way of direct procurement through vertical integration will avoid multiple handling, reduction in levies, fees, commission and to improve the efficiency. In promoting vertical integration and private sector participation, the government needs to examine the existing policies, rules and regulations with a view to minimize conflict in successful private sector participation.